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A.1 User Customization Window

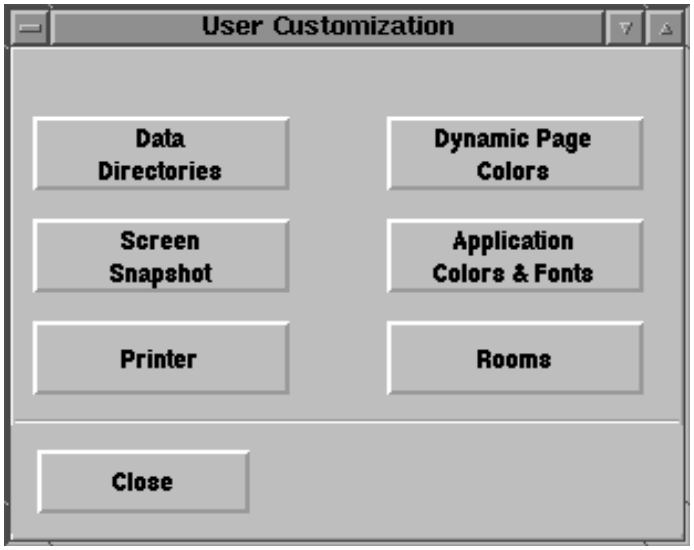


Figure A.1-1. User Customization Window

A.1.1 User Customization Window Usage

The User Customization window is used to bring up other customization dialogs which allow the user to modify the application environment to suit his/her preferences.

A.1.1.1 User Customization Access

The User Customization dialog can be accessed from the Room Controller.

A.1.1.2 User Customization Input

The User Customization dialog contains five buttons which are used for selecting the type of modification to edit:

1. Data Directories, which invokes the Data Directory Customization dialog.
2. Screen Snapshot, which invokes the Screen Snapshot Customization dialog.
3. Printer, which invokes the Printer Customization dialog.
4. Dynamic Page Color Intensities, which invokes the Dynamic Page Color Intensities Customization dialog.
5. Application Colors & Fonts, which invokes the Application Colors & Fonts Customization dialog.

The User Customization dialog also contains a "command area" which consists of a Close button as described below:

Close dismisses the dialog.

A.1.2 Application Colors and Fonts Customization Dialog

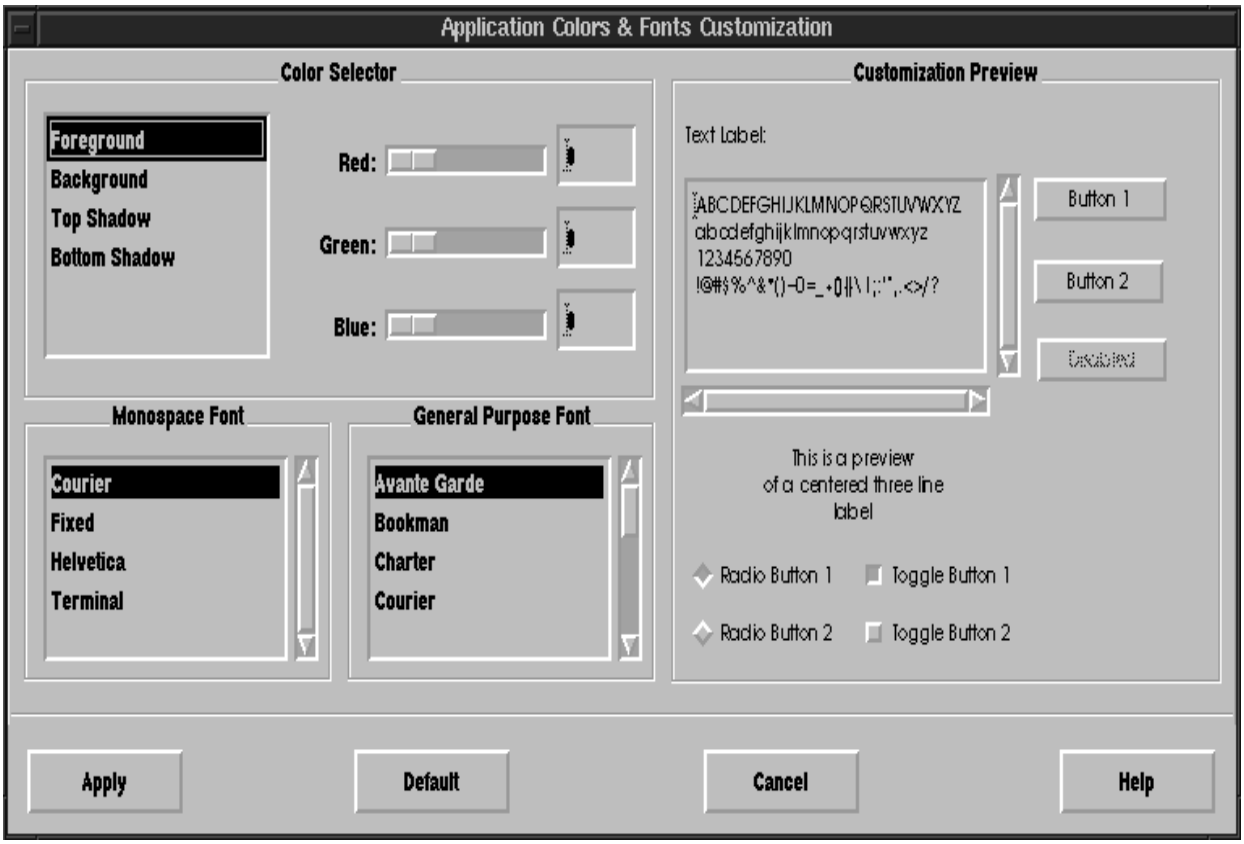


Figure A.1.2-1. Application Colors & Fonts Customization Dialog

A.1.2.1 Application Colors & Fonts Customization Dialog Usage

The Application Colors & Fonts Customization dialog is used to:

- select the colors for the configurable window attributes (foreground, background, top shadow color, and bottom shadow color).
- select a monospace font for use in displays that require characters to be of uniform width.
- select a font for use in the interface where such a restraint does not apply.

A.1.2.2 Application Colors & Fonts Customization Dialog Access

The Application Colors & Fonts Customization dialog can be accessed from the User Customization dialog by pressing the pushbutton labeled "Application Colors & Fonts".

A.1.2.3 Application Colors & Fonts Input

The Application Colors & Fonts Customization dialog has four different input components:

1. The Color Selector, where the user can select a window attribute and set its color. The selection is performed within a list box. The color may be set using the scales.
2. The Monospace Font list box, where the user can select a font to be used where a fixed-width font is required for display.
3. The General Purpose Font list box, where the user can select a font for use where a fixed-width font is not required.
4. The "command area", where the user can select Apply, Default, Cancel, or Help.

A.1.2.4 Application Colors & Fonts Output

The Customization Preview area, where changes to any of the first three components are immediately displayed.

A.1.3 Dynamic Page Color Customization Dialog

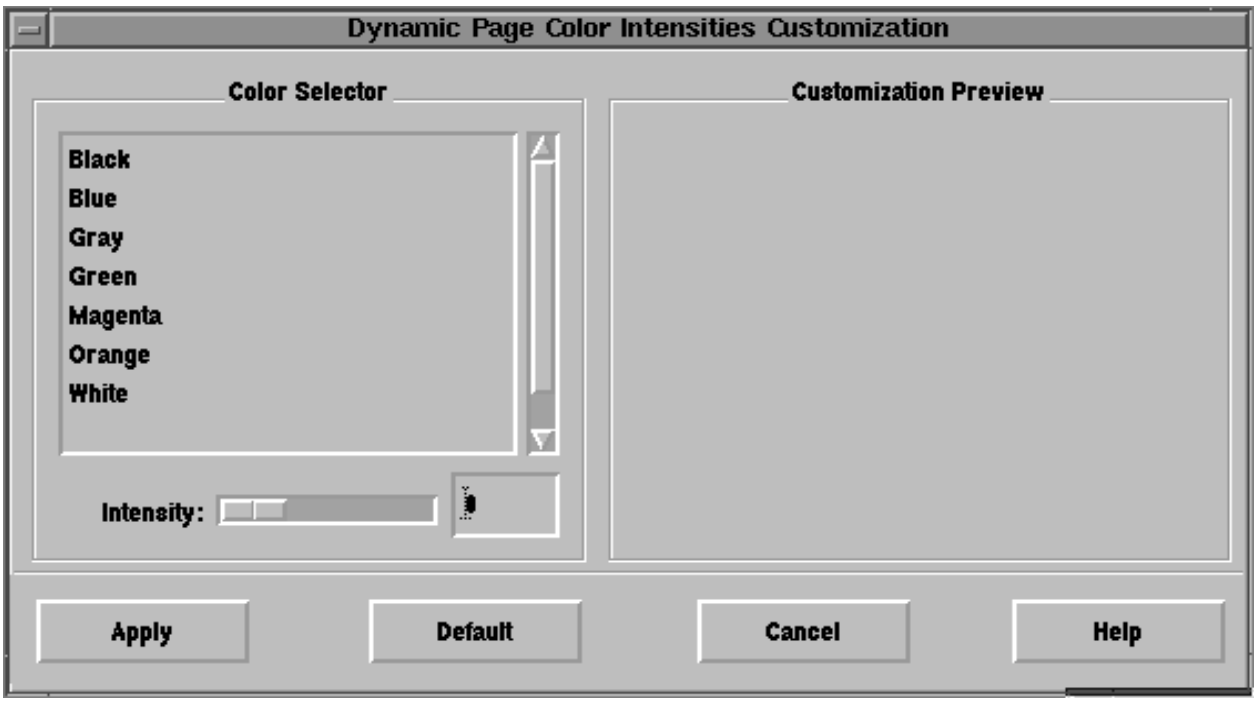


Figure A.1.3-1. Dynamic Page Color Customization Dialog

A.1.3.1 Dynamic Page Color Customization Dialog Usage

The Dynamic Page Color Customization dialog is used to set the intensities for the colors used in dynamic pages.

A.1.3.2 Dynamic Page Color Customization Dialog Access

The Dynamic Page Color Customization dialog can be accessed from the User Customization dialog by pressing the pushbutton labeled "Dynamic Page Color Intensities".

A.1.3.3 Dynamic Page Color Customization Input

The Dynamic Page Color Customization dialog contains the following sources of input:

1. A list box of available colors to adjust
2. A scale for adjusting or entering in the intensity of the color.
3. An area for Apply, Default, Cancel and Help buttons.

A.1.3.4 Dynamic Page Color Customization Output

The Customization Preview area, where changes to a color's intensity will be shown.

A.1.4 Printer Customization Dialog

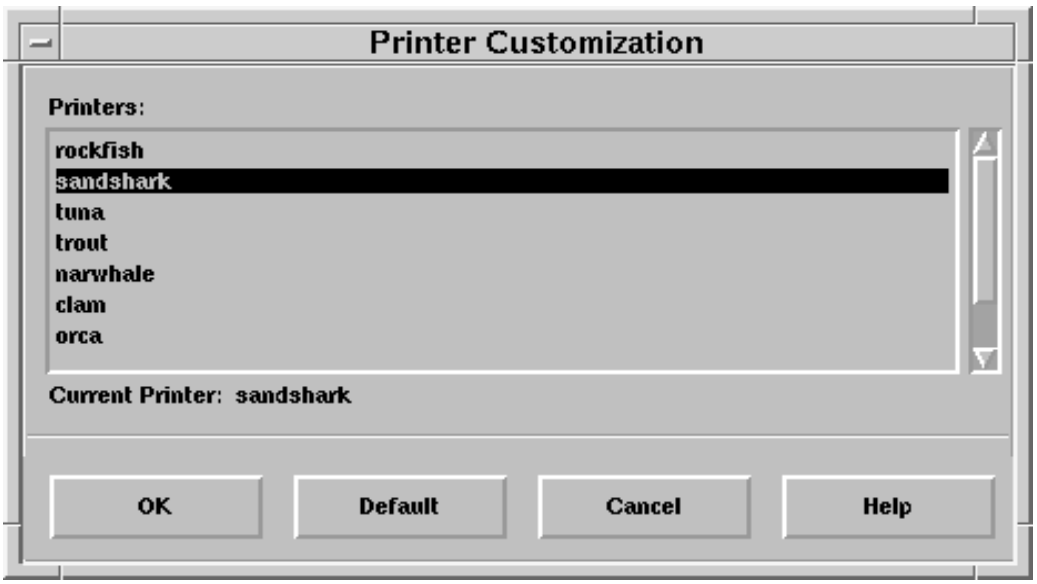


Figure A.1.4-1. Printer Customization Dialog

A.1.4.1 Printer Customization Dialog Usage

The Printer Customization dialog is used to set the default printer used for print operations.

A.1.4.2 Printer Customization Dialog Access

The Printer Customization dialog can be accessed from the User Customization dialog by pressing the pushbutton labeled "Printer".

A.1.4.3 Printer Customization Input

The Printer Customization dialog has a single list box which is used to select the new default printer.

It also has a "command area" which contains Apply, Default, Cancel, and Help pushbuttons.

A.1.4.4 Printer Customization Output

The Printer Customization dialog has a single label which outputs the current printer in use by the system as of the time the dialog was created.

A.1.5 Data Directory Customization Window

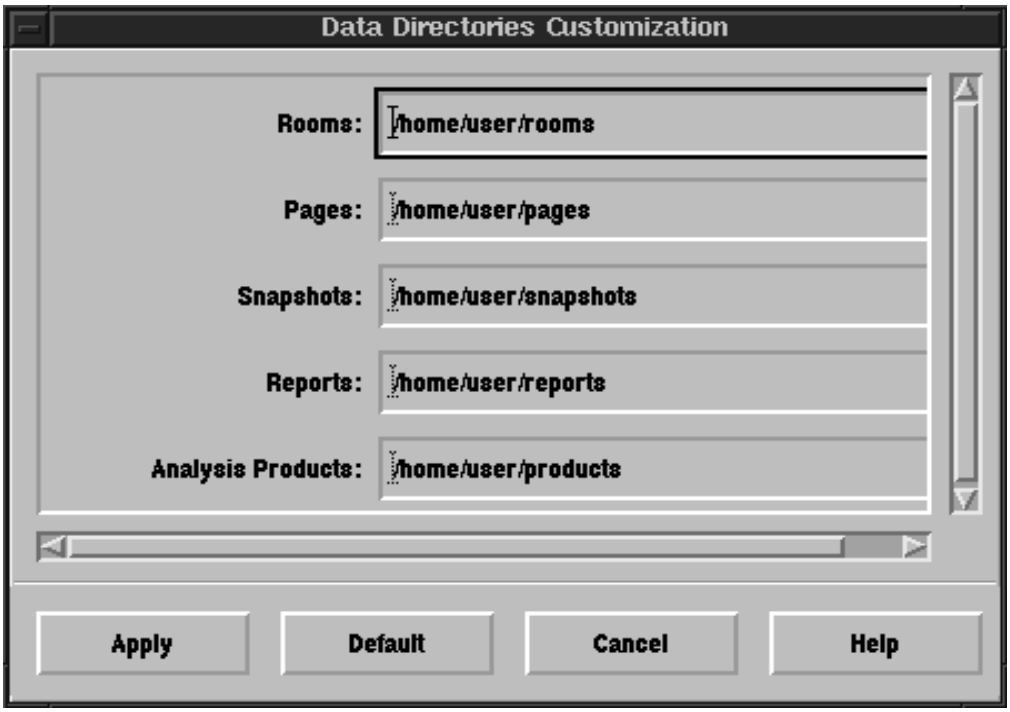


Figure A.1.5-1. Data Directory Customization Window

A.1.5.1 Data Directory Customization Dialog Usage

The Data Directory Customization dialog is used to set the directories used for room information, page information, screen snapshots, reports, and analysis products.

A.1.5.2 Data Directory Customization Dialog Access

The Data Directory Customization dialog can be accessed from the User Customization dialog by pressing the pushbutton labeled "Data Directories".

A.1.5.3 Data Directory Customization Input

There are five text fields used for user input of the directory names.

The dialog also contains a "command area" which contains Apply, Default, Cancel, and Help pushbuttons.

A.1.6 Screen Snapshot Customization Dialog

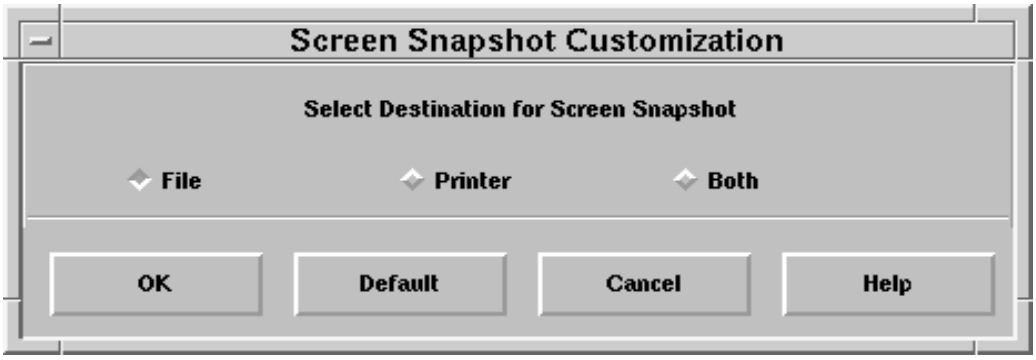


Figure A.1.6-1. Screen Snapshot Customization Dialog

A.1.6.1 Screen Snapshot Customization Dialog Usage

The Screen Snap Customization dialog is used to set the destination for a screen snap operations.

A.1.6.2 Screen Snapshot Customization Dialog Access

The Screen Snap Customization dialog can be accessed from the User Customization dialog by pressing the pushbutton labeled "Screen Snapshot".

A.1.6.3 Screen Snapshot Customization Input

The Screen Snapshot Customization dialog contains three radio buttons representing the user's available destinations for a screen snapshot (Printer, File, or both).

The dialog also has a "command area" which contains Apply, Default, Cancel, and Help pushbuttons.

A.1.7 Room Customization Dialog

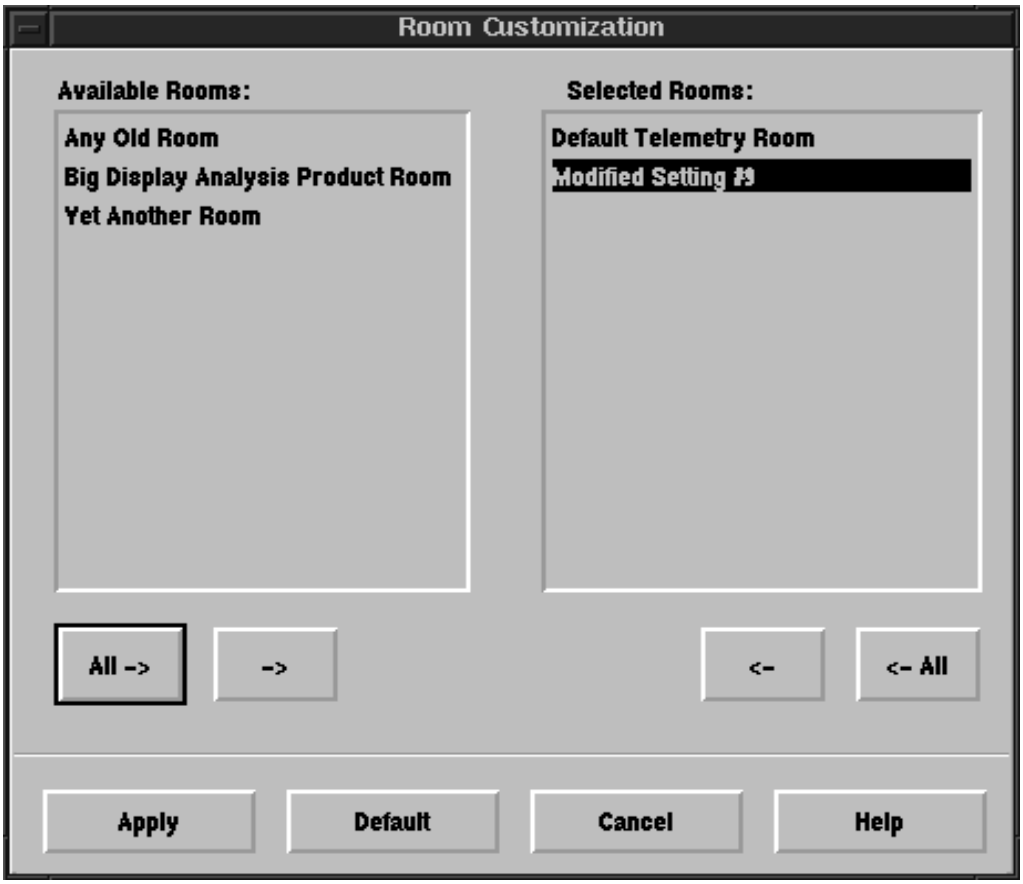


Figure A.1.7-1. Room Customization Dialog

A.1.7.1 Room Customization Dialog Usage

The Room Customization dialog is used to select the "default" rooms for the user.

A.1.7.2 Room Customization Dialog Access

The Room Customization dialog can be accessed from the User Customization dialog by pressing the pushbutton labeled "Rooms".

A.1.7.3 Room Customization Input

The Room Customization dialog contains two listboxes. The left list contains a list of available room settings for the user to select from. The list on the right shows the current rooms used as the user's default rooms.

The dialog also has a "command area" which contains Apply, Default, Cancel, and Help pushbuttons.

A.1.8 Control Window

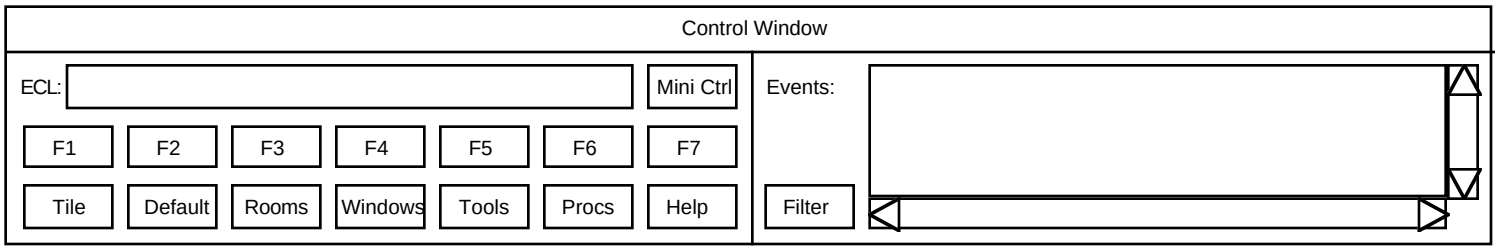


Figure A.1.8-1. Control Window

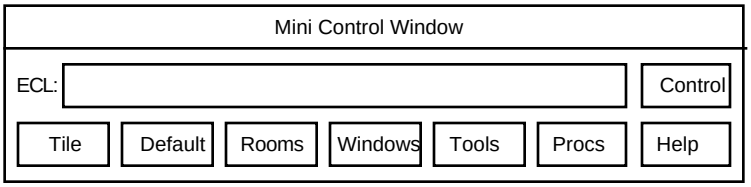


Figure A.1.8-2. Mini Control Window

A.1.8.1 Control Window Usage

Control window is used by the operator to manage the IST functions. It provides a set of function buttons that are used to gain quick access to rooms, windows, and IST functions.

The Control window (Figure A.1.8-1) is the default control window which will displayed at the bottom of the screen at user login. The right side of the Control window displays events information. It also contains seven user customizable buttons. For users who already have an event display window on the screen and do not need the customizable buttons, the Mini Control window (Figure A.1.8-2) can be used by selecting the 'Mini Ctrl' button in the Control window. User can switch the Mini Control window back to the default Control window by selecting the 'Control' button in the Mini Control window.

A.1.8.2 Control Window Access

The Control window is displayed upon user login. This window is always available to the IST user.

A.1.8.3 Control Window Input

The Control window contains a command line area that allows the user to issue command directives, unix command directives, or screen directives from a workstation keyboard.

F1-F7 buttons are user customizable buttons.

Tile button arranges, re-sizes, and displays all the windows on the screen without any overlapping.

Default button displays all the windows of a room on the screen in their default setting.

Windows button handles the user's selection of a window.

Rooms button invokes the room selection window.

Tools button invokes the tools selection window.

Procs button handles the user's selection of a procedure.

Help button invokes a help page.

Mini Ctrl button switches the Control window into the Mini Control window (Figure A.1.8-2).

Control button in the Mini Control window (Figure A.1.8-2) switches the Mini Control window back to the default Control window (Figure. A.1.8-1).

Events text widget displays the four most recent event messages.

Filter button initiates the event filter functions.

A.1.8.4 Control Window Output

The Control window executes directives entered at the command line. It also allows the user to manage the desktop environment according to user's selection.

A.1.9 Login Screen & User Role Dialog

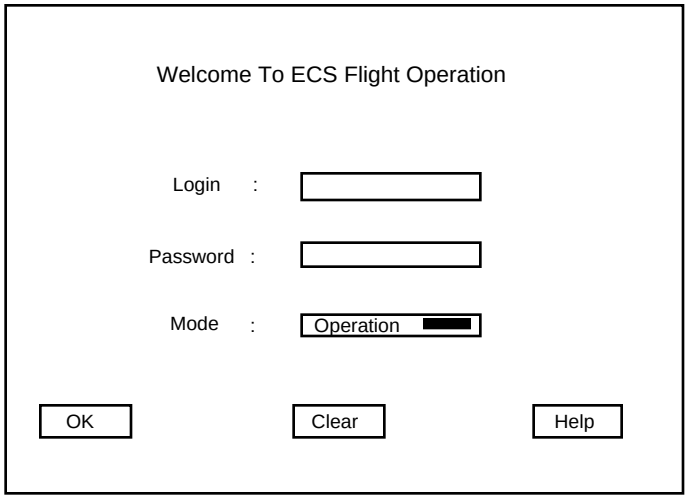


Figure A.1.9-1. Login Screen

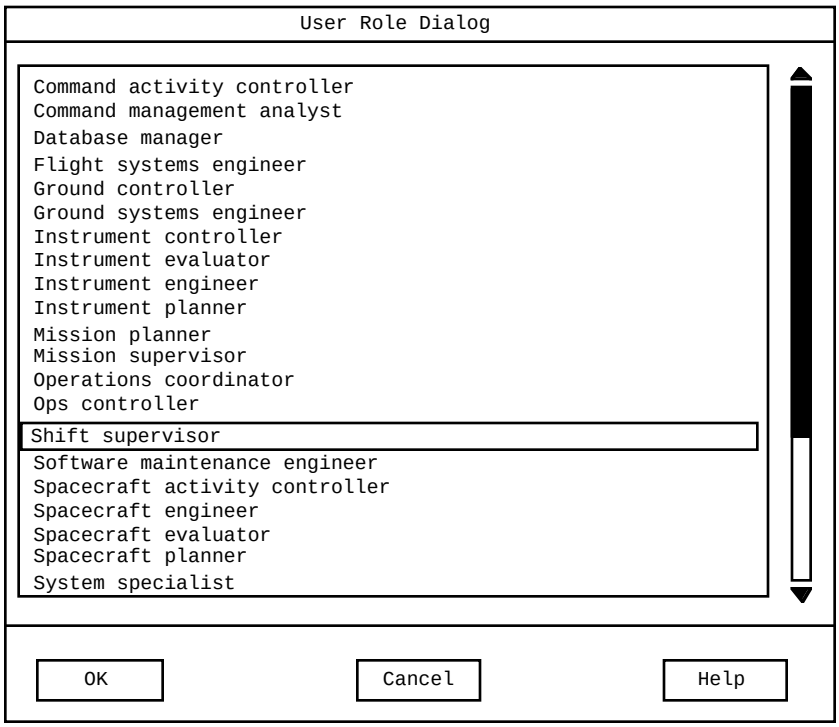


Figure A.1.9-2. User Role Dialog

A.1.9.1 Login Screen & User Role Dialog Usage

The FOS login screen (Figure A.1.9-1) allows the user to enter the user name and password to be verified and select the login mode. If the authentication fails, a warning dialog will be opened that shows "Login Failed" message. If the authentication succeeds, a user role list dialog (Figure A.1.9-2) will be opened. The user role list dialog allows the user to select a user role in the current session.

A.1.9.2 Login Screen & User Role Dialog Access

The FOS login screen can be accessed at the system start up time.

The user role list dialog can be accessed either after the user is authenticated or from the tools button on the command window.

A.1.9.3 Login Screen & User Role Dialog Input

The login screen contains two text fields, one option menu, and three push buttons. The two text field include:

Login field : The user enters user name.

Password field : The user enters user password.

The Mode option menu : There will be three login mode option : operation, test, and development. These three options will be used by the environment controller to set up the different UNIX working environments .

The four push buttons include:

OK : Will invoke user name and password authentication checking. Upon checking failed, a warning dialog will be opened. Upon checking succeeded, the login window will be closed and the user role list dialog will be opened.

Clear : Will clear the login text field and the password text field.

Help : Will open a context sensitive help window.

The user role list dialog contains a list of user roles and three buttons. The user can select the role from the list and press the button to take action. These buttons include :

OK : Will apply the new role selection and close the dialog.

Cancel : Will cancel the new role selection and close the dialog. This button is available only when the user changes to a new role. (Invoked from the tools button on the command window).

Help : Will open a context sensitive help window.

A.1.9.4 Login Screen & User Role Dialog Output

The user role selection dialog will send the user information (including the user name, role, and environment) to the FUI environment controller.

A.2.1 Quick Message Generator

A.2.1.1 Quick Message Generator Usage

The Quick Message Generator window allows a user may send a message of up to 240 characters as an event. The message types may be: information, a warning, or an emergency. Once sent to Data Management, the event is then broadcast to workstations. This event can then be seen in the Control window in the events scrolling window, and in the Event Display.

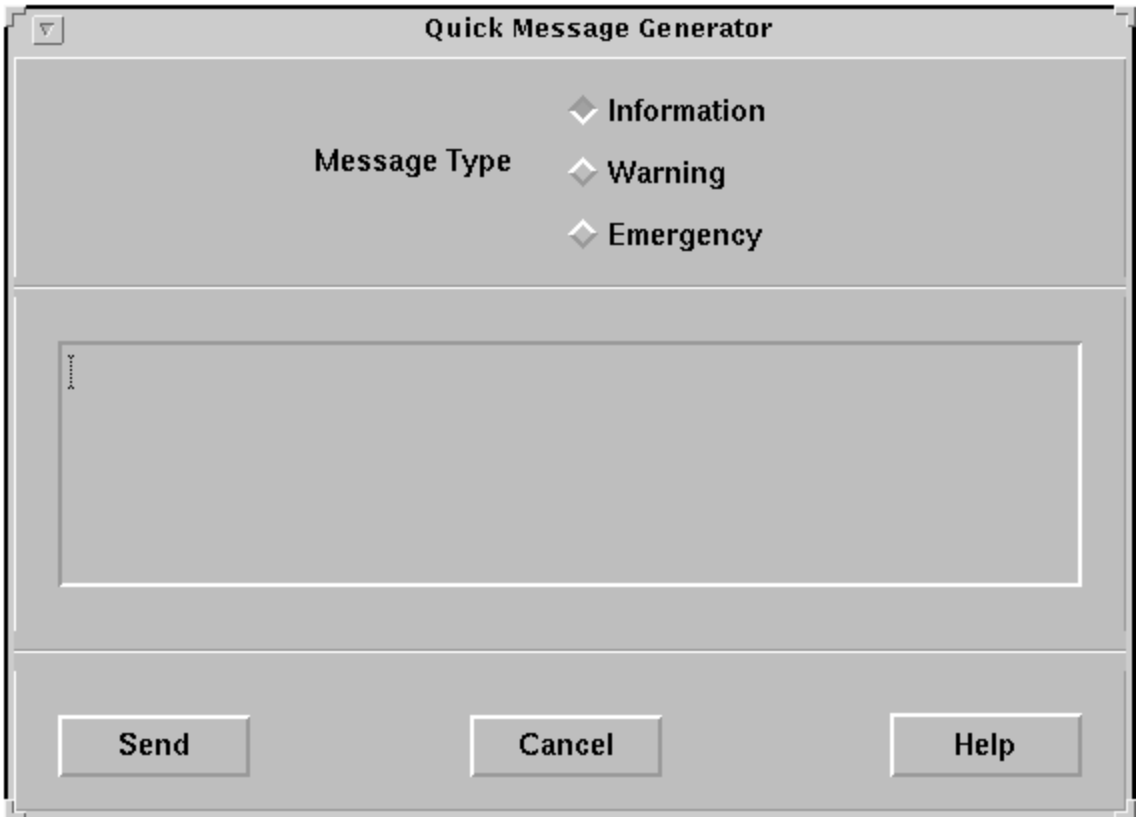


Figure A.2.1-1. Quick Message Generator Dialog

A.2.1.2 Quick Message Generator Access

The Quick Message Generator window is brought up from the Tool Selector window that is invoked from the Control window.

A.2.1.3 Quick Message Generator Input

The Quick Message Generator has a message type out of which one may be chosen:

Message Type:

Information

Warning

Emergency

The text message area has an area where text can be entered up to 240 characters.

Send: Sends the text message to Data Management, who formats it into an event for display.

Cancel: Quits the window with no action.

Help: Calls the Help window for Quick Message Generator.

A.2.1.4 Quick Message Generator Output

When the Send button on the Quick Message Generator window is pressed, the message is sent to Data Management, who formats it into an event for display.

A.2.2 Data Mover Window

A.2.2.1 Data Mover Usage

The Data Mover window is used by the user to transfer files. The transfer locations include the EOC and IST sites. The user may specify to send, receive or delete 1 or more files. Files may be selected to sent to multiple destinations.

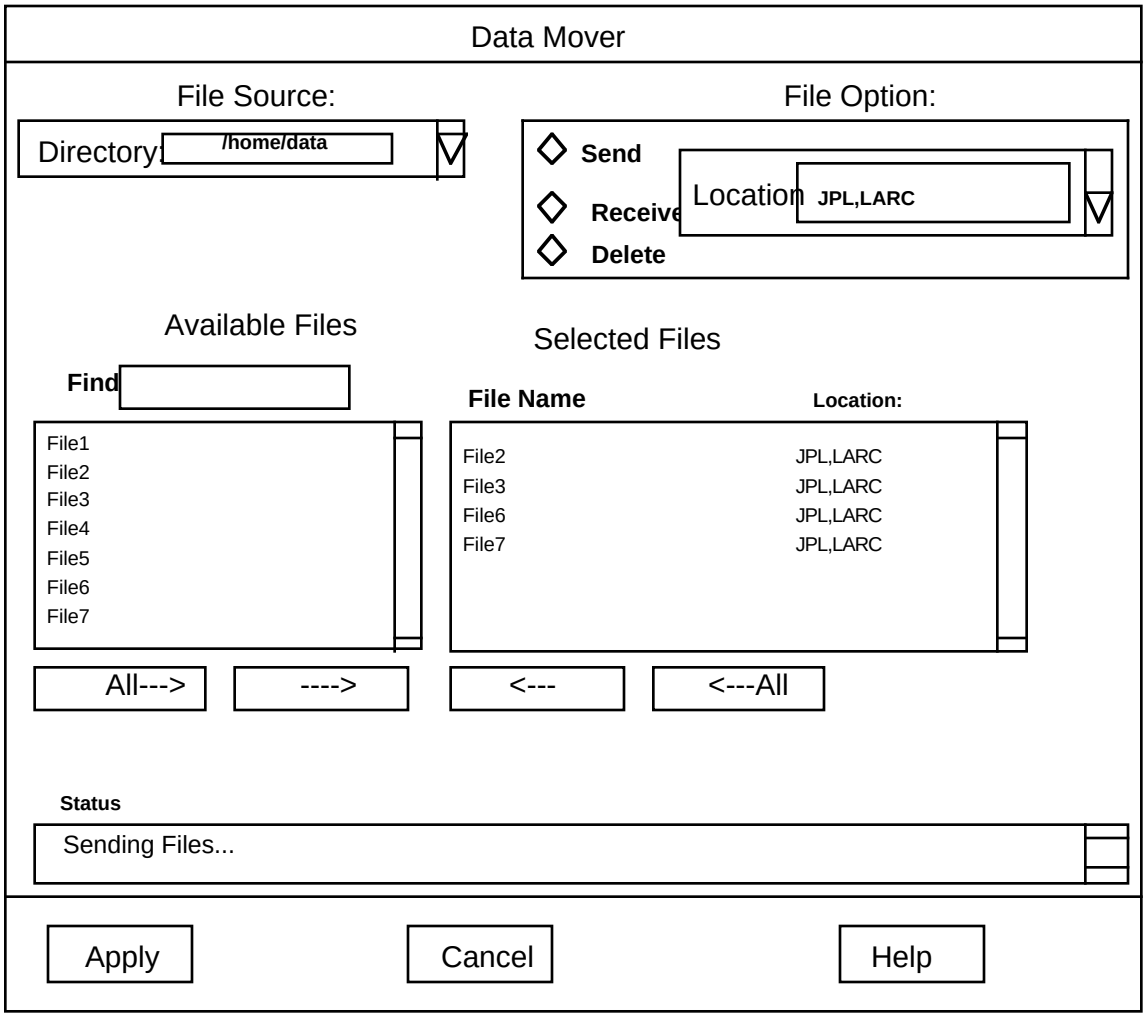


Figure A.2.1-1. Data Mover Window

A.2.2.2 Data Mover Access

The Data Mover window can be accessed from the Control Window.

A.2.2.3 Data Mover Input

The Data Mover Window allows the following inputs:

- Selection of source directory. The user must enter a directory path to get a list of available files. A list of available source directories/categories will be available.
- Selection of file option. The user chooses files selected be sent, received or deleted.
- Selection of location. The user must enter a location for files to be transferred. A list of available transfer locations will be provided.

A.2.2.4 Data Mover Output

The Completion Status will be displayed. Completion status will be one of the following:

- Started- indicating that the request was initiated.
- Complete- indicating the request was successful.
- Error- indicating that an error occurred for a particular file. An error message will be displayed for each file in error.

The "OK" button sends/receives or deletes the selected files.

The "Cancel" button ignores any inputs and closes the Data Mover window.

The "Help" button and pull-down menu provide context-sensitive help.

A.2.3 Replay Controller

A.2.3.1 Replay Controller Usage

The Replay Controller (Figure A.2.3-1) is used by the Flight Operations Team (FOT) and Instrument Operations Team (IOT) members to establish a shared (Ground Controller only) or dedicated replay string and to control the replay of the archived telemetry data via that string.

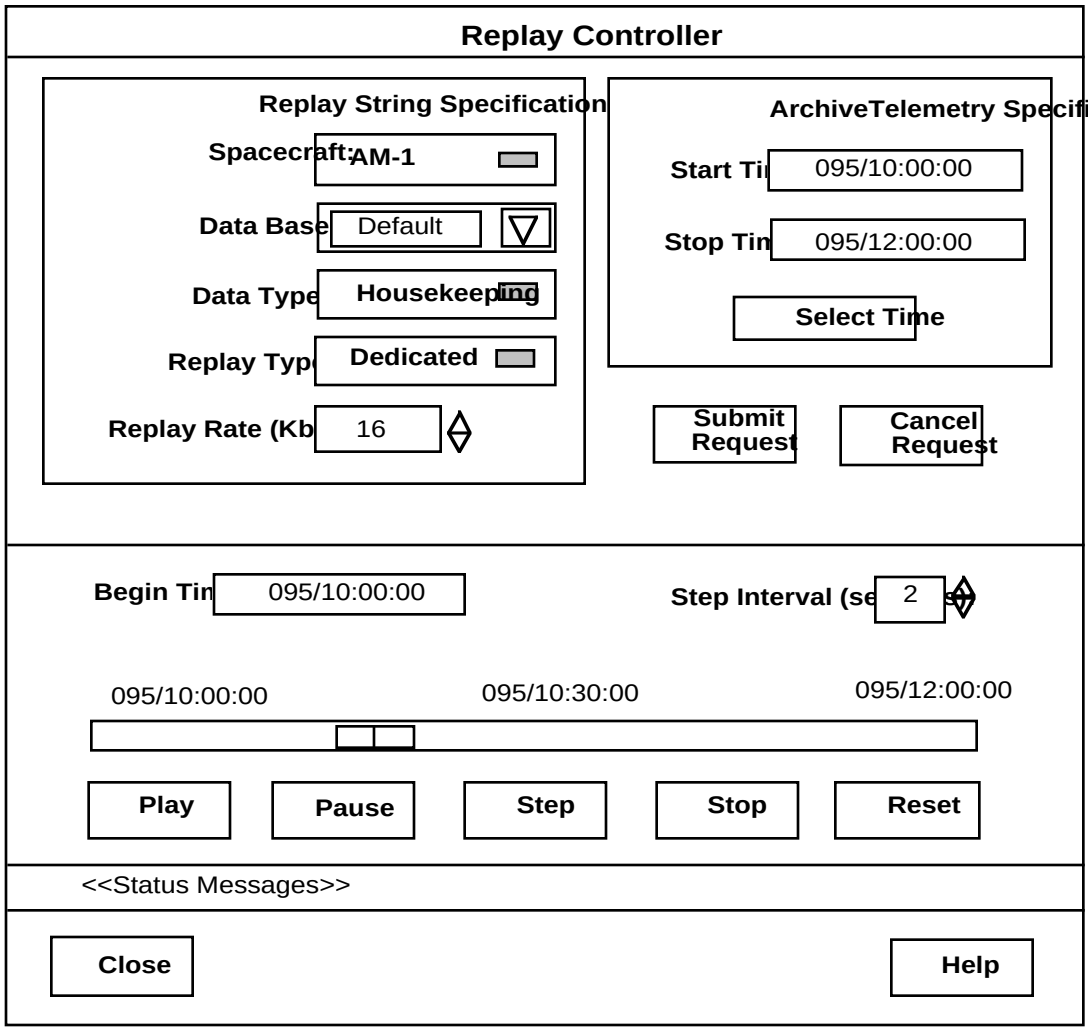


Figure A.2.3-1. Replay Controller Window

The Replay Controller window is divided into two major sections. The top section is used to define the replay request. The bottom section is used to control the replay once the resources (i.e., the logical string components) required for the replay have been allocated. The user inputs to define the replay request and to use the control functions are described in Section A.2.3.3 below.

A.2.3.2 Replay Controller Access

The Replay Controller may be accessed by any user from the Tools menu located on the Control window (see Section A.1.8).

A.2.3.3 Replay Controller Input

The top section of the Replay Controller window allows the user to specify the parameters for a replay request. The **Replay String Specification** area allows the user to specify parameters using a combination of option menus and text fields. These parameters include:

- **Spacecraft** (option menu) - default value is AM-1. This option menu will contain the spacecraft identifier of all operational vehicles.
- **Data Base** (combo box) - default value is the operational data base corresponding to the specified telemetry data. A user may enter the identifier of an alternate data base that will be used to decom the telemetry. If the default value is used, data base crossovers will be handled automatically. If a specific data base identifier is provided, the replay decom process will use the specified data base regardless of any data base crossovers.
- **Data Type** (option menu) - default value is Housekeeping; other options include Health&Safety and Standby.
- **Replay Type** (option menu) - default value is Dedicated. A user with ground control authority may specify a shared replay. If a shared replay is specified, the option will also include the identifier of the Real-Time Server (1-3).
- **Replay Rate** (text field) - default value is 16 Kbps for Housekeeping and 1 Kbps for Health&Safety and Standby. The user may enter a number from 1 to 150 (AM-1 specific) for the replay rate. Two arrow buttons located next to the text field may be used to increment or decrement this value.

The **Archive Telemetry Specification** area is used to define the time frame of the data to be replayed. The user may type in the start and stop time in the respective text fields, or activate the Time Selector, via the **Select Time** button, to specify these values. The Time Selector is further defined in Section A.3.1.

Once the Replay String Specification and Archive Telemetry Specification information has been entered, the user must select the **Submit Request** button to initiate processing of the replay request. If the required replay resources are available, the corresponding logical string(s) is created. A status message, indicating the success or failure of the replay request, will be displayed on the status line located near the bottom of the window. If successful, the top section of the Replay Controller is deactivated (i.e., becomes insensitive) since changes to the replay configuration are not allowed, and the control functions of the window are activated. If the required replay resources are not available, the request is placed in a queue and a Pending status message is displayed. The replay request will be processed as soon as the required resources become available. The user may cancel a pending replay request by selecting the **Cancel Request** button.

The bottom section of the Replay Controller window provides the mechanism to control the replay. The control features of this window allow the user to pause and resume the replay, as well as to step through the replay at a user-specified interval.

A **Begin Time** text field allows the user to specify a new start time for the replay. This new start time must be a time between the start and stop times specified in the **Archive Telemetry**

Specification area when the logical string was created. The **Begin Time** field defaults to the original start time and may only be modified when the replay is paused.

A **Step Interval** text field allows the user to select the interval, in seconds, that will be used to step through the replay. When paused, the replay will advance by the value of this field each time the **Step** button is pressed.

A slider bar shows the user the current time of the replay with respect to the initial start and stop times. The slide bar advances when the replay is active. When paused, the user may adjust the slider bar to select a new begin time (i.e., modifies the **Begin Time** text field).

Five buttons are located just beneath the slider bar. The **Play** button is used to start the replay when it is paused, and the **Pause** button is used to suspend an active replay. The **Step** button advances the replay by the specified **Step Interval**. The **Stop** button terminates the replay and allows the user to specify new replay parameters. When the **Stop** button is selected, the user is prompted with a warning dialog, which provides the option to cancel or continue the stop action. The **Reset** button moves the slider bar back to the last specified **Begin Time**. The **Step** and **Reset** buttons are active only when the replay is paused.

Two buttons are located along the bottom of the Replay Controller window. The **Close** button will remove the Replay Controller window, terminating the replay. The user is prompted with a warning dialog, which allows the user to cancel or continue the close action. The **Help** button activates a window that provides help information about the Replay Controller.

A.2.3.4 Replay Controller Output

The output of the Replay Controller consists of status messages displayed on the status line located above the **Close** and **Help** buttons. These status messages provide feedback for user actions, such as the success or failure of a replay request and the occurrence of data base crossovers.

The logical string created as a result of using the replay controller will be reflected in the Data Source Selector. The Data Source Selector (reference Section A.8.1) allows a user to connect dynamic pages to a logical string. Multiple logical strings will be created if data base crossovers occur (one additional logical string per crossover). If a data base crossover is detected, the replay will automatically pause to allow the user to manually switch the logical string assignment of any dynamic pages associated with the replay.

The use of the control functions (e.g., pause a replay) will be reflected in the telemetry data that is displayed on any connected dynamic pages.

A.2.4 Document Reader

A.2.4.1 Document Reader Usage

The Document Reader is used to display on-line documentation, including user guides, operational procedures, and spacecraft and instrument technical documents.

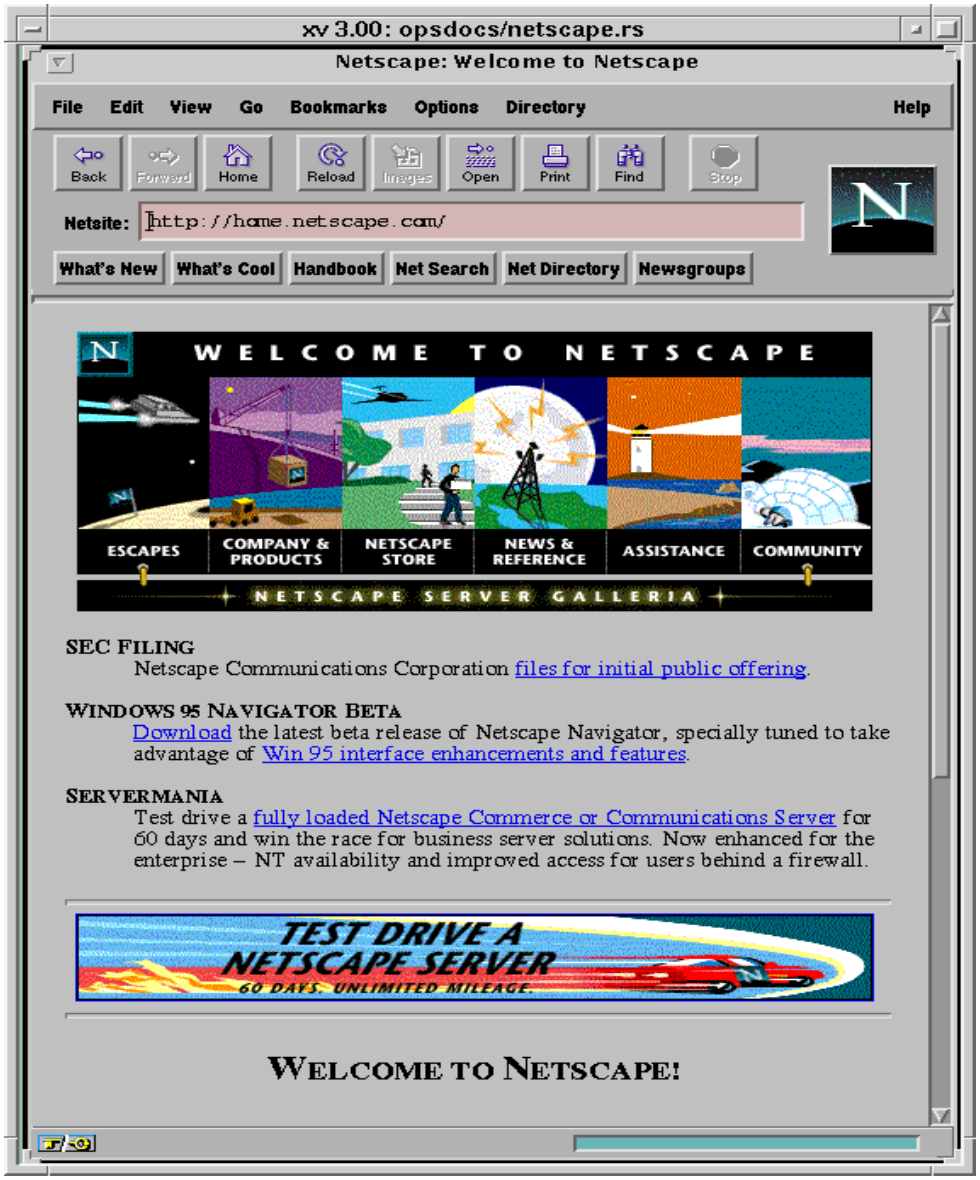


Figure A.2.4-1. Document Reader

A.2.4.2 Document Reader Access

The Document Reader is invoked from the Tools Selector window, that is brought up off the Control window.

A.2.4.3 Document Reader Input

This will depend upon the COTS product which will be an HTML Browser. The window will contain such features as: a home button that will take the user to a menu; a scrollbar to view the

text; save text to a file; print text; traverse forward and backward; and hypertext capabilities where related subjects that are highlighted can be clicked upon to bring up information about the particular subject.

A.2.4.4 Document Reader Output

On-line browsing, and the printing of a document are the output.

