



SceneControl 500

Motorized Rigging Control System

Operating Manual

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Introduction

The Clancy SceneControl 500 is a sophisticated, microprocessor-based system, used for controlling motorized stage rigging. It uses a touchscreen operator interface, and offers simple modes of operation for rapid, easy use. A number of powerful features provide greater flexibility of operation for more sophisticated operators.

The control system is designed to enable the safe operation of the motorized rigging. It is crucial that, before operating any stage equipment, all operators should be given the necessary training and should then work only under the direction of qualified supervisors. Stage equipment can be hazardous when improperly operated and maintained. Never use the system to lift people!

While there are a number of principles that guide the safe operation of rigging equipment, there is one that will be reiterated throughout this manual:

WATCH THE PIECE!

Whenever a set, batten, hook, or other piece is being moved by the motorized rigging system, make sure that the operator can see the entire piece throughout its path of travel. If the operator cannot see the entire piece, or the entire path, then spotters must be positioned to supplement the operator's view. All spotters must be in clear and reliable communication with the operator throughout the move. This is the level of vigilance that is necessary to safely operate rigging equipment. Whenever you see the words WATCH THE PIECE! (or the initials WTP!) take a second to make sure you are paying attention to the important stuff - the moving iron, not the flashing pixels!

While the information in this manual will not cover all possible situations, nor due to the nature of theatre could such instructions be possibly written, it is intended to provide a guide to the safe and efficient operation of the furnished stage equipment and its routine maintenance. No manual can replace constant vigilance and common sense.

A routine maintenance schedule should be established and followed and appropriate records should be maintained.

- Learn the feel, sound, and even the smell of your equipment so that you will immediately sense when something is not correct.
- Study the capacities and capabilities of each system and its components.
- Thoroughly learn and practice the proper operating procedures.
- Before operating any equipment, ask yourself questions about the current condition of equipment and about any existing conditions which may affect proper operation or which could be affected by its operation. For example, is anything fouling the equipment or in the path of its intended travel?

Further, any problem noticed during setup or operation of the stage equipment should be corrected IMMEDIATELY. Someone's life could be at stake.

We suggest that emergency procedures be established in case of fire or injury and that periodic drills be held.

In addition to routine maintenance, we strongly recommend that a qualified rigging firm be engaged to perform periodic inspections and to correct any deficiencies discovered. These firms have personnel who are trained to spot present hazards and many "potential" hazards. Routine maintenance also prolongs the useful life of equipment and keeps it operating at peak efficiency for the quietest possible operation and so that less effort is required on the part of the operator.

Basic Operation

SYSTEM STARTUP

The SceneControl 500 system uses a system of distributed microprocessors that communicate with each other over a network system. On startup, the main processor queries the microprocessor at each starter; therefore, all of the starters must be able to communicate at startup. The steps required to start the system are:

- Release the Emergency Stop button at the console, and assure that all other system Emergency Stop buttons are released.
- Turn on the power keyswitch at the console

The system will go through a boot up routine. During this routine, the program will be loaded and all of the winches will be interrogated by the controller. While this boot up is going on, the following message will appear on the screen:

WARNING

To be operated by trained and authorized personnel only.

Always maintain direct visual contact with moving sets. Do not watch the screen.

Safety devices do not completely eliminate the risk of injuries. Always pay attention.

Read and follow safety instructions in Operation and Maintenance Manual.

Once the boot up routine is complete, the legend "Accept" will appear at the bottom of the screen, along with a "Yes" button. Touching this button will take the startup to the next step.

If the system has been configured without a password, then the system will boot up into Access Level. If the system has been configured with a password for Access Level, then upon boot-up a keyboard will pop up on the screen as a prompt to enter a password. The password entered will determine the user's operator privileges by password levels.

PASSWORD LEVELS

There are four password levels, which are used to regulate access to the control system. They are as follows:

ACCESS LEVEL - User can perform the following:

- move a set Up or Down in deadman operation
- create and move a Temporary Preset
- load and move a recorded Preset or Cue

Note: the borders are blue while in Access Level.

EDIT LEVEL - in addition to Access Level features, user can perform the following:

- Select and load a show previously saved
- create a new show
- delete an existing show
- edit show specific soft upper and soft lower limits
- record, edit, and/or delete presets and cues
- turn load sensing on or off for individual winches, and put winches through the load learning process.

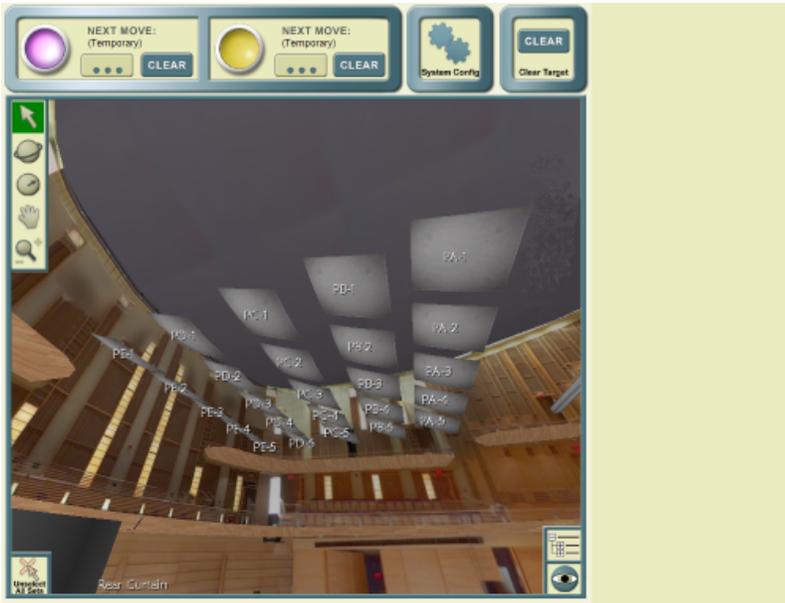
Note: the borders are gold while in Edit Level or above

SYSTEM LEVEL - in addition to Access and Edit Level features, user can perform the following:

- create, delete, edit sets
- edit motors

CLANCY LEVEL - in addition to Access, Edit and System Level features, user can access certain system base parameters. This level must only be used by factory-trained maintenance personnel.

SYSTEM STARTUP - STAGE VIEW



When the system boots up, the display screen will show the stage as viewed from the operator's position. The name of each set will be indicated on a graphic representation of the set.

SHORTCUT OPERATIONS

DEADMAN OPERATION - SHORTCUT

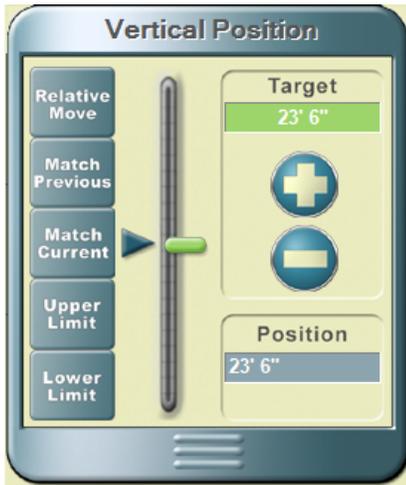
To select a set (or sets) for operation, the operator touches the graphic corresponding to the set on the touchscreen. The set label will change from white to green