A.2.5 Display Builder

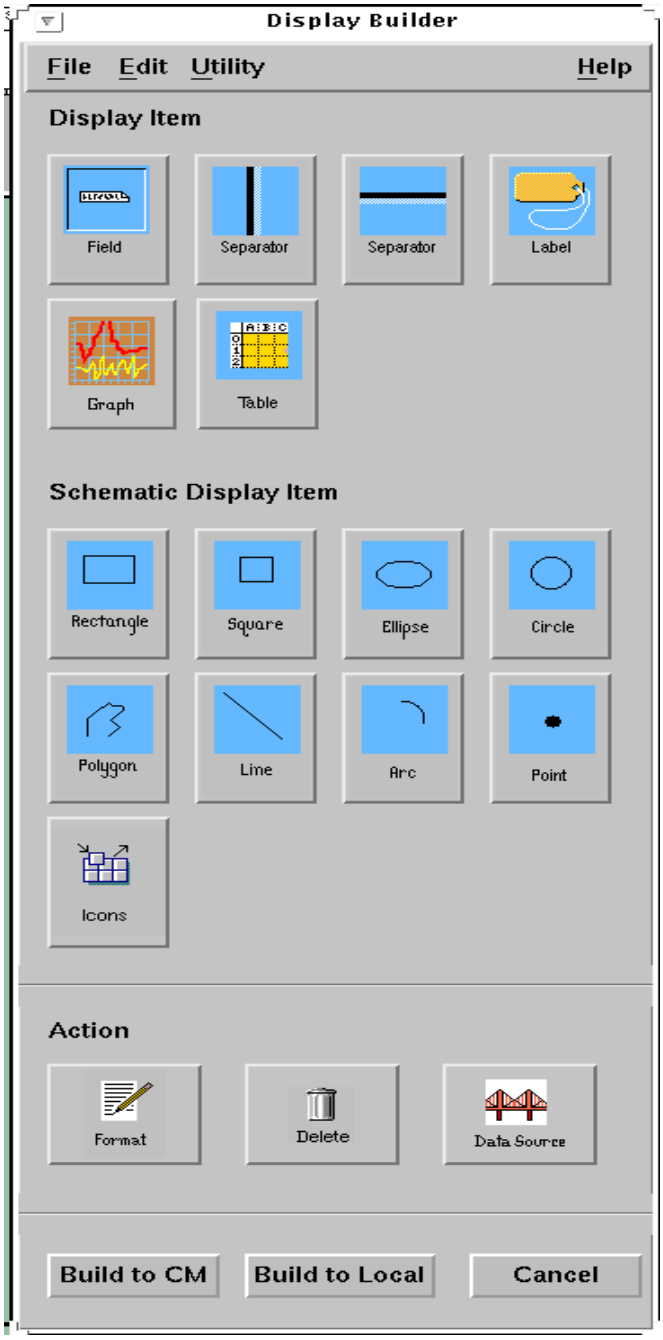


Figure A.2.5-1. Display Builder Palette Window

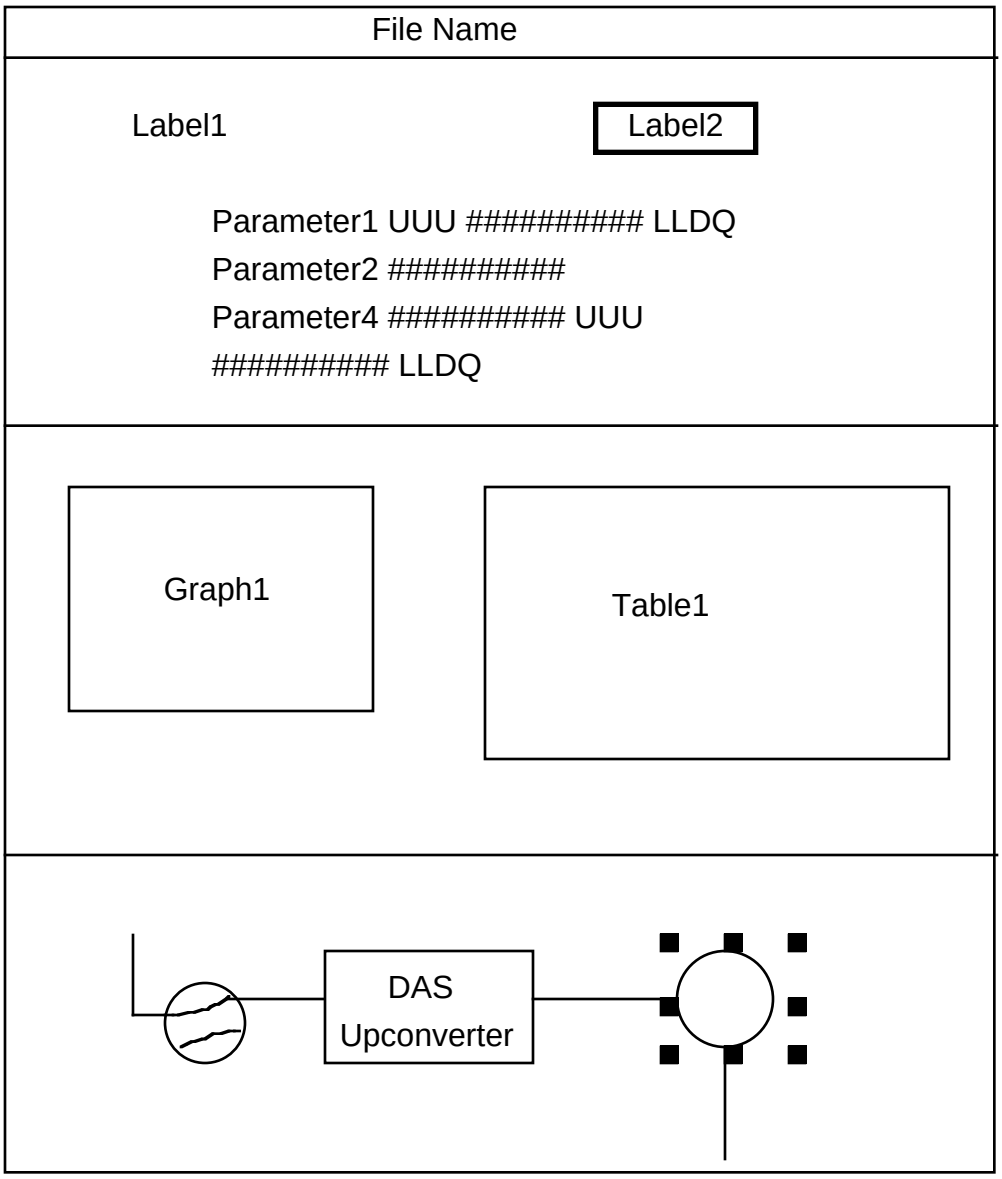


Figure A.2.5-2. Display Builder Window (after drop)

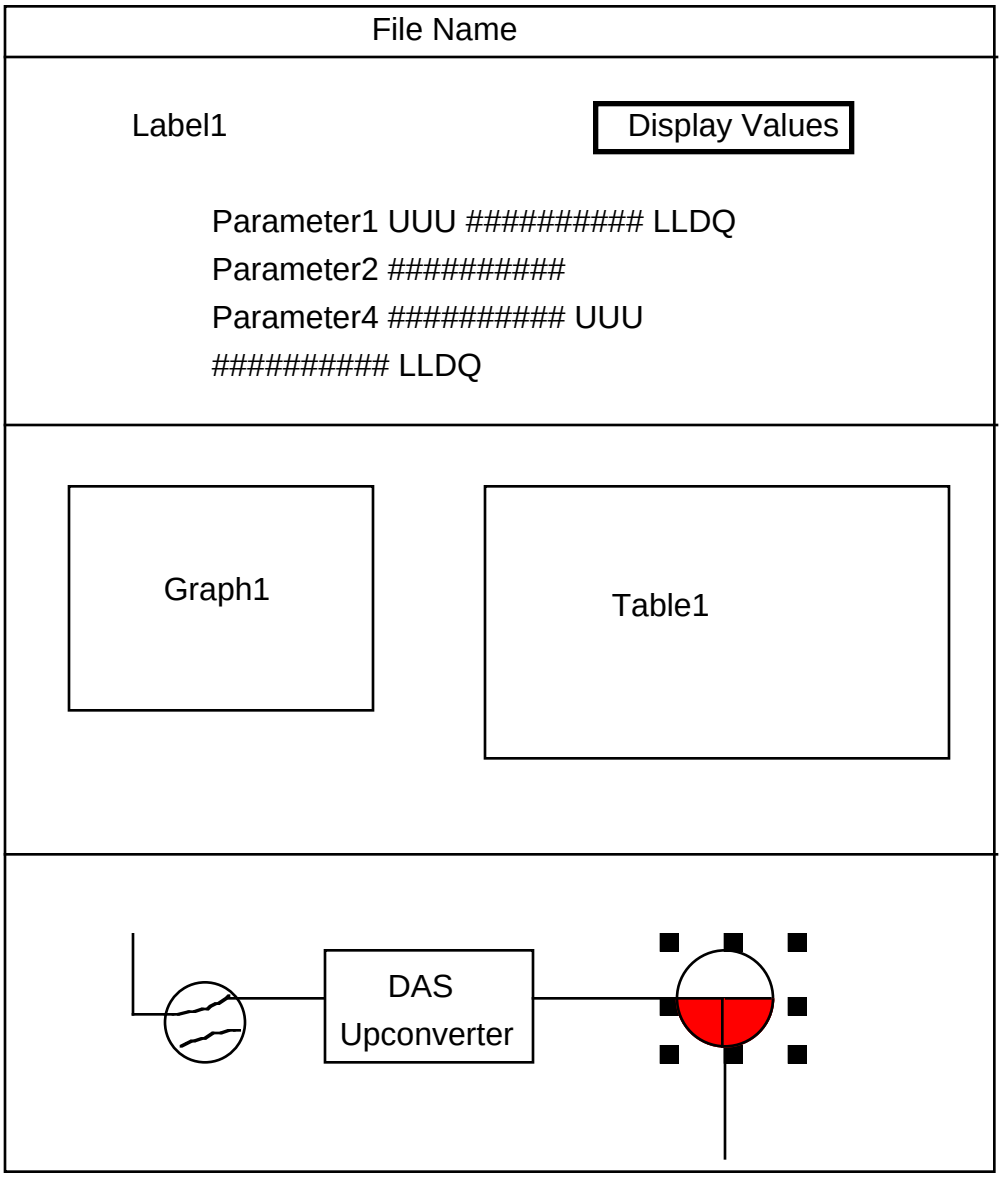


Figure A.2.5-3. Display Builder Window (after format changes)

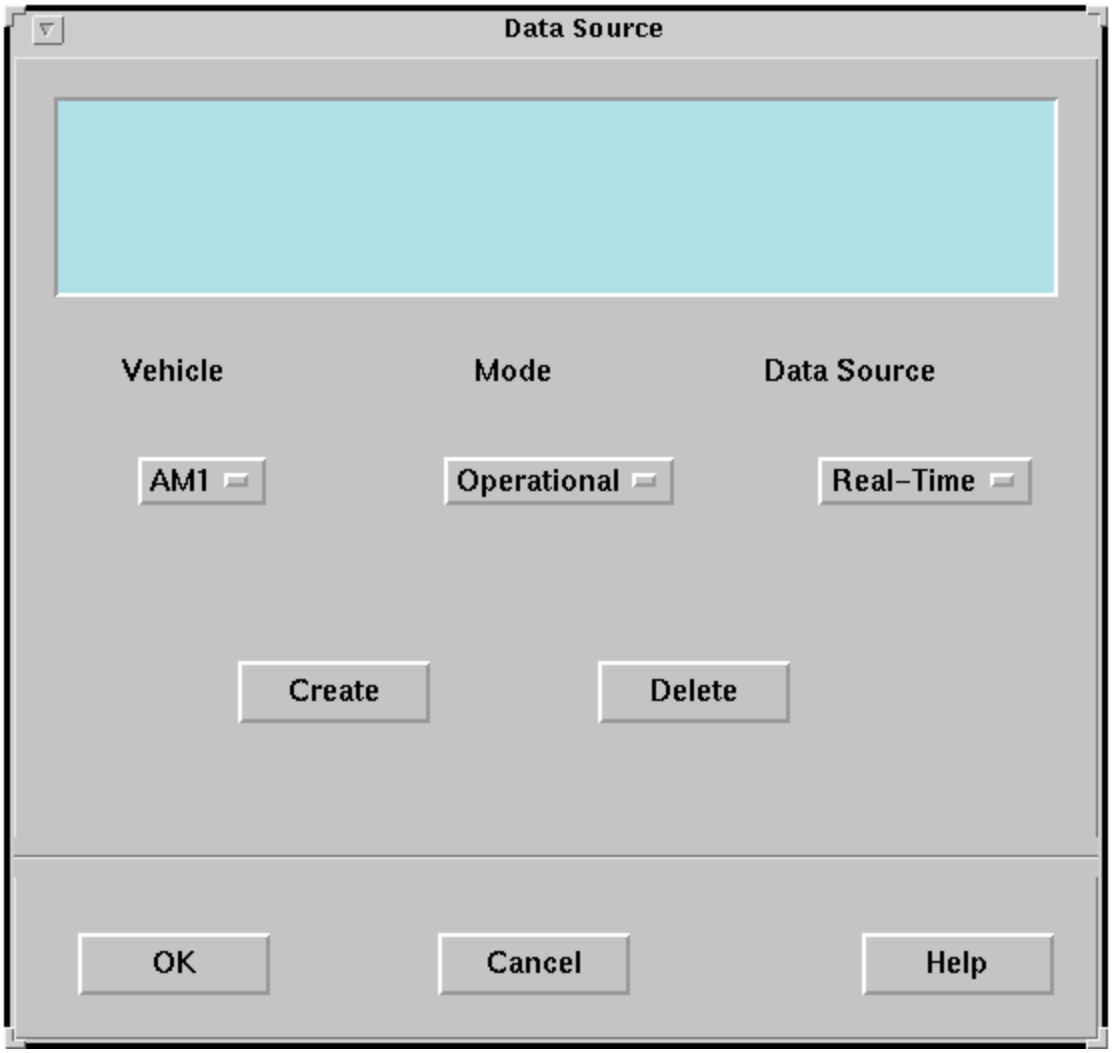


Figure A.2.5-4. Data Source Dialog

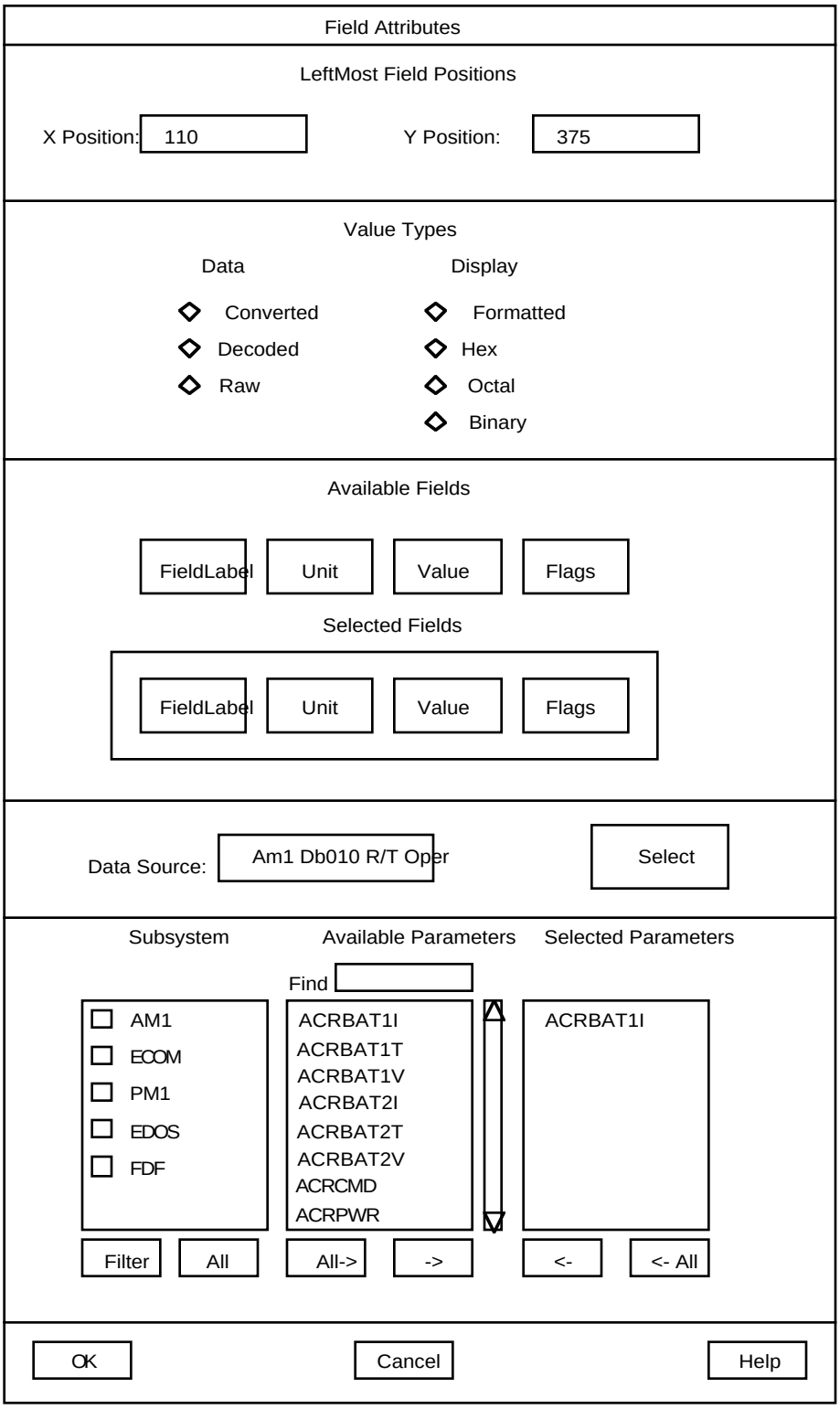


Figure A.2.5-5. Field Format Dialog

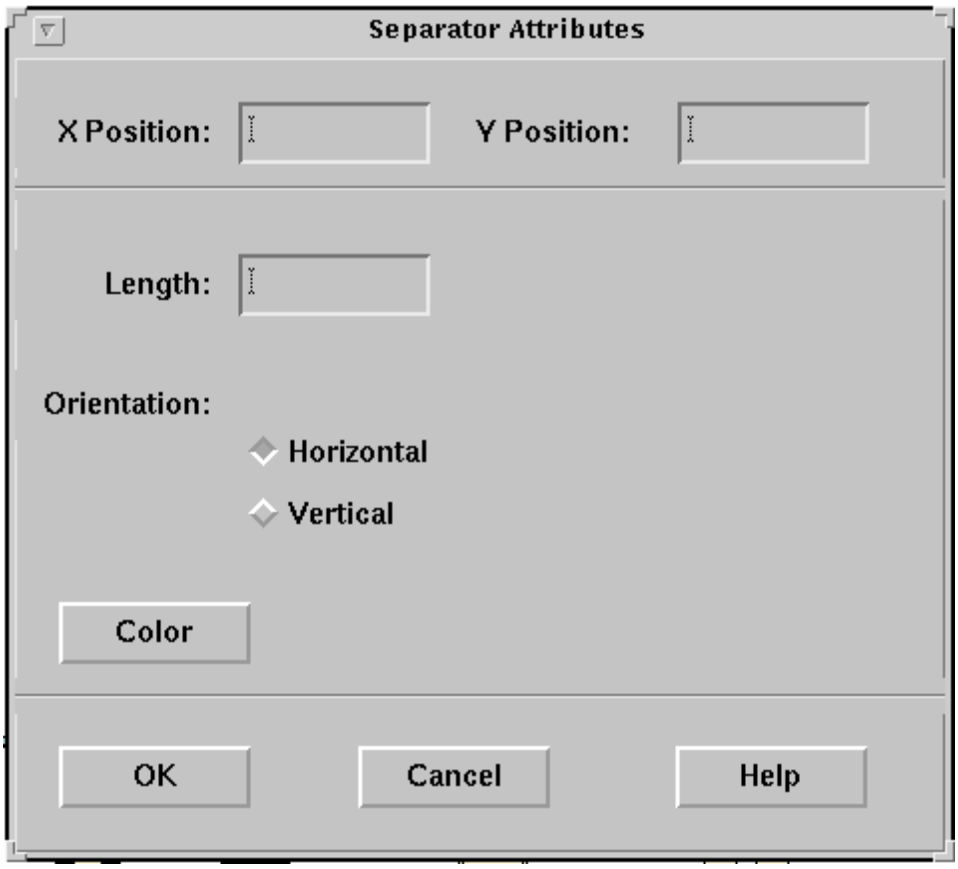


Figure A.2.5-6. Separator Format Dialog

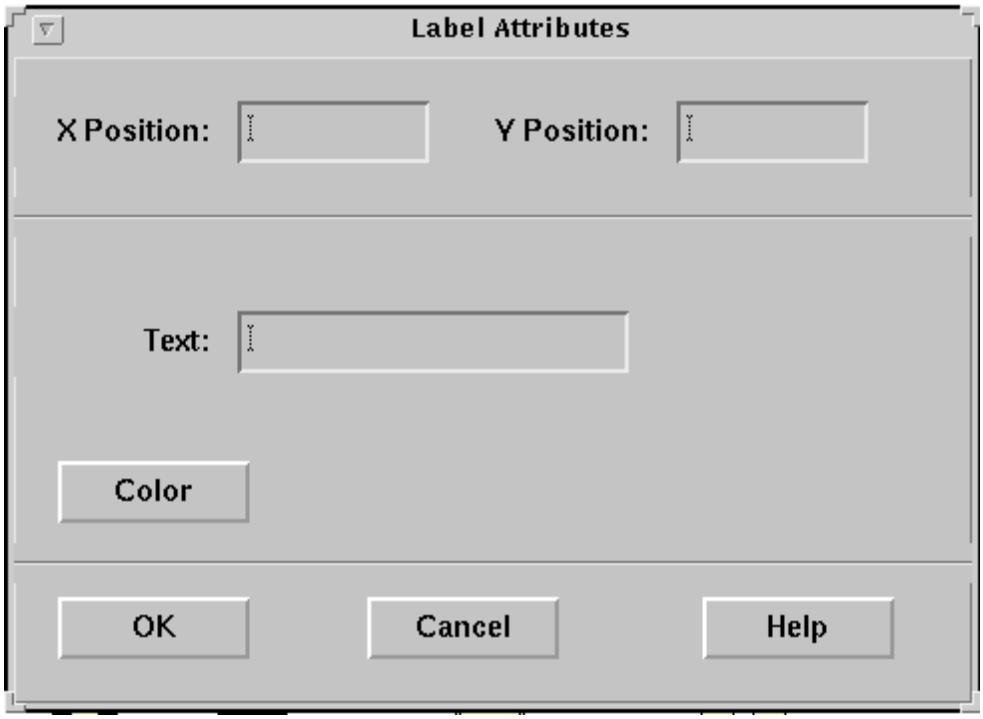


Figure A.2.5-7. Label Format Dialog

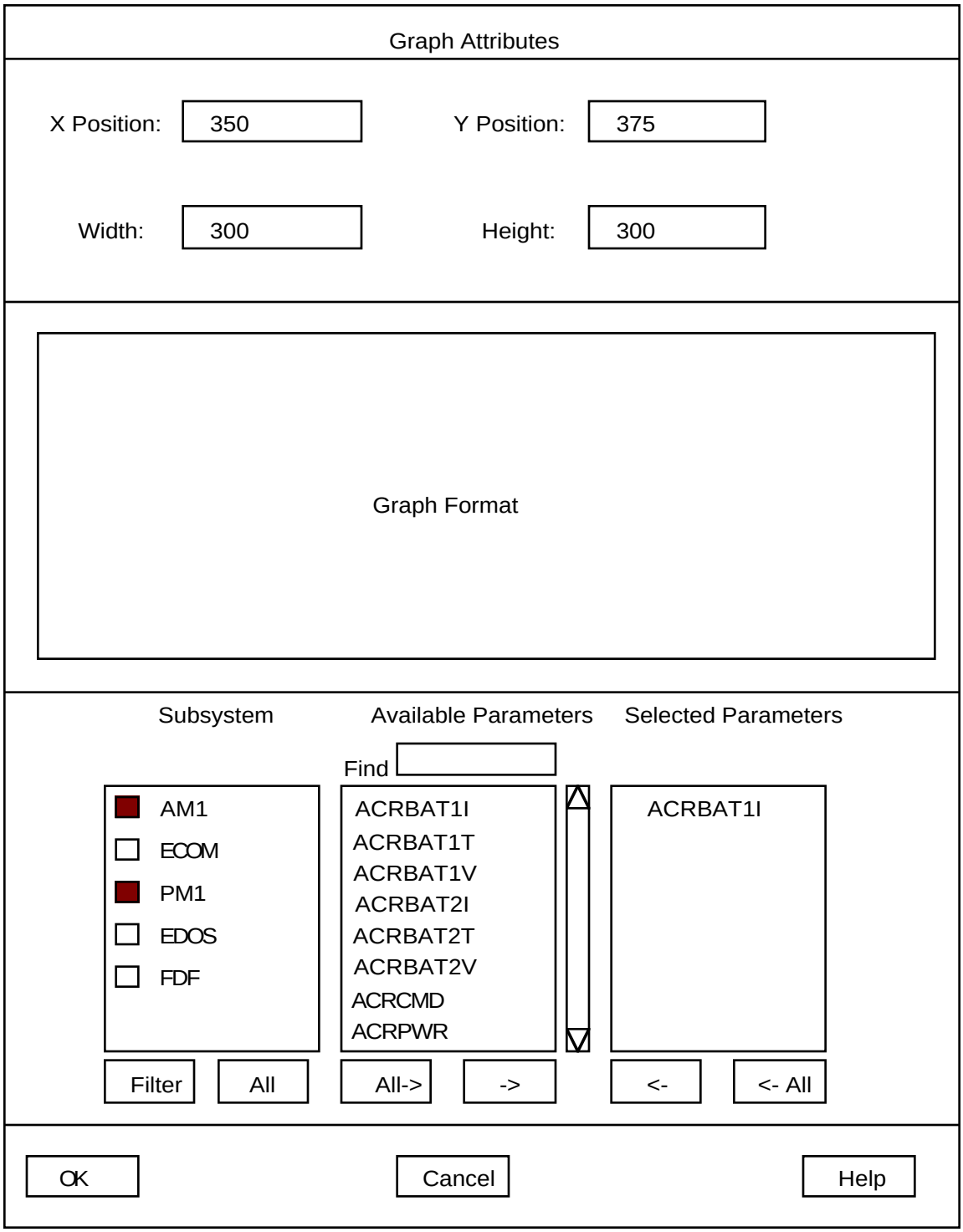


Figure A.2.5-8. Graph Format Dialog

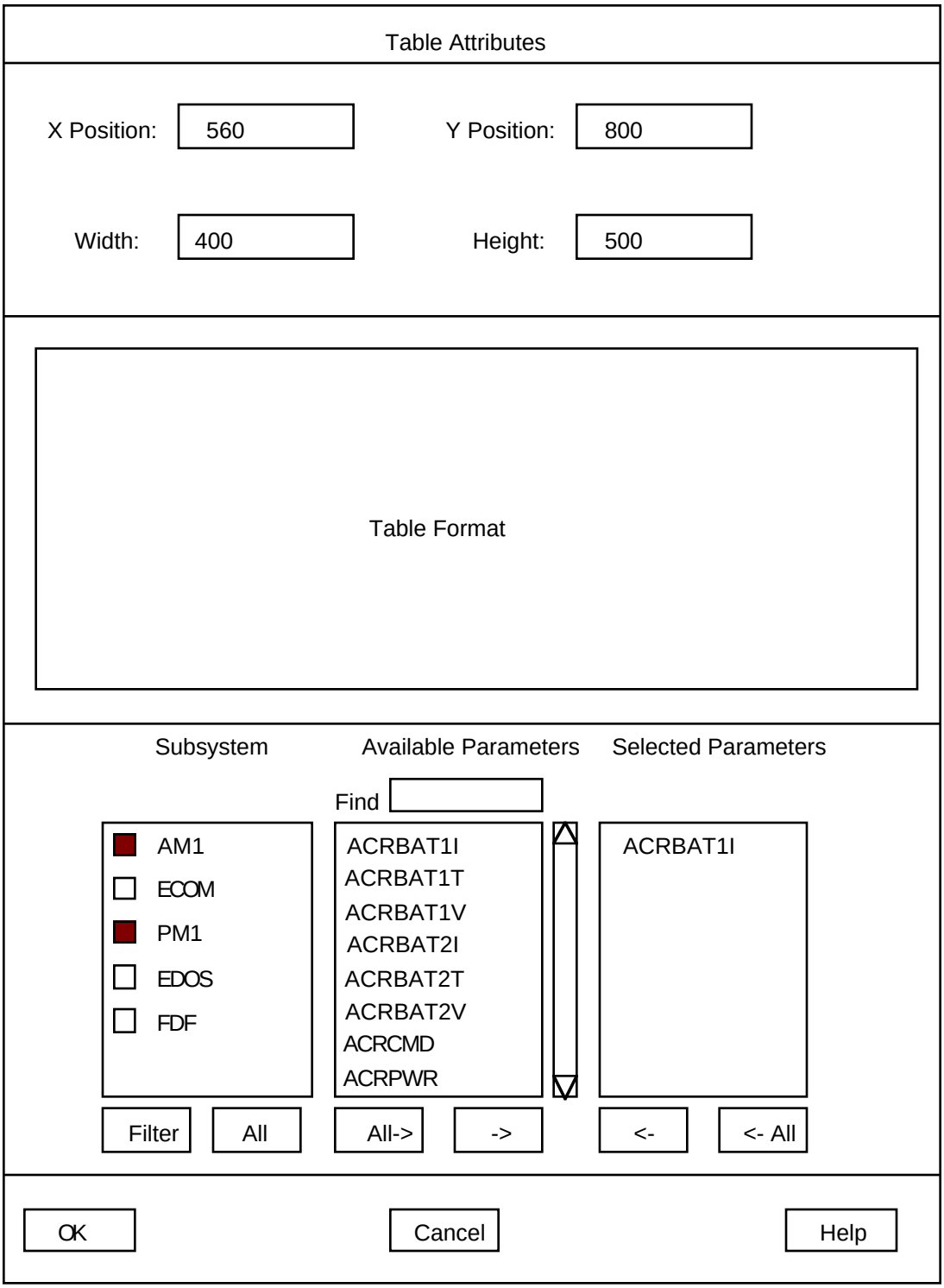


Figure A.2.5-9. Table Format Dialog

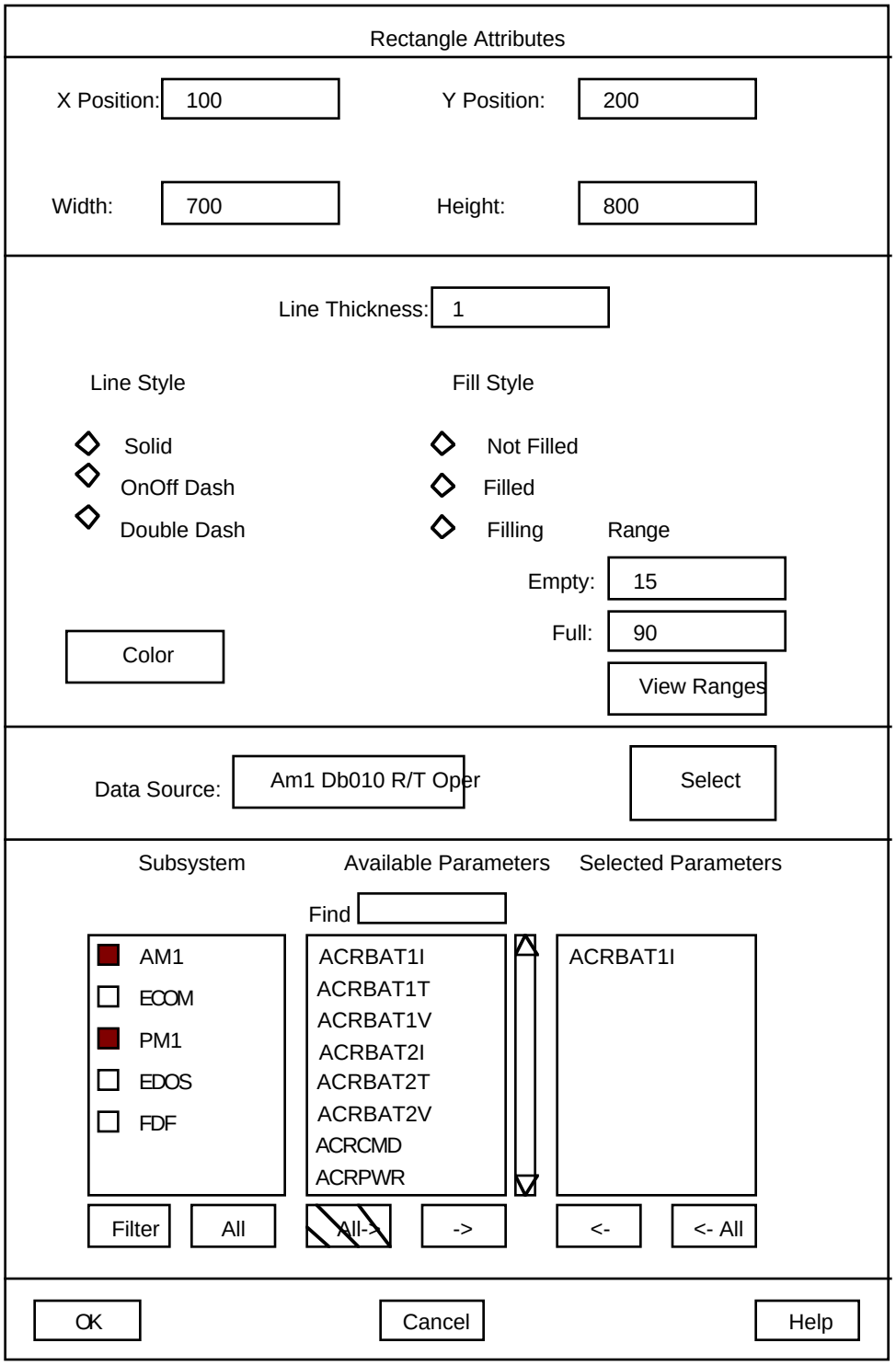


Figure A.2.5-10. Rectangle Format Dialog

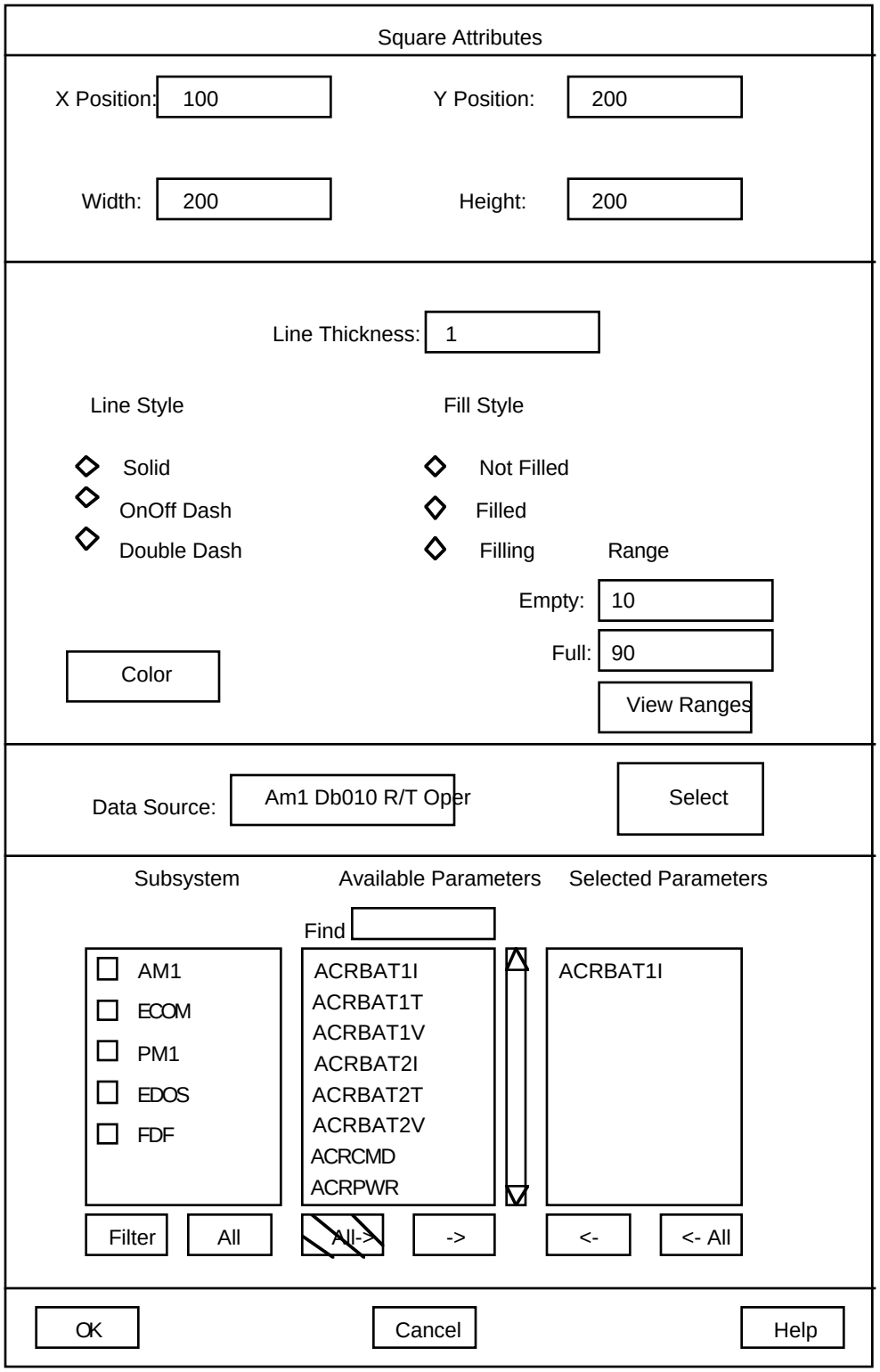


Figure A.2.5-11. Square Format Dialog

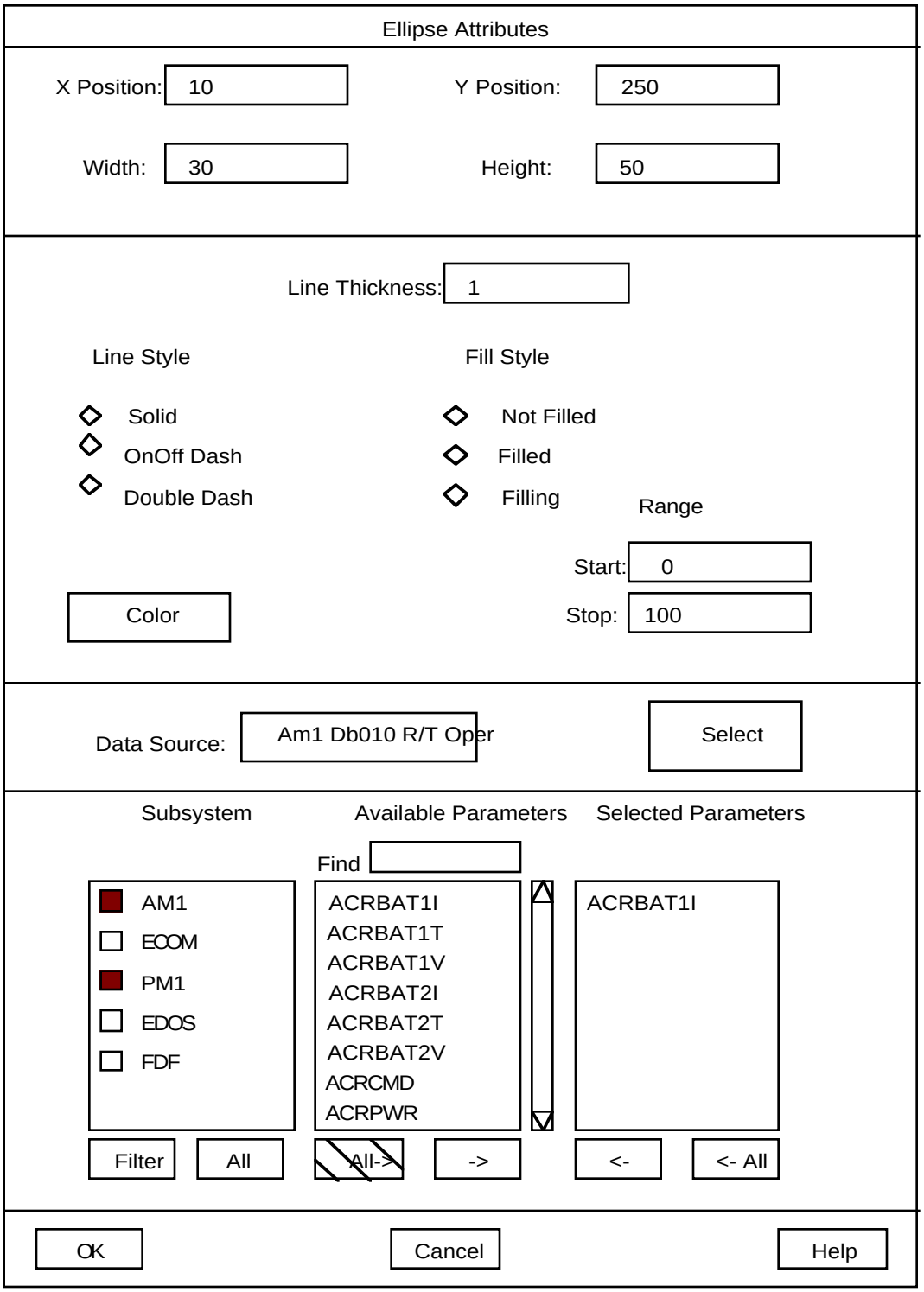


Figure A.2.5-12. Ellipse Format Dialog

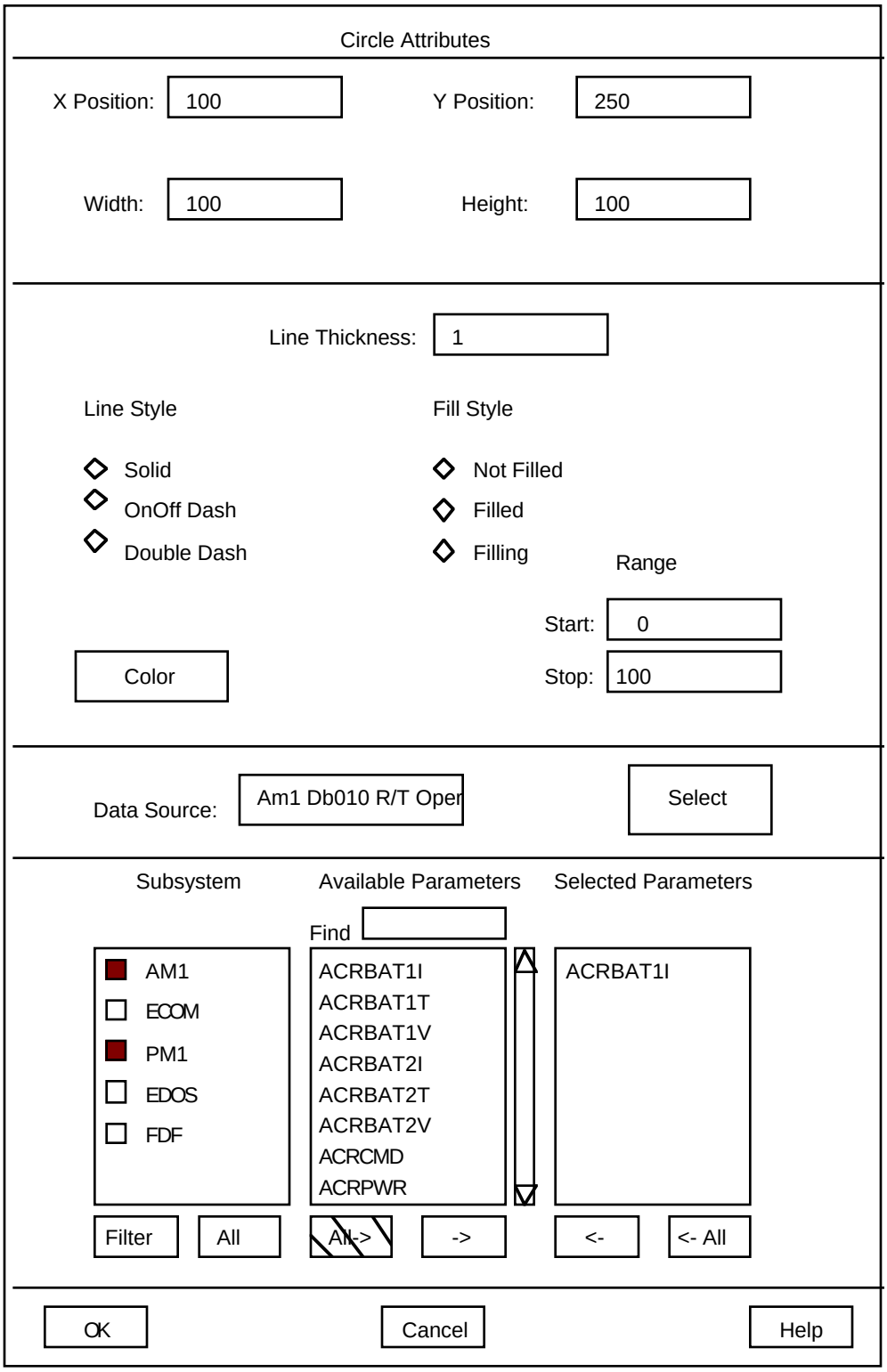


Figure A.2.5-13. Circle Format Dialog

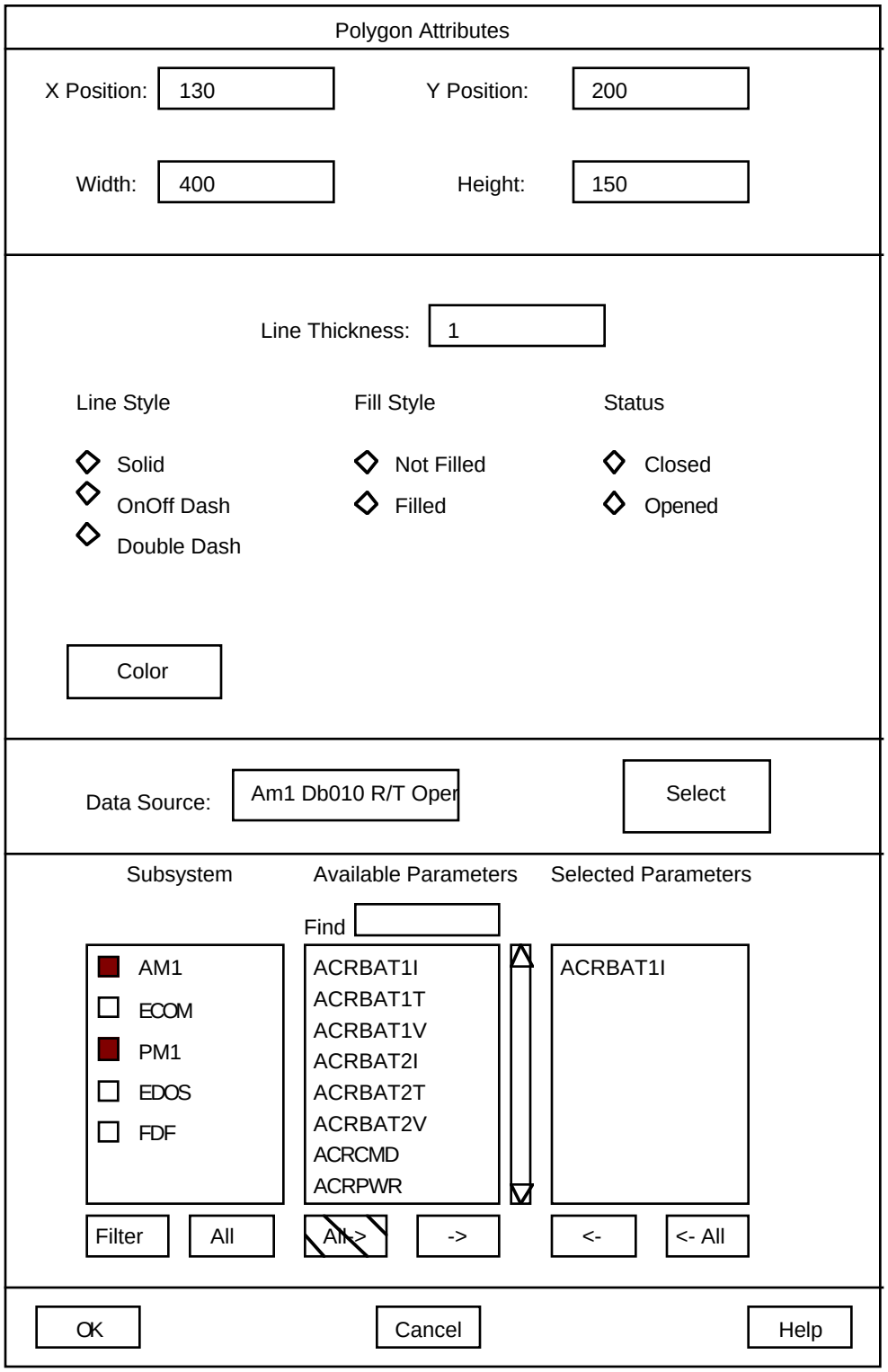


Figure A.2.5-14. Polygon Format Dialog

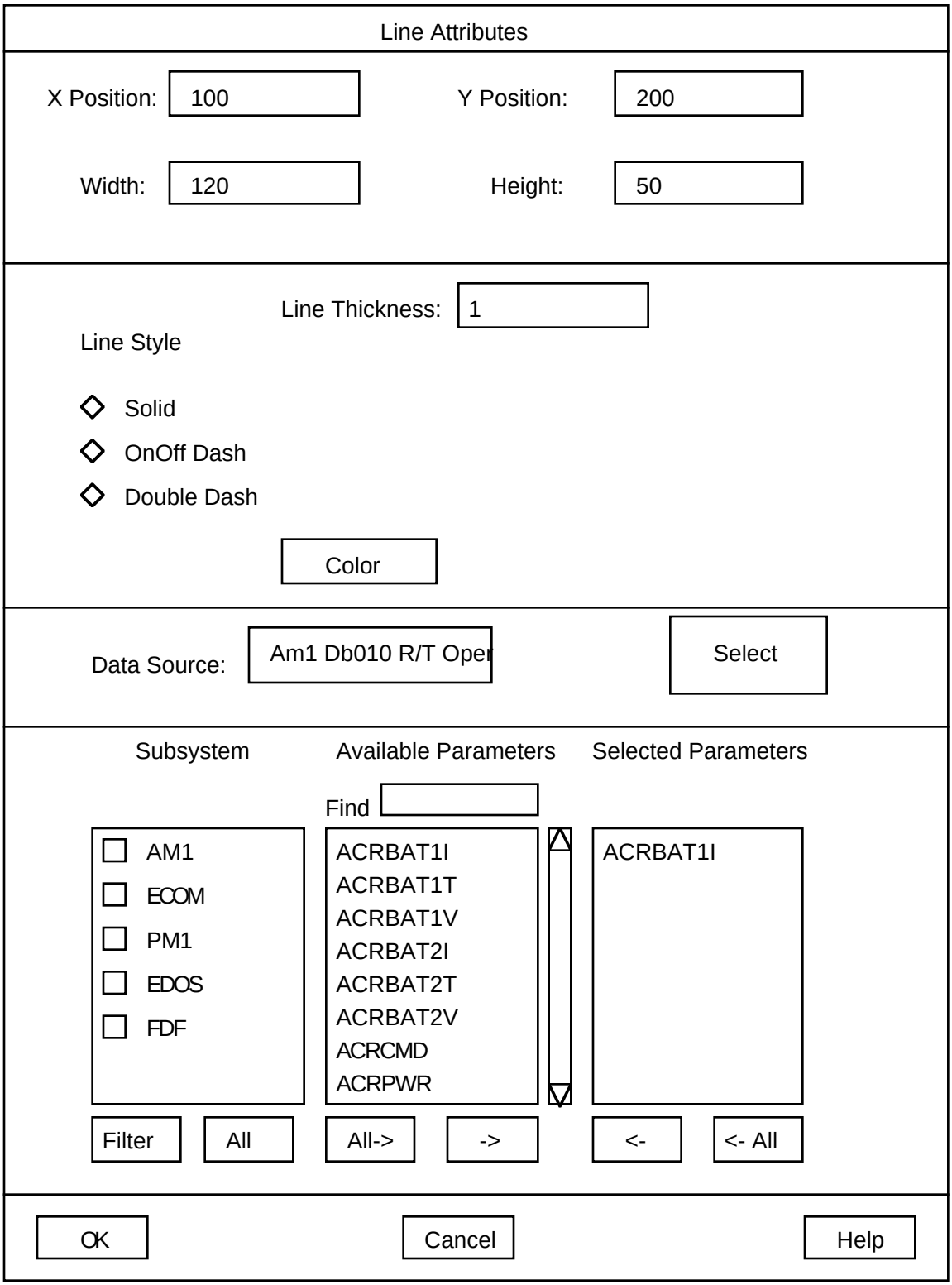


Figure A.2.5-15. Line Format Dialog

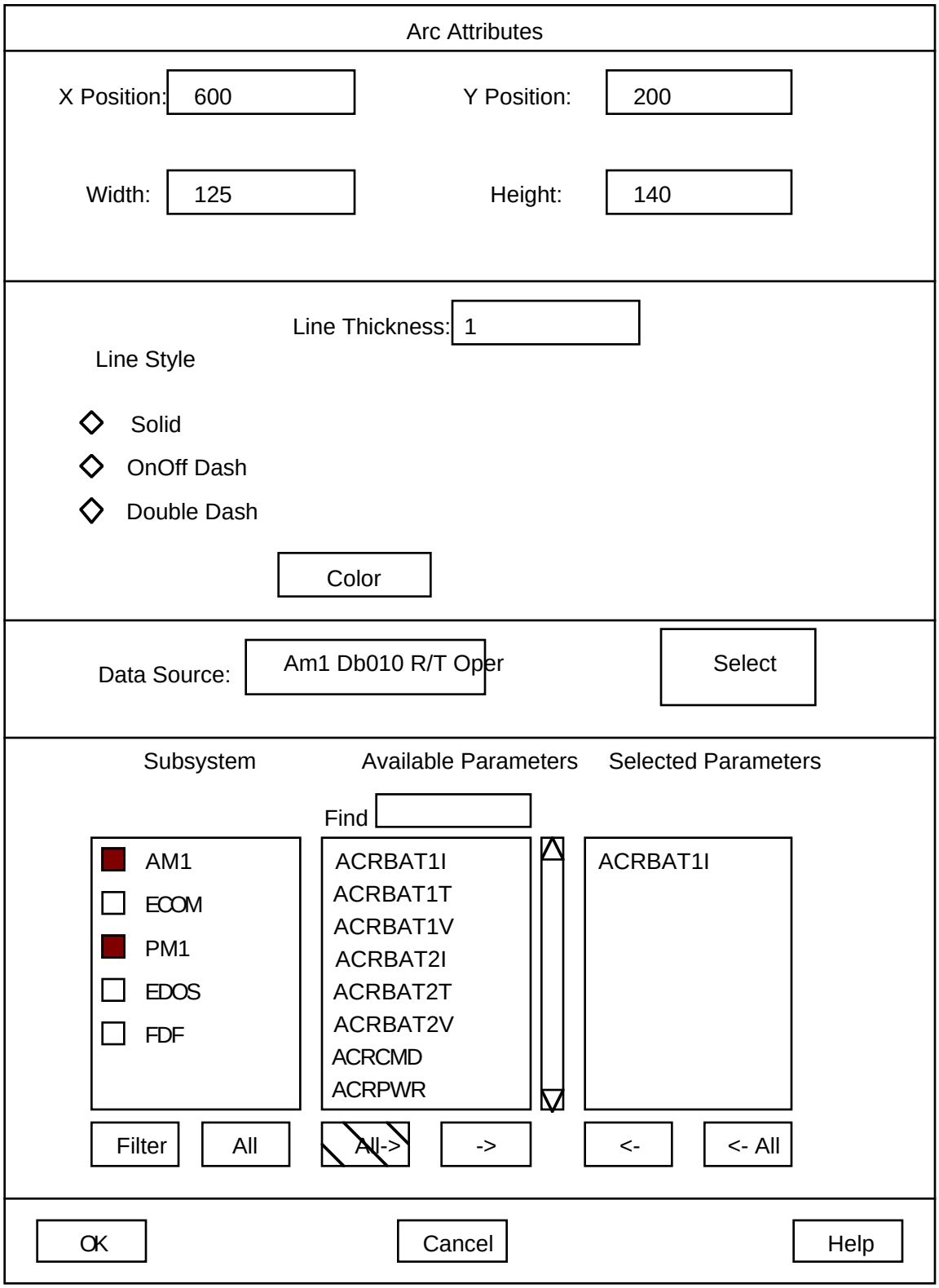


Figure A.2.5-16. Arc Format Dialog

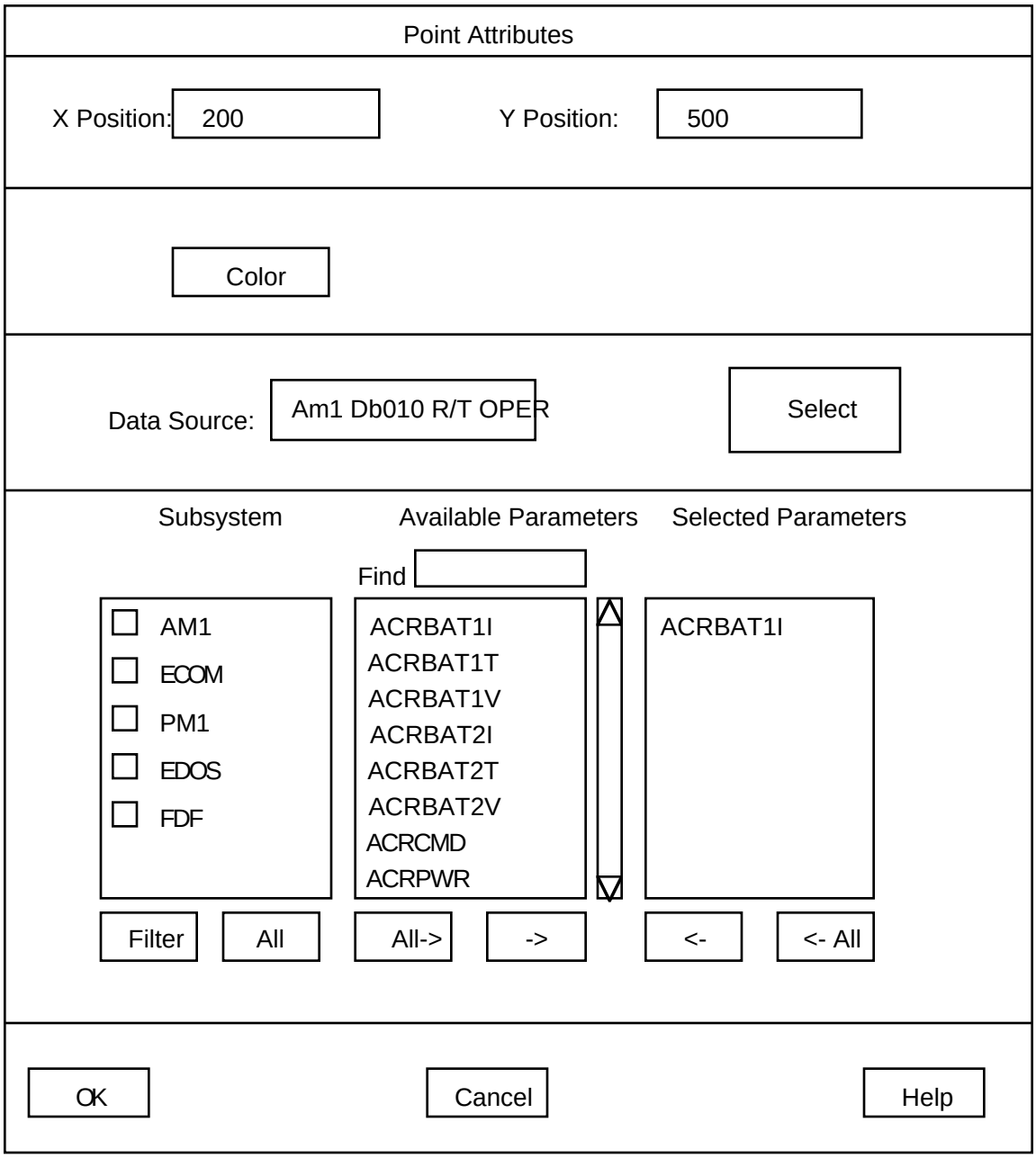


Figure A.2.5-17. Point Format Dialog

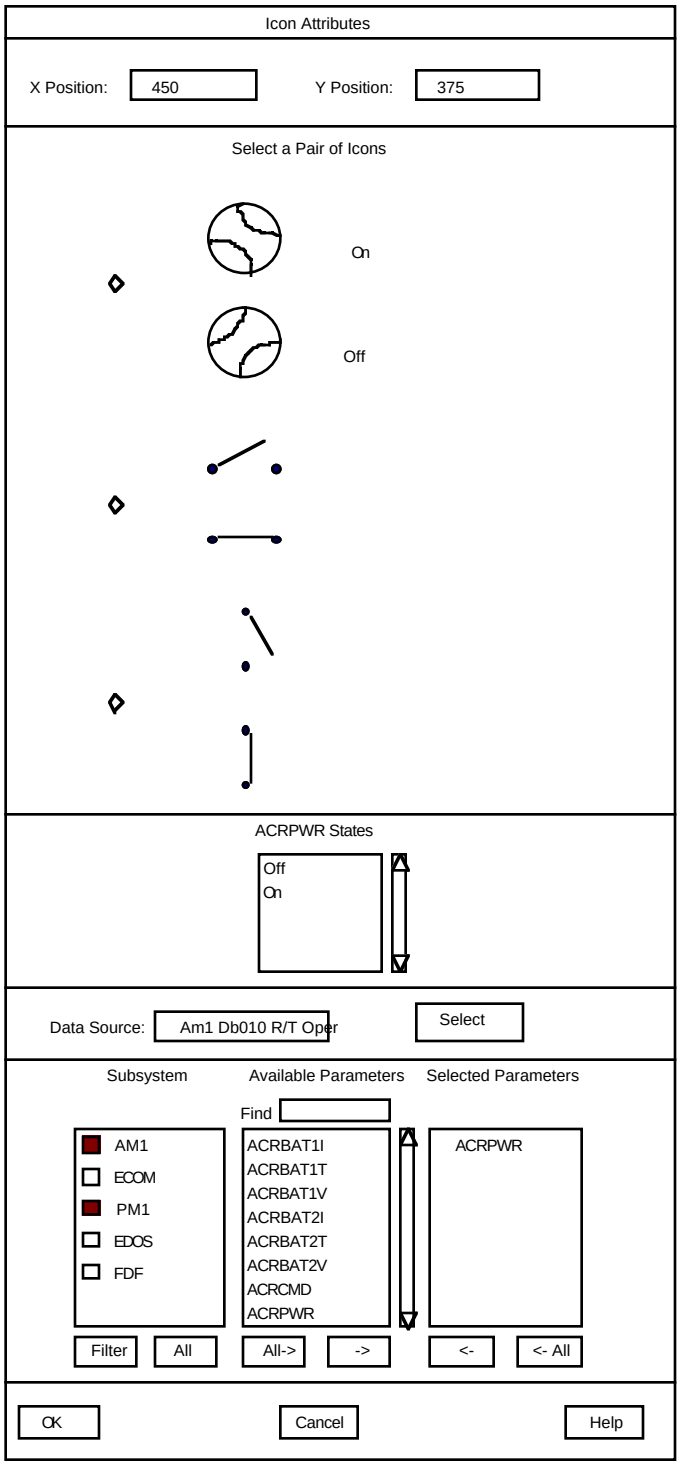


Figure A.2.5-18. Icons Format Dialog

A.2.5.1 Display Builder Usage

The Display Builder is brought up from the tools button on the command window. A palette window and a drawing area, representing a dynamic page, will be displayed. The user can drag and drop display items from the palette to the dynamic page. Items such as labels, separators, fields, graphs, tables, and schematic display items: rectangles, squares, ellipses, circles, open and closed polygons, lines, arcs, points, and icons can become part of the dynamic page. Fields, graphs, tables, and schematic display items may be attached to a data source. The user presses a format button to invoke a format window that enables display items to be updated. From the format window, those items that are attached to a data source can then be attached to a subsystem and parameter in order for the user to visualize real-time spacecraft activity. The dynamic page is written to a file once the build button has been pressed on the Palette window. The file will be sent to Data Management for storage. It can be retrieved at any time for viewing.

Release A3 will include the design for labels, separators, fields, graphs, and tables, while release B2 will include the schematic display items.

A.2.5.2 Display Builder Access

The Display Builder is brought up from the Tools window which is started from the Command Control window.

A.2.5.3 Display Builder Input

Display Builder Palette Window (Figure A.2.5-1):

File:

This is a pull-down menu that displays the following menu items: Open, New, Save, Save As, Print, and Quit.

Open:

This option invokes a File Selection dialog from which the user may select a dynamic page file to open in the Display Builder.

Save:

This option invokes a dialog from which the user may save the dynamic page as a file to the local drive.

Save As:

This option invokes a dialog from which the user may save the dynamic page as a file to the local drive under a different name other than the current file name.

Print:

This option allows the user to print the dynamic page.

Quit:

This option quits the Display Builder.

Edit:

This is a pull-down menu that displays the following options: Cut, Copy, Paste, Delete, and Undo.

Cut:

This option will delete the highlighted display item, but place it in a buffer so that it can be pasted if needed.

Copy:

This option copies the highlighted display item into the buffer so that it can be pasted if needed.

Paste:

This option pastes whatever is in the buffer to the dynamic page.

Delete:

This option deletes a highlighted display item the same as the delete button on the Palette window.

Undo:

This option undoes the last action that the user performed.

Utility:

This is a pull-down menu that displays the following option: Grid.

Grid:

This button invokes will draw a grid on the dynamic page area for more precise placement of a display item. It can also be removed. This feature will not be implemented in release A.

Help:

This option displays help information about the Display Builder.

Display Item:

Under "Display Item", the user may drag and drop display items off each of the buttons. These include: Field Separator (vertical), Separator (horizontal), Label, Graph, Table.

To drag and drop a display item, the user should keep the mouse button depressed after pressing on the desired button. The cursor icon will change. The user will move the cursor to the desired portion of the dynamic page, and let go of the mouse button. The cursor will revert to its original state, and the display item will be visible on the dynamic page with its surrounding borders highlighted.

Schematic Display Item:

Under "Schematic Display Item", the user may drag and drop only off the Icons' button. The rest of the buttons for Rectangle, Square, Ellipse, Circle, Polygon, Line, Arc, and

Point may be depressed in the usual manner. The user then draws the schematic display item to the desired size, after which the item's borders become highlighted.

Action:

Format:

The format button is used to display the format windows for the display items. The user may update the display item's attributes, and in some cases, the subsystem and parameters.

Delete:

The display item that is highlighted can be deleted by pressing this button.

Data Source:

Display items such as field, graph, table, and schematic display items can be attached to a data source or logical string in order to connect to a spacecraft part in real-time. By pressing this button to invoke the Data Source dialog, the user can set up one or more logical strings. However, **only one data source can be active at a time.**

Build to CM:

This button may pressed after all of the display items have been dropped and formatted. A file will be written containing the dynamic page information. It will be copied to a Configuration Management directory under the auspices of Data Management. It may be retrieved at any time for viewing.

Build to Local:

This button may pressed after all of the display items have been dropped and formatted. A file will be written containing the dynamic page information. It will be sent to Data Management for storage. It may be retrieved at any time for viewing.

Cancel:

This button cancels any processing of the dynamic page, and exits the Display Builder.

Display Builder Window (after drop) (Figure A.2.5-2):

Drawing Area/Dynamic Page:

Any display item from the Display Builder Palette window can be dropped, or drawn and displayed in the drawing area that represents the dynamic page. Once a display item has been dropped or drawn, it will be surrounded by a bounding box (rectangle, for tables, graphs, labels, fields, and separators only), and highlighted as the active display item. While only one display item can be highlighted, the example in the referenced figure shows "Label2" is an active display item, and a circle as an active schematic display item in order to explain the changes performed upon them by updating their format windows.

Numbering Scheme:

Each time a display item that contains text is dropped, a unique identifying number will be attached to the text. For example, if a label is dropped, it will be called "Label1". A second dropped label will be called "Label2", and the third will be "Label3". If "Label2" is then deleted, and a new label is dropped, the new label will read "Label2".

Movement:

When a display item is clicked upon, it will become highlighted. Any highlighted display item can be moved about the dynamic page by clicking on the highlighted bounding box a second time. When the user holds down the mouse button, the cursor will change to a crosshair, and a box will appear. Drag the box to the desired location, and release the mouse button. The highlighted display item will appear at its new location, and it will be erased from its old location.

Resizing:

Resizing, if allowed, can be accomplished by placing the cursor over the highlighted portion of the active display item. The cursor arrow will change to the direction the resize will go if the user presses that area of the bounding box. Resizing is achieved by holding down the mouse button and dragging it in the allowed direction. The bounding box will stretch or shrink according to the direction of the mouse. Release the mouse button when the desired size is achieved. This method is called rubber-banding. Once finished, the highlighted display item will be re-drawn at its new size, and the old size will be deleted. The following describes the resize movements allowed by the display items.

Labels:

Labels may not be resized from the Display Builder window because the length of the label is fixed, and determines the size of the item as well as the highlighted bounding box.

Vertical separators:

Vertical separators may be enlarged or made smaller only from the top and bottom of the separator.

Horizontal separators:

Horizontal separators may be enlarged or made smaller only from the left and right sides of the separator.

Field:

A field may not be resized from the Display Builder window because the length of each portion that comprises a field is fixed, and determines the size of the item as well as the highlighted bounding box.

Graph:

A graph may be resized in any direction.

Table:

A table may be resized in any direction.

Rectangle, Square, Ellipse, Circle, Open Polygon, Closed Polygon, Arc:

These schematic display items may be resized in any direction.

Line:

A line may be resized in any direction at its endpoints.

Point:

A point may not be resized, otherwise it would become a filled circle.

Icons:

An icon may not be resized because it is a pixmap, which is a fixed size.

Display Builder Window (after format changes) (Figure A.2.5-3):

Drawing Area/Dynamic Page:

This is the same screen as Figure A.2.5-2 except that:

1. formatting for "Label2" has taken place. The user has changed the value of the text in the Label Format window to read "Display Values". The Display Builder window now shows the update from that label text change.
2. formatting for the circle has taken place. The user has changed the circle to a "filling" circle, and applied a parameter's analog values to it. The Display Builder window now shows the update from that circle update.

Data Source Dialog (Figure A.2.5-4):

This dialog is used to build and display data sources, or logical strings that can be connected to display items. Note: if * is used for the default, then the best guess will be used to connect to a logical string at the time the dynamic page is viewed in its operational stage.

Vehicle:

Option menu that displays the spacecrafts. Can be set to AM1, PM1, or * for default.

Mode:

Option menu that displays various modes. Can be set to Operational, Test, Training, or * for default.

Data Source:

Option menu that displays various data sources. Can be set to Real-time, Replay, Simulation, or * for default.

Create:

This button is pressed once the Vehicle, Mode, and Data Source have been selected. The combined selection will appear highlighted in the scrolling window.

Delete:

This button will delete the highlighted data source in the scrolling window.

OK:

This button will save the data sources that have been created. Only the highlighted data source will be the active data source at the time. Then the window is deleted.

Cancel:

This button will quit the dialog with no updates.

Help:

This button invokes a display that gives help information about the Data Source dialog.

Field Format Dialog (Figure A.2.5-5):

This dialog is used to update the attributes, content, and parameter of a field.

X Position:

The upper left x coordinate of the field bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the field bounding box will be pre-filled, and can be updated by the user.

Value Types (Data):

From this radio box, only one choice may be selected for a value portion of a field: Converted, Decoded, Raw.

Value Types (Display):

From this radio box, only one choice may be selected for a value portion of a field: Formatted, Hex, Octal, Binary.

Available Fields:

The buttons: FieldLabel, Unit, Flags, and Value allow the user to drag a portion of the field, and drop it in the Selected Fields area. In this manner the components of the field may be moved in any combination, and are optional. However, **Value is required,** and will be displayed in the Selected Fields portion of the screen at all times (its order in the chain may be rearranged).

Selected Fields:

The buttons: FieldLabel, Unit, Flags, and Value represent the components of the field, and the order in which they will show up on the dynamic page. A component may be dragged and dropped back to its same component button in the Available fields are in order to be deleted from the Selected Fields portion of the screen. **Only Value may not be dragged and dropped to its Available Fields button because it is the required portion of a field.**

Data Source:

The data source that was highlighted in the Data Source dialog will be pre-filled here. It can be updated from the Data Source dialog.

Data Source (Select):

This button invokes the Data Source dialog from which the user may change the data source.

Subsystem:

The subsystem filter selector can be executed to select a subsystem.

Filter:

This button will bring up the Selection Filter window.

All:

This button selects all the subsystems.

Available Parameters:

Find:

The user inputs text into this area, and a search is performed for that text in the Available Parameters window.

All->:

This button will be shaded out as only one parameter may be selected at a time.

->:

This button moves the selected parameter to the Selected Parameters window.

Selected Parameters:

<-:

This button moves the selected parameter back to the Available Parameters window.

<-All:

This button moves the selected parameter back to the Available Parameters window.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Field Format dialog.

Separator Format Dialog (Figure A.2.5-6):

This dialog is used to update the position and attributes of a separator.

X Position:

The upper left x coordinate of the separator bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the separator bounding box will be pre-filled, and can be updated by the user.

Length:

The length of the separator will be pre-filled, and can be updated by the user.

Orientation:

The orientation of the separator will be pre-filled to either horizontal, or vertical, and can be updated by the user.

Color:

This button brings up a color dialog from which the user may change the color of the separator.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Separator Format dialog.

Label Format Dialog (Figure A.2.5-7):

This dialog is used to update the position and attributes of a label.

X Position:

The x coordinate of the label's highlighted bounding box will be pre-filled, and can be updated by the user.

Y Position:

The y coordinate of the label's highlighted bounding box will be pre-filled, and can be updated by the user.

Text:

The text of the label will be pre-filled the first time with "Label" and the identifying number of the label. The text can be updated by the user.

Color:

This button brings up a color dialog from which the user may change the color of the label.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Label Format dialog.

Graph Format Dialog (Figure A.2.5-8):

This dialog is used to update the attributes, content, and parameters of a graph.

X Position:

The upper left x coordinate of the graph highlighted bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the graph highlighted bounding box will be pre-filled, and can be updated by the user.

Width:

The width of the graph highlighted bounding box will be pre-filled, and can be updated by the user.

Height:

The height of the graph highlighted bounding box will be pre-filled, and can be updated by the user.

Graph Format:

The Graph Format dialog widget will appear here from which the user may change attributes about the graph.

Subsystem:

The subsystem filter selector can be executed to select a subsystem.

Filter:

This button will bring up the Selection Filter window.

All:

This button selects all the subsystems.

Available Parameters:

Find:

The user inputs text into this area, and a search is performed for that text in the Available Parameters window.

All->:

This button will be shaded out as only one parameter may be selected at a time.

->:

This button moves the selected parameter to the Selected Parameters window.

Selected Parameters:

<-:

This button moves the selected parameter back to the Available Parameters window.

<-All:

This button moves the selected parameter back to the Available Parameters window.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Graph Format dialog.

Table Format Dialog (Figure A.2.5-9):

This dialog is used to update the attributes, content, and parameters of a table.

X Position:

The upper left x coordinate of the table highlighted bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the table highlighted bounding box will be pre-filled, and can be updated by the user.

Width:

The width of the table highlighted bounding box will be pre-filled, and can be updated by the user.

Height:

The height of the table highlighted bounding box will be pre-filled, and can be updated by the user.

Table Format:

The Table Format dialog widget will appear here from which the user may change attributes about the table.

Subsystem:

The subsystem filter selector can be executed to select a subsystem.

Filter:

This button will bring up the Selection Filter window.

All:

This button selects all the subsystems.

Available Parameters:

Find:

The user inputs text into this area, and a search is performed for that text in the Available Parameters window.

All->:

This button will be shaded out as only one parameter may be selected at a time.

->:

This button moves the selected parameter to the Selected Parameters window.

Selected Parameters:

<-:

This button moves the selected parameter back to the Available Parameters window.

<-All:

This button moves the selected parameter back to the Available Parameters window.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Table Format dialog.

Rectangle Format Dialog (Figure A.2.5-10):

This dialog is used to update the attributes and parameters of a rectangle.

X Position:

The upper left x coordinate of the rectangle's highlighted bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the rectangle's highlighted bounding box will be pre-filled, and can be updated by the user.

Width:

The width of the rectangle's highlighted bounding box will be pre-filled, and can be updated by the user.

Height:

The height of the rectangle's highlighted bounding box will be pre-filled, and can be updated by the user.

Line Thickness:

The line thickness of the rectangle will be pre-filled, and can be updated by the user.

Line Style:

Solid:

The line style of the rectangle will default to "Solid". A line will be drawn using the foreground color.

OnOff Dash:

This selection specifies that only dashes are drawn with the foreground color.

Double Dash:

This selection specifies that the full path of a line is drawn with the foreground color while are drawn gaps with the background color.

Fill Style:

Not Filled:

The fill style of the rectangle will default to "Not Filled". A rectangle's borders will be drawn with no fill color.

Filled:

A rectangle's borders and interior will be filled with a specified color.

Filling:

A rectangle may be attached to an analog parameter's values. The "Filling" selection allows the start and stop range values to pop up. The rectangle will begin as "Not Filled" when at the start range, and will proportionally fill itself with a specified color, until it is filled at the stop range.

Range:

This portion of the display will only appear if "Filling" is selected.

Empty:

The empty value relating to the analog parameter will be pre-filled to the low yellow value, and can be updated by the user.

Full:

The full value relating to the analog parameter will be pre-filled to the high yellow value, and can be updated by the user.

View Ranges:

This portion of the display will only appear if "Filling" is selected. When the user presses this button, a dialog will appear from which the ranges of the parameter (i.e. high red, high yellow, low yellow, and low red) may be viewed.

Color:

A color dialog is invoked with this selection. The color chosen will act as the foreground color of the schematic display item. This color will be overridden if the display item is attached to a parameter.

Data Source:

The data source that was highlighted in the Data Source dialog will be pre-filled here. It can be updated from the Data Source dialog.

Data Source (Select):

This button invokes the Data Source dialog from which the user may change the data source.

Subsystem:

The subsystem filter selector can be executed to select a subsystem.

Filter:

This button will bring up the Selection Filter window.

All:

This button selects all the subsystems.

Available Parameters:

Find:

The user inputs text into this area, and a search is performed for that text in the Available Parameters window.

All->:

This button will be shaded out as only one parameter may be selected at a time.

->:

This button moves the selected parameter to the Selected Parameters window.

Selected Parameters:

<-:

This button moves the selected parameter back to the Available Parameters window.

<-All:

This button moves the selected parameter back to the Available Parameters window.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Rectangle Format dialog.

Square Format Dialog (Figure A.2.5-11):

This dialog is used to update the attributes and parameters of a square.

X Position:

The upper left x coordinate of the square's highlighted bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the square's highlighted bounding box will be pre-filled, and can be updated by the user.

Width:

The width of the square's highlighted bounding box will be pre-filled, and can be updated by the user.

Height:

The height of the square's highlighted bounding box will be pre-filled, and can be updated by the user.

Line Thickness:

The line thickness of the square will be pre-filled, and can be updated by the user.

Line Style:

Solid:

The line style of the square will default to "Solid". A line will be drawn using the foreground color.

OnOff Dash:

This selection specifies that only dashes are drawn with the foreground color.

Double Dash:

This selection specifies that the full path of a line is drawn with the foreground color while are drawn gaps with the background color.

Fill Style:

Not Filled:

The fill style of the square will default to "Not Filled". A rectangle's borders will be drawn with no fill color.

Filled:

A square's borders and interior will be filled with a specified color.

Filling:

A square may be attached to an analog parameter's values. The "Filling" selection allows the start and stop range values to pop up. The square will begin as "Not Filled" when at the start range, and will proportionally fill itself with a specified color, until it is filled at the stop range.

Range:

This portion of the display will only appear if "Filling" is selected.

Empty:

The empty value relating to the analog parameter will be pre-filled to the low yellow value, and can be updated by the user.

Full:

The full value relating to the analog parameter will be pre-filled to the high yellow value, and can be updated by the user.

View Ranges:

This portion of the display will only appear if "Filling" is selected. When the user presses this button, a dialog will appear from which the ranges of the parameter (i.e. high red, high yellow, low yellow, and low red) may be viewed.

Color:

A color dialog is invoked with this selection. The color chosen will act as the foreground color of the schematic display item. This color will be overridden if the display item is attached to a parameter.

Data Source:

The data source that was highlighted in the Data Source dialog will be pre-filled here. It can be updated from the Data Source dialog.

Data Source (Select):

This button invokes the Data Source dialog from which the user may change the data source.

Subsystem:

The subsystem filter selector can be executed to select a subsystem.

Filter:

This button will bring up the Selection Filter window.

All:

This button selects all the subsystems.

Available Parameters:

Find:

The user inputs text into this area, and a search is performed for that text in the Available Parameters window.

All->:

This button will be shaded out as only one parameter may be selected at a time.

->:

This button moves the selected parameter to the Selected Parameters window.

Selected Parameters:

<-:

This button moves the selected parameter back to the Available Parameters window.

<-All:

This button moves the selected parameter back to the Available Parameters window.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Square Format dialog.

Ellipse Format Dialog (Figure A.2.5-12):

This dialog is used to update the attributes and parameters of an ellipse.

X Position:

The upper left x coordinate of the ellipse's highlighted bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the ellipse's highlighted bounding box will be pre-filled, and can be updated by the user.

Width:

The width of the ellipse's highlighted bounding box will be pre-filled, and can be updated by the user.

Height:

The height of the ellipse's highlighted bounding box will be pre-filled, and can be updated by the user.

Line Thickness:

The line thickness of the ellipse will be pre-filled, and can be updated by the user.

Line Style:

Solid:

The line style of the ellipse will default to "Solid". A line will be drawn using the foreground color.

OnOff Dash:

This selection specifies that only dashes are drawn with the foreground color.

Double Dash:

This selection specifies that the full path of a line is drawn with the foreground color while are drawn gaps with the background color.

Fill Style:

Not Filled:

The fill style of the ellipse will default to "Not Filled". A rectangle's borders will be drawn with no fill color.

Filled:

A ellipse's borders and interior will be filled with a specified color.

Filling:

A ellipse may be attached to an analog parameter's values. The "Filling" selection allows the start and stop range values to pop up. The ellipse will begin as "Not Filled" when at the start range, and will proportionally fill itself with a specified color, until it is filled at the stop range.

Range:

This portion of the display will only appear if "Filling" is selected.

Empty:

The empty value relating to the analog parameter will be pre-filled to the low yellow value, and can be updated by the user.

Full:

The full value relating to the analog parameter will be pre-filled to the high yellow value, and can be updated by the user.

View Ranges:

This portion of the display will only appear if "Filling" is selected. When the user presses this button, a dialog will appear from which the ranges of the parameter (i.e. high red, high yellow, low yellow, and low red) may be viewed.

Color:

A color dialog is invoked with this selection. The color chosen will act as the foreground color of the schematic display item. This color will be overridden if the display item is attached to a parameter.

Data Source:

The data source that was highlighted in the Data Source dialog will be pre-filled here. It can be updated from the Data Source dialog.

Data Source (Select):

This button invokes the Data Source dialog from which the user may change the data source.

Subsystem:

The subsystem filter selector can be executed to select a subsystem.

Filter:

This button will bring up the Selection Filter window.

All:

This button selects all the subsystems.

Available Parameters:

Find:

The user inputs text into this area, and a search is performed for that text in the Available Parameters window.

All->:

This button will be shaded out as only one parameter may be selected at a time.

->:

This button moves the selected parameter to the Selected Parameters window.

Selected Parameters:

<-:

This button moves the selected parameter back to the Available Parameters window.

<-All:

This button moves the selected parameter back to the Available Parameters window.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Ellipse Format dialog.

Circle Format Dialog (Figure A.2.5-13):

This dialog is used to update the attributes and parameters of a circle.

X Position:

The upper left x coordinate of the circle's highlighted bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the circle's highlighted bounding box will be pre-filled, and can be updated by the user.

Width:

The width of the circle's highlighted bounding box will be pre-filled, and can be updated by the user.

Height:

The height of the circle's highlighted bounding box will be pre-filled, and can be updated by the user.

Line Thickness:

The line thickness of the circle will be pre-filled, and can be updated by the user.

Line Style:

Solid:

The line style of the circle will default to "Solid". A line will be drawn using the foreground color.

OnOff Dash:

This selection specifies that only dashes are drawn with the foreground color.

Double Dash:

This selection specifies that the full path of a line is drawn with the foreground color while are drawn gaps with the background color.

Fill Style:

Not Filled:

The fill style of the circle will default to "Not Filled". A rectangle's borders will be drawn with no fill color.

Filled:

A circle's borders and interior will be filled with a specified color.

Filling:

A circle may be attached to an analog parameter's values. The "Filling" selection allows the start and stop range values to pop up. The circle will begin as "Not Filled" when at the start range, and will proportionally fill itself with a specified color, until it is filled at the stop range.

Range:

This portion of the display will only appear if "Filling" is selected.

Empty:

The empty value relating to the analog parameter will be pre-filled to the low yellow value, and can be updated by the user.

Full:

The full value relating to the analog parameter will be pre-filled to the high yellow value, and can be updated by the user.

View Ranges:

This portion of the display will only appear if "Filling" is selected. When the user presses this button, a dialog will appear from which the ranges of the parameter (i.e. high red, high yellow, low yellow, and low red) may be viewed.

Color:

A color dialog is invoked with this selection. The color chosen will act as the foreground color of the schematic display item. This color will be overridden if the display item is attached to a parameter.

Data Source:

The data source that was highlighted in the Data Source dialog will be pre-filled here. It can be updated from the Data Source dialog.

Data Source (Select):

This button invokes the Data Source dialog from which the user may change the data source.

Subsystem:

The subsystem filter selector can be executed to select a subsystem.

Filter:

This button will bring up the Selection Filter window.

All:

This button selects all the subsystems.

Available Parameters:

Find:

The user inputs text into this area, and a search is performed for that text in the Available Parameters window.

All->:

This button will be shaded out as only one parameter may be selected at a time.

->:

This button moves the selected parameter to the Selected Parameters window.

Selected Parameters:

<-:

This button moves the selected parameter back to the Available Parameters window.

<-All:

This button moves the selected parameter back to the Available Parameters window.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Circle Format dialog.

Polygon Format Dialog (Figure A.2.5-14):

This dialog is used to update the attributes and parameters of a polygon.

X Position:

The upper left x coordinate of the polygon's highlighted bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the polygon's highlighted bounding box will be pre-filled, and can be updated by the user.

Width:

The width of the polygon's highlighted bounding box will be pre-filled, and can be updated by the user.

Height:

The height of the polygon's highlighted bounding box will be pre-filled, and can be updated by the user.

Line Thickness:

The line thickness of the polygon will be pre-filled, and can be updated by the user.

Line Style:

Solid:

The line style of the polygon will default to "Solid". A line will be drawn using the foreground color.

OnOff Dash:

This selection specifies that only dashes are drawn with the foreground color.

Double Dash:

This selection specifies that the full path of a line is drawn with the foreground color while are drawn gaps with the background color.

Fill Style:

Not Filled:

The fill style of the polygon will default to "Not Filled". A rectangle's borders will be drawn with no fill color.

Filled:

A polygon's borders and interior will be filled with a specified color.

Status:

The status of the polygon will be pre-filled to either opened, or closed depending on how the user drew the polygon.

Closed:

If the status of the polygon was previously set to "Opened", then a line would be drawn across the two open ended points to close the polygon.

Open:

If the status of the polygon was previously set to "Closed", then a line would be erased across the first and the last points of the polygon.

Color:

A color dialog is invoked with this selection. The color chosen will act as the foreground color of the schematic display item. This color will be overridden if the display item is attached to a parameter.

Data Source:

The data source that was highlighted in the Data Source dialog will be pre-filled here. It can be updated from the Data Source dialog.

Data Source (Select):

This button invokes the Data Source dialog from which the user may change the data source.

Subsystem:

The subsystem filter selector can be executed to select a subsystem.

Filter:

This button will bring up the Selection Filter window.

All:

This button selects all the subsystems.

Available Parameters:

Find:

The user inputs text into this area, and a search is performed for that text in the Available

Parameters window.

All->:

This button will be shaded out as only one parameter may be selected at a time.

->:

This button moves the selected parameter to the Selected Parameters window.

Selected Parameters:

<-:

This button moves the selected parameter back to the Available Parameters window.

<-All:

This button moves the selected parameter back to the Available Parameters window.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Polygon Format dialog.

Line Format Dialog (Figure A.2.5-15):

This dialog is used to update the attributes and parameters of a line.

X Position:

The upper left x coordinate of the line's highlighted bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the line's highlighted bounding box will be pre-filled, and can be updated by the user.

Width:

The width of the line's highlighted bounding box will be pre-filled, and can be updated by the user.

Height:

The height of the line's highlighted bounding box will be pre-filled, and can be updated by the user.

Line Thickness:

The line thickness of the line will be pre-filled, and can be updated by the user.

Line Style:

Solid:

The line style of the line will default to "Solid". A line will be drawn using the foreground color.

OnOff Dash:

This selection specifies that only dashes are drawn with the foreground color.

Double Dash:

This selection specifies that the full path of a line is drawn with the foreground color while are drawn gaps with the background color.

Color:

A color dialog is invoked with this selection. The color chosen will act as the foreground color of the schematic display item. This color will be overridden if the display item is attached to a parameter.

Data Source:

The data source that was highlighted in the Data Source dialog will be pre-filled here. It can be updated from the Data Source dialog.

Data Source (Select):

This button invokes the Data Source dialog from which the user may change the data source.

Subsystem:

The subsystem filter selector can be executed to select a subsystem.

Filter:

This button will bring up the Selection Filter window.

All:

This button selects all the subsystems.

Available Parameters:

Find:

The user inputs text into this area, and a search is performed for that text in the Available Parameters window.

All->:

This button will be shaded out as only one parameter may be selected at a time.

->:

This button moves the selected parameter to the Selected Parameters window.

Selected Parameters:

<-:

This button moves the selected parameter back to the Available Parameters window.

<-All:

This button moves the selected parameter back to the Available Parameters window.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Line Format dialog.

Arc Format Dialog (Figure A.2.5-16):

This dialog is used to update the attributes and parameters of an arc.

X Position:

The upper left x coordinate of the arc's highlighted bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the arc's highlighted bounding box will be pre-filled, and can be updated by the user.

Width:

The width of the arc's highlighted bounding box will be pre-filled, and can be updated by the user.

Height:

The height of the arc's highlighted bounding box will be pre-filled, and can be updated by the user.

Line Thickness:

The line thickness of the arc will be pre-filled, and can be updated by the user.

Line Style:

Solid:

The line style of the arc will default to "Solid". A line will be drawn using the foreground color.

OnOff Dash:

This selection specifies that only dashes are drawn with the foreground color.

Double Dash:

This selection specifies that the full path of a line is drawn with the foreground color while are drawn gaps with the background color.

Color:

A color dialog is invoked with this selection. The color chosen will act as the foreground color of the schematic display item. This color will be overridden if the display item is attached to a parameter.

Data Source:

The data source that was highlighted in the Data Source dialog will be pre-filled here. It can be updated from the Data Source dialog.

Data Source (Select):

This button invokes the Data Source dialog from which the user may change the data source.

Subsystem:

The subsystem filter selector can be executed to select a subsystem.

Filter:

This button will bring up the Selection Filter window.

All:

This button selects all the subsystems.

Available Parameters:

Find:

The user inputs text into this area, and a search is performed for that text in the Available Parameters window.

All->:

This button will be shaded out as only one parameter may be selected at a time.

->:

This button moves the selected parameter to the Selected Parameters window.

Selected Parameters:

<-:

This button moves the selected parameter back to the Available Parameters window.

<-All:

This button moves the selected parameter back to the Available Parameters window.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Arc Format dialog.

Point Format Dialog (Figure A.2.5-17):

This dialog is used to update the attributes and parameters of a point.

X Position:

The upper left x coordinate of the point's highlighted bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the point's highlighted bounding box will be pre-filled, and can be updated by the user.

Color:

A color dialog is invoked with this selection. The color chosen will act as the foreground color of the schematic display item. This color will be overridden if the display item is attached to a parameter.

Data Source:

The data source that was highlighted in the Data Source dialog will be pre-filled here. It can be updated from the Data Source dialog.

Data Source (Select):

This button invokes the Data Source dialog from which the user may change the data source.

Subsystem:

The subsystem filter selector can be executed to select a subsystem.

Filter:

This button will bring up the Selection Filter window.

All:

This button selects all the subsystems.

Available Parameters:

Find:

The user inputs text into this area, and a search is performed for that text in the Available Parameters window.

All->:

This button will be shaded out as only one parameter may be selected at a time.

->:

This button moves the selected parameter to the Selected Parameters window.

Selected Parameters:

<-:

This button moves the selected parameter back to the Available Parameters window.

<-All:

This button moves the selected parameter back to the Available Parameters window.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Point Format dialog.

Icons Format Dialog (Figure A.2.5-18):

This dialog is used to update the attributes and parameters of a point.

X Position:

The upper left x coordinate of the point's highlighted bounding box will be pre-filled, and can be updated by the user.

Y Position:

The upper left y coordinate of the point's highlighted bounding box will be pre-filled, and can be updated by the user.

Select a Pair of Icons:

The user may choose one pair of icons from which a discrete parameter's values may be attached.

"Discrete Parameter" States:

Once a discrete parameter has been chosen, its possible values will appear in the scrolling list window. The user may click on a value, and that state will be assigned to one of the selected icons. Similarly, a click on a second value will assign that state to the other icon in the pair.

Data Source:

The data source that was highlighted in the Data Source dialog will be pre-filled here. It can be updated from the Data Source dialog.

Data Source (Select):

This button invokes the Data Source dialog from which the user may change the data source.

Subsystem:

The subsystem filter selector can be executed to select a subsystem.

Filter:

This button will bring up the selection Filter window.

All:

This button selects all the subsystems.

Available Parameters:

Find:

The user inputs text into this area, and a search is performed for that text in the Available Parameters window.

All->:

This button will be shaded out as only one parameter may be selected at a time.

->:

This button moves the selected parameter to the Selected Parameters window.

Selected Parameters:

<-:

This button moves the selected parameter back to the Available Parameters window.

<-All:

This button moves the selected parameter back to the Available Parameters window.

OK:

This button processes the changes from the dialog, and quits it.

Cancel:

This button quits the dialog without any updates.

Help:

This button invokes a display that gives help information about the Icons Format dialog.

A.2.5.4 Display Builder Output

When the Build button on the Display Builder Palette window is pressed, the dynamic page will be saved to a file. The file will be sent to Data Management for storage and retrieval.

A.2.6 Help Window

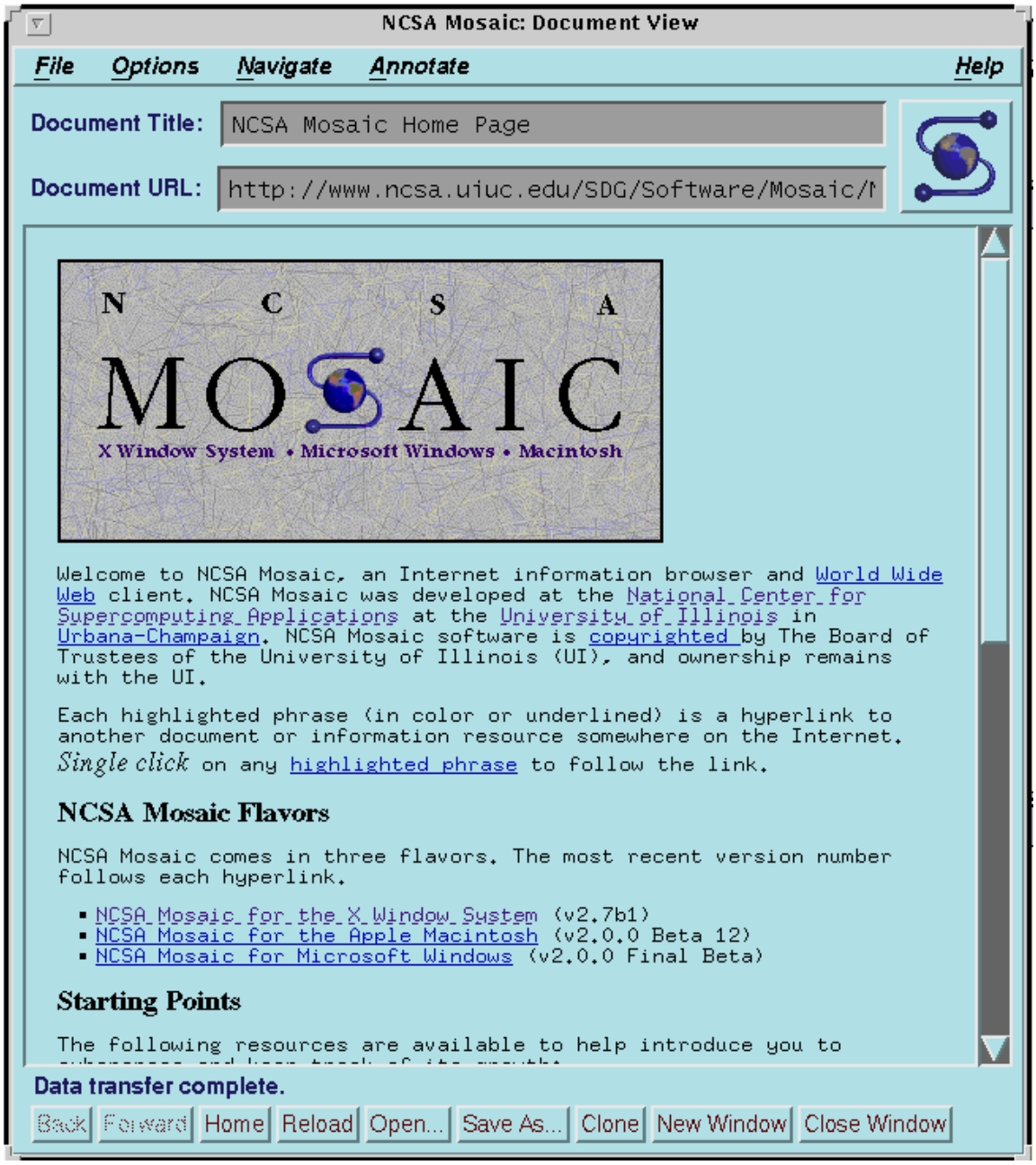


Figure A.2.6-1. Help Window

A.2.6.1 Help Usage

The help window is used to display context-sensitive help information from any FOS window. It will be implemented using a COTS product.

A.2.6.2 Help Access

Each window has a help button. When the button is pressed, the context-sensitive text for that window will be displayed in the help window. For example, when the quick analysis window's help button is pressed, the quick analysis help text will appear in the help window.

A.2.6.3 Help Input

This will depend upon the COTS product. The window will contain such features as: a home button that will take the user to a menu; a scrollbar to view the text; save text to a file; print text; traverse forward and backward; and hypertext capabilities where related subjects that are highlighted can be clicked upon to bring up information about the particular subject.

A.2.6.4 Help Output

The help window will display the help text for the window that called it.

A.2.7 Procedure Builder/Procedure Editor

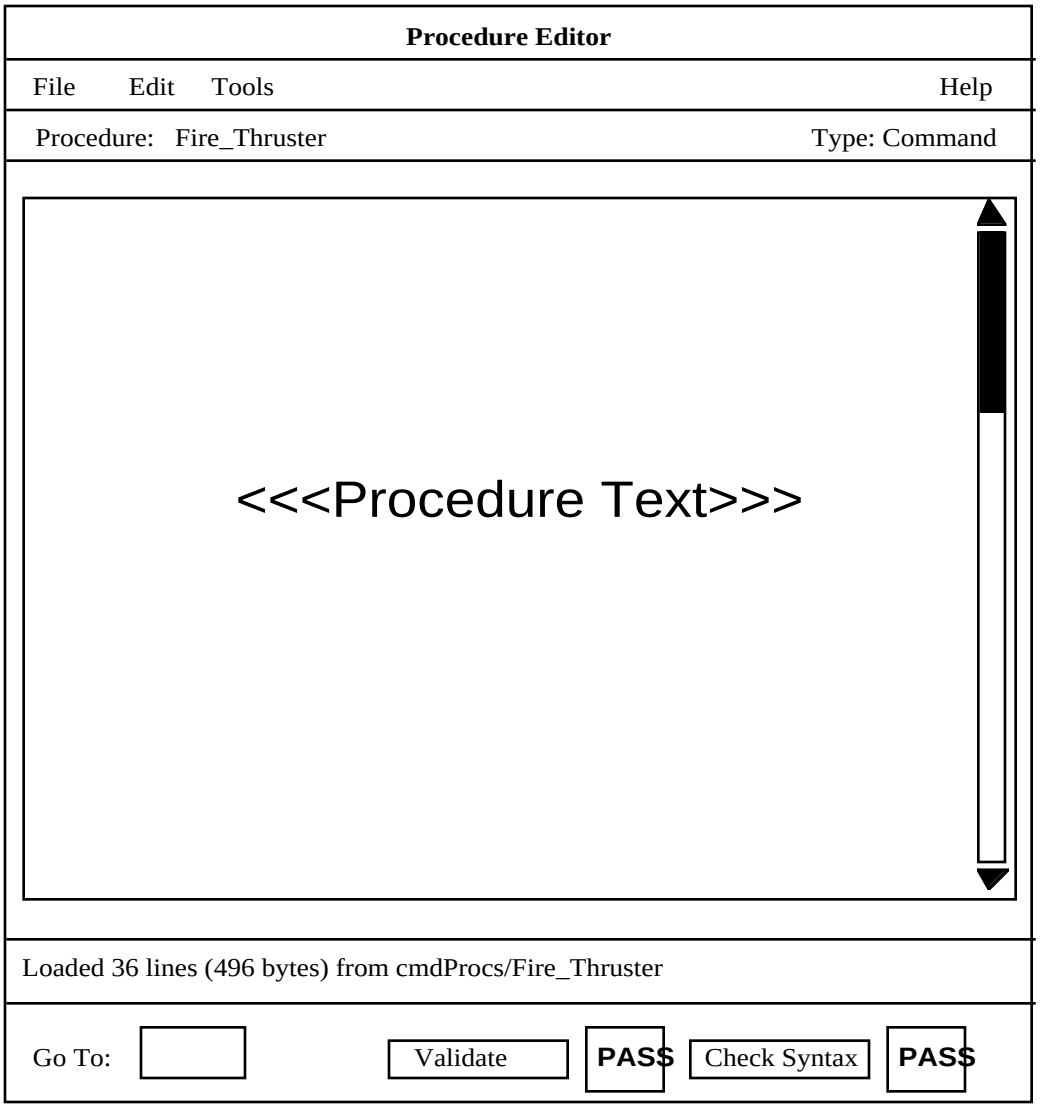


Figure A.2.7-1. Procedure Editor Window

A.2.7.1 Procedure Editor Usage

The Procedure Editor (Figure A.2.7-1) is used by the Flight Operations Team (FOT) and Instrument Operations Team (IOT) members to develop and maintain ECS Command Language (ECL) procedures. This tool allows a user to create, edit, delete, save, and print procedures. The edit and delete operations are subject to authorization checking. The Procedure Editor includes standard editing operations (e.g., cut, copy, paste, etc.) along with FOS-specific operations that allow the user to perform syntax checking (i.e., check the grammar) and validation (i.e., check command constraints).

The Procedure Editor includes a menu bar with four pull-down menus: **File, Edit, Tools**, and **Help**. Each of these menus is described in Section A.2.7.3 below. Just below the menu bar is an identification line. This line contains the name of the procedure and its type. Valid types include Emergency, Command, Ground, Local, Activity, and User-defined. A scrolling text window is located below the identification line. This window contains the procedure text entered by the user. Standard keyboard and mouse editing functions (e.g., Page Up, Page Down, highlighting with the mouse, etc.) are accommodated in this window. Under the text window is a status line The status line displays messages indicating the completion of user-activated operations (e.g., procedure loaded, syntax check completed, etc.). If an error occurs during an operation, the status message will provide information to assist the user in resolving the error. Along the bottom of the Procedure Editor window is a text input field and two buttons with associated status indicators. The text input field allows a user to enter either a line number or a label for the Go To operation. The buttons allow a user to validate the procedure or to check the syntax of the directives. The values displayed in the associated status indicators is described in Section A.2.7.4.

A.2.7.2 Procedure Editor Access

The Procedure Editor may be accessed from several windows, including:

- The Control Window (two methods),
- The Command Request Window, and
- The Command Control Display.

A user may access the Procedure Editor from the Control Window either through the Tools menu or the Proc menu. If the Procedure Editor is activated from the Tools menu, it will display a procedure template. If activated from the Proc menu, the editor will display the selected procedure.

The Command Request Window, which provides the capability to create and submit command requests to the Command Activity Controller, allows a user to access the Procedure Editor via a push button. The Procedure Editor allows the requester to create, modify, or display procedures that can be attached to a command request.

The Command Control Display allows a user with command authority to activate the procedure editor using a procedure selection dialog. This capability allows the user to create, edit, or display a procedure that can be merged in with the executing ground script directives.

In addition to the access provided through the windows described above, the Procedure Editor may be activated via an ECL directive. A user may specify the name and type of the procedure in the directive. If a name is not specified, the procedure editor will be activated with a procedure template.

A.2.7.3 Procedure Editor Input

The Procedure Editor provides the user with standard editing capabilities through a combination of keyboard and mouse input. The keyboard is used primarily to enter procedure text. Support

for keyboard control keys (e.g., Page Up, Page Down, Home, End, etc.) is also provided. Accelerator keys are provided for both the menu bar and the pull-down menu options (e.g., <alt>F displays the File menu, <alt>X performs the cut operation).

The mouse is used to position the cursor within the procedure text, to perform standard Motif selection operations (e.g., double-click selects the current word, triple-click select the current line, quadruple-click select all text), to select options from the menu bar and pull-down menus, and to select the **Validate** or **Check Syntax** buttons. The Procedure Editor menu bar contains four pull-down menus: File, Edit, Tools, and Help. The File menu options include:

New	opens a template file to create a new procedure.
Open	displays a file selection dialog window that allows the user to open an existing procedure.
Save	saves the current procedure, including its validation and syntax check indicators. By default, the procedure is saved to the area specified by the last Save As operation. If Save As has been used, the procedure is saved locally.
Save As	displays a file selection dialog window that allows the user to save the current procedure with a new name. This dialog allows the user to save the procedure to either a local area or to a CM staging area. Procedure saved to the staging area will undergo a formal CM procedure.
Print	displays a file selection dialog window that allows the user to print a selected procedure (default is the current procedure).
Quit	exits the Procedure Editor.

The Edit menu contains the options that allow the user to perform typical cut, copy, paste, find and replace operations. The Edit menu options include:

Undo	performs an undo of the last edit operation.
Cut	deletes the selected text and places it into the clipboard.
Copy	places a copy of the selected text into the clipboard.
Paste	inserts the text in the clipboard into the procedure text at the current cursor location
Delete	deletes the selected text.
Find	activates a find dialog that allows the user to either find and highlight the next occurrence of a specified text string or to highlight all occurrences of the text string.
Replace	activates a replace dialog that allows the user to either find the next occurrence of a one text string and replace it with another specified string or to replace all occurrences of a text string.

The Tools menu contains options that invoke procedure-related tools to assist the user. These options include:

Command Request invokes the Command Request window (see Section A.6.3).

Command Builder toggles the Command Builder (see Section A.2.8).

The Help menu contains options that provide context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

The Validate button initiates the validation of the procedure by the Command Management Subsystem. This action will also perform a syntax check of the procedure if the syntax check status indicator is not set to PASS (see Section A.2.7.4 below).

The Check Syntax button initiates a syntax check of the directive text.

A.2.7.4 Procedure Editor Output

The Procedure Editor outputs includes status messages, a warning dialog, syntax and validation indicators, informational dialogs, saved procedure files, and updated procedure information. Status messages indicate the completion status of user-specified operations, including:

- Loading (reading) a procedure file,
- Saving (writing) a procedure file,
- Checking the syntax of a procedure,
- Validating a procedure,
- Printing a procedure,
- Searching for text (number of occurrences found), and
- Replacing text (number of replacements performed).

A warning dialog is displayed when a user attempts to create a new procedure, open an existing procedure, or exit the editor if modifications have been made to the current procedure since the last save operation. The warning dialog provides options to save the current procedure, discard the procedure modifications, or cancel the current action (e.g., cancel the quit operation).

The syntax and validation indicators use both color and text to indicate the respective status of the current procedure. The values displayed by these indicators are **PASS** (green), **????** (yellow), and **FAIL** (red). The **????** is used to signify an unknown state. Anytime that the procedure text is modified, the indicators display this state.

An informational dialog is displayed whenever syntax or validation errors are detected. This dialog contains the error messages generated by the syntax or validation check, including the directive text, if appropriate.

The procedure file and procedure information are saved as the result of a save (or save as) operation. The status of the save operation is displayed to the user via one of the status message described above. A procedure may be saved to either a local area of to a CM staging area. A

procedure saved to the CM staging area will undergo a formal CM approval process before it can be used in an operational environment. Only procedures that pass validation may be saved to the CM staging area.

A.2.8 Command Builder

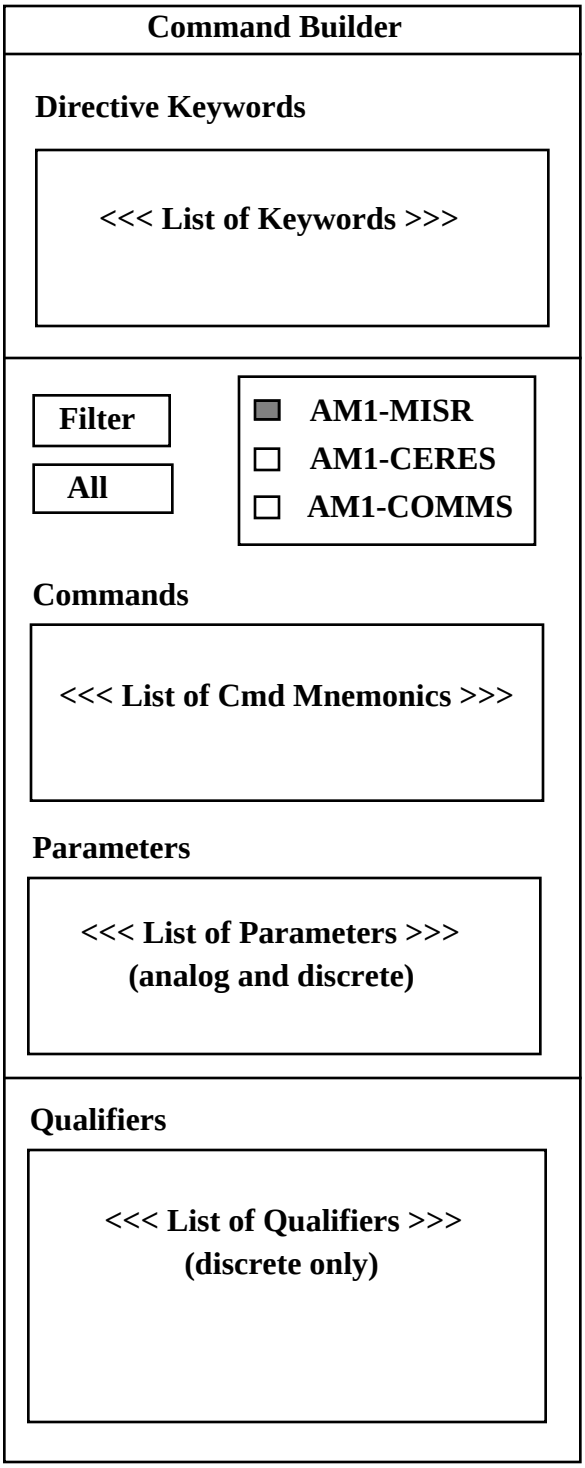


Figure A.2.8-1 Command Builder (Qualifiers)

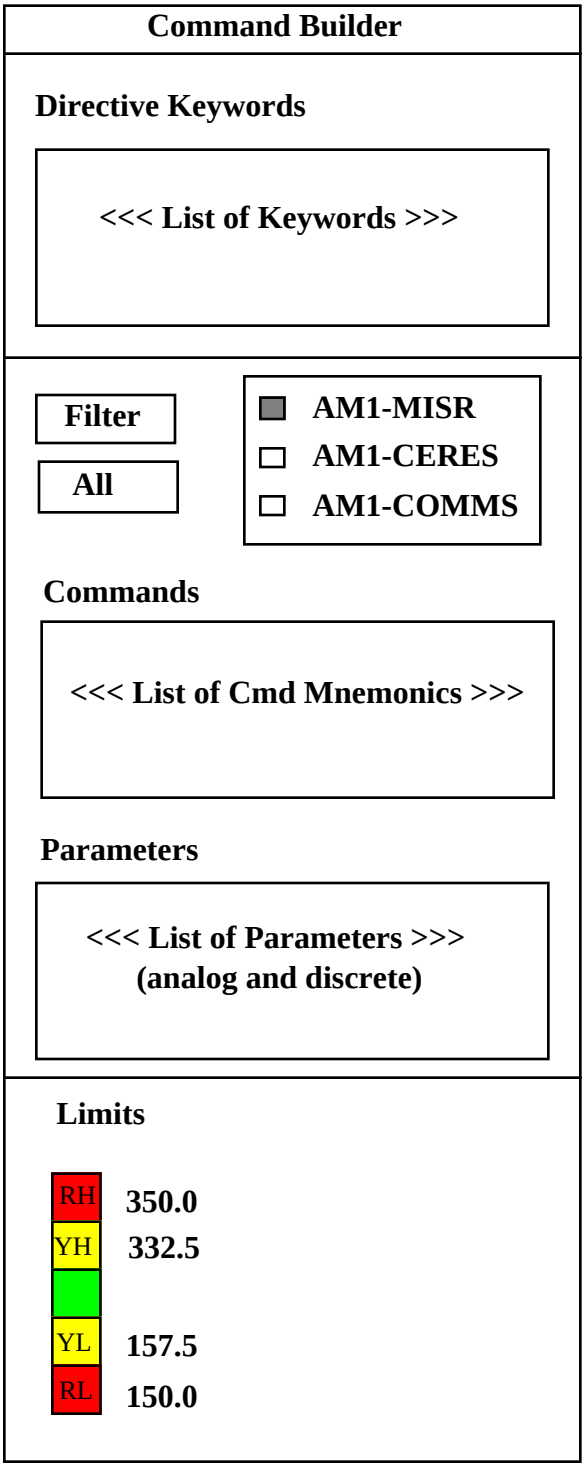


Figure A.2.8-2 Command Builder (Limits)

A.2.8.1 Command Builder Usage

The Command Builder is used in conjunction with the Procedure Editor (see Section A.2.8) to dynamically construct ECL directives. The Command Builder is also used with the RTS Load Builder (see Section A.4.2) to dynamically construct commands for a RTS load. The Command Builder window consists of four scrolling lists, a selection filter, and a set of color-coded boxes corresponding to the parameter limits.

The scrolling lists contain directive keywords, command mnemonics, parameter mnemonics, and qualifiers. The directive keywords are the keywords defined by the ECL grammar. The parameters and command mnemonics are displayed according to a user-specified subsystem/instrument filter. The qualifiers list (see Figure A.2.8-1), which is displayed only when a discrete parameter or directive keyword is selected, contains the secondary keyword(s) for the selected ECL directive keyword (e.g., CLOSE and CLOSE ALL for the PAGE keyword) or the states for a selected discrete parameters (e.g., ON, OFF for MICAMERA).

The color-coded boxes representing limits (see Figure A.2.8-2) are displayed only when an analog parameter is selected. The boxes and limit values are displayed in a vertical column with high-red at the top and low-red at the bottom.

A.2.8.2 Command Builder Access

The Command Builder is accessed by selecting the **Command Builder** option from either the Utility menu of the Procedure Editor or the Utility menu of the RTS Load Builder. Sections A.2.8.3 and A.4.2.3 provide more information about the Procedure Editor and the RTS Load Builder option menus, respectively.

A.2.8.3 Command Builder Input

The Command Builder provides a user with the capability to dynamically construct directives, including commands, using the mouse. A single left-button click on either the directive keyword list or the parameter list highlights the selection and updates either the qualifiers list or the limit boxes according to the following rules:

Select	Updates
directive keyword	qualifiers list - secondary keyword(s)
discrete parameter	qualifiers list - valid states
command mnemonic	n/a
analog parameter	limit boxes - current limit values

A double left-button click on any item in a list will insert the item (i.e., directive keyword, command mnemonic, parameter mnemonic, or qualifier) into the procedure or RTS load contents text at the current cursor location (note: only the command mnemonic items may be selected when the Command Builder is used with the RTS Load Builder). If a user double-clicks on one of the limit boxes, a symbolic constant (e.g., high-red, high-yellow, nominal, low-yellow, low-red) will be placed into the procedure text. This symbolic constant will be evaluated when the procedure is executed.

A Selection Filter window may be accessed by selecting the **Filter** button on the Command Builder window. The Selection Filter window allows a user to construct a set of filters for the parameter and command lists. This set of selection filters is then displayed in a scrolling window above the parameter list. The contents of the parameter list are defined according to the filters selected by the user. A user may select the **All** button to select all filters in the set. Section A.3.2 provides a further description of the Selection Filter utility.

A.2.8.4 Command Builder Output

The output of the Command Builder consists of user-constructed directives that are inserted into the editor text. These directives may include a combination of directive keywords, parameter mnemonics, command mnemonics, qualifiers (secondary keywords and discrete states), and symbolic constants representing parameter limits.

A.2.9 Reports

A.2.9.1 Report Selector

A.2.9.1.1 Report Selector Usage

The Report Selector (Figure A.2.9.1-1) is used by the Flight Operations Team (FOT) and Instrument Operations Team (IOT) members to select the type of report they wish to generate.

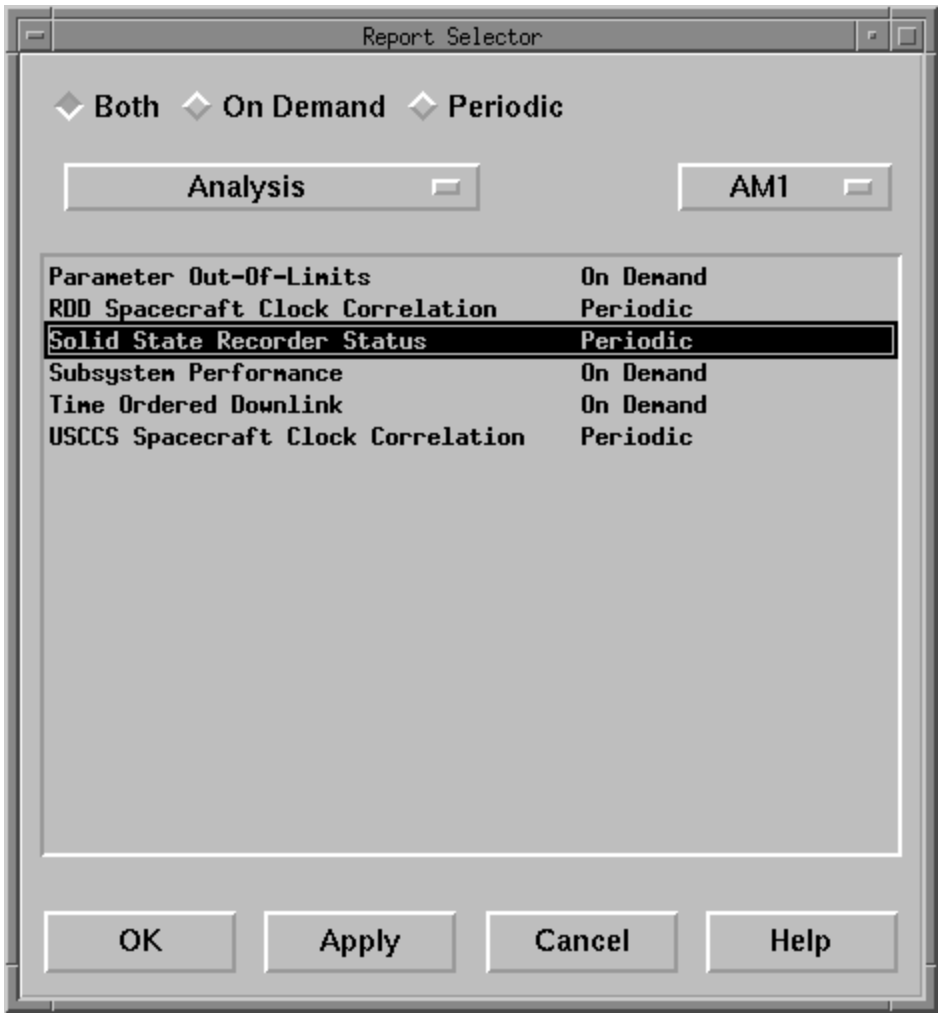


Figure A.2.9.1-1. Report Selector Window

A.2.9.1.2 Report Selector Access

The Report Selector may be accessed by any user from the Tools menu located on the Control window (see Section A.1.8).

A.2.9.1.3 Report Selector Input

The Report Selector window allows the user to select the type of report they wish to generate. The user may specify parameters to restrict the types of reports selections displayed. These parameters include:

- **Both, On Demand, Periodic** (radio box) - default value is Both. This radio box controls whether only On Demand or Periodic or Both report types are displayed.

- **Subsystem** (option menu) - default value is All; other options include Custom, Analysis, Command Management, Data Management, Planning & Scheduling, Resource Management, Telemetry and User Interface.
- **Vehicle** (option menu) - default value is AM1; other options include Chemistry and PM1.

The **Available Reports** list is used to select the type of report desired. The available reports are listed alphabetically with a qualifier of either "On Demand" or "Periodic". The user selects the type of report with the mouse and then pushes the **Ok** or **Apply** button at the bottom of the window. This will bring up the select report template dialog box.

Four buttons are located along the bottom of the Report Selector window. The **Ok** button will remove the Report Selector window, and bring up the selected report template dialog box. The **Apply** button will leave up the Report Selector window, and bring up the selected report template dialog box. The **Cancel** button will ignore any selections and remove the Report Selector window. The **Help** button activates a window that provides help information about the Report Selector.

A.2.9.2 Periodic Report Selector Dialog

A.2.9.2.1 Periodic Report Selector Dialog Usage

The Periodic Report Selector Dialog (Figure A.2.9.2-1) is used by the Flight Operations Team (FOT) and Instrument Operations Team (IOT) members to browse, print, or copy to a file a periodically generated report such as the Solid State Recorder Status Report.

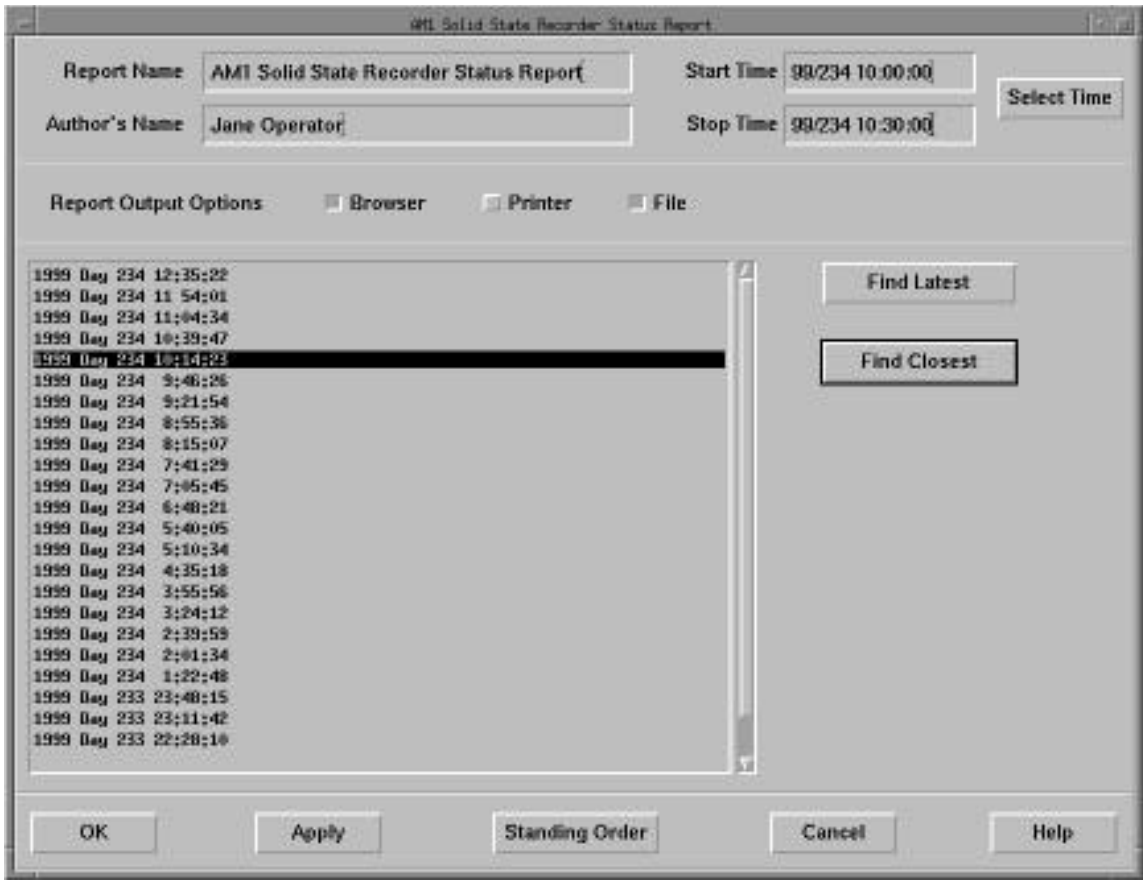


Figure A.2.9.2-1. Periodic Report Selector Dialog

A.2.9.2.2 Periodic Report Selector Dialog Access

The Periodic Report Selector Dialog may be accessed by any user from the Report Selector window (see Section A.2.9.1).

A.2.9.2.3 Periodic Report Selector Dialog Input

The Periodic Report Selector Dialog allows the user to select the periodic report they wish. The dialog is used to build a template which is used by the report generator to retrieve the periodic report. The user can specify parameters which are used by the report generator. The user may also pass this template on to the standing order manager. These parameters include:

- **Report Name** (text field) - The name of the report (automatically filled in).
- **Author's Name** (text field) - The author of this report template (automatically filled in).
- **Start Time** (text field) - The earliest periodic report the user is interested in (optional for normal requests, required for standing orders). The user may use the **Select Time** button to bring up the time selector to assist in filling in the start and stop times.

- **Stop Time** (text field) - The latest periodic report the user is interested in (optional for normal requests, required for standing orders). The user may use the **Select Time** button to bring up the time selector to assist in filling in the start and stop times.
- **Browser** (toggle button) - Generate the report and display it in the Report Browser.
- **Printer** (toggle button) - Generate the report and send it to the printer.
- **Browser** (toggle button) - Generate the report and save it to a file.

The **Available Reports** list is used to select the periodic report desired. The available reports are listed in descending chronological order. The user selects the periodic report with the mouse and then pushes the **Ok** or **Apply** button at the bottom of the window. This will generate a report template and pass it to the Report Generator, or the Standing Order Manager in the case of Standing Orders. The **Find Latest** button automatically selects the latest report. The **Find Closest** button automatically selects the report closest to the specified start/stop time period.

Five buttons are located along the bottom of the Periodic Report Selector Dialog. The **Ok** button will remove the Periodic Report Selector Dialog, and pass on the report template for processing. The **Apply** button will leave up the Periodic Report Selector Dialog, and pass on the report template for processing. The **Standing Order** button will bring up the Standing Order Dialog and allow the user to turn the current report template into a Standing Order. The **Cancel** button will ignore any selections and remove the Periodic Report Selector Dialog. The **Help** button activates a window that provides help information about the Periodic Report Selector Dialog.

A.2.9.3 On Demand Report Selector Dialog

A.2.9.3.1 On Demand Report Selector Dialog Usage

The On Demand Report Selector Dialog (Figure A.2.9.3-1) is used by the Flight Operations Team (FOT) and Instrument Operations Team (IOT) members to generate an On Demand report such as the Parameter Out-Of-Limits Report.

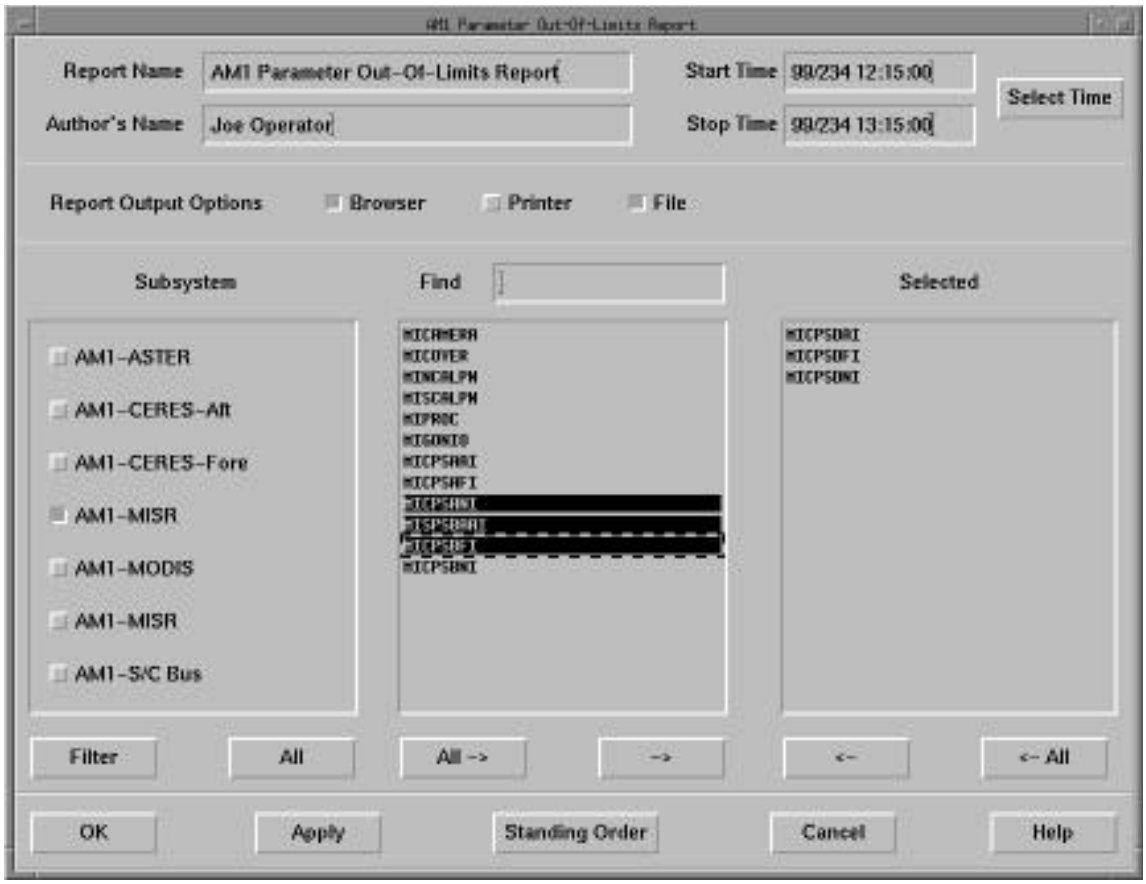


Figure A.2.9.3-1. On Demand Report Selector Dialog

A.2.9.3.2 On Demand Report Selector Dialog Access

The On Demand Report Selector Dialog may be accessed by any user from the Report Selector window (see Section A.2.9.1).

A.2.9.3.3 On Demand Report Selector Dialog Input

The On Demand Report Selector Dialog allows the user to specify the data required for the on demand report they wish. The dialog is used to build a template which is used by the report generator to generate the on demand report. The user can specify parameters which are used by the report generator. The user may also pass this template on to the standing order manager. These parameters include:

- **Report Name** (text field) - The name of the report (automatically filled in).
- **Author's Name** (text field) - The author of this report template (automatically filled in).

- **Start Time** (text field) - The earliest periodic report the user is interested in (optional for normal requests, required for standing orders). The user may use the **Select Time** button to bring up the time selector to assist in filling in the start and stop times.
- **Stop Time** (text field) - The latest periodic report the user is interested in (optional for normal requests, required for standing orders). The user may use the **Select Time** button to bring up the time selector to assist in filling in the start and stop times.
- **Browser** (toggle button) - Generate the report and display it in the Report Browser.
- **Printer** (toggle button) - Generate the report and send it to the printer.
- **Browser** (toggle button) - Generate the report and save it to a file.

The Parameter Out-Of-Limits Report is an example of an on demand report. There will be at least 30 different on demand reports available. Each will have a unique dialog. In the case of the Parameter Out-Of-Limits Report, the user is required to specify the period of time of interest as well as the parameters of interest. The parameters are selected using a standard subsystem filter along with a double scrolling list selector.

Five buttons are located along the bottom of the On Demand Report Selector Dialog. The **Ok** button will remove the On Demand Report Selector Dialog, and pass on the report template for processing. The **Apply** button will leave up the On Demand Report Selector Dialog, and pass on the report template for processing. The **Standing Order** button will bring up the Standing Order Dialog and allow the user to turn the current report template into a Standing Order. The **Cancel** button will ignore any selections and remove the On Demand Report Selector Dialog. The **Help** button activates a window that provides help information about the On Demand Report Selector Dialog.

A.2.9.4 Custom Report Dialog

A.2.9.4.1 Custom Report Dialog Usage

The Custom Report Dialog (Figure A.2.9.4-1) is used by the Flight Operations Team (FOT) and Instrument Operations Team (IOT) members to generate a custom report.

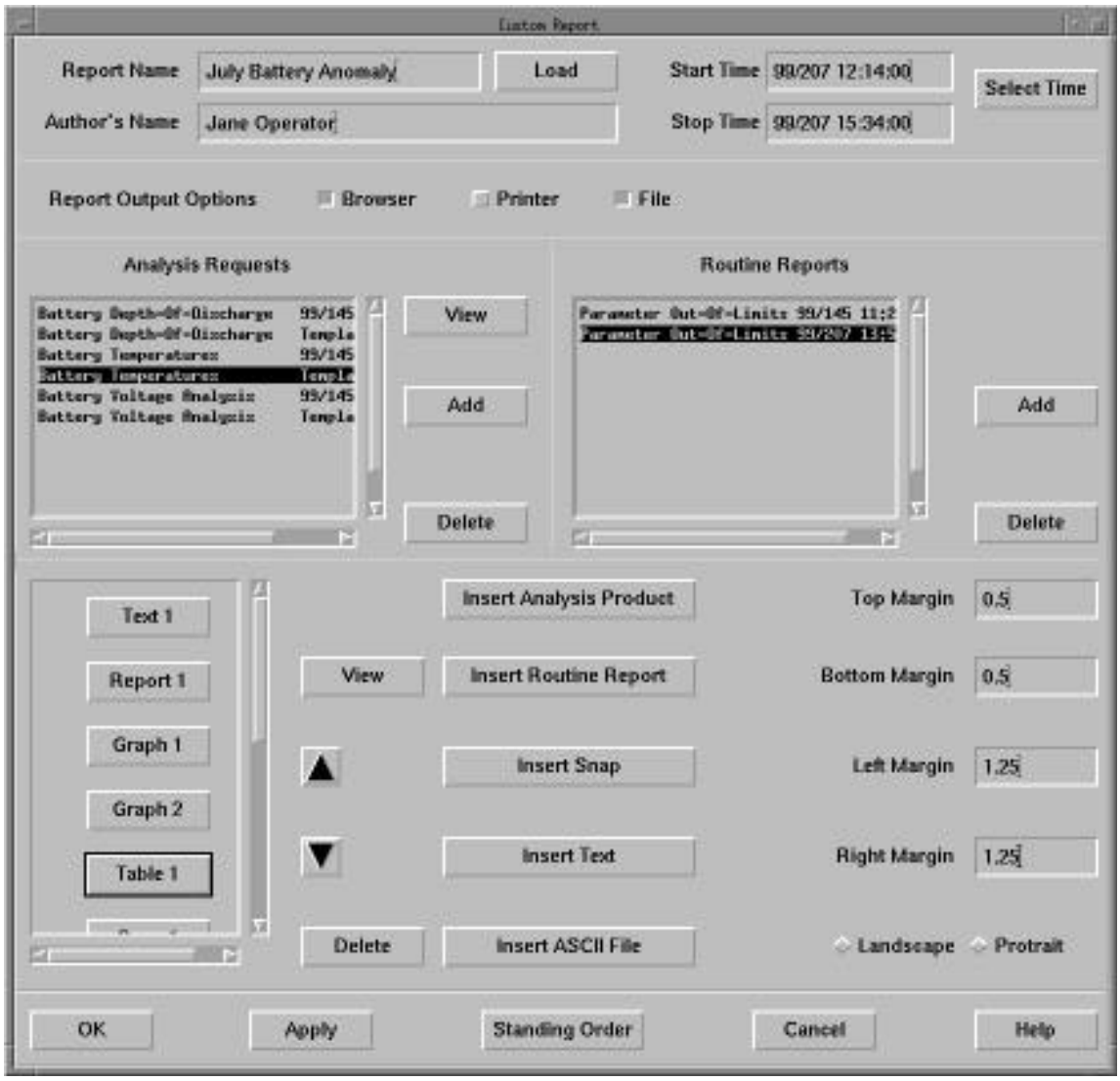


Figure A.2.9.4-1. Custom Report Dialog

A.2.9.4.2 Custom Report Dialog Access

The Custom Report Dialog may be accessed by any user from the Report Selector window (see Section A.2.9.1).

A.2.9.4.3 Custom Report Dialog Input

The Custom Report Dialog allows the user to define the contents of a custom report. The dialog is used to build a template which is used by the report generator to generate the custom report. The user can specify parameters which are used by the report generator. The user may also pass this template on to the standing order manager. These parameters include:

- **Report Name** (text field) - The name of the report (automatically filled in).
- **Load** (push button) - Load an existing custom report template for editing (brings up a file selector dialog).
- **Author's Name** (text field) - The author of this report template (automatically filled in).
- **Start Time** (text field) - The earliest periodic report the user is interested in (optional for normal requests, required for standing orders). The user may use the **Select Time** button to bring up the time selector to assist in filling in the start and stop times.
- **Stop Time** (text field) - The latest periodic report the user is interested in (optional for normal requests, required for standing orders). The user may use the **Select Time** button to bring up the time selector to assist in filling in the start and stop times.
- **Browser** (toggle button) - Generate the report and display it in the Report Browser.
- **Printer** (toggle button) - Generate the report and send it to the printer.
- **Browser** (toggle button) - Generate the report and save it to a file.

A custom report can be a collection of analysis products (graphs, tables), routine reports, page snaps, free form text and ASCII files. The user defines which items should be placed in the report and in what order. Towards this end, the Custom Report Dialog has two center sections. The first allows a user to analysis request products or reports are available to be inserted into the report. The second area allows the user to define the contents of the report. The Analysis Requests area is composed of the following items:

- **Analysis Requests** (single select scrolling list) - List of available analysis request templates and products the user wishes to insert into the report.
- **View** (push button) - View the selected analysis request in the Analysis Request Window.
- **Add** (push button) - Add analysis request templates and products to the available list (brings up a selection dialog).
- **Delete** (push button) - Delete the currently selected analysis request.

The Routine Reports area is composed of the following items:

- **Add** (push button) - Add routine reports to the available list (brings up a selection dialog).
- **Delete** (push button) - Delete the currently selected routine report.

The report composition area is composed of the following items:

- **Report Layout** (single select scrolling window) - List of push buttons representing the current layout of the report. Every time a new item is added to the report, a button is added to the bottom of the scrolling window. The user may select an item (push a button) and modify the margin and orientation attributes.
- **View** (push button) - View the selected item in the report browser.
- **Up Arrow** (push button) - Move the selected item up one place.

- **Down Arrow** (push button) - Move the selected item down one place.
- **Delete** (push button) - Delete the currently selected item.
- **Insert Analysis Product** (push button) - Insert an analysis product. This brings up selection dialog with all of the products associated with the specified analysis requests.
- **Insert Routine Report** (push button) - Insert a routine report. This brings up selection dialog with all of the products associated with the specified routine reports.
- **Insert Snap** (push button) - Insert a page snap. This brings up selection dialog with all of the user's page snaps.
- **Insert Text** (push button) - Insert free form text. This brings a simple editor into which the user enters the text.
- **Insert ASCII File** (push button) - Insert an ASCII file. This brings up file selection dialog.
- **Top Margin** (text field) - Item's top margin in inches.
- **Bottom Margin** (text field) - Item's bottom margin in inches.
- **Left Margin** (text field) - Item's left margin in inches.
- **Right Margin** (text field) - Item's right margin in inches.
- **Orientation** (radio box) - Item's orientation. This can be either landscape or portrait.

Five buttons are located along the bottom of the Custom Report Dialog. The **Ok** button will remove the Custom Report Dialog, and pass on the report template for processing. The **Apply** button will leave up the Custom Report Dialog, and pass on the report template for processing. The **Standing Order** button will bring up the Standing Order Dialog and allow the user to turn the current report template into a Standing Order. The **Cancel** button will ignore any selections and remove the Custom Report Dialog. The **Help** button activates a window that provides help information about the Custom Report Dialog.

A.2.9.5 Report Browser Dialog

A.2.9.5.1 Report Browser Dialog Usage

The Report Browser Dialog (Figure A.2.9.5-1) is used by the Flight Operations Team (FOT) and Instrument Operations Team (IOT) members to browse and edit reports.

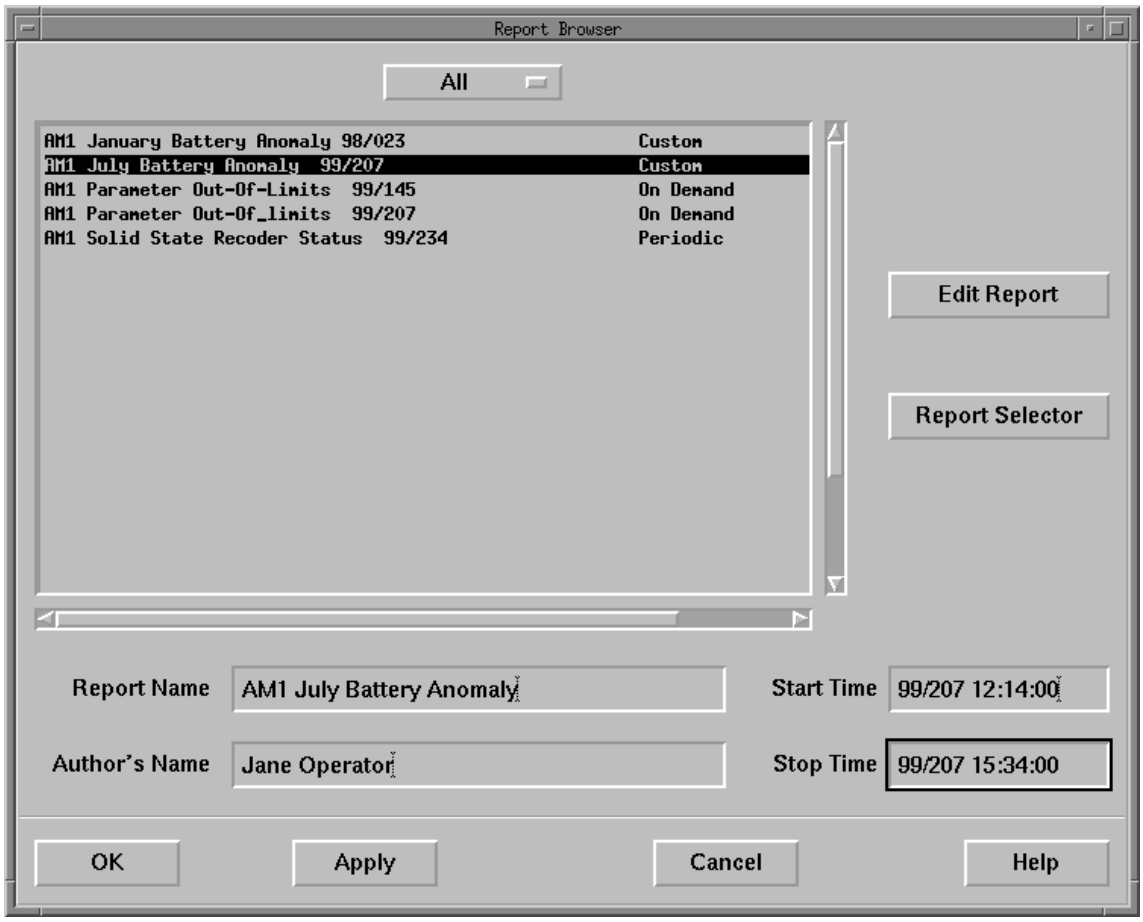


Figure A.2.9.5-1. Report Browser Dialog

A.2.9.5.2 Report Browser Dialog Access

The Report Browser Dialog may be accessed by any user from the Tools menu located on the Control window (see Section A.1.8).

A.2.9.5.3 Report Browser Dialog Input

The Report Browser Dialog allows the user to browse or edit a previously generated report. The Report Browser Dialog is composed of the following parts:

- **Report Types** (option menu) - default value is All; other options include Custom, On Demand and Periodic.
- **Available Reports** (single select scrolling list) - A list of all the reports that have been generated by the user. The reports are listed alphabetically by type and are also tagged with their report type (custom, on demand or periodic).
- **Edit Report** (push button) - Edit or browse the currently selected report.

- **Report Selector** (push button) - Bring up the Report Selector Dialog.
- **Report Name** (uneditable text field) - The name of the currently selected report .
- **Author's Name** (uneditable text field) - The author of the currently selected report .
- **Start Time** (uneditable text field) - The start time of the currently selected report.
- **Stop Time** (uneditable text field) - The stop time of the currently selected report.

Four buttons are located along the bottom of the Report Browser Dialog. The **Ok** button will remove the Report Browser Dialog, and pass on the report template for processing. The **Apply** button will leave up the Report Browser Dialog, and pass on the report template for processing. The **Cancel** button will ignore any selections and remove the Report Browser Dialog. The **Help** button activates a window that provides help information about the Report Browser Dialog.

A.2.9.5.4 Report Browser Dialog Output

The Report Browser Dialog may be accessed by any user from the Report Selector window (see Section A.2.9.1).

A.3.1 Time Selector

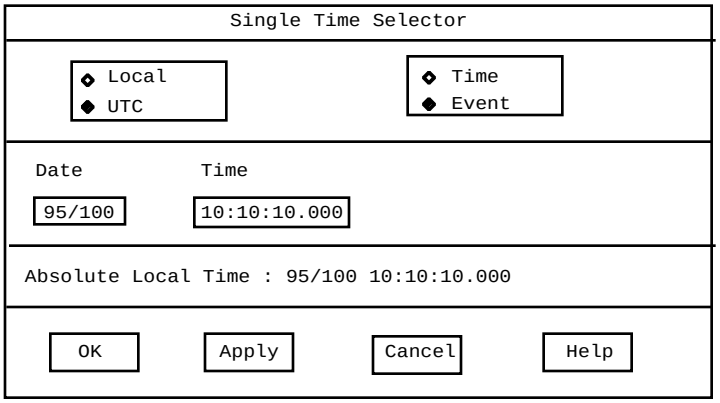


Figure A.3.1-1 Single Time Selector

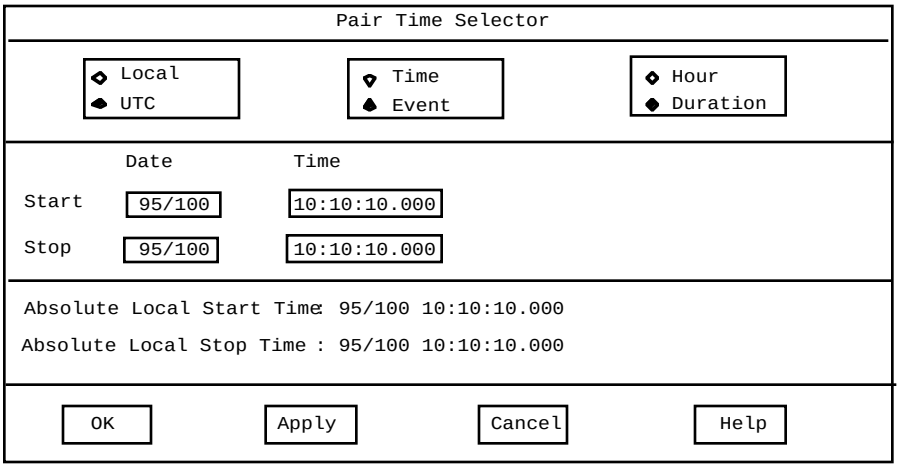


Figure A.3.1-2 Pair Time Selector

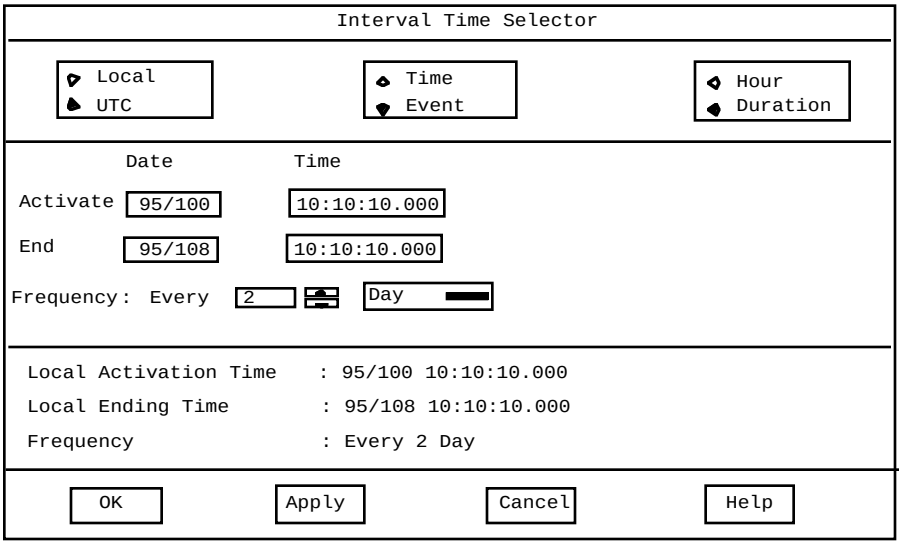


Figure A.3.1-3 Interval Time Selector

A.3.1.1 Time Selector Usage

The time selector is a utility of FOS user interface and will be used in many different areas of the FOS user interface whenever the user needs to specify time values. Such as off-line analysis,

historical tables or graphs, replays, event display will use the time selector to specify a time, a pair of start and stop times, or a time interval. The time values could be an absolute time, an orbital event, or a relative time. The time interval could be a specified event (e.g. every n orbits) or a time period (e.g. every n hours).

A.3.1.2 Time Selector Access

The time selector can be accessed from off-line analysis, historical tables or graphs, replays, or event display by activating single time selector, pair time selector, or interval time selector.

A.3.1.3 Time Selector Input

The time selector dialog contains five parts -- title area, option area, user input area, information area, and button area.

The title area displays three different types of time selector -- single time selector, pair time selector, and interval time selector.

The option area contains sets of toggle buttons that user can select. These will change the meaning of the input time data. The absolute/relative toggle buttons is used for absolute/relative time. An absolute time is a time which contains year, day, hour, minute, and second. A relative time is a time which contains only hour, minute, and second. The local/utc toggle buttons is used for local/utc time. The time/event toggle buttons is used to input time/event. The hour/orbit/duration toggle button is used to input hour/orbit or duration.

The user input area is where the user inputs the time based upon the option that the user sets in the option area. In the single time selector, the user will be able to input the single time or the single orbital event. In the pair time selector, the user will be able to input the start and stop times, the start time and the duration, the start and stop orbital event, and the start orbital event and the duration. In the interval time selector, the user will be able to input the activation time, the ending time, and the frequency, or the activation time, the duration, and the frequency.

The information area displays all the options that the user sets and all the times that the user inputs after pressing the apply button.

The button area contains four buttons -- OK button, Apply button, Cancel button, and help button. The OK button returns the information displayed in the information area and closes the dialog. The Apply button displays the options and the times input from the user in the information area. The cancel button closes the dialog without returning the data. The Help button provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

A.3.1.4 Time Selector Output

The time selector outputs times that the user specified.

The single time selector outputs the single time. The pair time selector outputs the start and stop times. The interval time selector outputs activation and end times and frequency.

A.3.2 Selection Filter Window

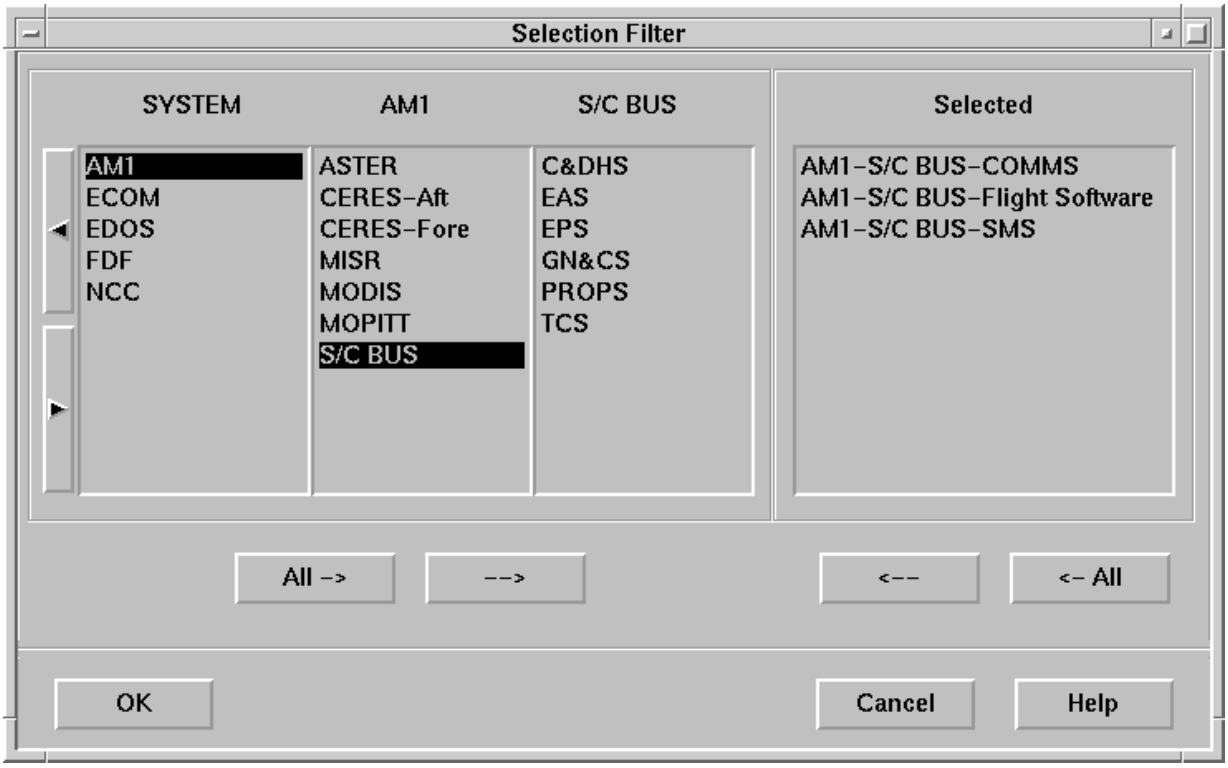


Figure A.3.2-1. Selection Filter Window

A.3.2.1 Selection Filter Usage

The Selection Filter window will be used in many different areas of the FOS user interface. For instance, a user will use this utility for filtering a list of items for selection according to a specific spacecraft (e.g. AM-1, PM-1, ACRIMSAT, etc.), spacecraft subsystem (e.g. GN&C, C&DH, TCS, COMM, etc.), instrument (e.g. MISR, CERES, ASTER, etc.), or ground system (e.g. NCC, EDOS, ECOM, etc.).

A.3.2.2 Selection Filter Access

The Selection Filter window can be accessed from several windows such as the Quick Analysis window, the Analysis Request window, and the Analysis Product Selector window.

A.3.2.3 Selection Filter Input

The Selection Filter window contains three Display Labels, three Data Display areas for displaying multiple levels of data and one Selected Data Display area for selected items, a Select

All function (All -->), a Select function (-->), a Deselect All function (<-- All), a Deselect function (<--), a OK button, a Cancel button, and a Help button.

The mouse is used to expand or shrink multiple levels of data and highlight the data for future operations. A 'Double Click' on a single item in the Data Display area will expand to the next level of data associated with that item if available. The Selection Filter Window has the capability to go to n-levels. If a user continues to expand to the next level and so on, simply double click on the desire item, the next level of data will be shown in the right most Data Display area and the existing data in each Data Display area will be shifted to the next left Data Display area. For instance, if AM-1 is in the first (left most) Data Display area, a 'Double Click' on AM-1 will expand to the next level of data in the second Data Display area. The second (immediate right) Data Display area will show a list of subsystems/instruments such as ASTER, MISR, MOPITT, and S/C BUS, etc. A 'Double Click' on S/C BUS will expand to the next level of data that displays in the third Data Display area. The list of items is C&DHS, EAS, EPS, and GN&CS, etc. A 'Single Click' on any item in the Data Display area will clear all the data in the right Data Display area (s).

The Left Arrow button has the capability to scroll each level of data to the left Data Display areas if the data has expanded more than three levels.

The Right Arrow button has the capability to scroll each level of data to the right Data Display areas if the data has expanded more than three levels.

The Select All button has the capability to select all the items in the right most Data Display area.

The Select button has the capability to select all the highlighted items in the right most Data Display area.

The Deselect All button has the capability to deselect all the items in the Selected Data Display area.

The Deselect button has the capability to deselect all the highlighted items in the Selected Data Display area.

The OK button sends the selected list of items in the Selected Data Display area to the window that invoked the Selection Filter window and then closes the window.

The Cancel button closes the Selection Filter window.

The Help button provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

A.3.2.4 Selection Filter Output

The Selection Filter window returns a list of selectable items to the invoking window.

A.4.1 Table Load Builder

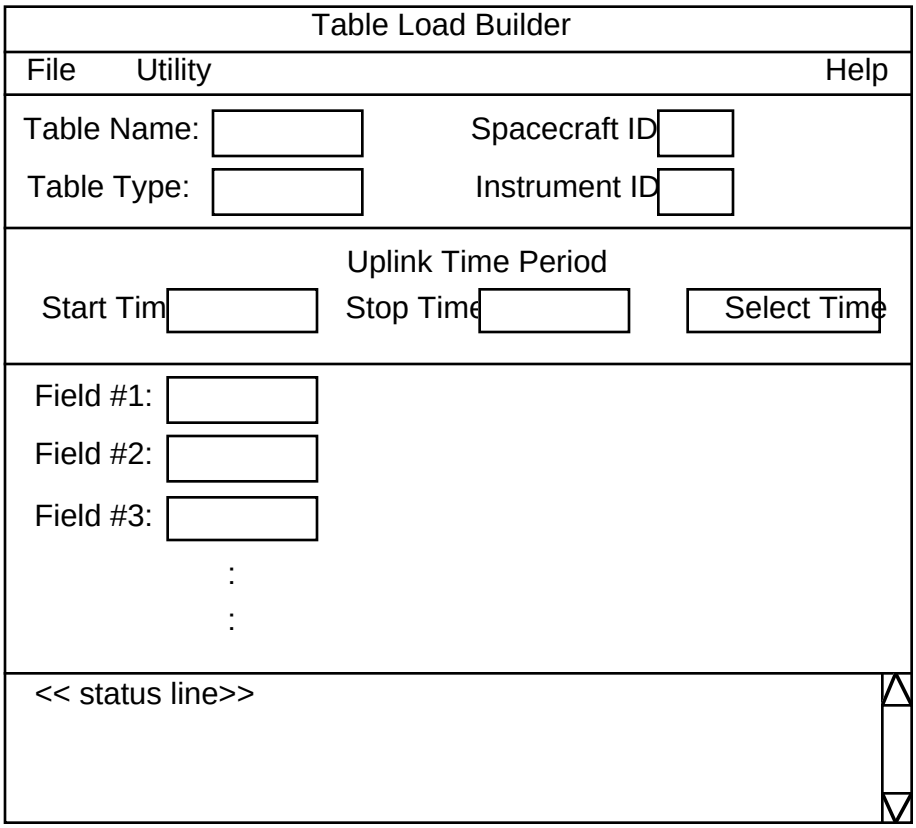


Figure A.4.1-1. Table Load Builder

A.4.1.1 Table Load Builder Usage

The Table Load Builder is used to create and generate table loads. This tool allows a user to generate a table load file and send it to Command Management Subsystem (CMS). A user may use previously loaded file parameters or table load dumps to create a new table load.

The Table Load Builder includes a menu bar with three pull-down menus: File, Utility, and Help. Each of these menus is described in Section A.5.1.3 below. Just below the menu bar is an identification area. This area contains the table name, table type, spacecraft ID, and instrument ID. The uplink time period area is below the identification area. It allows user to define the uplink start and stop times. A scrollable text widget locate at the bottom of the window represents the status messages area. Status messages indicating the completing of user-activated operations (e.g., Table Load Generated) are displayed in this area. If an error occurs during an operation, the status message will provide information to assist the user in resolving the error.

A.4.1.2 Table Load Builder Access

The Table Load Builder is accessed from the Tools menu on the Control Window. This tool is only accessible by authorized personnel that have been granted access to create table loads.

A.4.1.3 Table Load Builder Input

The Table Load Builder provides the user with standard editing capabilities through a combination of keyboard and mouse input. The keyboard is used primarily to enter or modify the table name, spacecraft, and instrument identifiers. The mouse is used to perform standard Motif selection operations, and to select options from the menu bar and pull-down menus.

The Table Load Builder contains three pull-down menus: File, Utility, and Help. The File menu options include

New...	displays a selection dialog window. It allows a user to select a table template.
Open Table...	displays a selection dialog window. It allows a user to select table parameters from existing table load contents.
Open Dump...	displays a selection dialog window. It allows a user to select table parameters from table load dumps.
Save	allows user to save the current table parameters.
Quit	exits the Table Load Builder.

The Utility menu contains the options that allow the user to perform special operations. The Utility menu options include:

Validate	validates the table parameters for each field of the table template. It will generate a message on the status line indicating whether the validation process is successful or not.
Generate	will automatically validates the table parameters and sends a load generation request to CMS. CMS creates a new table load if no errors are detected.

The Help menu contains an option that provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

The Uplink Time Period area allows a user to specify a valid uplink start and stop times. The Select Time button will display a time selector window (refer to section A.3.1). The Start Time and Stop Time fields allow user to specify the starting time and stopping time for uplink.

A.4.1.4 Table Load Builder Output

The Table Load Builder will update metadata and table load contents. The Table Load Builder outputs includes status messages. Status messages are displayed at the status line area. Status messages indicate the generic status of user-specified operations. Error message(s) will appear in the status area if user has entered invalid table parameter(s). Field(s) in error will be highlighted.

A.4.2 RTS Load Builder

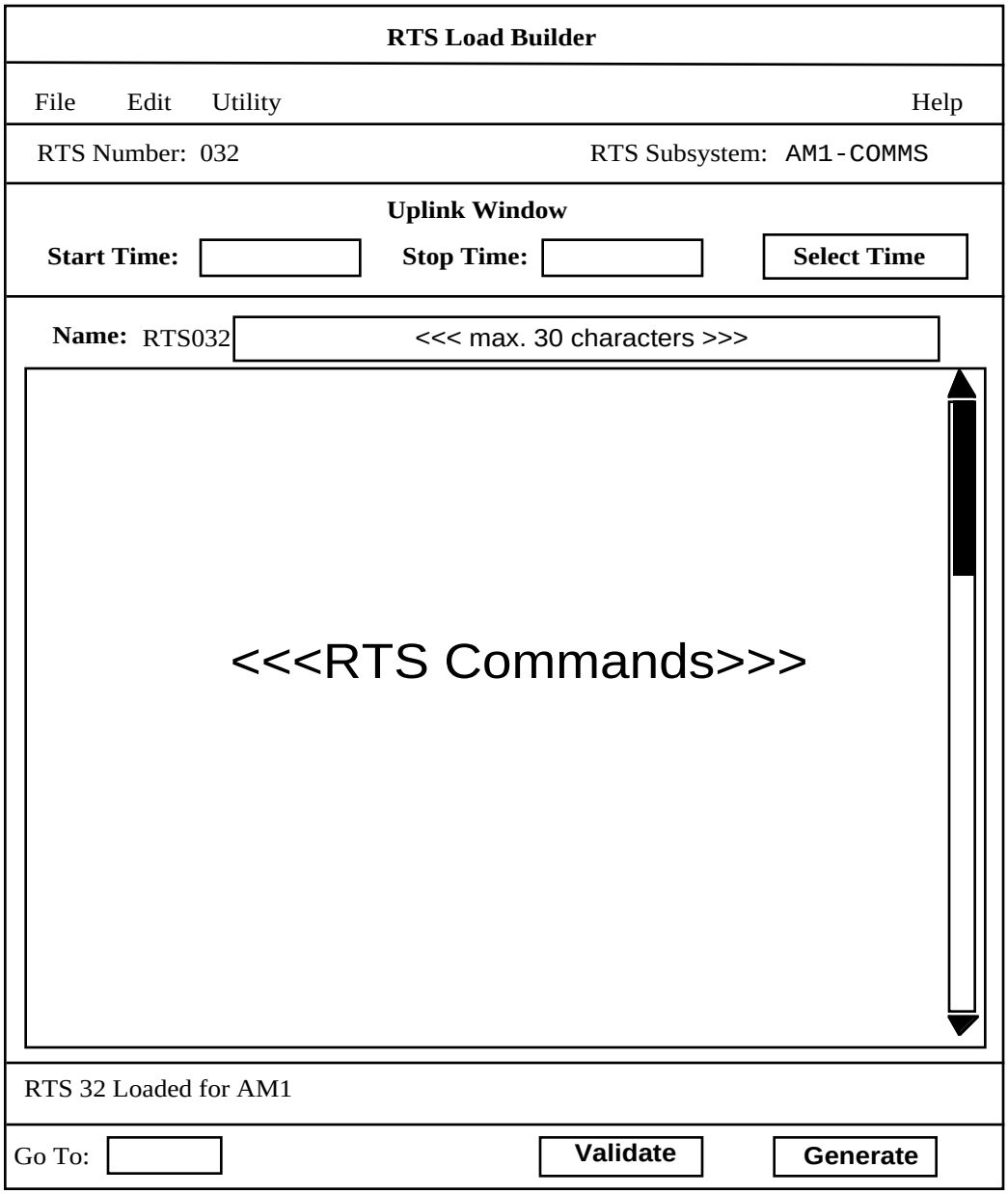


Figure A.4.2-1. RTS Load Builder Window

A.4.2.1 RTS Load Builder Usage

The RTS Load Builder is used by authorized members of the Flight Operations Team (FOT) and Instrument Operations Team (IOT) to create and generate Relative Time Sequence (RTS) loads. This tool allows a user to create a RTS load contents file containing directives with relative time offsets. Once the load contents file has been completed, the RTS Load Builder provides the

capability for the user to send this file to CMS where the corresponding binary RTS load is created for uplink at a later time. A user may open an existing RTS load contents file and modify its contents. The RTS Load Builder is based upon the Procedure Editor (see Section A.2.8), and therefore includes standard editing operations (e.g., cut, copy, paste, etc.) for entering RTS directives.

The RTS Load Builder includes a menu bar with four pull-down menus: File, Edit, Utility, and Help. Each of these menus is described in Section A.4.2.3 below. Just below the menu bar is an identification line. This line contains the sequence number of the RTS load and its associated subsystem or instrument (e.g., AM1-COMMS). The user may modify the subsystem field, if appropriate. Underneath the identification line is a pair of time fields. These fields allow a user to define the uplink window for the RTS load. The times may be entered manually, or the user may access the time selector (see Section 2.3.1) to specify the times. Underneath the time fields is a text field where the user may specify the function or purpose of the table load (e.g., PATCH03). The text in this field is appended to the label 'RTSxxx', where 'xxx' is the RTS number, to form the name of the RTS load. A scrolling text window, located below this text field, contains the RTS load contents (i.e., directives and relative time offsets) entered by the user. Standard keyboard and mouse editing functions (e.g., Page Up, Page Down, highlighting with the mouse, etc.) are accommodated in this window. Under the text window is a status line The status line displays messages indicating the completion of user-activated operations (e.g., RTS load generated). If an error occurs during an operation, the status message will provide information to assist the user in resolving the error. Along the bottom of the RTS Load Builder window is a text input field that allows a user to enter a line number for the Go To operation. Next to the Go To text field are two buttons that allow the user to validate the load contents or to generate the binary load.

A.4.2.2 RTS Load Builder Access

The RTS Load Builder is accessed from the Tools menu on the Control Window. This tool is only accessible by FOT and IOT personnel that have been granted access to create RTS loads.

A.4.2.3 RTS Load Builder Input

The RTS Load Builder provides the user with standard editing capabilities through a combination of keyboard and mouse input. The keyboard is used primarily to enter the RTS load contents, to modify the associated subsystem/instrument identifier, and to enter the load function. Support for keyboard control keys (e.g., Page Up, Page Down, Home, End, etc.) is also provided. Accelerator keys are provided for both the menu bar and the pull-down menu options (e.g., <alt>F displays the File menu).

The mouse is used to position the cursor within the RTS load contents, to perform standard Motif selection operations (e.g., double-click selects the current word, triple-click select the current line, quadruple-click select all text), to select options from the menu bar and pull-down menus, and to select the Validate or Generate buttons. The RTS Load Builder menu bar contains four pull-down menus: File, Edit, Utility, and Help. The File menu options include:

New — opens a template file that is used to create a new RTS load contents file.

Open	displays a file selection dialog window that allows the user to open an existing RTS load contents file. An existing file can be used to create a new RTS load.
Save	saves the current RTS load contents file. This option should be used in cases where the user wants to save the results of the current edit session without generating a load.
Print	displays a file selection dialog window that allows the user to print a selected RTS load contents file (default is the current RTS load contents file).
Quit	exits the RTS Load Builder.

The Edit menu contains the options that allow the user to perform typical cut, copy, paste, find, and replace operations. The Edit menu options include:

Undo	performs an undo of the last edit operation.
Cut	deletes the selected text and places it into the clipboard.
Copy	places a copy of the selected text into the clipboard.
Paste	inserts the text in the clipboard into the procedure text at the current cursor location
Delete	deletes the selected text.
Find	activates a find dialog that allows the user to either find and highlight the next occurrence of a specified text string or to highlight all occurrences of the text string.
Replace	activates a replace dialog that allows the user to either find the next occurrence of a one text string and replace it with another specified string or to replace all occurrences of a text string.

The Utility menu provides access to the Command Builder, which may be used as an aid in constructing RTS commands. At this time the Utility menu includes only one option:

Command Builder	activates/deactivates the Command Builder (see Section A.2.9).

The Help menu contains options that provide context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

The user may specify the start and stop times for the load uplink window by either manually entering these times in two text fields or by accessing the Time Selector utility. The Time Selector, which is described in Section A.3.1, is accessed via a pushbutton, Select Time, located to the right of the start and stop time fields. The Time Selector updates the start and stop time text fields when the user closes this window.

A.4.2.4 RTS Load Builder Output

The RTS Load Builder outputs includes status messages, a warning dialog, an informational dialog, saved RTS load contents files, and updated RTS load contents information. Status messages indicate the completion status of user-specified operations, including:

- Opening (reading) a RTS load contents file,
- Saving (writing) a RTS load contents file,
- Printing a RTS load contents file,
- Validating the load contents,
- Generating the binary load file,
- Searching for text (number of occurrences found), and
- Replacing text (number of replacements performed).

A warning dialog is displayed when a user attempts to create a new RTS load contents file, open an existing RTS load contents file, or exit the RTS Load Builder if modifications have been made to the current RTS load contents since the last save or generate operation. The warning dialog provides options to save the current contents file, discard the load contents modifications, or cancel the current action (e.g., cancel the quit operation).

An informational dialog is displayed whenever validation or load generation errors are detected. This dialog contains the error messages, including the offending directive text, if appropriate.

The RTS load contents file and RTS load contents information are saved as the result of a save operation. The status of these operations is displayed to the user via one of the status message described above.

A.4.3 Ground Script Display

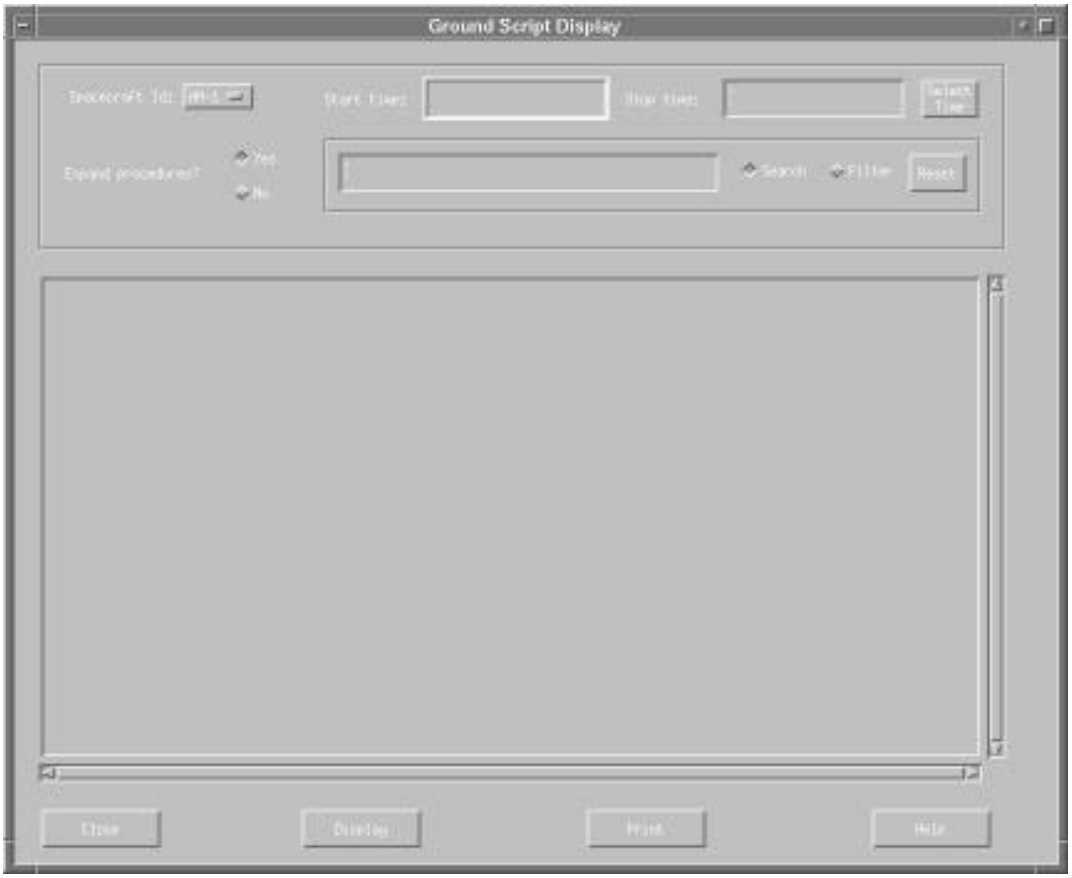


Figure A.4.3-1. Ground Script Display Window

Figure A.4.3-2. Ground Script Error Message Dialog

A.4.3.1 Ground Script Display Usage

The Ground Script Display window (figure A.4.3-1) is used for displaying and printing ground scripts generated by the Command Management Subsystem.

A.4.3.2 Ground Script Display Access

The Ground Script Display window can be accessed from the tool menu.

A.4.3.3 Ground Script Display Input

The Ground Script Display window provides the capability for viewing and printing ground scripts based on specific time ranges.

The Ground Script Display window includes the following input fields:

spacecraft id	the spacecraft that the requesting ground script is based upon
start time	the requesting starting time of the ground script
stop time	the requesting ending time of the ground script
search string	the string pattern that is to be searched for in the ground script
expand procedure flag	the indication of whether or not to display or print the ground script with the embedded command language procedures expanded
string search flag	the indication of searching for the next line containing this search string
string filter flag	the indication of searching for only those lines having this search string

The Ground Script Display window includes a text output field:

ground script display	the display area for the ground script contents

The Ground Script Display window also includes seven action push buttons:

Select Time	activates a pair time selector window to select a pair of start and stop times
Reset	re-displays the entire requested ground script if display has changed (e.g. if the display previously had been filtered for a specific sting)
Display	displays the ground script onto the viewing area
Print	activates a print dialog window
Help	invokes a message dialog box describing the capabilities and how to use the Ground Script Display window
Close	closes the Ground Script Display tool

A.4.3.4 Ground Script Display Output

The Ground Script Display window displays or prints the ground script requested based on the spacecraft id, start time, and stop time.

A.4.4 ATC Buffer Display

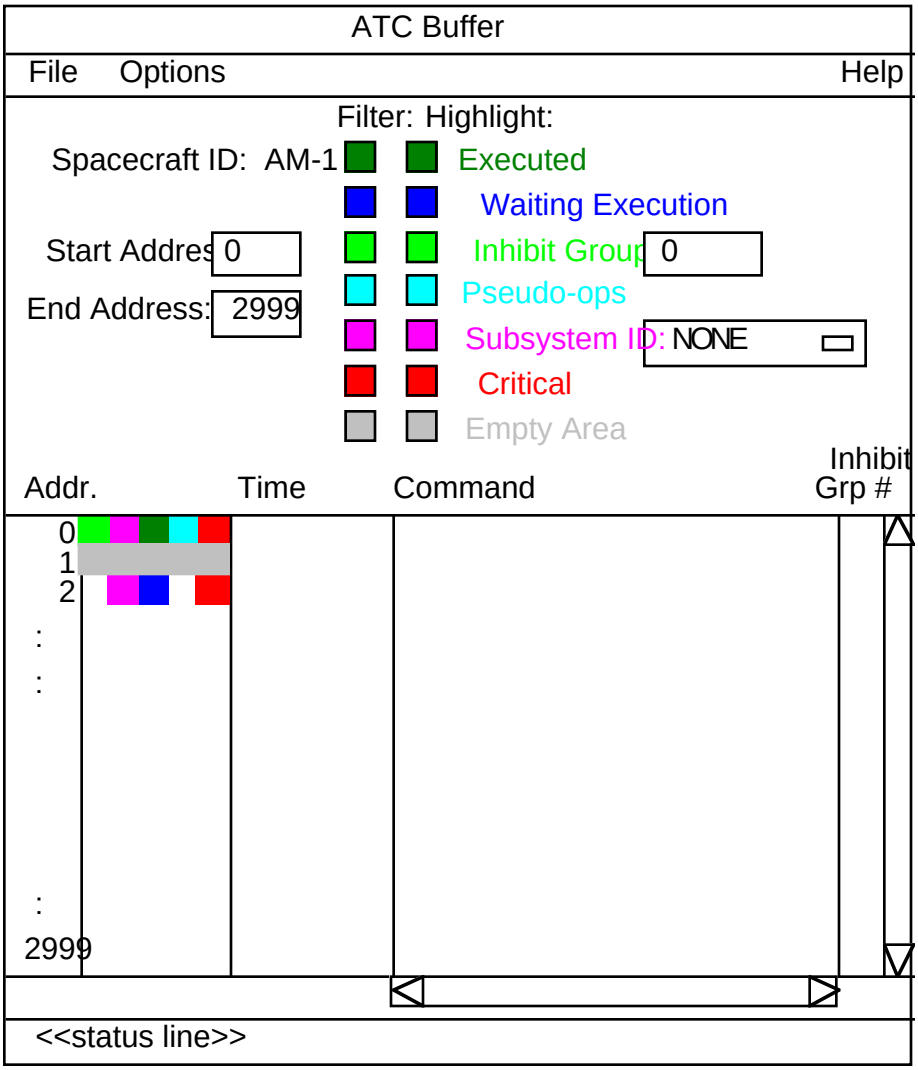


Figure A.4.4-1. ATC Buffer Display

A.4.4.1 ATC Buffer Display Usage

The ATC Buffer Display window will allow the user to view the command-to-memory map of an Absolute Time Command (ATC) buffer. This display will allow the user to highlight commands within the buffer according to various criteria.

The ATC Buffer Display includes a menu bar with three pull-down menus: File, Options, and Help. Each of these menus is described in Section A.4.4.3 below. Just below the menu bar is an identification area. It contains the spacecraft ID, start and stop address. Underneath that is the highlight filter area which contains the instrument name, subsystem name, and inhibit group name. It also indicates what highlight criteria are being set. The buffer contents are located below the identification area. It displays the absolute time command address, indicator, and command text. A text widget located at the bottom of the window represents the status messages area. Status messages indicating the completing of user-activated operations (e.g., File Open) are displayed in this area.

A.4.4.2 ATC Buffer Display Access

The ATC Buffer Display is accessed from the Tools menu on the Control Window.

A.4.4.3 ATC Buffer Display Input

The ATC Buffer Display provides the user with standard input capabilities through a combination of keyboard and mouse input. The keyboard is used primarily to specify the inhibit group, instrument, and subsystem identifiers for the highlight criteria. The mouse is used to perform standard Motif selection operations and to select options from the menu bar and pull-down menus. User may turn on/off certain highlight criteria by selecting the toggle button right next to it, e.g., user may filter out all the buffer which contains critical command by turning off the critical highlight filter.

The ATC Buffer Display contains three pull-down menus: File, Options, and Help. The File menu options include:

Open	allows the user to access other ATC buffers.
Quit	exits the ATC Buffer Display window.

The Options menu contains the options that allow the user to perform special operations. The Options menu options include:

Clear All Filter	turns off all filtering of the buffer contents in response to a user request.
Set All Filter	sets all filtering options of the buffer contents according to the user-specified criteria.
Clear All Highlight	turns off all highlighting of the buffer contents in response to a user request.
Set All Highlight	sets all highlighting options of the buffer contents according to the user-specified criteria.

The Help menu contains an option that provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

A.4.4.4 ATC Buffer Display Output

The ATC Buffer Display will display the ATC buffer for a spacecraft. The ATC Buffer Display will display the command-to-memory map of an ATC buffer and highlight the contents of the ATC buffer according to the criteria. The ATC Buffer Display outputs includes status messages. Status messages are displayed at the status line area. Status messages indicate the generic status of user-specified operations.

A.4.5 RTS Buffer Display

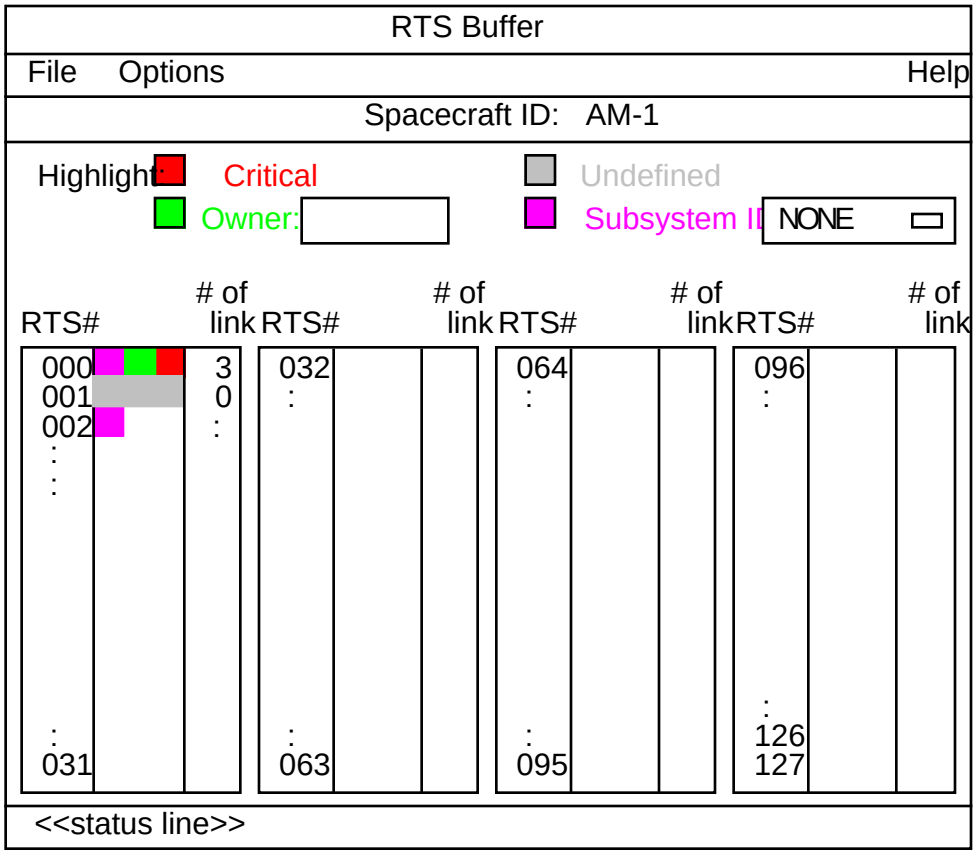


Figure A.4.5-1. RTS Buffer Display

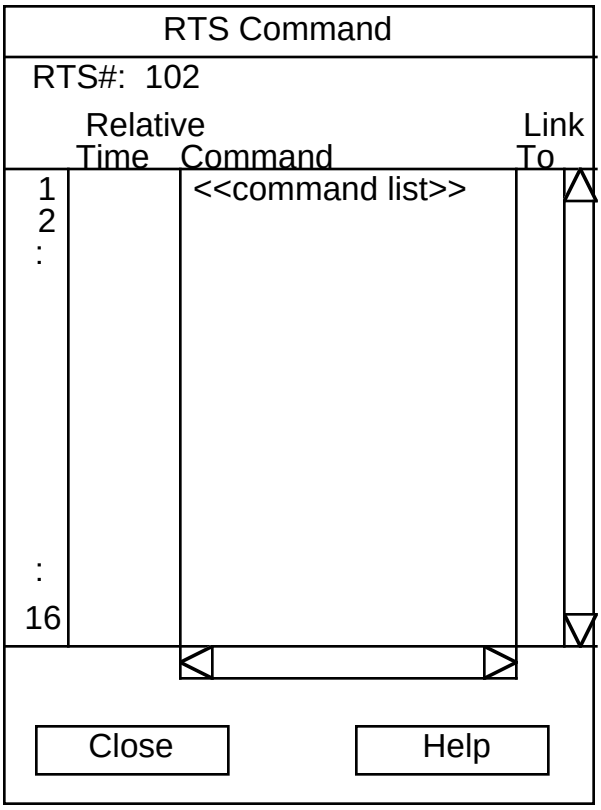


Figure A.4.5-2. RTS Command Display

A.4.5.1 RTS Buffer Display Usage

The RTS Buffer Display (Figure A.4.5-1) will display the map of the Relative Time Sequence (RTS) buffers. It will allow the user to highlight the RTS buffer according to various criteria. In addition, the display will indicate linkages between the RTS buffers. A user may also select an RTS buffer and view its command-to-memory map.

The RTS Buffer Display includes a menu bar with three pull-down menus: File, Options, and Help. Each of these menus is described in section A.4.5.3 below. Below the menu bar is an identification area. This area contains the spacecraft name, instrument name, and owner's name. It also indicates what highlight criteria are being set. Beneath the identification area is the mapping area. It also contains the highlight code for RTS buffer. The graphical display of RTS buffer is displayed at this area. A text widget locate at the bottom of the window represents the status messages area. Status messages indicating the completing of user-activated operations (e.g., updating highlight options) are displayed in this area.

The RTS Command Display window is enabled by double clicking a buffer in the RTS Buffer Display window. The RTS commands which belong to this buffer will display in this window. For spacecraft AM-1, The maximum number of RTS commands for each buffer is sixteen.

Additional RTS Command Display can be displayed by double clicking a row of RTS command which contains a linkage to another RTS buffer in the RTS Command window.

A.4.5.2 RTS Buffer Display Access

The RTS Buffer Display is accessed from the Tools menu on the Control Window.

A.4.5.3 RTS Buffer Display Input

The RTS Buffer Display provides the user with standard input capabilities through a combination of keyboard and mouse. The keyboard is used primarily to specify the instrument name, subsystem name, and ownership criteria. The mouse is used to perform standard Motif selection operations and to select options from the menu bar and pull-down menus. User can turn on/off certain highlight criteria by selecting the toggle button right next to it.

The RTS Buffer Display contains three pull-down menus: File, Options, and Help. The File menu options include:

Quit	exits the RTS Buffer Display window.

The Options menu contains the options that allow the user to perform special operations. The Options menu options include:

Clear All Highlight	turns off all highlighting of the buffer contents in response to a user request.
Set All Highlight	sets all highlighting options of the buffer contents according to the user-specified criteria.
Show Linkage	highlights the selected buffer linkage.

The Help menu contains an option that provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

The RTS Command Display (Figure A.4.5-2) provides the user capabilities to view the RTS command text for a selected buffer. The Close button allows the user to dismiss the window. The Help button contains an option that provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

A.4.5.4 RTS Buffer Display Output

The RTS Buffer Display window will display the map of the Relative Time Sequence (RTS) buffer graphically. The second column in the map area will be highlighted with appropriate colors to represent the different criteria. If a user double clicks on a map area, a command-to-memory map window will be displayed. This window will display the RTS commands associated with the selected map area. If a user selects a buffer and executes the show linkage option, all the other buffer links to the selected buffer will be highlighted. The ATC Buffer Display outputs includes status messages, which are displayed in the status line area. Status messages indicate the generic status of user-specified operations (e.g., updating highlight options).

A.5.1 Procedure Control Window

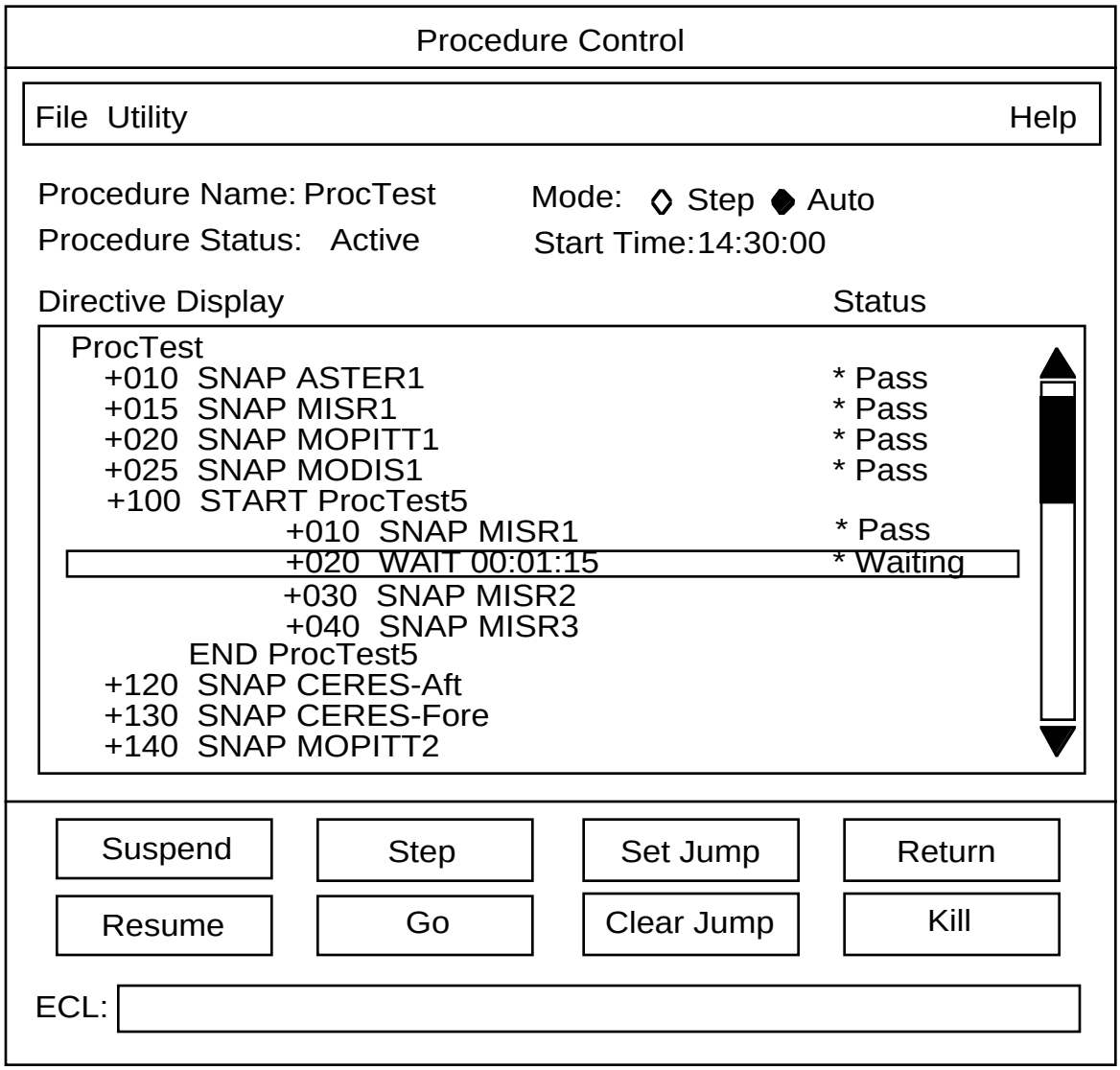


Figure A.5.1-1. Procedure Control Window

A.5.1.1 Procedure Control Usage

The Procedure Control window is used by the user who wants to execute non-command procedures. A non-command procedure does not contain any spacecraft or instrument commands. Users are able to invoke a procedure at a specified time. Users are also able to monitor and control the execution of the procedure. Control functions allow a user to suspend, resume, or kill the execution of the procedure.

A.5.1.2 Procedure Control Access

The Procedure Control window can be accessed in two ways: A user can bring up a Procedure Control window by typing a start procedure directive with the option in the command line, or by selecting Procedure Control via the tool menu.

A.5.1.3 Procedure Control Input

The Procedure Control window provides the user the capability for controlling the execution of non-command procedures through a combination of keyboard and mouse input. The keyboard is used primarily to enter directives in the ECL input line. The mouse is used to perform standard Motif selection operations and to select options from the menu bar, pull down menus, and push buttons.

The Procedure Control contains a menu bar that has three pull-down menus: File, Utility, and Help. The File menu options include:

Open	displays a Procedure Selector dialog that allows the user to open an existing procedure.
Quit	quits the Procedure Control window.

The Utility menu options include:

Show Cur Directive	scrolls the procedure display to the current executing directive.
Find	invokes a find dialog to allow a user to search for a specified string.

The Help menu contains options that provide context-sensitive help for the user. Section 2.2.7 contains further information about the Help utility.

There are two radio buttons for Mode: Step and Auto. For Step mode, each directive in the procedure will be executed only when the user presses the 'Step' button. For Auto mode, each directive in the procedure will be executed automatically once the user resumes the execution of the procedure.

The Resume button resumes the execution of a suspended procedure.

The Suspend button suspends the execution of a procedure.

The Step button executes one directive statement at a time if the procedure mode is step.

The Go button resumes the execution of a procedure if it is in the 'Wait' state.

The Set Jump button sets a forward jump target in the procedure. Once the currently executing directive has completed, execution will jump to the target directive.

The Clear Jump button deselects a jump target directive.

The Kill button terminates the execution of a procedure.

The Return button returns to the calling (previous level) procedure. This button is insensitive if the procedure is at the top level.

The ECL input line allows a user to enter directives for controlling the execution of a procedure.

A.5.1.4 Procedure Control Output

The Procedure Control window displays the executing procedure. This display includes:

- The procedure name,
- The procedure status (active or suspended),
- The procedure mode (step or auto),
- The start time of the procedure,
- The status of the executed directives,
- The current executing directive.

A.5.2 Command Control Window

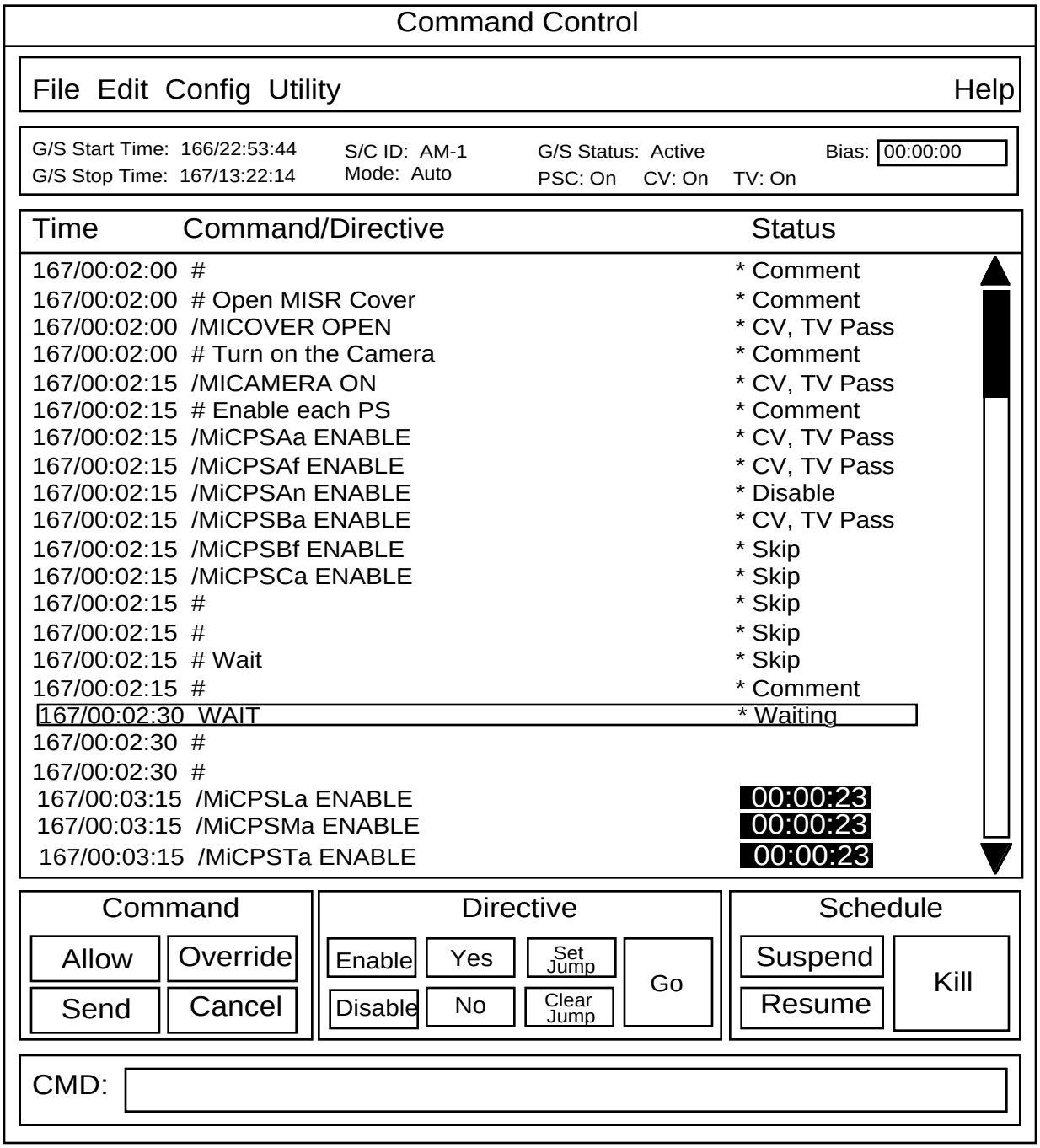


Figure A.5.2-1. Command Control Window

A.5.2.1 Command Control Usage

The Command Control window is used to control and monitor commanding of the spacecraft and its instrument. A user who has the command authority will be able to use the Command Control window for controlling the execution of a ground script. A ground script consists of time-stamped, time-ordered directives.

A.5.2.2 Command Control Access

The Command Control window can be accessed from the tool menu. Only a user with command authority may access the Command Control window.

A.5.2.3 Command Control Input

The Command Control window provides the user the capability for controlling the execution of the ground script.

The Command Control window contains a menu bar that has five pull-down menus: File, Edit, Config., Utility, and Help. The File menu options include:

Open	invokes a ground script selector dialog window that allows the user to select a ground script from the list.
Print	invokes a print dialog to allow a user to print the current executing ground script.
Quit	quits the Command Control window.

The Edit menu options include:

Copy	copies one or more lines in the ground script into a buffer (clipboard). The user highlights the ground script directive lines to copy using the mouse.
Insert	inserts the directive lines from the buffer (see Copy above) immediately after the selected line in the ground script.
Undo	undos the last insert operation. (Cannot undo the last insert once the execution of the ground script is resumed).

The Config menu options include:

Set Step Mode	sets mode to Step.
Set Auto Mode	sets mode to Auto.
Pre State Check	sets prerequisite state check on or off.
Cmd Verification	sets command verification on or off.
Tlm Verification	sets telemetry verification on or off.

The Utility menu options include:

Show Cur Directive	scrolls the ground script display to the current executing directive.
Find	invokes a find dialog to allow a user to search for a specified text string, a command, a procedure, or a time.
Command Request	invokes a command request status window to allow a user to check or respond to the command requests.
Select Procedure	invokes a procedure selector dialog to allow a user to select a procedure off the procedure list. The user can then use the procedure selector to insert the procedure into the ground script.

The Help menu contains options that provide context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

The Allow button allows a critical command to be sent.

The Send button allows a command to be sent in 'Step' mode.

The Override button overrides the command directive when pre-requisite state check fails.

The Cancel button cancels a command directive.

The Enable button enables one or more directives.

The Disable button disables one or more directives (not executed).

The Yes button allows a CAC to answer yes to a question when prompted.

The No button allows a CAC to answer no to a question when prompted.

The Set Jump button allows a CAC to transfer the execution to a directive in the ground script.

The Clear Jump button allows a CAC to deselect a previously set jump target in the ground script.

The Go button allows a CAC to resume the execution if the directive is in the wait state.

The Resume button resumes the execution of the ground script.

The Suspend button suspends the execution of the ground script.

The Kill button terminates the execution of the ground script.

The Command Input Line (CMD) allows a CAC to execute a command directive manually. The CAC enters the command in this field. If an existing directive is selected in the ground script, the manual directive will be inserted immediately after the selected directive. If no existing directive is selected in the ground script, the manual directive will be inserted immediately after the current executing directive.

A.5.2.4 Command Control Output

The Command Control window displays the executing ground script. This display includes:

- The start time of the ground script
- The stop time of the ground script
- The spacecraft identifier associated with the ground script
- The ground script status (active or suspended)
- The ground script processing mode
- The current bias time
- The verification flags (Prerequisite State Check, Command, and Telemetry)
- The status of the executed directives
- The current executing directive
- The count down timer of the next three non-comment directives

A.5.3 Command Monitor Window

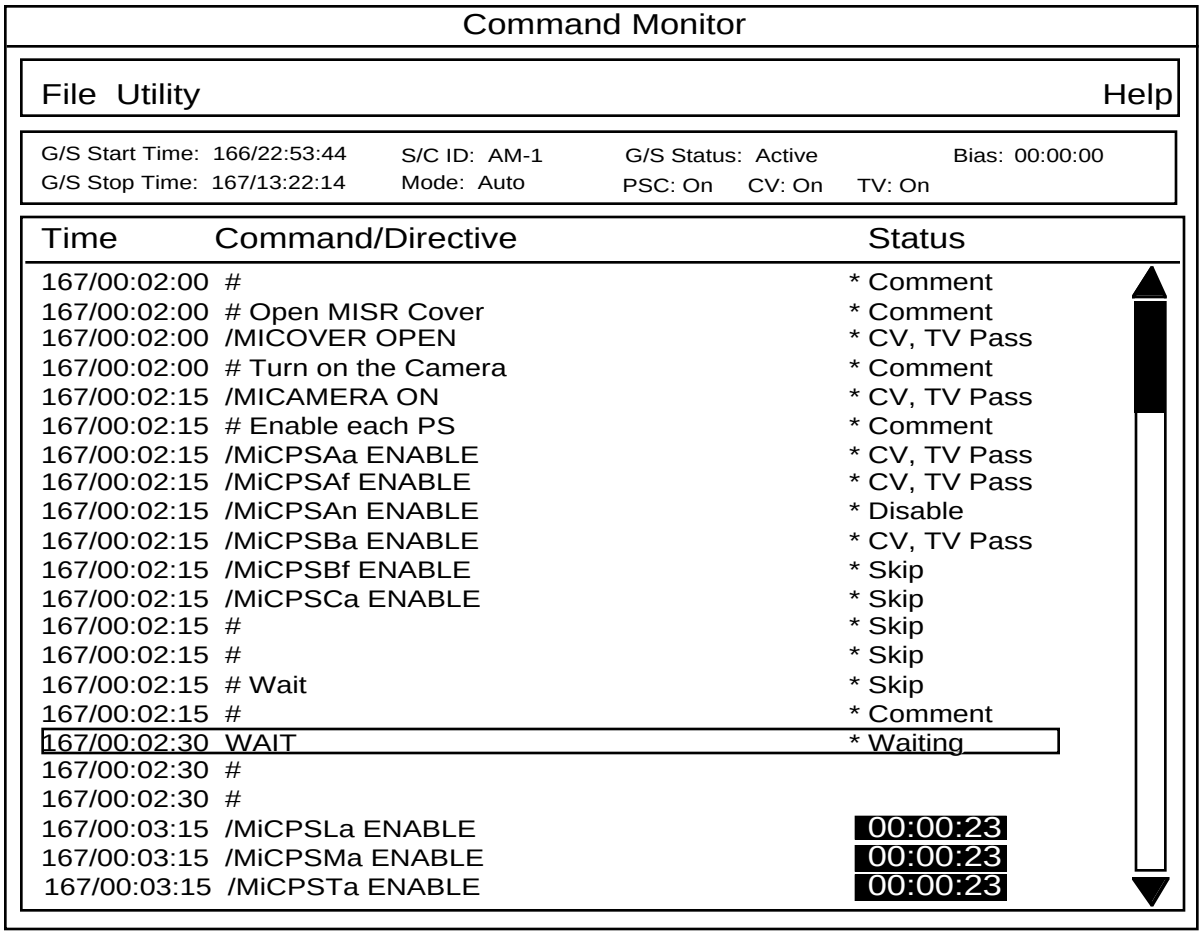


Figure A.5.3-1. Command Monitor Window

A.5.3.1 Command Monitor Usage

The Command Monitor window (Figure A.5.3.-1) is used for monitoring the execution of the ground script.

A.5.3.2 Command Monitor Access

The Command Monitor window can be accessed from the tool menu. This window may be accessed by user without command authority in lieu of the Command Control window (reference Section A.5.2).

A.5.3.3 Command Monitor Input

The Command Monitor window provides the user the capability for monitoring the execution of the ground script.

The Command Monitor window contains a menu bar that has three pull-down menus: File, Utility, and Help. The File menu options include:

Open	invokes a ground script selector dialog window that allows the user to select a ground script from the list.
Print	invokes a print dialog to allow a user to print the executing ground script.
Quit	quits the Command Monitor window.

The Utility menu options include:

Show Cur Directive	scrolls the ground script display to the current executing directive.
Find	invokes a find dialog to allow a user to search for a specified text string, a command, a procedure, or a time.
Command Request	invokes a command request status window to allow a user to check or respond to the command requests.

The Help menu contains options that provide context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

A.5.3.4 Command Monitor Output

The Command Monitor window displays the same information that is provided by the Command Control window (see Section A.5.3). This display includes:

- The start time of the ground script,
- The stop time of the ground script,
- The spacecraft identifier associated with the ground script,
- The ground script status (active or suspended),
- The ground script processing mode,
- The current bias time,
- The verification flags (Prerequisite State Check, Command, and Telemetry),
- The status of the executed directives,
- The current executing directive,
- The count down timer of the next three non-comment directives.

A.5.4 Command Request Generation

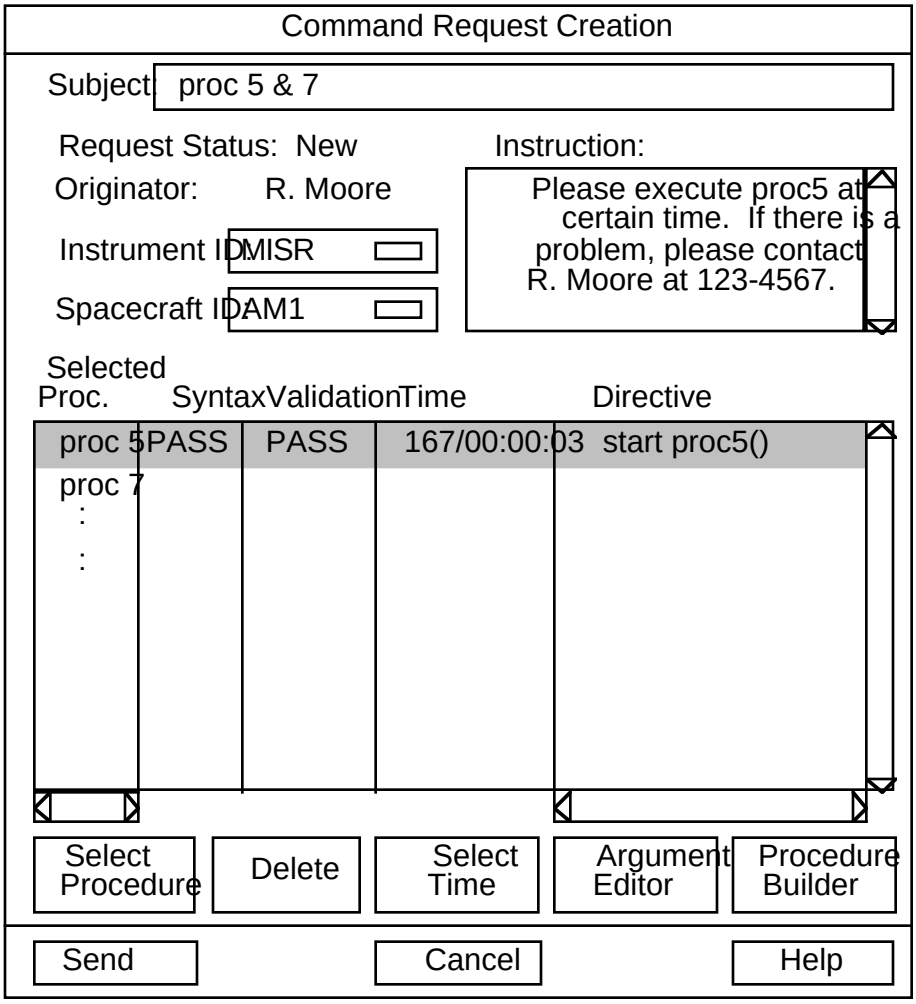


Figure A.5.4-1. Command Request Creation Window

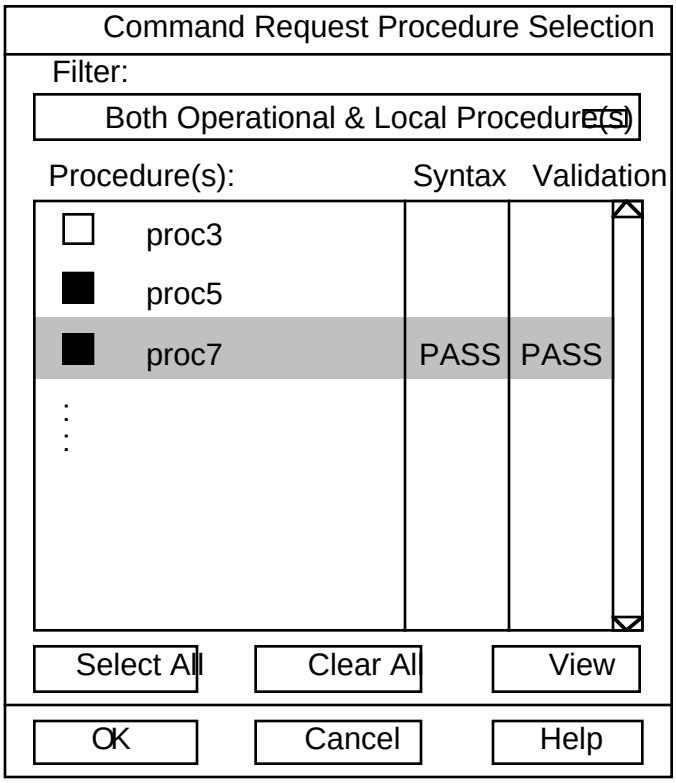


Figure A.5.4-2. Command Request Procedure Selection Window

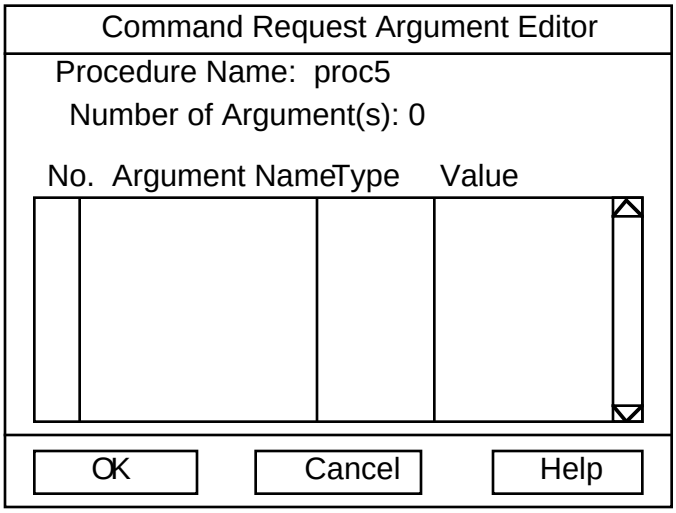


Figure A.5.4-3. Command Request Argument Editor Window

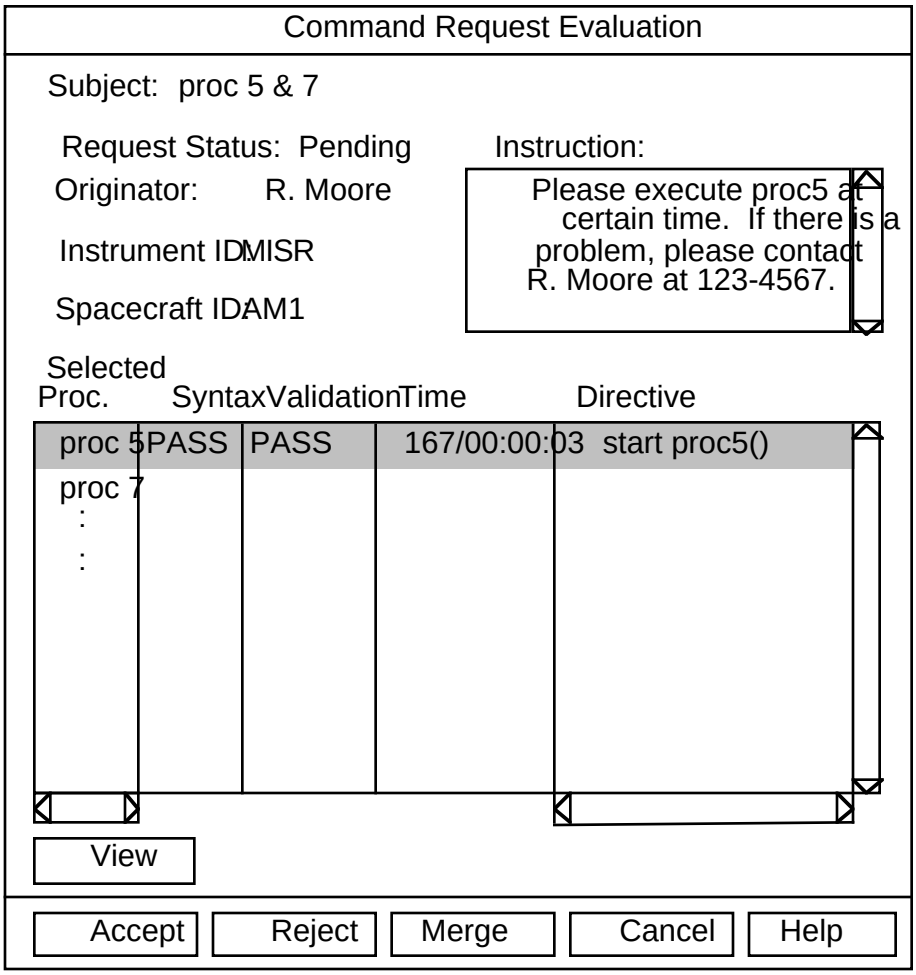


Figure A.5.4-4. Command Request Evaluation Window

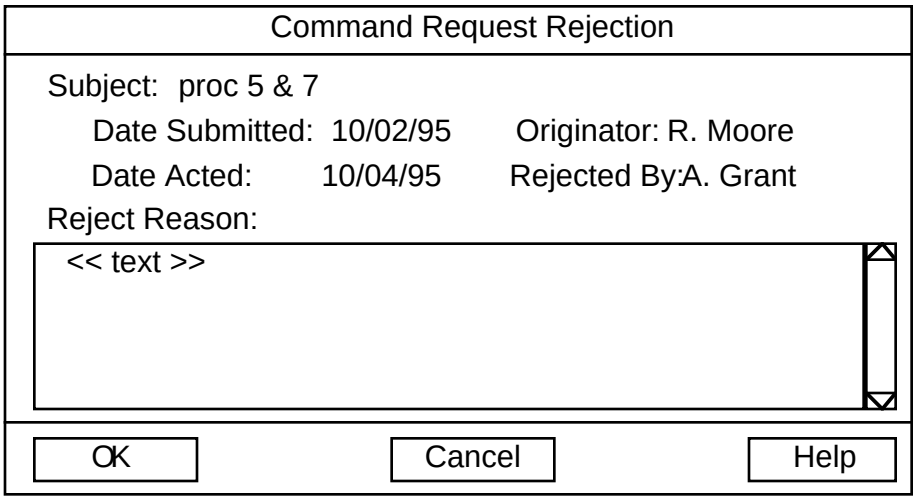


Figure A.5.4-5. Command Request Rejection Window

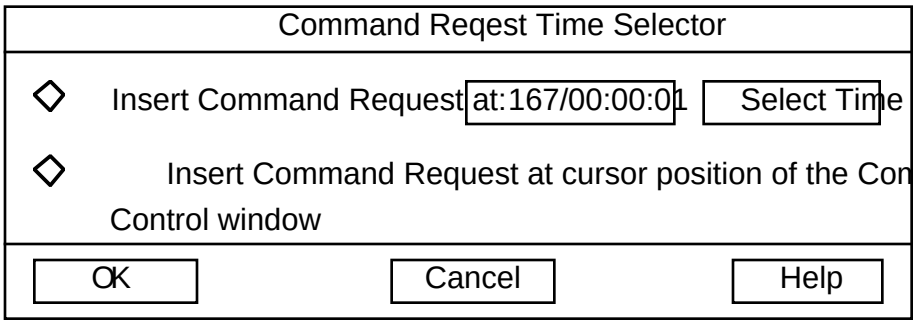


Figure A.5.4-6. Command Request Time Selector Window

A.5.4.1 Command Request Generation Usage

The Command Request Generation windows are used to create and evaluate command requests. This tool allows an authorized user to create a command request and send it to the Ops Controller. The Ops Controller can evaluate the request and determine whether to accept or reject the request using this tool. The requests that are accepted are merged by the Command Activity Controller (CAC) into the ground script.

Five windows are being used to define the Command Request Generation process, they are:

The Command Request Creation window allows user to create and send a command request (Figure A.5.4-1). The upper half of the window contains the request subject, originator, subsystem ID, spacecraft ID, request status, and instruction fields. Below that is scrolled list which contains the user selected procedure(s) list for a command request. It also display the validation status, syntax status, execution time, and its directive for each selected procedure. The

Time column represents the actual execution time for a procedure. This field is optional. There are eight push buttons at the bottom. Each of these buttons will be discuss in section A.5.4.3.

The Command Request Procedure Selection window (Figure A.5.4-2) allows user to select procedure for a command request. User can select to display local procedure(s), operational procedure(s), or both. If the same procedure exist in both directories, only the local one will be used.

The Command Request Argument Editor window (Figure A.5.4-3) allows user to edit the argument(s) value of a selected command request procedure. The name of the procedure, and its number of argument will be displayed. If argument(s) does exist, the name and type of the argument(s) will also be displayed. User can edit the argument value field.

The Command Request Evaluation window (Figure A.5.4-4) is very similar to the Command Request Creation window. However, all the information display in this window is for read-only purpose. There are five push buttons at the bottom. Each of these buttons will be discuss in section A.5.4.3.

The Command Request Rejection window (Figure A.5.4-5) allows user to edit or review the reject reason of a selected command request. The name of the originator and ops controller will be displayed. The submitted date and rejected date will also be displayed.

The Command Request Time Selector window (Figure A.5.4-6) allows the CAC to merge the command request into a particular time frame of the Command Controller window. This window will be displayed only if the originator did not provides the actual execution time of the command request.

A.5.4.2 Command Request Generation Access

The Command Request Creation (Figure A.5.4-1) and Command Request Evaluation (Figure A.5.4-4) windows can be accessed from the Command Request Status window. This tool is only accessible by authorized personnel that have been granted access to create or evaluate command requests.

The Command Request Procedure Selection window (Figure A.5.4-2) and the Command Request Argument Editor window (Figure A.5.4-3) can be accessed by the Command Request Creation window.

The Command Request Rejection window (Figure A.5.4-5) can be accessed by selecting the 'Reject' button of the Command Request Evaluation window.

The Command Request Time Selector window (Figure A.5.4-6) can be accessed by selecting the 'Merge' button of the Command Request Evaluation window.

A.5.4.3 Command Request Generation Input

The Command Request Generation provides the user with standard editing capabilities through a combination of keyboard and mouse input. The keyboard is used primarily to edit the subject, and instruction fields. The mouse is used to position the cursor within the window contents, to

perform standard Motif selection operations, and to select options from the pull-down menus and push buttons.

The Command Request Creation window (Figure A.5.4-1) allow authorized user to create a command request. The subject field allows user to define the purpose of the command request. The instruction field allows user to provide specific instruction or miscellaneous information for the FOT to review.

The Select Procedure button will display the Command Request Procedure Selection window (Figure A.5.4-2).

The Delete button will remove the selected procedure in the selected procedure list.

The Select Time button will display a single time selector. This button will be disabled if no procedure is selected in the Selected Procedure list area.

The Argument Editor button will display the Command Request Argument Editor window (Figure A.5.4-3) for a selected procedure.

The Procedure Builder button will display the Procedure Builder.

The Send button allows an authorized user to send a command request.

The Cancel button will dismiss the Command Request Creation window without making any change or update to the selected command request.

The Help button contains an option that provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

The Command Request Procedure Selection window (Figure A.5.4-2) allows the authorized user to selected procedure(s) from a list of available procedures list. There are two type of procedure available: local, or operational. User can selected the procedure type from the filter pull-down menu.

The Procedure list area will list all the procedures available. The toggle button on the left of each procedure identifies whether the procedure has be selected or not.

The Select All button will turn on all the toggle button in the procedures list.

The Clear All button will turn off all the toggle button in the procedures list.

The View button will display a selected procedure (which is being highlight) in the Procedure Builder.

The OK button will dismiss the Command Request Procedure Selection window with the current selected procedure in the procedure list.

The Cancel button will dismiss the Command Request Procedure Selection window without making any change to the selected procedure list.

The Help button contains an option that provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

The Command Request Argument Editor window (Figure A.5.4-3) allows the authorized user to edit the argument value of a selected procedure. If argument(s) is expected for a procedure, user can edit the argument value field in the window.

The OK button will dismiss the Command Request Argument Editor window with the current argument(s) value.

The Cancel button will dismiss the Command Request Argument Editor window without making any change or update to the selected command request.

The Help button contains an option that provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

The Command Request Evaluation window (Figure A.5.4-4) allows the Ops Controller to reject or accept a command request. All the command request information is displayed in this window without any editing capability.

The View button will display a selected procedure in the Procedure Builder.

The Accept button allows the Ops Controller to accept the command request.

The Reject button allows the Ops Controller to reject the command request. It will display a Command Request Rejection window (Figure A.5.4-5).

The Merge button will allow the CAC to merge the command request into the ground script.

The Cancel button will dismiss the Command Request Evaluation window without making any change or update to the selected command request.

The Help button contains an option that provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

The Command Request Rejection window (Figure A.5.4-5) allows the Ops Controller to edit the rejection reason of a command request.

The OK button allows will dismiss the Command Request Rejection window with a reject reason of a selected command request.

The Cancel button will dismiss the Command Request Rejection window without making any change or update to the selected command request.

The Help button contains an option that provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

The Command Request Time Selector window (Figure A.5.4-6) allows the CAC to merge the command request into the Command Controller at certain time. This window is displayed only when the originator did not provide any execution time for the command request. The CAC can select either to merge the command request into the command controller by an actual time, or by the cursor position in the command controller.

The Select Time button will display a single time selector.

The OK button allows will dismiss the Command Request Rejection window with a reject reason of a selected command request.

The Cancel button will dismiss the Command Request Rejection window without making any change or update to the selected command request.

The Help button contains an option that provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

A.5.4.4 Command Request Generation Output

The Command Request Generation will create or update a command request. The status of the command request will display at the Command Request Status window (refer to section A.5.5).

A.5.5 Command Request Status

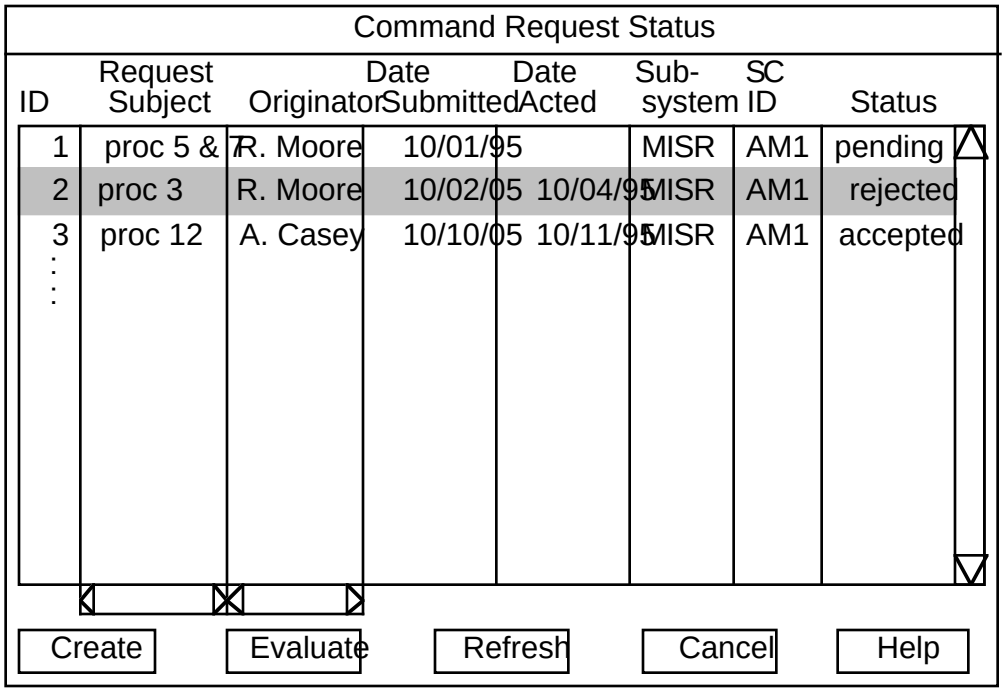


Figure A.5.5-1. Command Request Status Window

A.5.5.1 Command Request Status Usage

The Command Request Status is used to display command request status. This tool allows an authorized user to create, evaluate or merge a command request..

The Command Request Status includes the command request status area. This area contains the request ID, request subject, originator name, date submitted, date acted, spacecraft ID, subsystem

ID, and status. At the bottom there are five push buttons. Each of these buttons is described in Section A.5.5.3 below.

A.5.5.2 Command Request Status Access

The Command Request Status is accessed from the Tools menu on the Control Window. This tool is only accessible by authorized personnel that have been granted access to create and submit command requests to the Flight Operations Team (FOT). In the IST, the authorized users are the users who receive authorization from the PI/TL. In EOC, the authorized users are the users who receive authorization from the EOC Manager. The Ops Controller is authorized to evaluate the request. Requests that are accepted are merged by the Command Activity Controller (CAC).

A.5.5.3 Command Request Status Input

The Command Request Status provides the user with standard editing capabilities through mouse input. The mouse is used to perform standard Motif selection operations, to select a request from the command request area, and to select push buttons.

The Create button will activate the Command Request Generation window.

The Evaluate button will activate the Command Request Evaluation window for a selected command request.

The Refresh button will refresh the Command Request Status window.

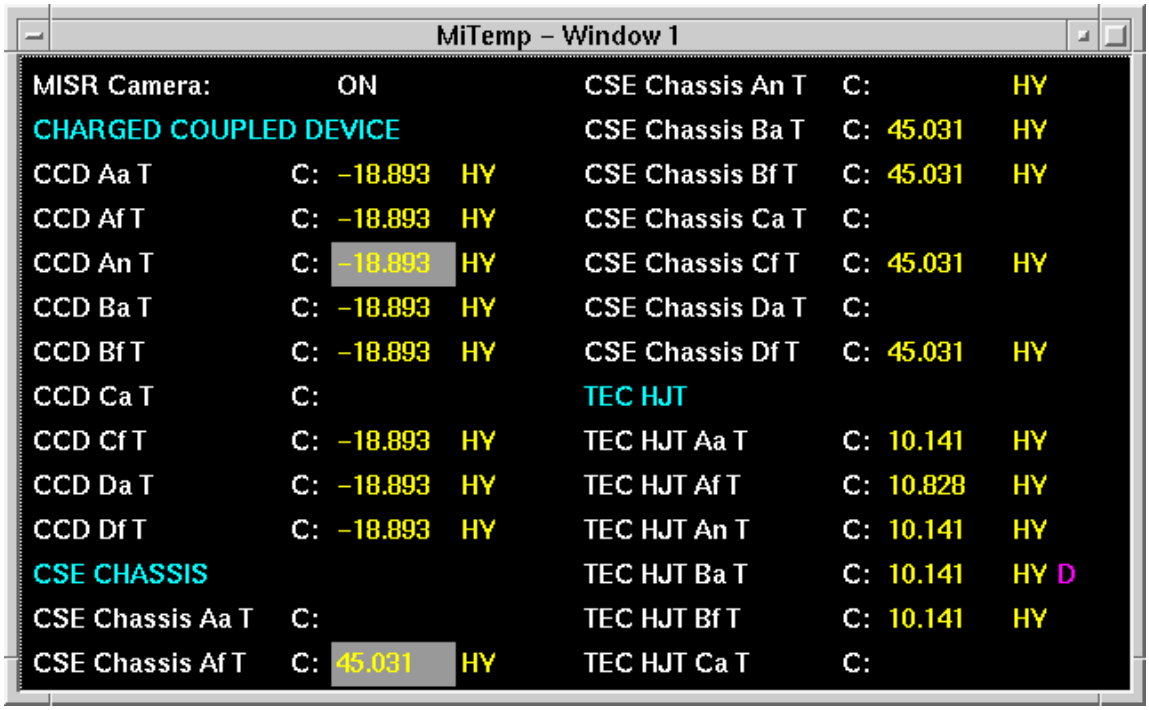
The Cancel button will dismiss the Command Request Status window.

The Help button contains an option that provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

A.5.5.4 Command Request Status Output

The Command Request Status will display command request information and status.

A.6.1 Alphanumeric Windows



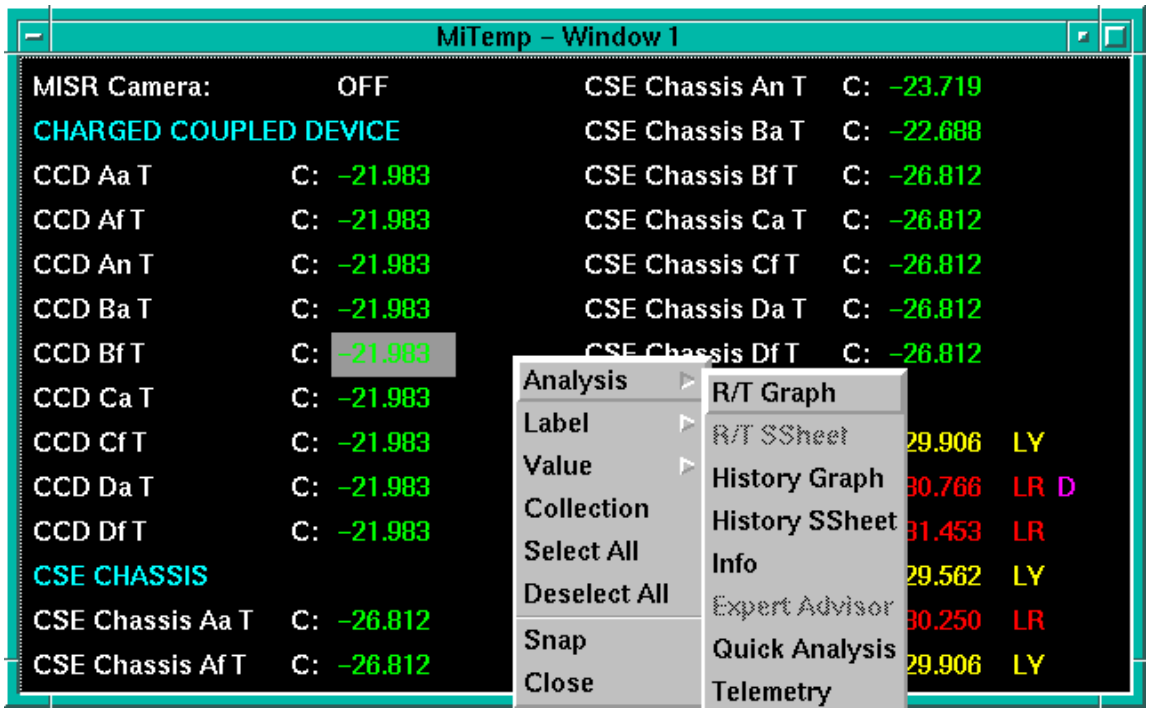


Figure A.6.1-1 Alphanumeric windows (sample)

A.6.1.1 Alphanumeric Window Usage

An Alphanumeric window is used for displaying to EOC users the telemetries associated with spacecrafts' subsystems and instruments at real-time. This display may also include the unit of measurement, the converted value, and a set of flags corresponding to each mnemonic or descriptor.

A.6.1.2 Alphanumeric Window Access

An Alphanumeric window can be accessed from an user input command or any of the push buttons from the Control Window; or from another alphanumeric window.

A.6.1.3 Alphanumeric Window Input

An Alphanumeric window does not require any user input data.

A.6.1.4 Alphanumeric Window Output

An Alphanumeric window allows the user to:

- Generate graphs analyzing the real-time telemetries
- Generate graphs or spreadsheets analyzing the historical telemetries
- Change the display of the descriptor label to its corresponding mnemonic label
- Change the display of the mnemonic label to its corresponding descriptor label
- Change the display of the converted value into various formats: English units, raw decimal, or raw hexadecimal
- Display a collection of selected telemetries onto a new alphanumeric window

A.6.5 Command Request Status

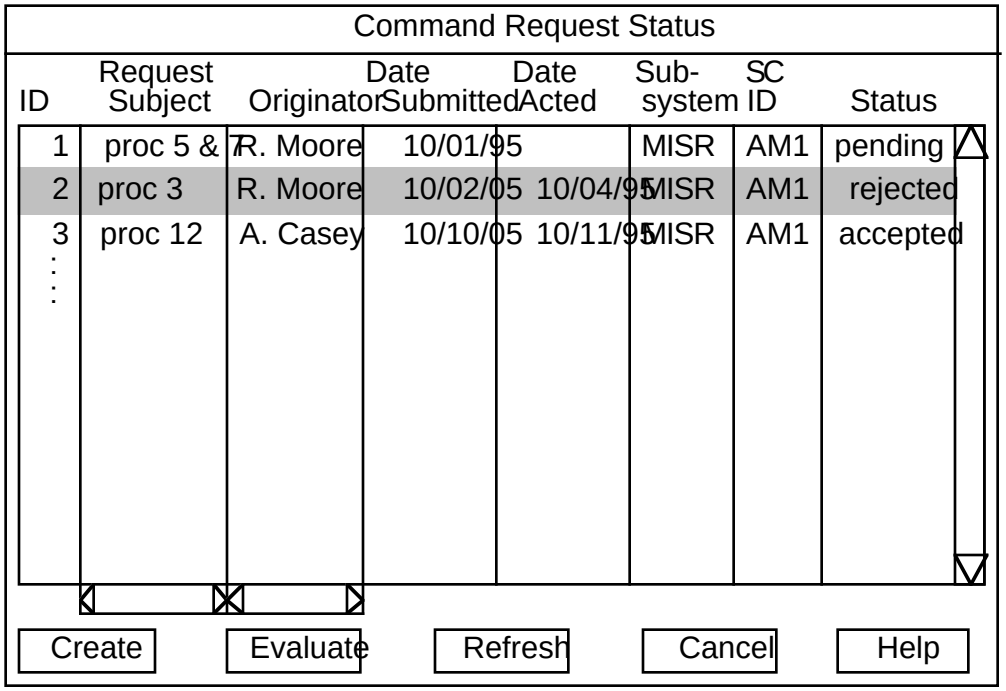


Figure A.6.5-1. Command Request Status Window

A.6.5.1 Command Request Status Usage

The Command Request Status is used to display command request status. This tool allows an authorized user to create, evaluate or merge a command request..

The Command Request Status includes the command request status area. This area contains the request ID, request subject, originator name, date submitted, date acted, spacecraft ID, subsystem ID, and status. At the bottom there are five push buttons. Each of these buttons is described in Section A.6.5.3 below.

A.6.5.2 Command Request Status Access

The Command Request Status is accessed from the Tools menu on the Control Window. This tool is only accessible by authorized personnel that have been granted access to create and submit command requests to the Flight Operations Team (FOT). In the IST, the authorized users are the users who receive authorization from the PI/TL. In EOC, the authorized users are the users who receive authorization from the EOC Manager. The Ops Controller is authorized to evaluate the request. Requests that are accepted are merged by the Command Activity Controller (CAC).

A.6.5.3 Command Request Status Input

The Command Request Status provides the user with standard editing capabilities through mouse input. The mouse is used to perform standard Motif selection operations, to select a request from the command request area, and to select push buttons.

The Create button will activate the Command Request Generation window.

The Evaluate button will activate the Command Request Evaluation window for a selected command request.

The Refresh button will refresh the Command Request Status window.

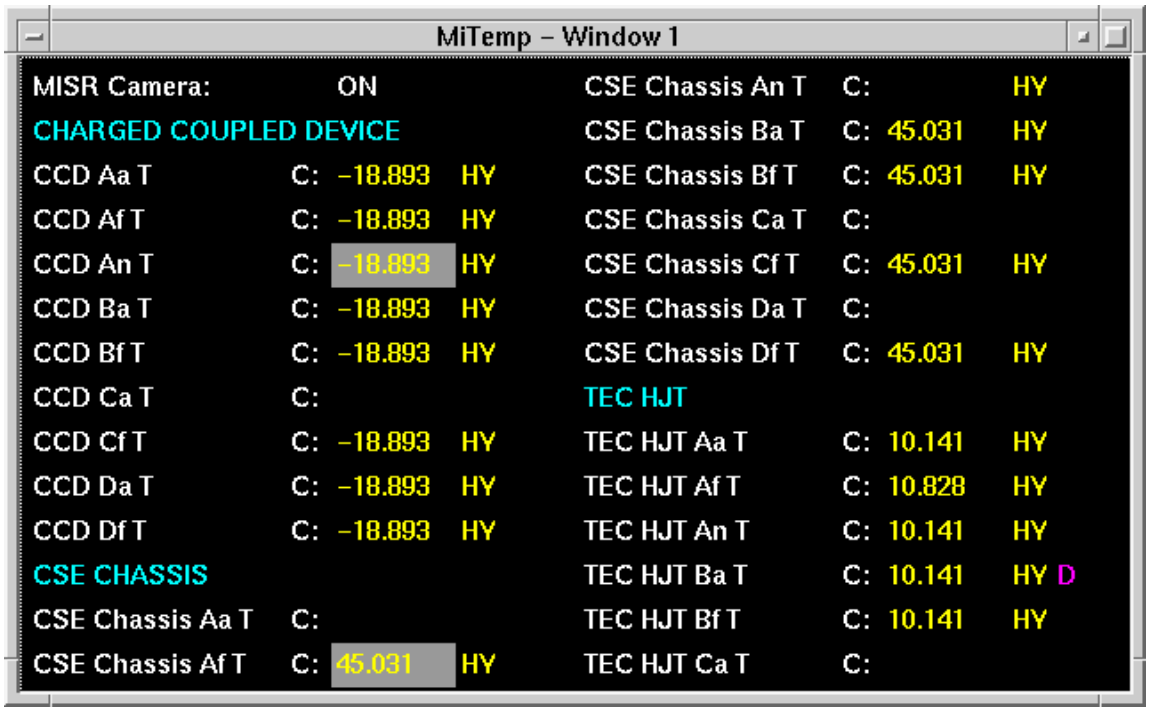
The Cancel button will dismiss the Command Request Status window.

The Help button contains an option that provides context-sensitive help for the user. Section A.2.7 contains further information about the Help utility.

A.6.5.4 Command Request Status Output

The Command Request Status will display command request information and status.

A.6.1 Alphanumeric Windows



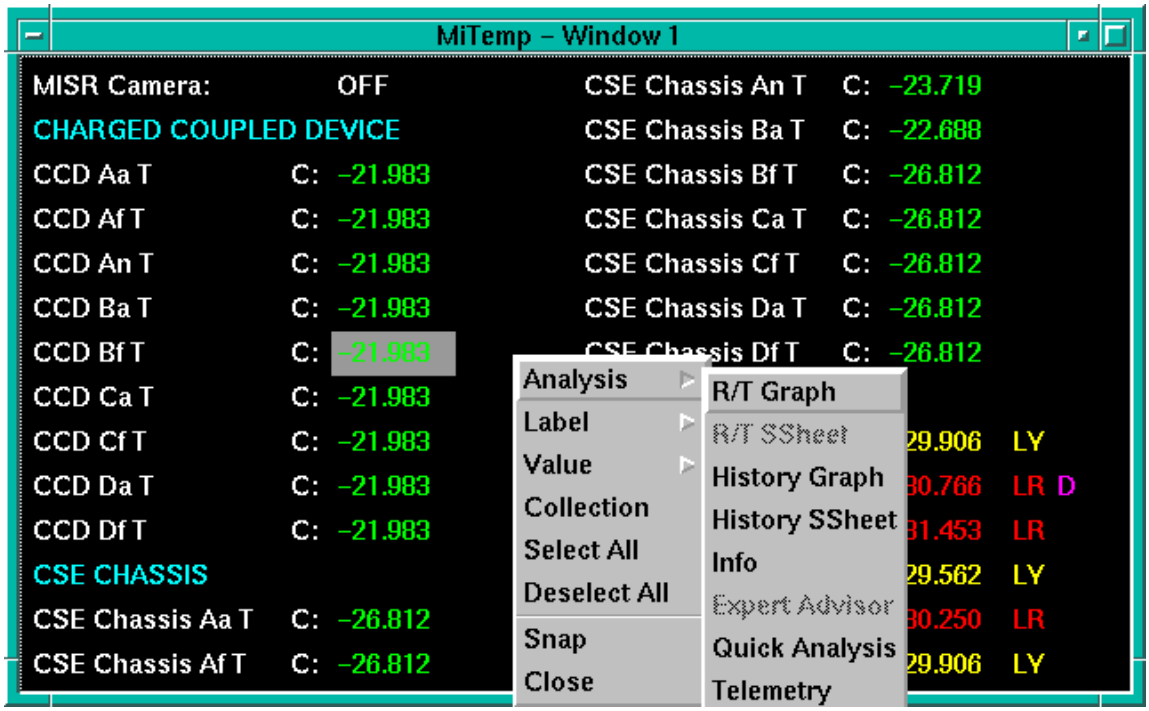


Figure A.6.1-1 Alphanumeric windows (sample)

A.6.1.1 Alphanumeric Window Usage

An Alphanumeric window is used for displaying to EOC users the telemetries associated with spacecrafts' subsystems and instruments at real-time. This display may also include the unit of measurement, the converted value, and a set of flags corresponding to each mnemonic or descriptor.

A.6.1.2 Alphanumeric Window Access

An Alphanumeric window can be accessed from an user input command or any of the push buttons from the Control Window; or from another alphanumeric window.

A.6.1.3 Alphanumeric Window Input

An Alphanumeric window does not require any user input data.

A.6.1.3 Alphanumeric Window Output

An Alphanumeric window allows the user to:

- Generate graphs analyzing the real-time telemetries
- Generate graphs or spreadsheets analyzing the historical telemetries

- Change the display of the descriptor label to its corresponding mnemonic label
- Change the display of the mnemonic label to its corresponding descriptor label
- Change the display of the converted value into various formats: English units, raw decimal, or raw hexadecimal
- Display a collection of selected telemetries onto a new alphanumeric window

A.6.2.1 Graph

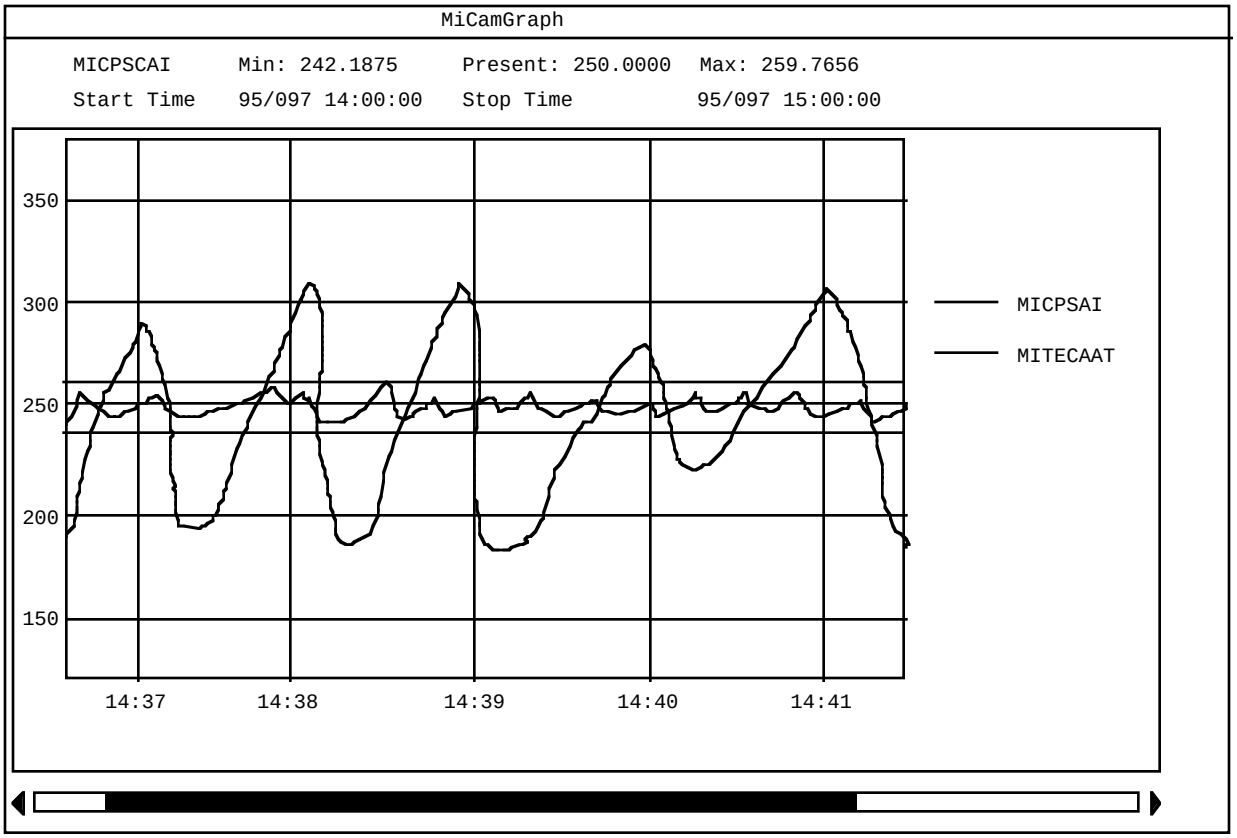


Figure A.6.2.1-1. Graph Window

A.6.2.1.1 Graph Usage

The graph will be either a real-time or a historical graph displaying up to six telemetry parameters in X vs. Y line format. The real-time graph will update at a user selectable rate from 1 to 60 seconds. The user will be able to interactively modify the view of the graph with the ability to change graph attributes such as the title, axis labels, axis granularity, grid granularity, parameter symbols and line style.

A.6.2.1.2 Graph Access

The graph can be accessed from a predefined dynamic page which contains graph display items, from the Quick Analysis window, or from the Analysis Request window which can request a historical graph window.

A.6.2.1.3 Graph Input

The dynamic page with only one graph widget will contains graph widget, scroll bar, labels showing start/stop time, and labels showing parameter minimum/current/maximum value.

The right mouse button is used to pop-up a menu to choose an operation to be executed on the graph. These operations are described as follow:

To change the update mode for real-time graph: the user can switch between latest value mode (normal mode) and all values mode (strip chart mode).

To change the update rate for real-time graph: the user can change the update rate from 1-60 seconds.

To change the graph attributes: the user can change graph attributes, such as the parameter line style attributes, the grid line attributes, the high and low, red and yellow limit line attributes, the axis and the legend attributes.

To pause/resume the real-time graph: the user can pause the real-time graph and resume the real-time graph from the pop-up menu. User can zoom in/out the graph and return to default graph display (before zoom in/out).

A.6.2.1.4 Graph Output

The graph outputs an encapsulated postscript file of the graph widget itself.

A.6.2.2 Graph Format Dialog

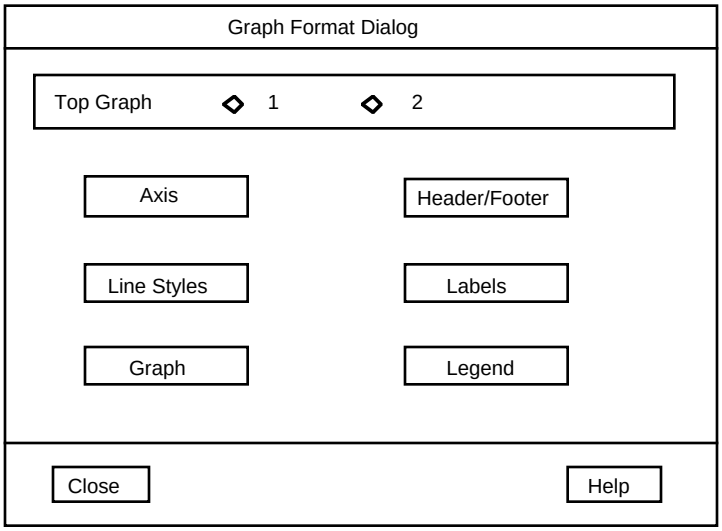


Figure A.6.2.2-1. Graph Format Dialog

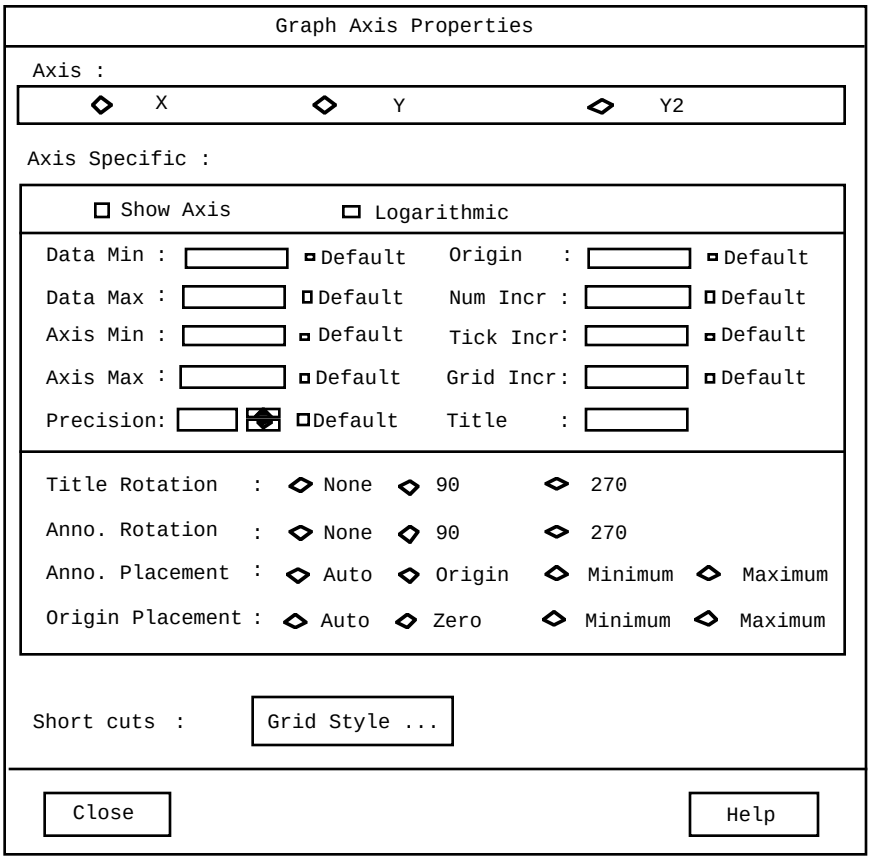


Figure A.6.2.2-2. Graph Axis Properties

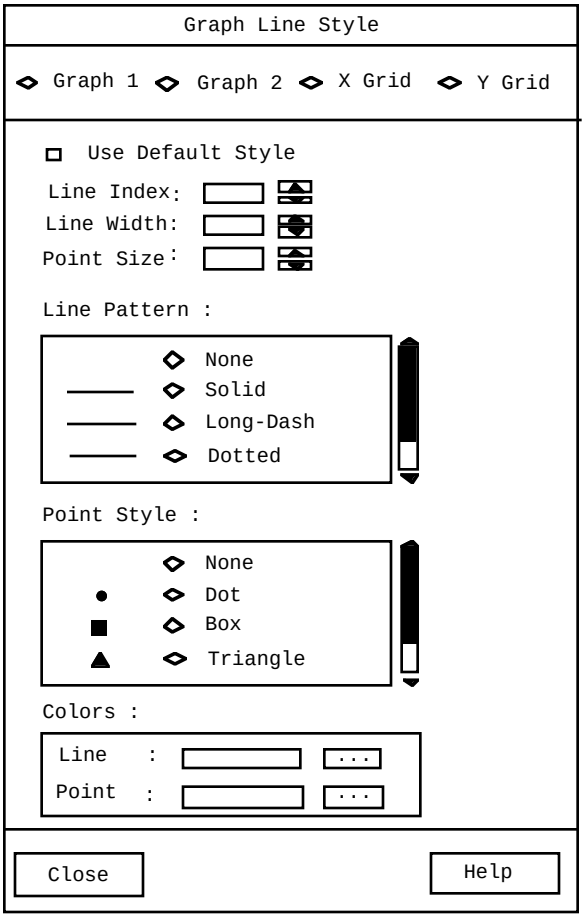


Figure A.6.2.2-3. Graph Line Style

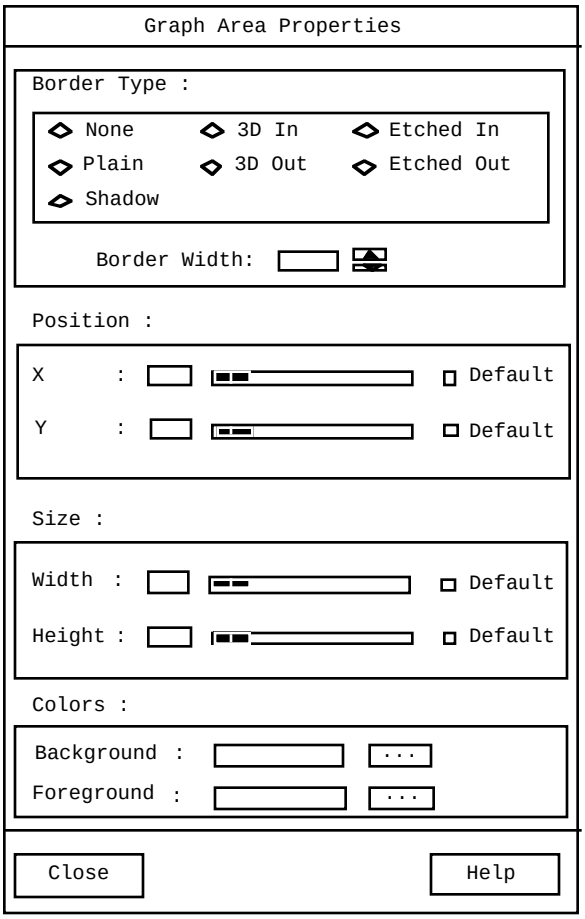


Figure A.6.2.2-4. Graph Area Properties

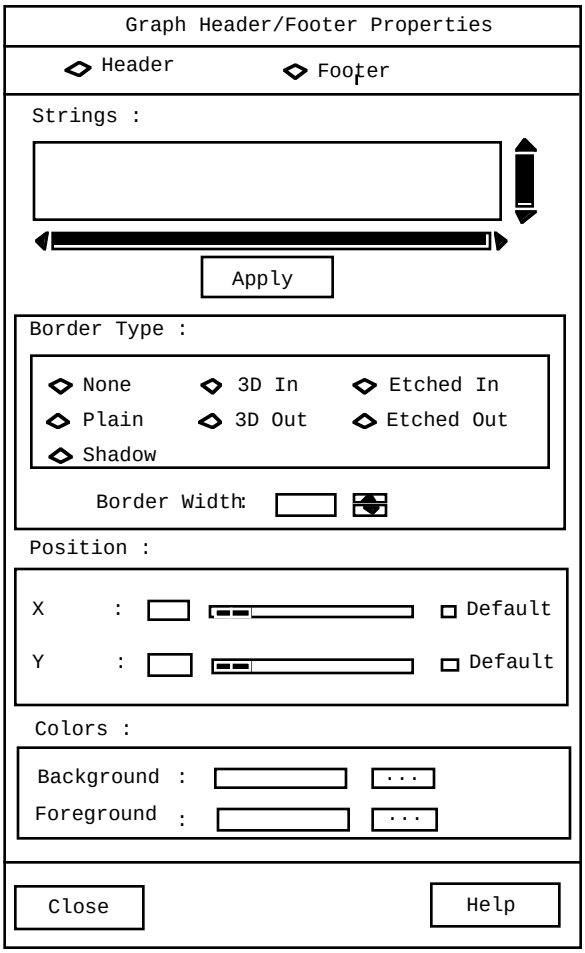


Figure A.6.2.2-5. Graph Header/Footer Properties

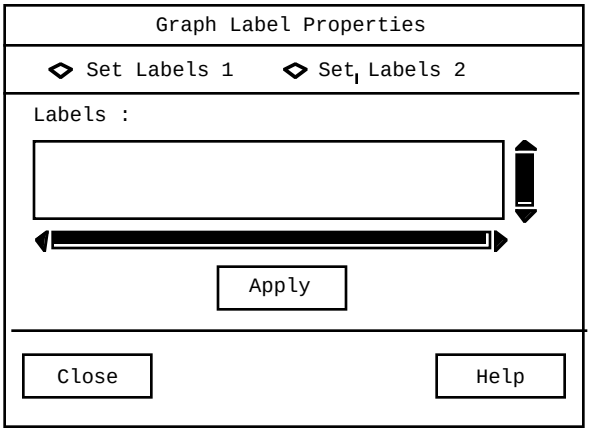


Figure A.6.2.2-6. Graph Label Properties

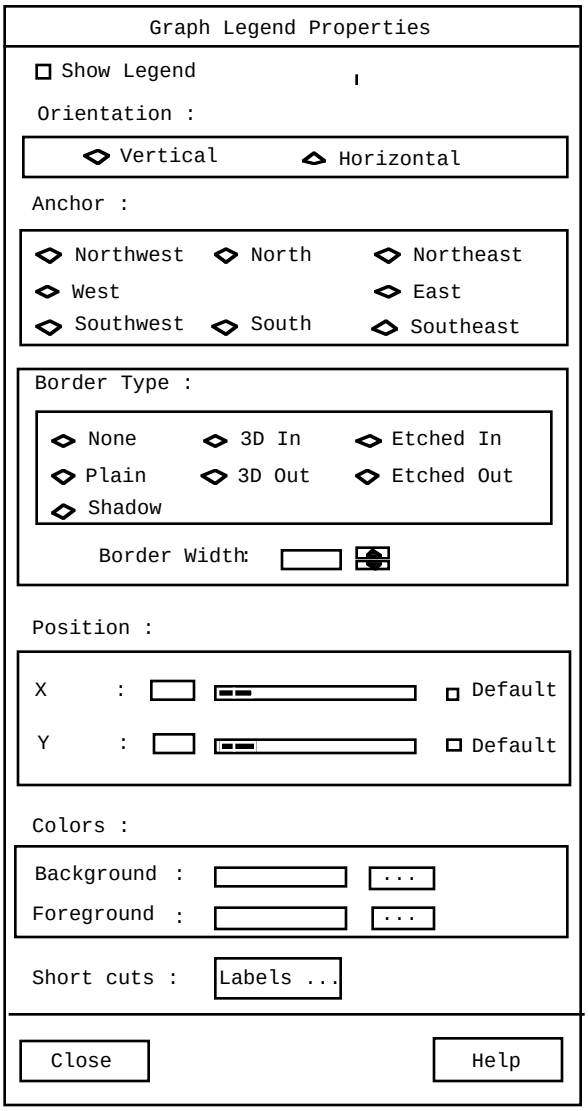


Figure A.6.2.2-7. Graph Legend Properties

A.6.2.2.1 Graph Format Dialog Usage

The graph format dialog allows the user to change the format attributes of the associated graph. Attributes which are allowed to be modified by the user include the axis properties, the data line styles, the graph area properties, the header and footer properties, the label strings, and the legend properties.

A.6.2.2.2 Graph Format Dialog Access

The graph format dialog can be accessed from a predefined dynamic page which contains graph display items, from the Quick Analysis window, or from the Analysis Request window which can request a historical graph window.

A.6.2.2.3 Graph Format Dialog Input

The graph format dialog contains seven windows, Figure A.6.2.2-1 graph format dialog, Figure A.6.2.2-2 graph axis properties, Figure A.6.2.2-3 graph line style, Figure A.6.2.2-4 graph area properties, Figure A.6.2.2-5 graph header/footer properties, Figure A.6.2.2-6 graph label properties, and Figure A.6.2.2-7 graph legend properties. Details description of each figure are followed.

The Graph Format Dialog (Figure A.6.2.2-1) :

This is the dialog that will be opened when a user wants to specify/change the format of the graph from the Quick Analysis window, the Analysis Request window, or from a dynamic page which contains graph display items. The graph format dialog contains the following components:

- Top graph toggle buttons : When a combination graph has been defined, the toggles select which dataset to display in the front.
- Axis button : To invoke the graph axis properties window.
- Line Styles button : To invoke the graph line styles window.
- Graph button : To invoke the graph area properties window.
- Header/Footer button : To invoke the header/footer properties window.
- Labels button : To invoke the graph label properties window.
- Legend button : To invoke the graph legend properties window.
- Close button : To close the graph format dialog.
- Help button : To invoke the help utility.

The Graph Axis Properties Window (Figure A.6.2.2-2) :

The graph axis properties is used to control the X, Y, and Y2 axis properties. The axis and data minimum/maximum, precision, and numbering/ticking increments have default values based on the data attached to the graph and the size of the graph area.

Specific values may be substituted for default values by de-selecting the Default toggle and entering a new value. To return to using the default values, select the Default toggle.

X Axis, Y Axis, and Y2 Axis toggles at the top of the window select which axis the following Axis Specific control elements apply to :

- The Show Axis toggle causes the axis to be shown on the graph.
- The Logarithmic toggle changes the axis into a logarithmic axis.

- The Data Min numeric text field specifies the low-end of the dataset. Data points with values lower then the specified value will not display.
- The Data Max numeric text field specifies the high-end of the dataset. Data points with values greater than the specified value will not display.
- The Axis Min numeric text field specifies the low-end of the axis itself. Data points with values lower than the specified value will not display.
- The Axis Max numeric text field specifies the high-end of the axis itself. Data points with values higher than the specified value will not display.
- The Precision numeric text field specifies how many digits of precision should be used for the axis annotation.
- The Origin numeric text field specifies where one axis crosses the other axis.
- The Numeric Increment numeric text field specifies the increment between numeric annotations on the axis.
- The Tick Increment numeric text field specifies the increment between tick marks on the axis.
- The Grid Increment numeric text field specifies the increment between grid marks on the axis. Set the Grid Increment to 0.0 and un-check the Default check-box to turn the grid off.
- The Title text field specifies the axis title.
- The Title Rotation and Annotation Rotation toggles specify how the axis title or annotation text should be rotated.
- The Annotation Placement toggle specifies the placement of the annotation and title. "Auto" causes determining placement automatically. "Minimum", "Maximum", and "Origin" place the annotation/title at the axis minimum, axis maximum, or origin respectively.
- The Origin Placement toggle specifies the placement of origins. "Auto" causes determining placement automatically. "Minimum", "Maximum", and "Zero" place the origin at the axis minimum, axis maximum, or zero point respectively.
- The Grid Style shortcut button will popup the Line Style window for editing the Grid Line Style.
- The Close button will close the Graph Axis Properties window.
- The Help button will invoke the help utility.

The Graph Line Style Window (Figure A.6.2.2-3) :

This window is used to specify the color and size of lines, points for the data representation in a graph (and the second graph in a combination graph), and the X and Y grid-lines. It is composed of the following items :

- The Line Styles toggle determines which data styles are being edited. When set to Graph1 or Graph2, the line styles properties corresponding to the data in the first or second graph in a combination graph are displayed. When set to X-Grid or Y-Grid, it displays data style properties of the appropriate grid line.
- The User Default toggle causes the default data style properties to be used. Specific data styles cannot be selected if this item is selected.
- The Line Index numeric text field only has meaning when the line style properties of a graph are being displayed. Each set of data has its own line style properties. The index identifies the set of data within the attached data.
- The Line width numeric text item specifies the line thickness.
- The Point Size numeric text item specifies the relative size of points.
- The Line Pattern scrolling list specifies the line pattern.
- The Point Style scrolling list specifies the point style used to identify the location of data points.
- The Line Color text item and button specifies the color used when drawing lines. The user may enter a color directly, or click the button to bring up the Color Chooser.
- The Point Color text item and button specifies the color used when drawing points. The user may enter a color directly, or click the button to bring up the Color Chooser.
- The Close button will close the Graph Line Style window.
- The Help button will invoke the help utility.

The Graph Area Properties Window (Figure A.6.2.2-4) :

The Graph Area Properties window is used to determine the position, size, color (off-line), and border style of the graph area within the graph window.

The Graph calculates a default position and size depending on the size of the other graph areas (the header, footer, and legend areas), and the current size of the window. By default, the graph always positions the graph area in the largest remaining rectangular area available once the header, footer, and legend have been sized and positioned.

Specific values may be substituted for default values by deselecting the Default toggle and entering a new value. To use the default values, select the Default toggle.

The Graph Area Properties window is composed of the following elements :

- The Border Type toggle determines the graph border style.
- The Border width numeric text item determines the width of the border.
- The X and Y numeric position selections determine the top-left corner of the graph area, measured relative to the window's top-left corner.
- The Width and Height numeric position selections determine the graph area's width and height.

- The Background and Foreground Color text fields and buttons specify the background and foreground colors. The user may enter a color directory or click the button to bring up the Color Chooser. This function is only available for off-line graph.
- The Close button will close the Graph Area Properties window.
- The Help button will invoke the help utility.

The Graph Header/Footer Properties Window (Figure A.6.2.2-5) :

The Header/Footer properties window is used to determine the text which appears in the header and footer areas. It also determines the header/footer area border, positioning and colors. It is composed of the following elements :

- The Strings scroll-list modifies the header/footer text.
- The Border Type toggle determines the header/footer border style.
- The Border Width numeric text item determines the width of the border.
- The X and Y numeric position selections determine the coordinate of the top-left corner of the header/footer area, measured relative to the window's top-left corner.
- The Background and Foreground Color text fields and buttons specify the background and foreground colors. The user may enter a color directory or click the button to bring up the Color Chooser.
- The Close button will close the Graph Axis Properties window.
- The Help button will invoke the help utility.

The Graph Label Properties Window (Figure A.6.2.2-6) :

The nth set-label is used to annotate the nth set in the attached data. The Label Properties window consists of the following element :

- The Labels scroll-list and apply button defines or modifies the text of each label.
- The Close button will close the Graph Axis Properties window.
- The Help button will invoke the help utility.

The Graph Legend Properties Window (Figure A.6.2.2-7) :

The Legend Properties window is used to specify how the legend will appear, and its position, border and color. It is composed of the following elements:

- The Show Legend toggle determines whether or not the legend will be displayed.
- The Orientation toggle specifies whether the legend should be laid out vertically or horizontally.
- The Anchor toggle specifies the general position of the legend relative to the graph window. The anchor specification only has effect when at least one of the positioning resources (X, Y) specified below is set to Default.

- The Border Type toggle determines the legend border style.
- The Border Width numeric text item determines the width of the border.
- The X and Y numeric position sliders determine the coordinate of the top-left corner of the legend area, measured relative to the window's top-left corner. The default legend position depends on the current size of the window and the Anchor setting. Specific values may be substituted for default values by deselecting the Default toggle, and entering a new value. To use the default values, select the Default toggle.
- The Background and Foreground Color text fields and buttons specify the background and foreground colors. The user may enter a color directly or click the button to bring up the Color Chooser.
- The Labels shortcut button exposes the Label Properties window.
- The Close button will close the Graph Axis Properties window.
- The Help button will invoke the help utility.

A.6.2.2.4 Graph Format Dialog Output

None.

A.6.3.1 Table

TABLE

Start Time 95/097 21:14:28 Stop Time 95/097 21:14:43

Time	MITECAAT	MITECAFT			MITECANT	MITECBAT
95/097 21:14:28	10.1406	10.1406	HR		10.1406	10.1406
95/097 21:14:33	9.2812	9.2832		S	8.9375	10.8281
95/097 21:14:38	10.1406	10.1406	HR	Q	8.4219	10.1406
95/097 21:14:43	10.1406	8.0781	LR		10.1406	10.1406

Figure A.6.3.1-1. Table Window

A.6.3.1.1 Table Usage

The table will be either a real-time or a historical table displaying up to fifty columns of telemetry parameters values and their associated times. The real-time table will update at a user selectable rate from 1 to 60 seconds. The telemetry parameter values will be raw values, decoded values, or converted values and displayed in the user selectable format such as the formatted, octal, hexadecimal, and binary.

A.6.3.1.2 Table Access

The table can be accessed from a predefined dynamic page which contains table display items, from Quick Analysis window, or from Analysis Request window which requests a historical table window.

A.6.3.1.3 Table Input

The dynamic page with table widget will contain a table widget, vertical and horizontal scroll bars, labels showing start/stop time of the table, and the column labels.

The right mouse button is used to pop-up a menu to choose an operation to be executed on the table. These operations are described as follow:

To change the update mode for a real-time table: the user can switch between latest value mode (normal mode) and all values mode.

To change the update rate for a real-time table: the user can change the update rate from 1-60 seconds.

To change the column labels: the user can switch between displaying parameter mnemonics as column labels or displaying parameter descriptors as column labels.

To change the parameter data type: the user can select the parameter data type, such as displaying the raw data, decoded data, or converted parameter data.

To change the parameter display type: the user can select the parameter display type, such as displaying the values in formatted, octal, hexadecimal, or binary.

To change the table attributes: the user can change the table attributes, such as the row/column width/height, colors, margin width/height, and border type/thickness.

To pause/resume the real-time table: the user can pause the real-time table and resume the real-time table.

A.6.3.1.4 Table Output

The table outputs an encapsulated postscript file of the table widget itself.

The table can output table data to a carry out format file.

A.6.3.2 Telemetry Table Format Dialog

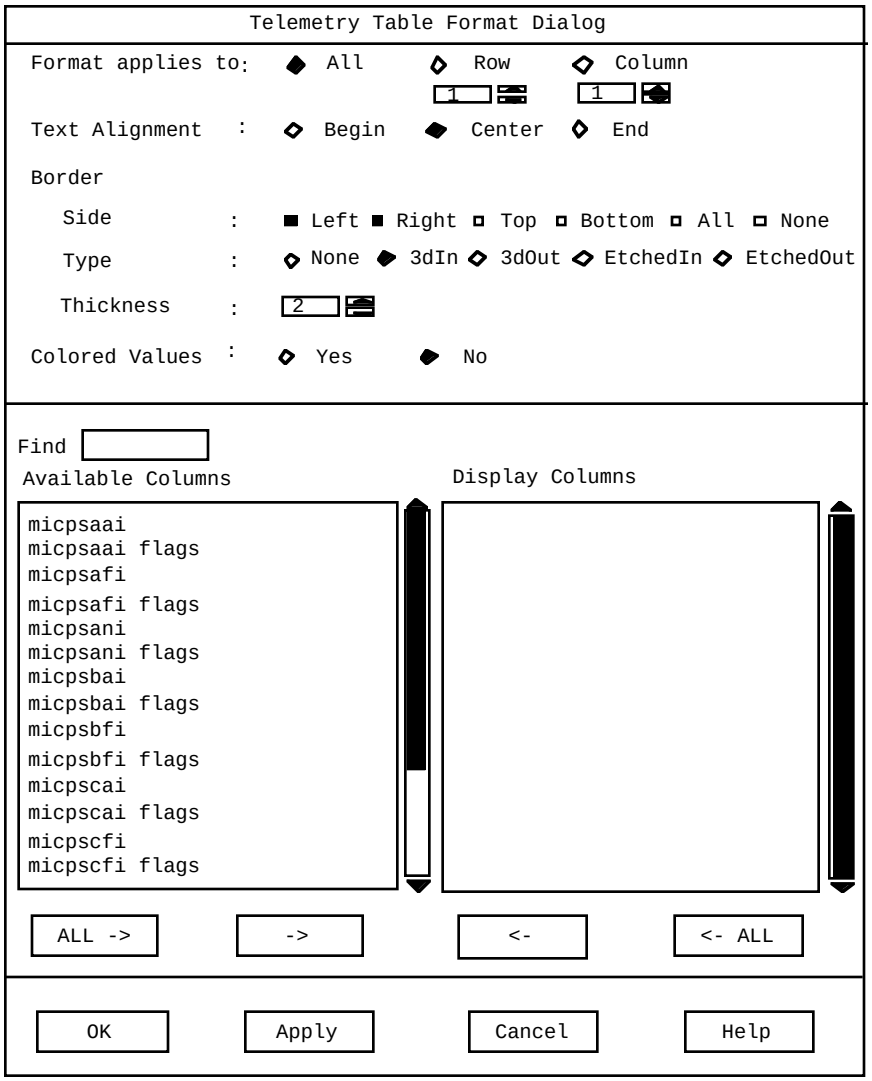


Figure A.6.3.2-1. Telemetry Table Format Dialog

A.6.3.2.1 Telemetry Table Format Dialog Usage

The Telemetry Table Format Dialog allows the user to change the format attributes of the telemetry table. Attributes which are allowed to be modified by the user include the text alignment, the cell border side, type, thickness, colored cell telemetry values, and hiding/displaying the telemetry values/flags columns. The user can apply the telemetry attribute changes to the whole table, to a specified row, or to a specified column.

A.6.3.2.2 Telemetry Table Format Dialog Access

The Telemetry Table Format Dialog can be accessed from the Analysis Request window, or from the Dynamic page which contains the telemetry table using the right mouse button pop up menu.

A.6.3.2.3 Telemetry Table Format Dialog Input

The Telemetry Table Format Dialog is used to change the format attributes of the telemetry table. The attributes that can be modified are described as follow:

Some attributes such as the text alignment, the cell border side, type can be modified and applied to the whole table, to a specified row, or to a specified column. The border width and the colored cell telemetry values are specified for the entire table.

The Format applies radio buttons:

- All - apply the attributes to the whole table
- Row - apply the attributes to one row only. The user needs to enter the row number.
- Column - apply the attributes to one column only. The user needs to enter the column number.

The Text Alignment radio buttons :

- Begin - The text aligns to the beginning of the cell.
- Center - The text aligns to the center of the cell.
- End - The text aligns to the end of the cell.

The cell border attributes :

- The border side : Specifies the sides of a cell that display the border type. The choices will be -- left, right, top, bottom, all, none.
- The border type : Specifies the type of border drawn around cells. The choices will be -- none, 3dIn, 3dOut, EtchedIn, EtchedOut.
- The border thickness : The width of the borders around the cells. This attribute applies to the entire table.

The colored values radio buttons:

- Yes : Turns on the color capability, i.e. when the telemetry value is not in the normal range, it will display different colors (High Red/Low Red, High Yellow/Low Yellow).
- No : Turns off the color capability, i.e. all telemetry values are displayed using the same foreground color.

The double selection list box :

Items in the display columns will be displayed and items in the available columns will be hidden. The user can user this double selection list box to display/hide telemetry value and/or telemetry flags.

Four push buttons :

- OK : Apply the changes and close the Telemetry Table Format dialog.
- Apply : Apply the changes.
- Cancel : Cancel the changes and close the Telemetry Table Format dialog.
- Help : Invoke the context sensitive help utility.

A.6.3.2.4 Telemetry Table Format Dialog Output

None

A.6.4.1 Schematic Parts

A.6.4.1.1 Schematic Part Usage

Schematic parts are assigned to a dynamic page by the Display Builder. A schematic part may also be associated with a parameter, which will cause the part to update its color and/or its appearance.

A.6.4.1.2 Schematic Part Access

Schematic parts may be accessed as part of a dynamic page.

A.6.4.1.4 Schematic Part Input

Schematic parts do not support user input.

A.6.4.1.5 Schematic Part Output

Schematic parts will display themselves according to their settings as specified within Display Builder. If a part is associated with a parameter, it will also exhibit behavior as described below:

- Icons will display a different image (pixmap) depending on the value of the parameter.
- Lines, points, arcs, polygons, rectangles, squares, ellipses, circles and arcs will change color according to the parameter's flags (e.g., High Yellow).
- Rectangles, squares, ellipses, and circles may also be filled to represent the value of the parameter relative to some predefined scale.

A.6.5.1 Combined Window

A.6.5.1.1 Combined Window

The combined window is a dynamic page that contains a variety of display item types. All dynamic pages are capable of containing alphanumerics, graphs, tables, and schematics. Figure A.6.5-1 shows a dynamic page containing a graph, alphanumericdisplay items, and schematic parts.

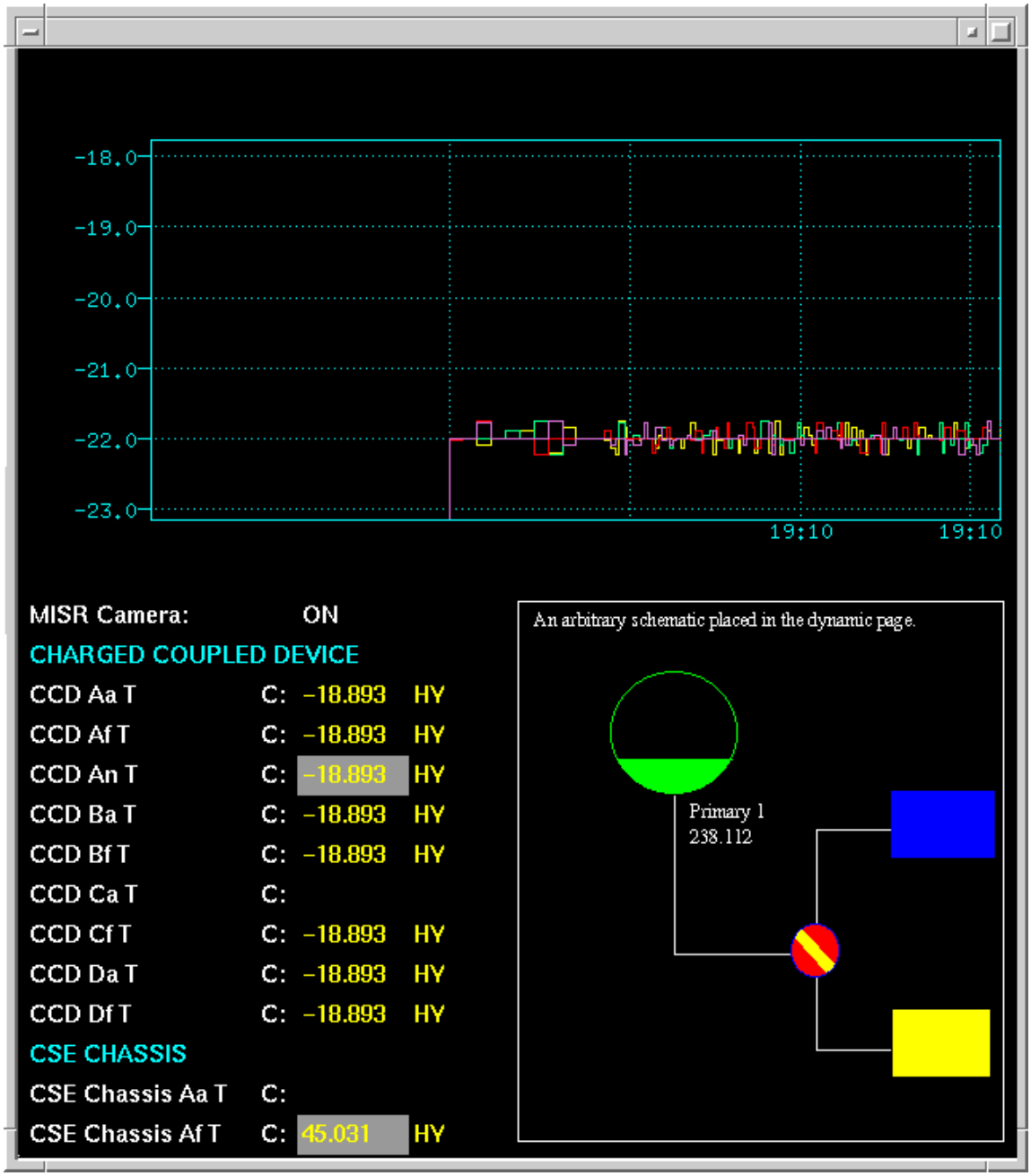


Figure A.6.5-1 Combined Window (sample)

A.6.5.1.2 Combined Window Usage

A combined window may be accessed via the Control Window (see Section A.1.8).

A.6.5.1.4 Combined Window Input

A combined window's components will accept input as described in sections A.6.1-2.7.4.

A.6.5.1.5 Combined Window Output

A combined window's components will produce output as described in sections A.6.1-2.7.4.

A.6.6.1. Telemetry Attributes

A.6.6.1.1 Telemetry Attributes Usage

The telemetry attributes will display a column of telemetry parameter mnemonics and respective columns of associated data in a tabular format. The data displayed in the Telemetry Attributes will come from the specified operational data base (ODB) in the off-line mode or come from the operational data base (ODB) and the DeCom process in the real-time mode. The data will include the valid discrete states, the high/low limit values, the delta limits, the parameter conversion coefficients etc.

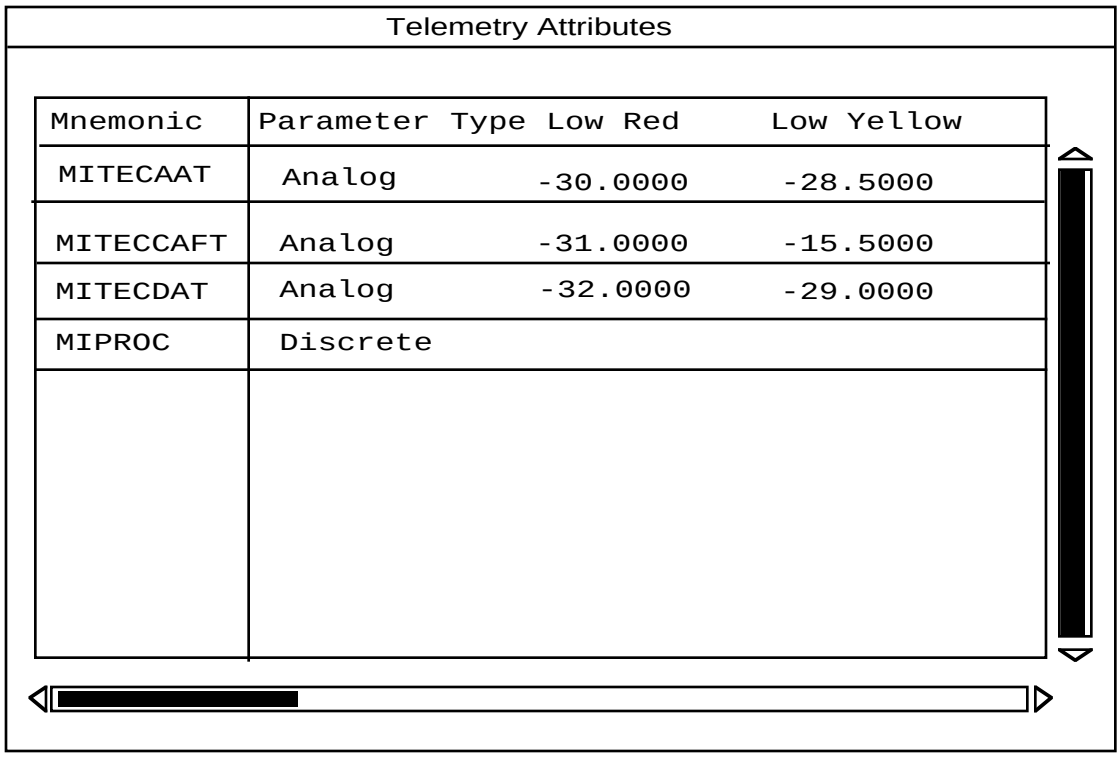


Figure A.6.6.1-1. Telemetry Attributes

A.6.6.1.2 Telemetry Attributes Access

The Telemetry Attributes can be accessed from several windows such as the Quick Analysis window, the Analysis Request window, and the Dynamic page using the right mouse button pop up menu.

A.6.6.1.3 Telemetry Attributes Input

The Telemetry Attributes is used for displaying telemetry parameter attribute information. The user can use the horizontal scrollbar or the vertical scrollbar to adjust the visible area to see other attribute data contained in the window.

A.6.6.1.4 Telemetry Attributes Output

The Telemetry Attributes outputs an encapsulated postscript file of the table widget itself.

A.6.6.2 Telemetry Attributes Format Dialog

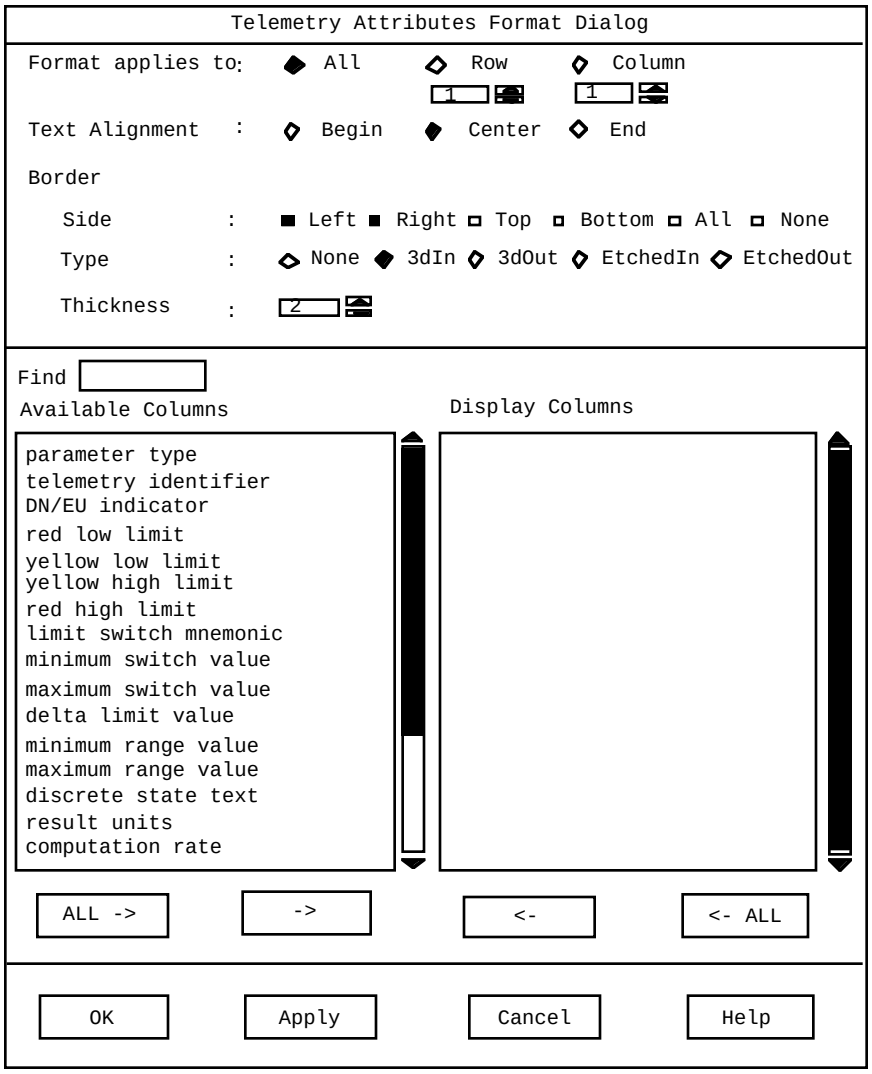


Figure A.6.6.2-1. Telemetry Attributes Format Dialog

A.6.6.2.1 Telemetry Attributes Format Dialog Usage

The telemetry attributes Format Dialog allows the user to change the format attributes. Attributes which are allowed to be modified by the user include the text alignment, the cell border side, type, thickness, and hiding/displaying the telemetry attribute columns. The user can apply the telemetry attribute changes to the whole table, to a specified row, or to a specified column.

A.6.6.2.2 Telemetry Attributes Format Dialog Access

The Telemetry Attributes Format Dialog can be accessed from the Analysis Request window, or from the Dynamic page which contains the telemetry attributes using the right mouse button pop up menu.

A.6.6.2.3 Telemetry Attributes Format Dialog Input

The Telemetry Attributes Format Dialog is used to change the format attributes of the telemetry attributes. The attributes that can be modified are described as follow:

Some attributes such as the text alignment, the cell border side, type can be modified and applied to the whole table, to a specified row, or to a specified column. The border width is specified for the entire table.

The Format applies radio buttons:

- All - apply the attributes to the whole table
- Row - apply the attributes to one row only. The user needs to enter the row number.
- Column - apply the attributes to one column only. The user needs to enter the column number.

The Text Alignment radio buttons :

- Begin - The text aligns to the beginning of the cell.
- Center - The text aligns to the center of the cell.
- End - The text aligns to the end of the cell.

The cell border attributes :

- The border side : Specifies the sides of a cell that display the border type. The choices will be -- left, right, top, bottom, all, none.
- The border type : Specifies the type of border drawn around cells. The choices will be -- none, 3dIn, 3dOut, EtchedIn, EtchedOut.
- The border thickness : The width of the borders around the cells. This attribute applies to the entire table.

The double selection list box :

Items in the display columns will be displayed and items in the available columns will be hidden. The user can user this double selection list box to display/hide telemetry attributes.

Four push buttons :

- OK : Apply the changes and close the telemetry attributes format dialog.
- Apply : Apply the changes.
- Cancel : Cancel the changes and close the telemetry attributes format dialog.

- Help : Invoke the context sensitive help utility.

A.6.6.2.4 Telemetry Attributes Format Dialog Output

None

A.6.7 Status Window

A.6.7.1 Status Window Usage

The Status Window is used for displaying to EOC users the status of the spacecraft and instruments from which real-time telemetry data is sent. The Status Window contains the following indicators:

UTC	-	ground station time
S/C	-	spacecraft time
Quality	-	quality of data being sent
Format	-	data format type
Rev	-	orbit identification number
TLM Rate	-	telemetry data transfer rate
Data Source	-	data server
Master/Major	-	master and major frame counters

A.6.7.2 Status Window Access

The Status Window is accessed when the Control Window is accessed.

A.6.7.3 Status Window Input

The Status Window usage does not require user input.

A.6.7.4 Status Window Output

The Status Window usage does not generate any output.

A.6.8 SSR Analysis

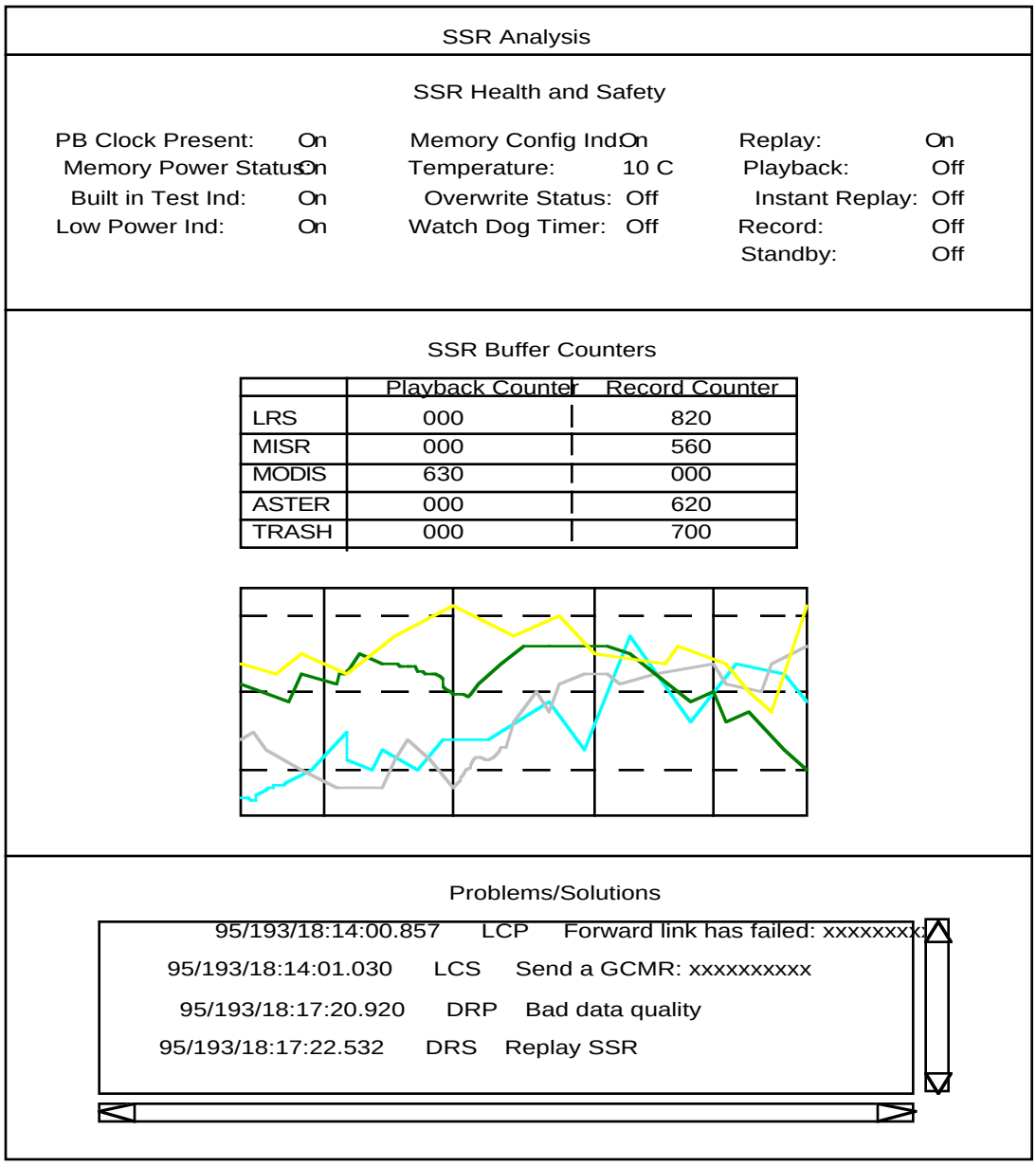


Figure A.6.8-1. SSR Analysis Window

A.6.8.1 SSR Analysis Usage

The SSR Analysis window allows the user to monitor the SSR buffer pointers, buffer status, playback state. Data loss recovery and RF link problems and solutions, as well as command requests for playbacks can be viewed.

A.6.8.2 SSR Analysis Access

The SSR Analysis window can be accessed from the Tool Selector that is activated from the Command window.

A.6.8.3 SSR Analysis Input

The SSR Analysis window is read only.

A.6.8.4 SSR Analysis Output

The SSR Analysis window displays SSR parameters and recording and playback counters in a table and a graph. These portions of the display will be initiated from a file that drives a dynamic page.

Data loss recovery and link problems and solutions can be viewed along with command requests in a scrolling list.

Known problem/solution categories are:

- PLC - Link Correction Problem
- SLC - Link Correction Solution
- PDR - Data Recovery Problem
- SDR - Data Recovery Solution
- SCR - Command Request Generated Solution

If additional problem areas are defined, this list will be expanded.

The user may snap a picture of this window.

A.7.1 Data Source Selector

A.7.1.1 Data Source Selector Usage

The Data Source Selector (Figure A.7.1-1) is used by the Flight Operations Team (FOT) and Instrument Operations Team (IOT) members to connect dynamic telemetry displays (i.e., dynamic pages) to one or more established data sources (i.e., logical strings). The number of data sources that a display can connect to is defined when the display is created (reference the Display Builder in Section A.2.6).

The Data Source Selector window consists of a Room list, a Page list, and a Data Source list. The Room list, located at the top of the window, contains the names of the rooms used to filter the items in the Page list. By default, the Room list will contain the names of the user's default and accessed rooms for the current session. Selecting the toggle button associated with a room name adds the dynamic pages defined in that room to the Page list. If the Data Source Selector is activated from a dynamic page, the Room list will be empty and the Page list will only contain the name and assigned data source of the dynamic page that activated the Data Source Selector.

The user may select the Additional Rooms button to activate a dialog that provides the capability to add the names of other defined rooms to this list.

The Page list, located on the left half of the window below the Room list, displays the list of dynamic pages and assigned data source connections. The data source connection type is also indicated in this list. An "M" indicates a Mirrored connection, and a "T" indicates a Tailored connection. Each dynamic page will have a default data source specified when it is defined by the Display Builder. When the page is activated, it will attempt to connect to its default data source. If this connection cannot be made (e.g., the data source is not active), then the data source is unresolved and question marks (??????) are displayed in the assigned data source column of the Page list.

The Data Source list, located to the right of the Page list, displays information about each of the currently established data sources, or logical strings. This list includes all data sources established in the EOC. An asterisk (*) is used to indicate the data sources that the user is currently connected to. The Page list and Data Source list are used to change the assigned data source of one or more pages. The mechanism to change a data source is described below in Section A.7.1.3.1

A radio box is located between the Page list and the Data Source list. This radio box allows the user to specify the connection type when changing a data source assignment. The options are Default (maintain the current connection type - use mirrored for unresolved connections), Mirrored (connect in a mirrored mode), and Tailored (connect in a tailored mode).

Two buttons located just below the Page list and the Data Source List allow the user to access the Data Source Global Switch dialog and the Data Source Parameter Display. The Data Source Parameter Display will include the parameters and assigned data sources contained in the pages selected from the Page list.

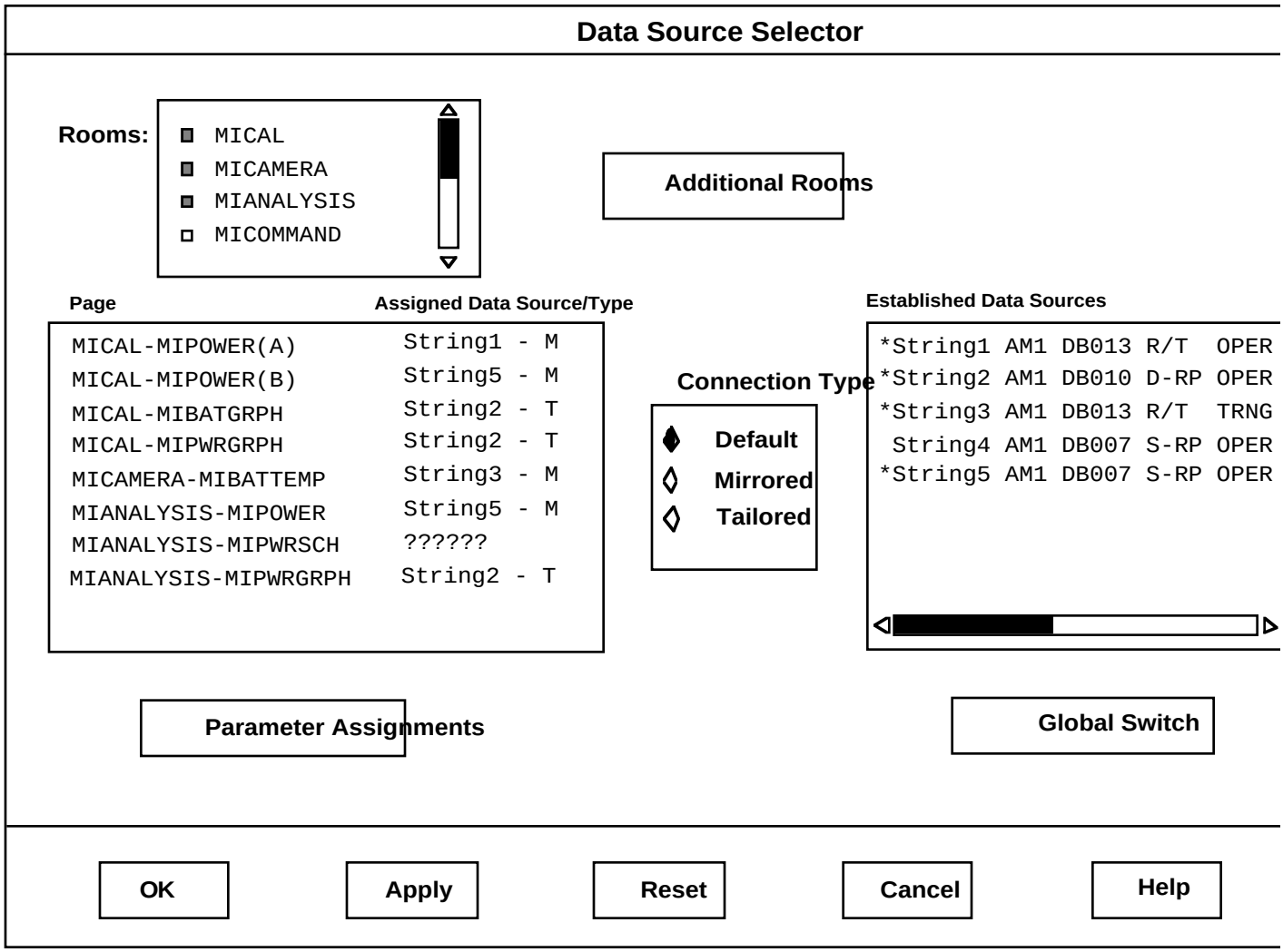


Figure A.7.1-1. Data Source Selector Window

The five buttons located along the bottom of the window allow the user to apply or cancel the data source assignment changes, or to receive help about this display. Each of the buttons is described in Section A.7.1.3.1 below.

The Data Source Global Switch dialog (Figure A.7.1-2) may be accessed from the Data Source Selector to allow a global switch of all active dynamic pages from one data source to another. For example, a user may use this capability to switch all active pages connected to logical string "String1", a real-time string not currently active, to logical string "String2", a replay string currently in progress.

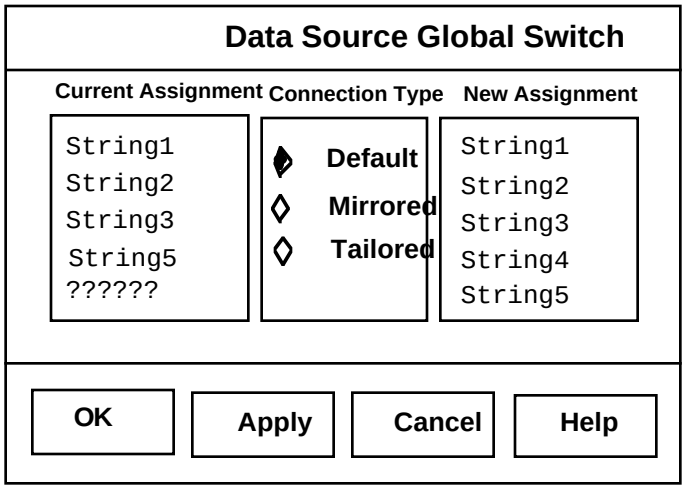


Figure A.7.1-2. Data Source Global Switch Window

The Data Source Global Switch dialog contains two scrolling lists. On the left portion of the dialog window is a list of the assigned data sources of all active pages (Current Assignment). The list on the right contains the list of all established data sources (New Assignment).

A radio box is located between the assigned data source list and the established data source list. This radio box allows the user to specify the connection type when changing a data source assignment. The options are Default (maintain the current connection type - use mirrored for unresolved connections), Mirrored (connect in a mirrored mode), and Tailored (connect in a tailored mode).

The four buttons located along the bottom of the dialog window allow the user to apply or cancel the global data source changes, or receive help about this display. Each of these buttons is described in Section A.7.1.3.2 below.

The Data Source Parameter Display (Figure A.7.1-3) may also be accessed from the Data Source Selector. This is a read-only display that shows the data source connections for each telemetry parameter included in one or more selected dynamic pages.

The Data Source Parameter Display contains two scrolling lists. The list on the left contains the parameters and assigned data sources. The connection type is indicated by an "M", for a mirrored connection, or a "T" for a tailored connection. As mentioned above, unresolved data source assignments are indicated with question marks (??????). The list on the right contains information about each of the established data sources. This list includes all data sources established in the EOC. An asterisk (*) is used to indicate the data sources that the user is currently connected to. The two buttons located along the bottom of the window allow the user to dismiss (Close) the window or request help (Help) about the window.

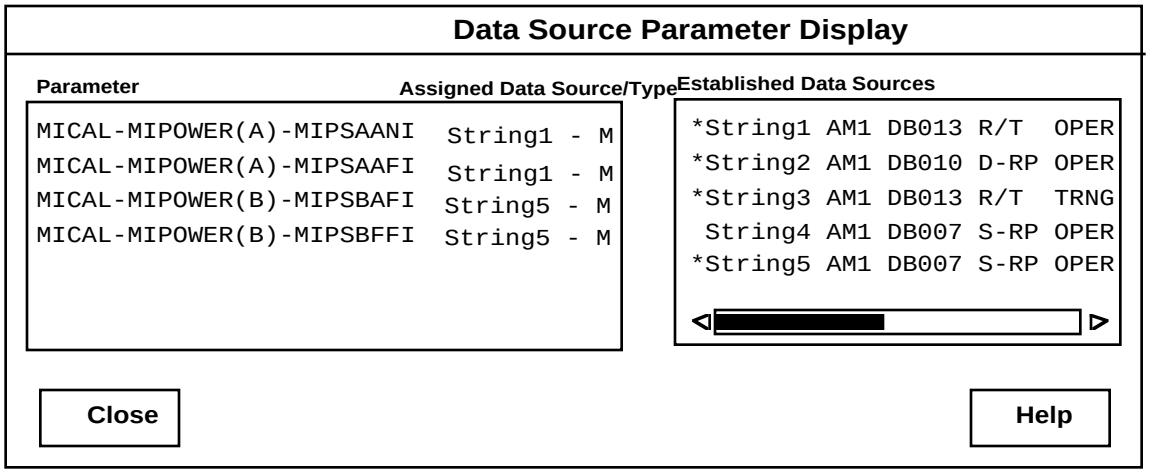


Figure A.7.1-3. Data Source Parameter Display Window

A.7.1.2 Data Source Selector Access

The Data Source Selector may be accessed by any user from either the Tools menu, located on the Control window (see Section A.7.1.3) or from any of the dynamic pages.

A user activates the Data Source Selector from a dynamic page by selecting the appropriate option from a pop-up menu. Dynamic pages are further defined in Section A.6, Telemetry Displays.

A.7.1.3 Data Source Selector Input

A.7.1.3.1 Data Source Selector Window

When activated from the Tool menu, the Data Source Selector's Room list will contain the list of default and accessed rooms (for the current session). Selecting the toggle button associated with a room name will add the names and assigned data sources of the pages contained in that room to the Page list. Deselecting a toggle button will remove the corresponding page entries from the Page list. If the Data Source Selector is activated from one of the dynamic pages, the Room list will be empty.

The user may add the names of other defined rooms to this Room list by selecting the Additional Rooms button. This button activates a dialog containing the list of all rooms defined within the FOS. The user selects one or more names in the list and selects the OK button to update the Room list. Selecting Cancel dismisses the dialog window without updating the Room list.

The user may select one or more entries in the Data Source Selector's Page list in order to switch the assigned data source. After selecting the pages to change, the user selects the connection type (default, mirrored, or tailored). By default, the connection type will remain the same as the current connection. Next, the user selects one of the established data sources in the Data Source

list. When the user selects the established data source, the assigned data source of the selected pages is updated in the Page list. A dollar sign ($) is prefixed to the assigned data source to indicate that a change is pending. The user may select the Reset button, located to right of the Apply button, to cancel all pending changes. The user must select either the OK or Apply button, located along the bottom of the window, to effect the changes.

In cases where the parameters on a single dynamic page are assigned to multiple data sources, the user may wish to display these assignments by parameter. This is accomplished by selecting the desired pages from the Page list and then selecting the Parameter Assignments button. This activates the Data Source Parameter Display.

The Global Switch button allows a user to switch the data source assignment of all pages assigned to a particular data source. This button activates the Data Source Global Switch dialog window.

The five buttons located along the bottom of the window provide the following functions:

OK	apply all pending data source assignment changes and dismiss the Data Source Selector window.
Apply	apply all pending data source assignment changes. The Data Source Selector window remains open for subsequent changes.
Reset	cancel all pending data source assignment changes.
Cancel	dismiss the Data Source Selector window. All pending data source assignment changes are discarded.
Help	activate a help window containing information about the Data Source Selector.

A.7.1.3.2 Data Source Global Switch Dialog Window

The Data Source Global Switch dialog contains two lists: a Current Assignment list (currently assigned data sources) and a New Assignment list (established data sources). The user selects an item from Current Assignment list, the connection type (default, mirrored, or tailored), and an item from the New assignment list. By default, the new connection type will remain the same as the current connection type for each affected dynamic page. The user must either select OK or Apply to effect the change. All active pages assigned to the data source selected from the Current Assignment list are switched to the data source selected in the New Assignment list.

The four buttons located along the bottom of the window provide the following functions:

OK	apply the changes indicated by selections in the Current Assignment and New Assignment lists and dismiss the Data Source Global Switch dialog window.
Apply	apply the changes indicated by selections in the Current Assignment and New Assignment lists. The Data Source Global Switch dialog window remains open for subsequent changes.

Cancel dismiss the Data Source Global Switch dialog window. Any changes that have not been applied are discarded.

Help activate a help window containing information about the Data Source Global Switch dialog.

A.7.1.3.3 Data Source Parameter Display Window

The Data Source Parameter Display is a read-only display containing a list of parameters and their assigned data source and a list of the established data sources. An "M" is appended to the assigned data source identifier (e.g., String1) to indicate a Mirrored connection, and a "T" is appended to indicate a Tailored connection. User input to this display is limited to the following buttons, which are located along the bottom of the window:

Close dismiss the Data Source Parameter Display window.

Help activate a help window containing information about the Data Source Parameter Display window.

A.7.1.4 Data Source Selector Output

The output of the Data Source Selector is reflected in the updated data source assignments displayed in the Page list on the Data Source Selector window and the Parameter list on the Data Source Parameter Display window. The results of the data source changes will be also be evident in the telemetry data displayed in the affected dynamic pages.

A.8.1 Analysis Request

A.8.1.1 Analysis Request Usage

The Analysis Request window is used by the user to request history data for analysis. An Analysis Request is the specification of telemetry parameters, time periods, sampling rate, statistics and/or algorithms for the generation of data. The user may specify the data to be displayed in several output views. The Analysis Request window provides a variety of tools for specifying all Analysis Request inputs. The user may also specify Standing Order requests, or access to the Report Generator function from the Analysis Request window.

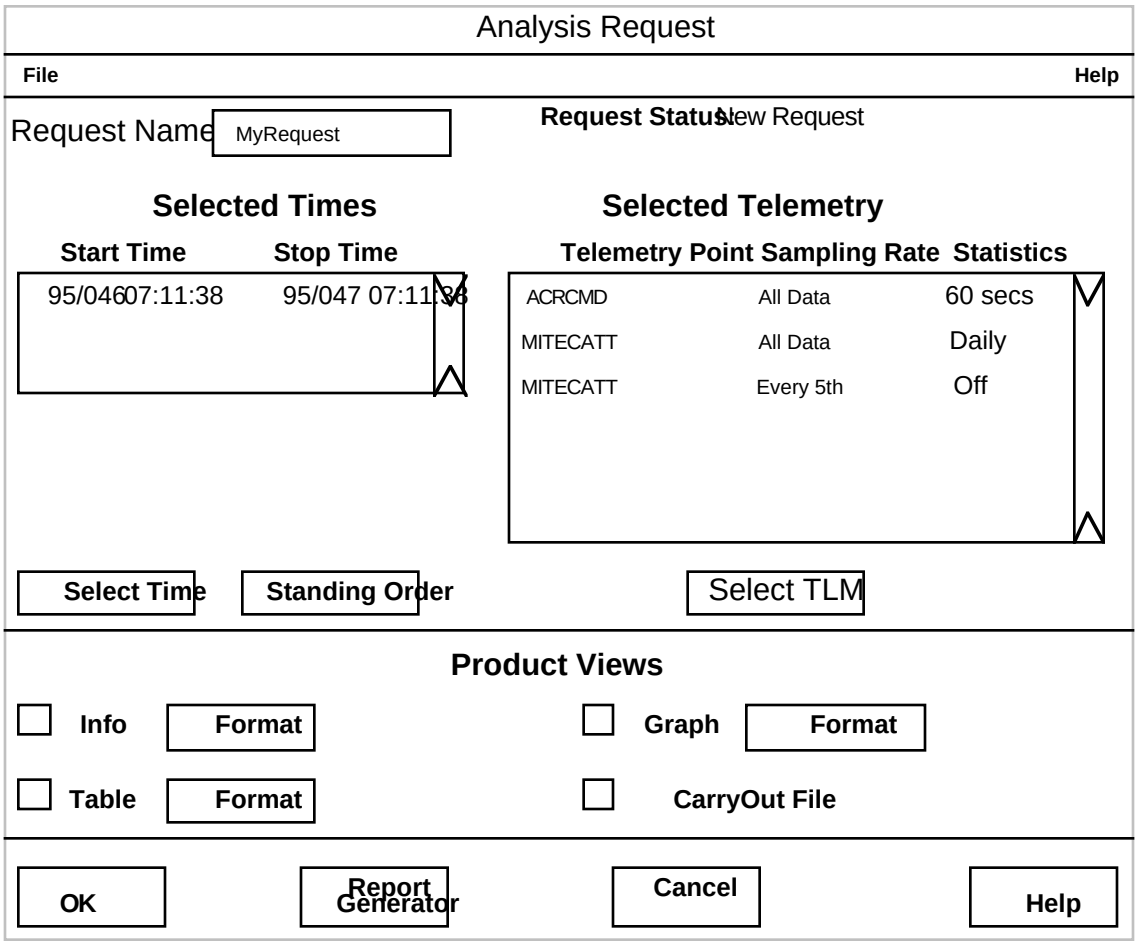


Figure A.8.1-1. Analysis Request Window

A.8.1.2 Analysis Request Access

The Analysis Request window can be accessed from the Control Window or from the Status Window. If the Analysis Request window is accessed from the Status Window, the selected request, by default, will be displayed in the Analysis Request window. (Details on selecting requests from the Status Window are described in Section A.8.2) If accessed from the Control Window, the user will need to specify the request inputs.

A.8.1.3 Analysis Request Input

The Analysis Request Window allows the following inputs:

- Selection of Analysis Request. The user must enter a directory path to get a list of available files.
- Selection of request time period. This specifies the start and stop time of the history data to be retrieved.

- Selection of Standing Order Times. This specifies the start and stop time and activation time of requests that are initiated by time/orbital event.
- Selection of telemetry parameters using the "Select TLM" button to access the Analysis Telemetry Selector. Figure A.8.1-2 shows the Analysis Telemetry Selector. It consists of the Selection Filter, a double scrolling list, sampling rate and statistics options. The Selection Filter utility provides for subsystem selections (details described in section A.3.2). Each parameter selected in the available list of parameters may have a sampling rate and/or statistics associated. Parameters can be selected more than once. Sampling Rates can be based on all data, changes only data or data for every Nth sample where N is an Integer. Statistics (Standard Deviation, or Min-Max Mean) can be system generated (e.g., Daily, Monthly...) or user defined where a Min-Max interval is specified. If statistics are associated with a selected parameter, the sampling rate will default to all data. If a sampling rate is associated with a selected parameter, statistics will default to off. (i.e., no statistics will be applied). Using the arrow "----->,<-----," buttons, the user may select or de-select telemetry parameters. Associated sampling rates and statistics flags will be displayed in the list of selected parameters. The "Find" option highlights a matching parameter with the unique characters entered in the "Find" text field.
- Selection of product view(s) using the toggle button. Product views can be a graph, table, Info window or carry out format. Product view selections can be made at the time of the initial analysis request or may be made after the request has been completed. If product view selections are made after the request has been completed, output products are generated from the existing data produced from the initial request. (Details describing output views are described in section A.7)
- Selection of product view format options using the "Format" button to access the Format Window. Format options are available for graph, table and info product views. Default formats are applied, if no format options are selected. (Details describing Format Windows are describe in section A.8.3)

The Analysis Request window has 2 pull-down menus: File and Help. The File menu options include:

New	clears the analysis request window and allows the user to create an new request.
Open	displays a selection dialog window and allows the user to edit/read an existing request.
Save	allows the user to save the current analysis request.
SaveAs.	allows the user to save the current analysis request with a new request name.
Quit	exits the Analysis Request window.

The "OK" button initiates the generation of the analysis request data and/or product views.

The "Report Generator" button initiates the report generation tool.

The "Cancel" button ignores any inputs and closes the Analysis Request window.

The "Help" button and pull-down menu provide context-sensitive help.

A.8.1.4 Analysis Request Output

The Analysis Request window outputs the specified output products. Output products can be a graph, table, Info window and/or carryout file. These products can be output to a printer, a file or display.

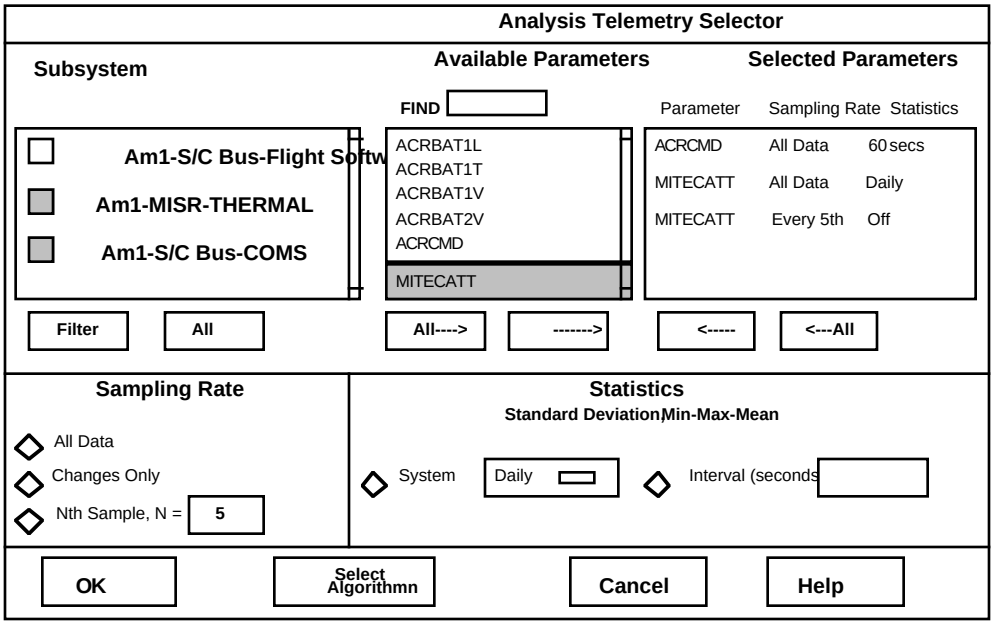


Figure A.8.1-2. Analysis Telemetry Selector

A.8.2 Analysis Status Window

A.8.2.1 Analysis Status Window Usage

The Analysis Status window is used to view Analysis Request Status. The Status window is updated upon selecting the refresh button. The Analysis Status window displays the current status of Analysis Request in the request queue along with an estimated of percentage of the request that has been completed. The user may specify to prioritize, delete or view the output of Analysis Requests displayed in the Analysis Status window.

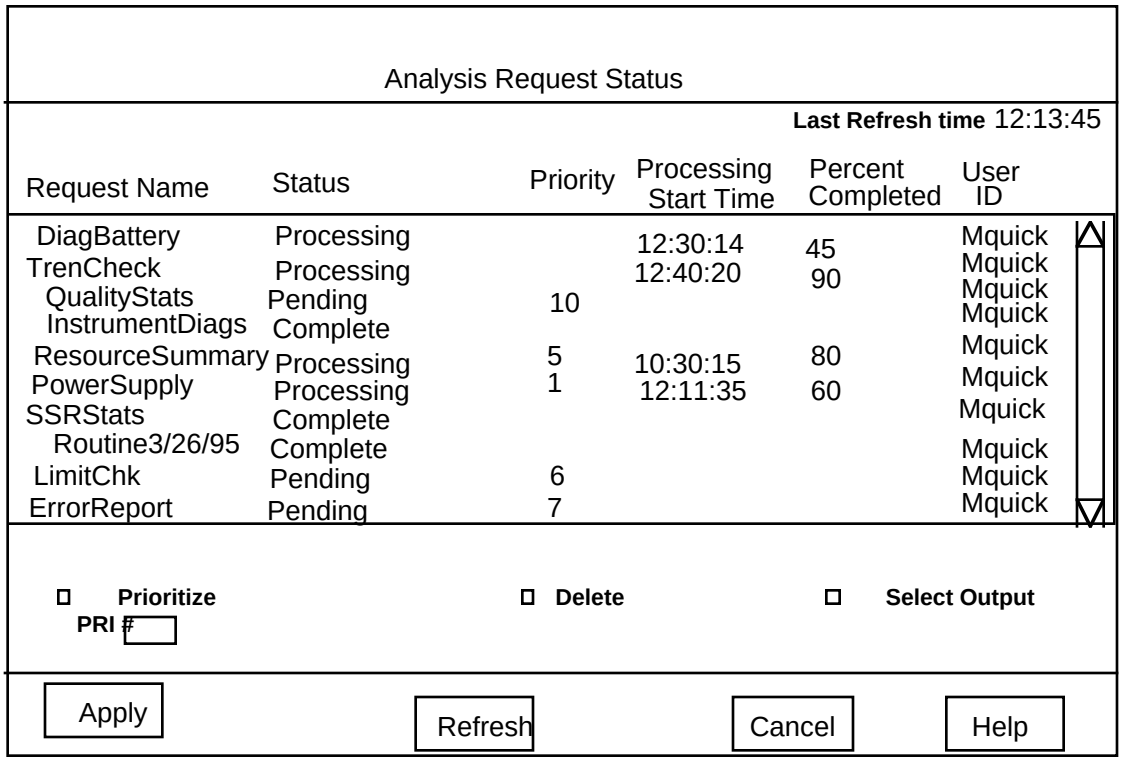


Figure A.8.2-1. Analysis Status Window

A.8.2.2 Analysis Status Access

The Analysis Status window can be accessed by the Control Window.

A.8.2.3 Analysis Status Input

The Analysis Status Window allows the following inputs:

- Selection of a Analysis Request Name. The user may select an Analysis Request from the scrolling window for deletion, prioritizing or output products.
- Selection of priority. The user may choose a priority for the Analysis Request with a pending status. This allows the user to manage the execution of Analysis Requests in the queue.
- Selection of refresh. The user may update the Analysis Status display by choosing the refresh button.

A.8.2.4 Analysis Status Output

The Analysis Status window executes the Analysis Request window upon selection to view output products.

The "Apply" button activates the selection for priority, delete or output selection.

The "Cancel" button ignores any inputs and closes the Analysis Status window.

The "Help" button and pull-down menu provide context-sensitive help.

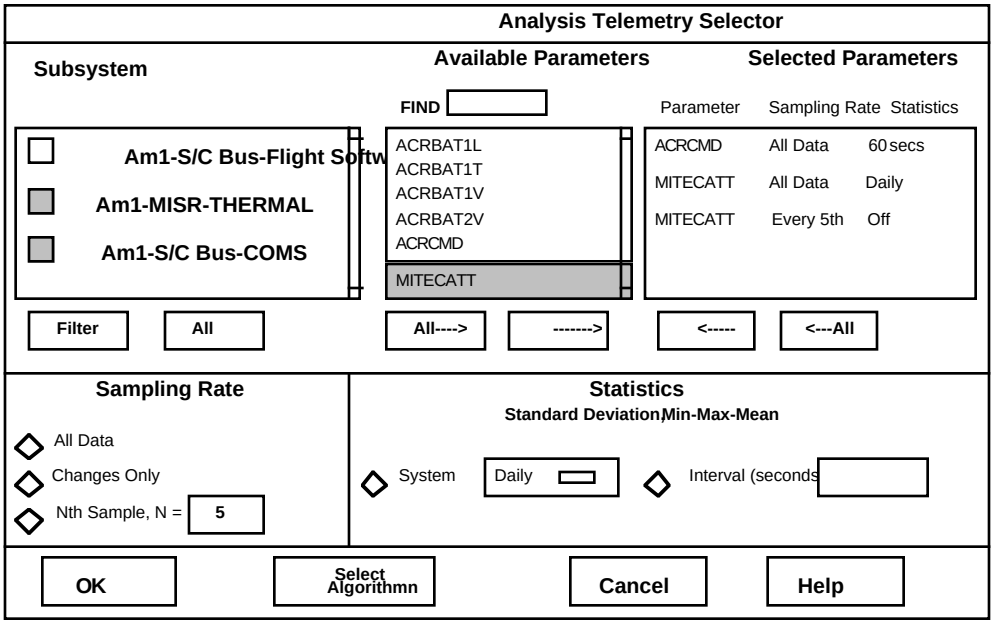


Figure A.8.1-2. Analysis Telemetry Selector

A.8.3 Format Window

A.8.3.1 Format Window Usage

The Format Window is used by the Quick Analysis window and the Analysis Request Window to specify output view formats for display pages. Format specifications are based upon telemetry parameters and associated format options. There is a Format Window for the Graph, Table and Info output views. The Format Window shown in Figure A.8.3-1 represents the common elements a Format Window. The actual Format windows will be defined in Release B when Graph, Table and Info format options will be defined.

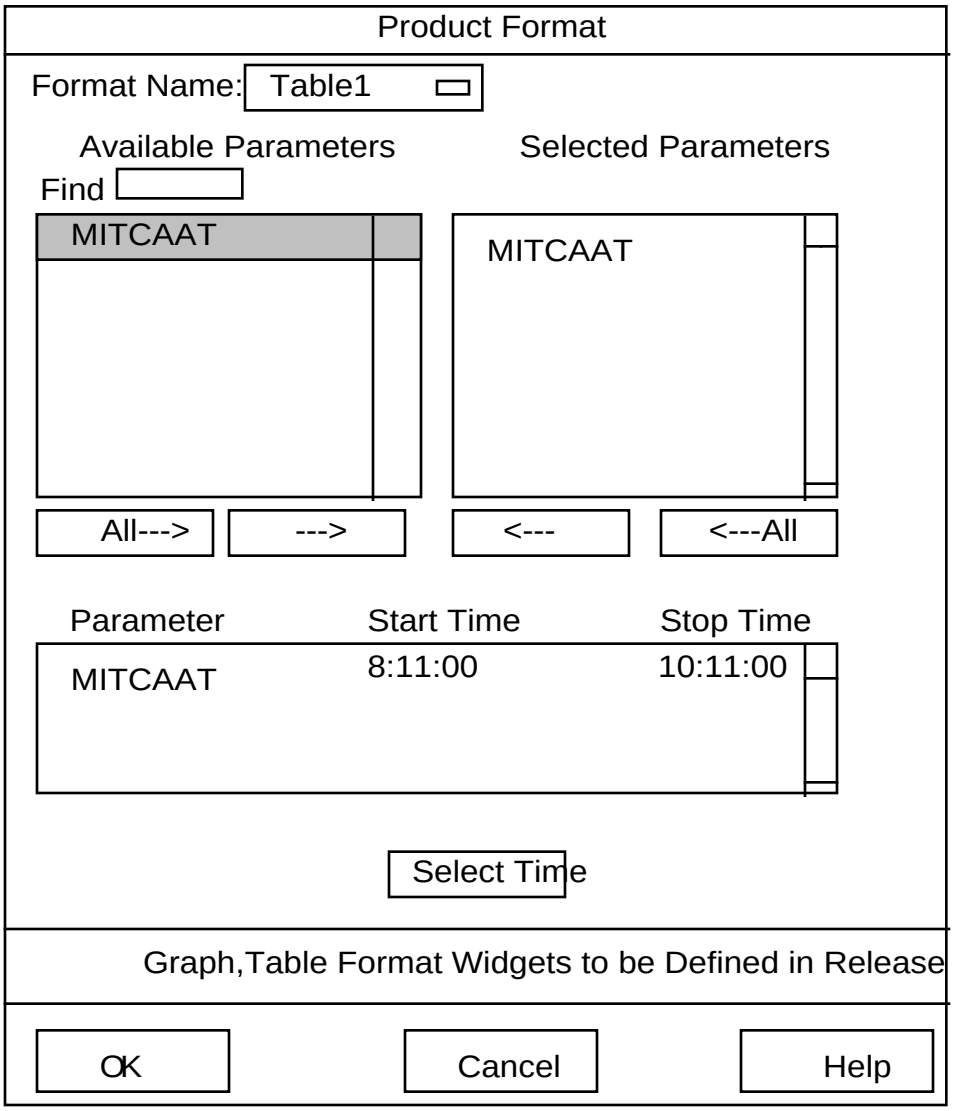


Figure A.8.3-1. Format Window

A.8.3.2 Format Window Access

The Format Window can be accessed from the Quick Analysis window and the Analysis Request Window via the "Format" button. If accessed from the Analysis Request Window, the Format window will, by default, display the telemetry parameters and start/stop times selected. If accessed from the Quick Analysis window, the Format window will, by default, display telemetry parameters. The time selection option will not be enabled.

A.8.3.3 Format Window Input

The Format Window allows the following inputs:

- Selection of Format Name. A user may select title for each format specification. The user may read an existing format or create a new format.
- Selection of telemetry parameters based upon subsystem selection. Available telemetry parameters are those selected in the parent window. (i.e., the Quick Analysis Window or Analysis Request Window). Telemetry parameters are displayed in a double scrolling list. The double scrolling list has a list of available parameters associated with a subsystem and a list of selected parameters. Using the arrow "----->,<-----," buttons below the double scrolling list, the user may select or de-select telemetry parameters. The "Find" option highlights a matching parameter with the unique characters entered in the "Find" text field.
- Selection of Format Time period using the Time Selector utility. (Time selector is described in section (A.3.1). The time period specifies the start and stop time of history data associated with a parameter. Time period specifications are bound by the start and stop time of the analysis request. Epic times may be specified using the Time Selector. Multiple times can be specified and will be displayed in the scrolling list.
- Selection of format options. Format options are for graph, table and info output views and will be defined in Release B.

The "OK" button saves selections to be used for the generation of output products.

The "Cancel" button ignores any inputs and closes the Analysis Request window.

The "Help" button provides context-sensitive help.

A.8.3.4 Format Window Output

The output of the Format Window selections are reflected in the output product. The Graph and Table output products will display the format selections.

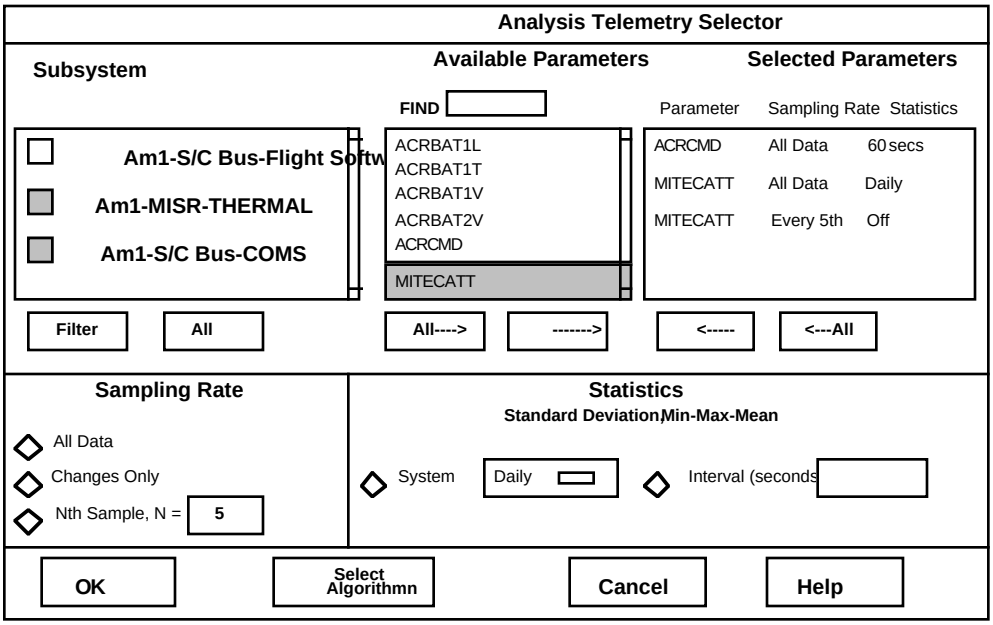


Figure A.8.1-2. Analysis Telemetry Selector

A.8.4 Standing Order Browser

Standing Order Browser

Sorted by User

Total standing order requests : 4 Product Status as: 95/097 10:00:00

User	Name	Next start time	Status	Activation Date	Ending Date	Frequency
JChung	dataRequest		Completed	95/095 10:00:00	95/096 10:00:00	every 1 day
JChung	graphRequest	95/105 15:00:00	Pending	95/105 15:00:00	95/113 15:00:00	every 7 days
RBroome	data		Disabled	95/102 10:00:00	95/150 10:00:00	every 5 days
VLiang	plotRequest	95/105 06:00:00	Pending	95/075 10:00:00	95/360 10:00:00	every 1 month

Modify Enable Disable Delete Products

Close Refresh Help

Figure A.8.4-1. Standing Order Browser

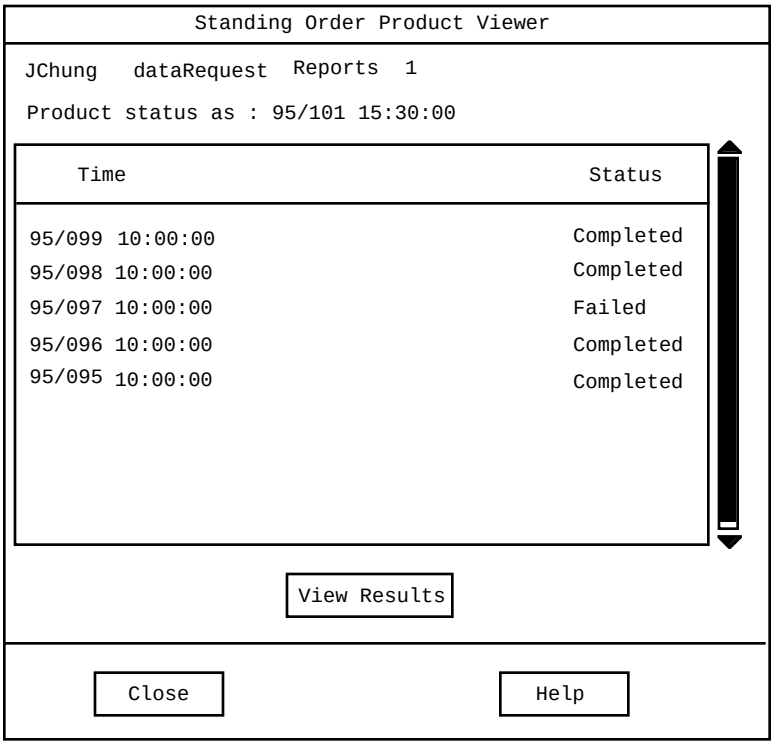


Figure A.8.4-2. Standing Order Product Viewer

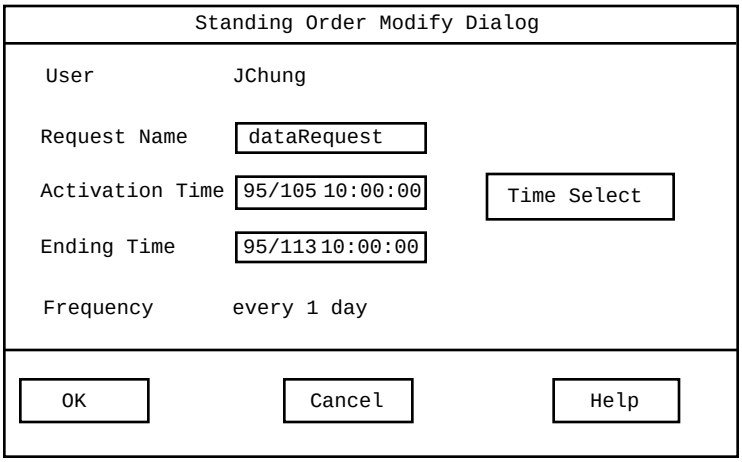


Figure A.8.4-3. Standing Order Modify Dialog

A.8.4.1 Standing Order Browser Usage

The standing order browser contains a browser, a product viewer, and a modify dialog. The standing order is either an analysis standing order that is generated from the analysis window or a

report standing order that is generated from the report template builder. The standing order browser will allow users to view all standing orders in the system. The user will be able to view the status of a standing order, as well as enable, disable, delete, and modify standing orders. The standing order product viewer allows users to view the completed standing order products, as well as products status and sends the selected analysis product to the analysis product selector or sends the selected report product to the report editor. The standing order modify dialog allows the user to modify the standing order. The user is allowed to modify the standing order request name, activation time, ending time, and the standing order frequency by activating the interval time selector.

A.8.4.2 Standing Order Browser Access

The standing order browser can be accessed from the tools button on the command window.

A.8.4.3 Standing Order Browser Input

Standing Order Browser :

All the standing orders are displayed in an ordered scrolling list. The user can change the order of the list to the user name who generated the standing order, the standing order request name, the next start time of the standing order, or the status of the standing order using the "Sorted by" option menu.

The user may only select one standing order and then modify, enable, disable, delete, or view the products by pressing the modify button, enable button, disable button, delete button, or products button.

Modify button : Activate the standing order modify dialog.

Enable button : Change the standing order status from "Disabled" to "Enabled". This button will be sensitive only when the status of the selected standing order is "Disabled"

Disable button : Change the standing order status from "Enabled" to "Disabled". This button will be sensitive only when the status of the selected standing order is "Enabled".

Delete button : Delete the standing order.

Products button : Activate the standing order product viewer window.

Close button : Close the standing order browser window.

Refresh button : Get the current standing order information from the standing order manager and update the standing order list.

Help button : Bring up a help window about the standing order browser.

Standing Order Product Viewer :

The standing order information such as the user name who submits the standing order, the standing order name, the product information, and the time when the standing order browser is

invoked are displayed on top of the window. All the completed standing order products associated with this standing order are displayed in a single select list.

The user can select an analysis product and press the "View Results" button to invoke the analysis product selector or select an report product and press the "View Results" button to invoke the report editor.

View Results button : Invoke the analysis product selector or the report editor.

Close button : Close the product viewer window.

Help button : Bring up a help window about the standing order product viewer.

Standing order Modify Dialog :

The user name who submits the standing order is displayed and is not modifiable.

The standing order request name, the activation time, and the ending time can be modified by entering values to each field in this dialog.

The frequency can be modified by pressing the "Time Select" button to activate the interval time selection window.

Time Select button : Activate the interval time selection window.

Ok button : Apply the changes and close the dialog.

Cancel button : Cancel the changes and close the dialog.

Help button : Bring up a help window about the standing order modify dialog.

A.8.4.4 Standing Order Browser Output

The standing order viewer will send the selected analysis product to the analysis product selector or the selected report product to the report editor.

A.8.5 Quick Analysis Window

A.8.5.1 Quick Analysis Usage

The Quick Analysis window is used by the user to create display pages of real-time data based upon the selection of telemetry parameters. The display pages provide updating displays of real-time telemetry data in several output views. The Quick Analysis window provides a selection filter to allow easy selections of spacecraft subsystems and telemetry parameters and a format option for customizing output views.

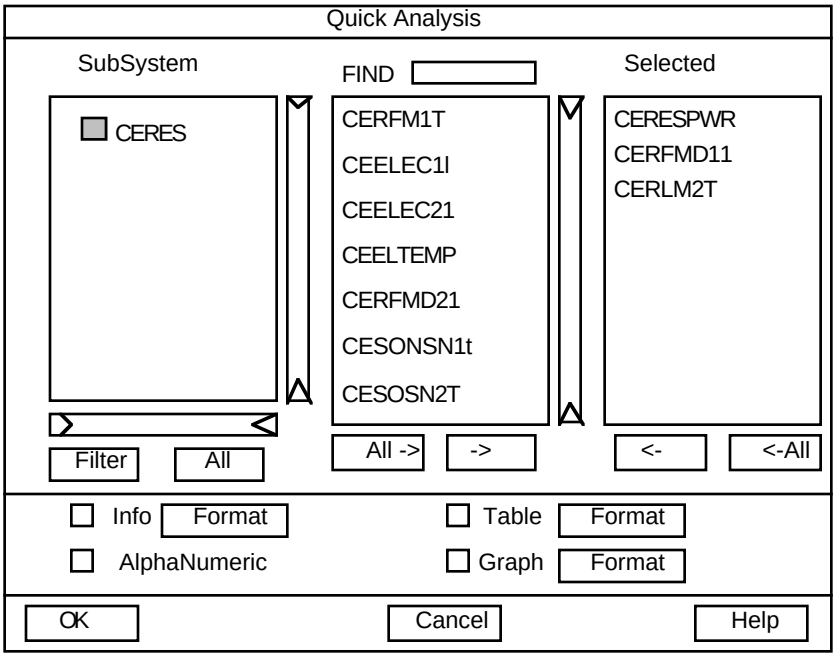


Figure A.8.5-1. Quick Analysis Window

A.8.5.2 Quick Analysis Access

The Quick Analysis window can be accessed from the Control Window or from a graph and table display page. If the Quick Analysis window is accessed from a graph or table display page, all selected parameters, by default , will be displayed as selected parameters in the Quick Analysis window. If accessed from the Control Window, available subsystems will be displayed for selection.

A.8.5.3 Quick Analysis Input

The Quick Analysis window allows the following inputs to create display pages:

- Selection of S/C Subsystem using the Selection Filter (Selection Filter described in section A.3.2)
- Selection of telemetry parameters based upon subsystem selection. Telemetry parameters are displayed in a double scrolling list. The double scrolling list has a list of available parameters associated with a subsystem and a list of selected parameters. Using the arrow "----->,<-----," buttons below the double scrolling list, the user may select or de-select telemetry parameters. The "Find" option highlights a matching parameter with the unique characters entered in the "Find" text field.
- Selection of output view(s) using the toggle button. Output views can be a graph, table, alphanumeric display or Info window. (Detail describing output views are described in section A.6)

- Selection of output view format options using the "Format" button to access the Format Window. Format options are available for graph, table and info product views. Default formats are applied if no format options are selected. (Details describing Format Windows are describe in section A.8.3)

The "OK" button initiates the generation the display pages based upon user inputs.

The "Cancel" button ignores any inputs and closes the Quick Analysis window.

The "Help" button provides context-sensitive help.

A.8.5.3 Quick Analysis Output

The Quick Analysis window outputs the specified output product. The output product can be a graph, table, info window and/or alphanumeric window.

A.8.6 Algorithm Registration

A.8.6.1 Algorithm Registration Usage

The Algorithm Registration window is used to enter algorithms into configuration control. When an algorithm is registered, the algorithm is checked and validated. The algorithm registration status is displayed.

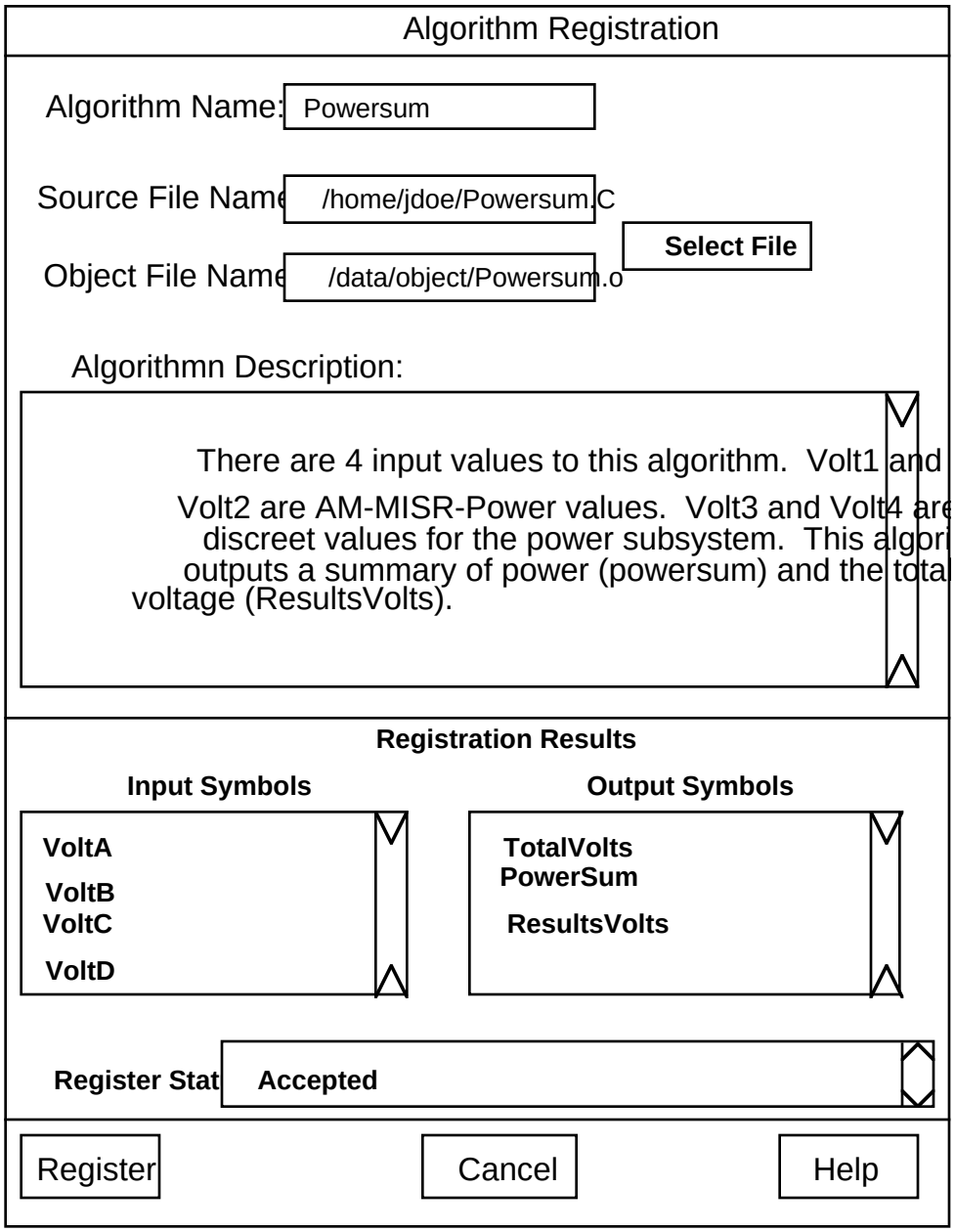


Figure A.8.6-1. Algorithm Registration Window

A.8.6.2 Algorithm Registration Access

The Algorithmn registration window can be accessed from the Control window.

A.8.6.3 Algorithm Registration Input

The Analysis Registration window requires the following inputs:

- Algorithm Name - The name of the Algorithmn function.
- Source File Name- The file name and path of the algorithm source code.
- Object File Name- The file name and path of the algorithm object file.
- Algorithm Description- A detailed description of the algorithm functionality including input and output descriptions.

The "Select File" button invokes the file selector dialog to allow the user to choose a file name.

The "Register" button initiates the algorithm registration process.

The "Cancel" button ignores any inputs and closes the Algorithm Registration window.

The "Help" button provides context-sensitive help.

A.8.6.4 Algorithm Registration Output

The Algorithm Registration window displays the status of the registration process. The input and output symbols of successfully registered algorithms will be displayed. Error messages containing reasons for failure are also displayed.

A.8.7 Algorithm Request

A.8.7.1 Algorithm Request Usage

The Algorithm Request window is used to select algorithms to be applied on history data for analysis. Since algorithms are dynamically linked and loaded, users have the ability to choose the values for its input and output arguments.

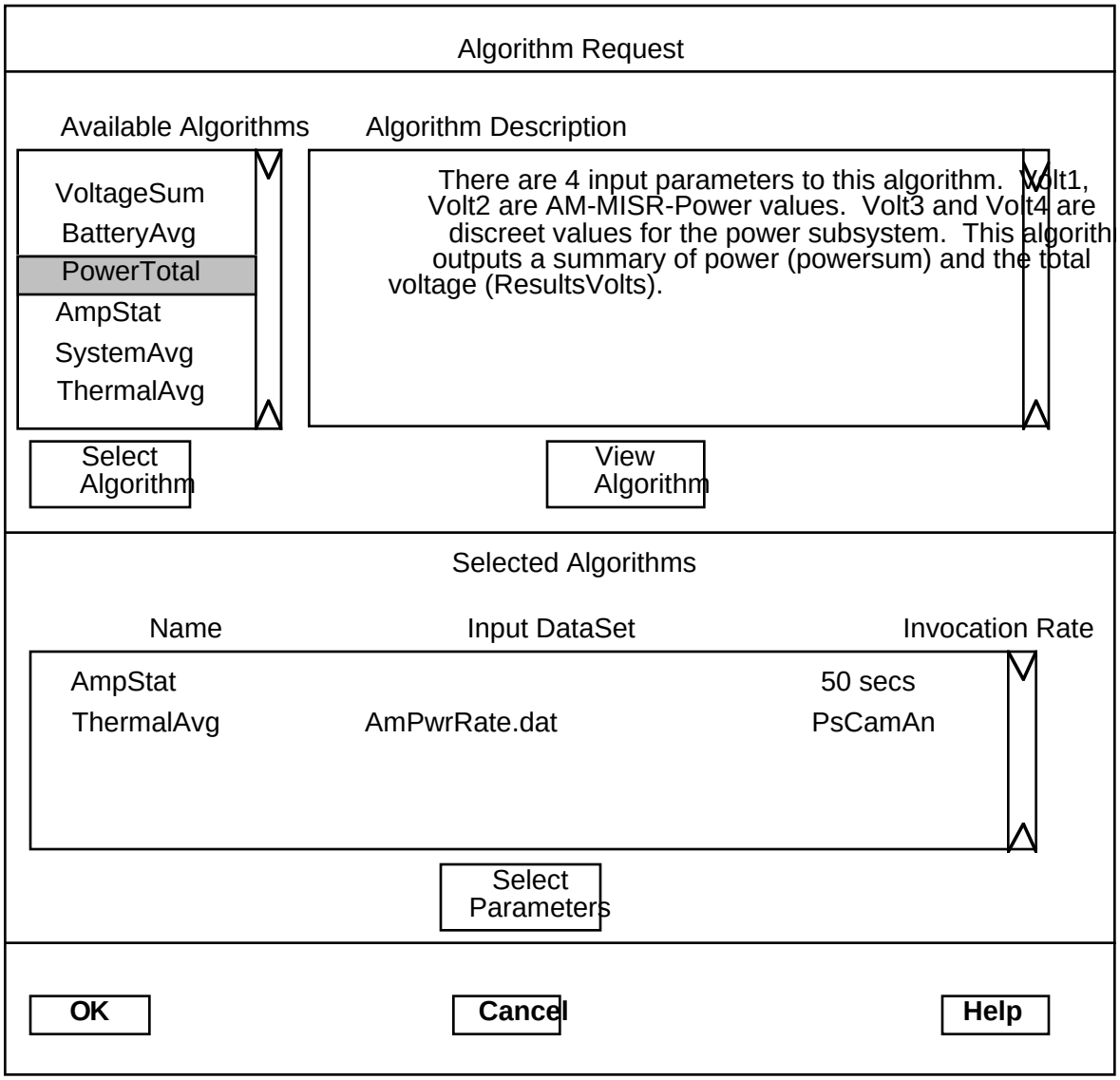


Figure A.8.7-1. Algorithm Request Window

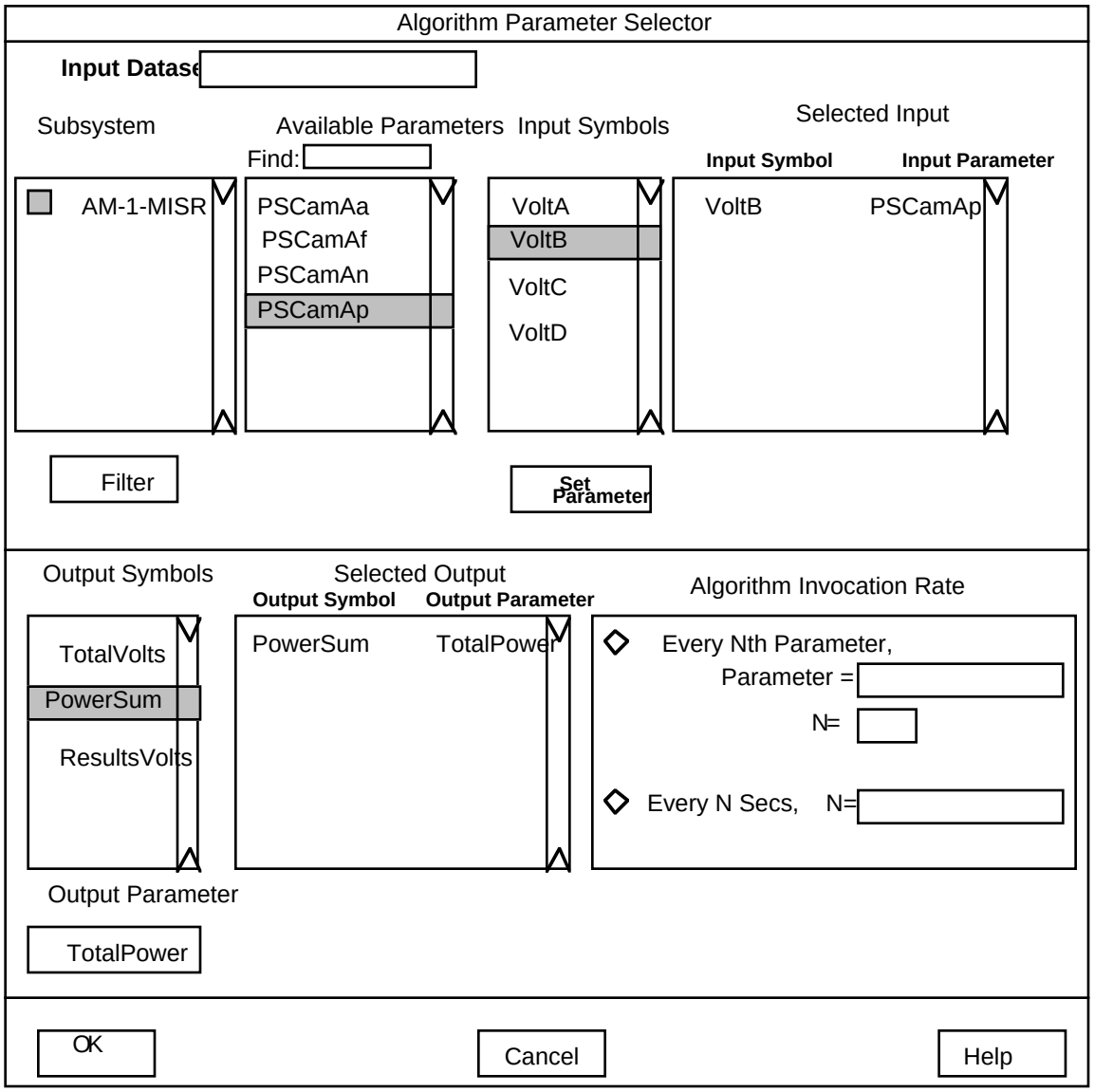


Figure A.8.7-2. Algorithm Parameter Selector Window

A.8.7.2 Algorithm Request Access

The Algorithm registration window is accessed from the Analysis Request window.

A.8.7.3 Algorithm Request Input

The Algorithm Request window requires the following inputs:

- Selection of Algorithm- The user must select an algorithm name from the list available algorithms provided. More than one algorithm may be selected in the Algorithm Request window.
- Selection of Algorithm parameters using the "Select Parameters" button to access the Algorithm Parameter Selector as shown in Figure A.8.7-2. The Algorithm Parameter Selector window provides a list of input and output symbols for the selected algorithm. The user must select a telemetry parameter to satisfy each algorithm input symbol. The "Filter" button invokes the Selection Filter tool (described in section A.3.2) and provides a list of available telemetry parameters. The "Set Parameter" button assigns the selected input symbol to the selected telemetry parameter. The user must also supply an output parameter name for each output symbol. The user can request the algorithm to use an existing dataset as input. An input dataset can be specified for each algorithm. The algorithm invocation rate is the rate at which the algorithm is to be applied. The user may choose the algorithm to be invoked based on a specified occurrence of a key parameter or on a specified seconds timer.
- At the Algorithm Parameter Selector window, the "OK" button applies the selections to the selected algorithm and closes the window. The "Cancel" button ignores any input and closes the window. The "Help" button provides context sensitive help. These button have the same behavior at the Algorithm Request window except that the "OK" button" applies all the algorithm selections and closes the Algorithm Request window.

A.8.7.4 Algorithm Request Output

The Algorithm Request window displays the algorithm description for each selected algorithm and a list the selected algorithms names, input dataset names (if applicable) and the algorithm invocation rate. The user may select an algorithm from the selected list to change parameter selections by pressing the "Select Parameters" button. The "Select Parameters" button will display the Algorithm Parameter Selector window (Figure A.8.7-2) with the selected algorithm input and output values. The user may change the selected values by selecting the input and output symbols and assigning them parameters as described in the Algorithm Request Input section above. As parameter get assigned, the Algorithm Parameter Selector window will update the display of selected input and output parameters accordingly.

The Algorithm Request window displays the algorithm source file upon selecting the "View Algorithm" button.

A.9.1 Event Display Window

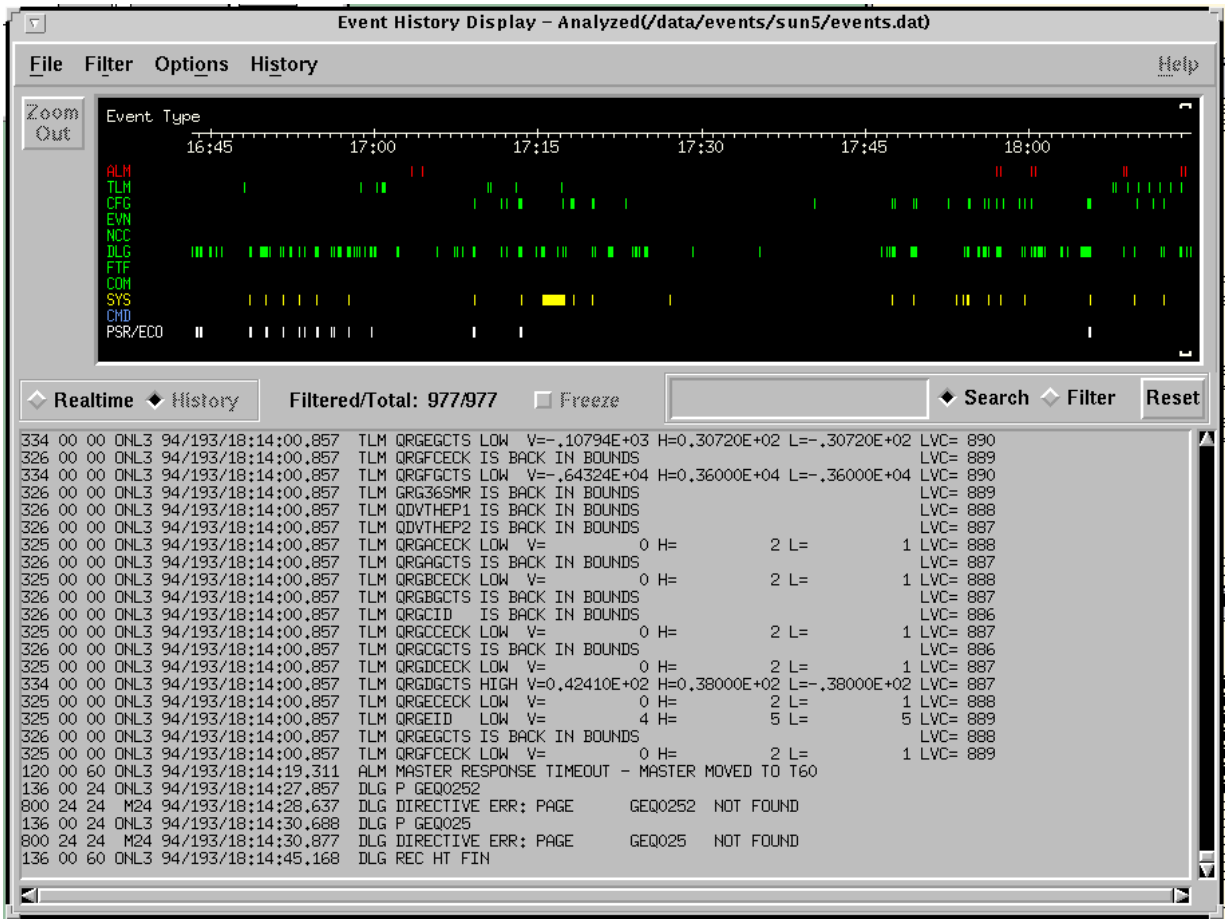


Figure A.9.1-1. Event Display Window

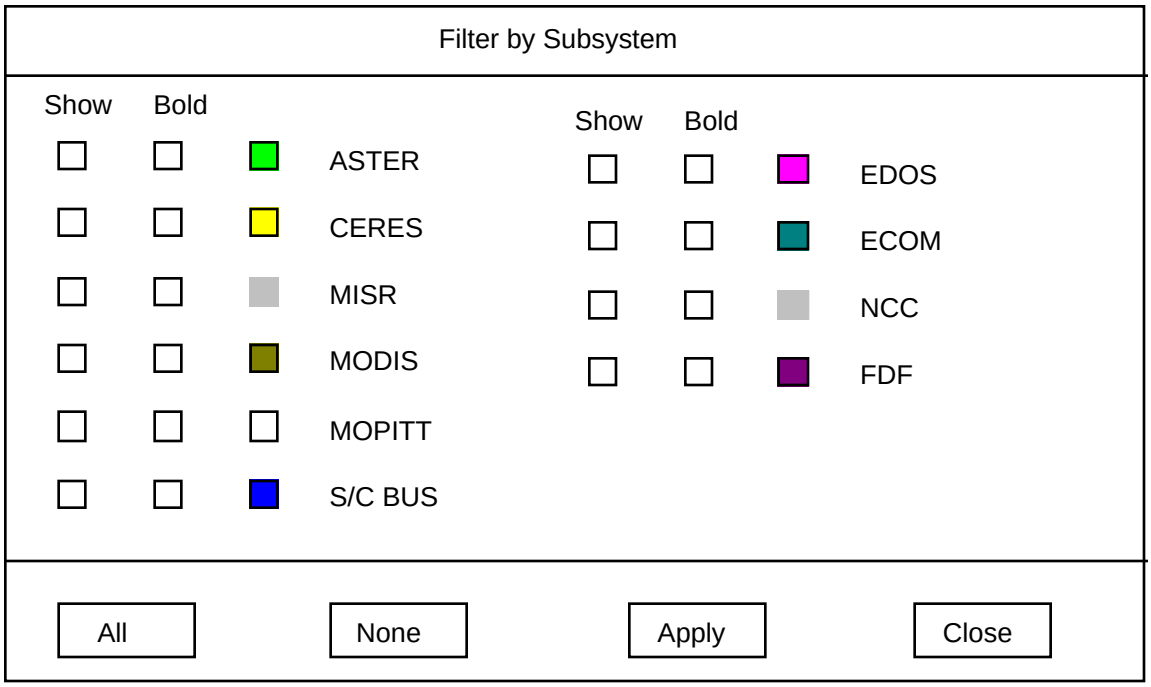


Figure A.9.1-2. Subsystems Dialog

Figure A.9.1-3. Event Types Dialog

A.9.1.1 Event Display Usage

The event display will allow the user to request time specific event files from the Data Management System, and view these events as well as real-time events. The user can them perform searches on the data, filter the data, zoom in on the timeline, and print and save the data.

A.9.1.2 Event Display Access

The event display can be accessed by pressing the Tools button on the command window. Choose "Event Display" from the Tool Selector.

A.9.1.3 Event Display Input

Real-time Events:

The real-time radio button will be pressed, and real-time events will be scrolling in the event display. The marker on the top of the timeline indicates the currently viewed events in the scrolled list. Each type of event will be color coded in the timeline and corresponds to each event message in the scrolling list.

TimeLine:

The timeline may be zoomed in upon by drawing a box around two time periods.

Zoom Out: This button enables the user to view all of the events in the timeline.

Scrolled List:

The user may type a word or partial word to search, and then press enter to search. Once the event that meets the criterion is found, it is highlighted. The user presses enter to find subsequent occurrences.

The user may type a word or partial to filter the events. Only those events with filter criteria will be shown in the event display.

Reset: The user may press "Reset" to reset to the full event list in the event display after searching or filtering on a word or partial word.

Freeze: The user may press "Freeze" in order to stop the movement of the scrolled list in real-time event mode.

Real-time/History:

The user may toggle the "Real-time" and "History" buttons to view one or the other kind of events.

Menu:

File:

Open: This button opens a dialog from which a previously saved event file can be loaded into the event display.

Save: This button saves events in a file.

Save As: This button saves events in a file.

Print: This button prints events.

Quit: Quits the display.

Filter:

Subsystems:

The user may press "Subsystems" to bring up the filter dialog for subsystems (See Figure A.9.1-2). A subsystem may be highlighted, and shown or not shown by pressing the toggle buttons. "All" shows all of the subsystems. "None" shows none of the subsystems. "Apply" applies the selected criteria to the event display. "Close" closes the filter dialog.

Event Types:

The user may press "Event Types" to bring up the filter dialog for event types (See Figure A.9.1-3). An event type may be highlighted, and shown or not shown by pressing the toggle buttons. "All" shows all of the events. "None" shows none of the events. "Apply" applies the selected criteria to the event display. "Close" closes the filter dialog.

All: This selection shows all the events.

None: This selection shows no filtered events.

Options:

Hide Graph/Show Graph:

"Hide Graph" will hide the graph, while "Show Graph" will makeit reappear.

History:

Retrieve From Archive:

This selection will bring up the event history request window. When the event history file is brought up, the radio button for "History" will be toggled. For more information on its use see Section. A.9.2 Event History Request Window.

A.9.1.4 Event Display Output

An event file may be saved or printed from this screen.

A.9.2 Event History Request Window

A.9.2.1 Event History Request Usage

The event history request window is brought up from the event display. It is selected by the user to request an event history file, which will be sent to the Data Management System (DMS). In turn, DMS will send back the file to the user for viewing in the event display.

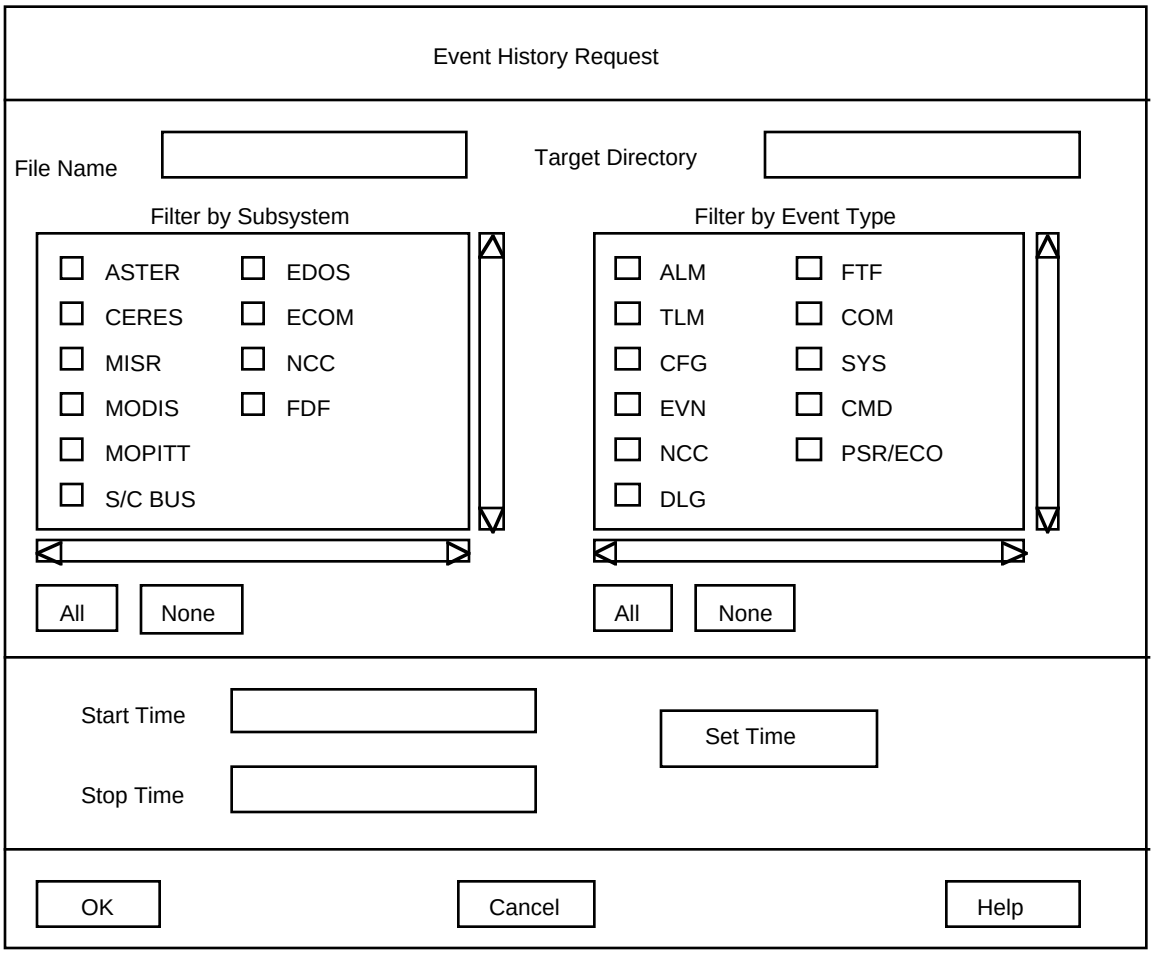


Figure A.9.2-1. Event History Request Window

A.9.2.2 Event History Request Access

The event history request window is accessed by pressing the "History" button from the menu on the event display. From there, pick "Retrieve From Archive", and the dialog will appear.

A.9.2.3 Event History Request Input

The following inputs are for the event history request:

The user must type in:

File Name - name of file to be sent back to user.

Target Directory - target directory where returned file from DMS will be placed. This will be prefilled with the user's default directory received from the Environment Controller.

Filter by Subsystem:

Toggle one or more subsystems, or

Press "All" to select all subsystems.

Press "None" to de-select all subsystems.

Filter by Event Type:

Toggle one or more event types, or

Press "All" to select all event types.

Press "None" to de-select all event types.

Enter Start Time and Stop Time, or

Press "Set Time" to process more detailed start and stop times for the event history request.

Press "OK" to process the event history request after start and stop times, subsystem, event types, target directory, filename, author, and request name have been filled in.

Press "Cancel" to cancel the request and quit the window.

Press "Help" to request help.

A.9.2.4 Event History Request Output

The event history request.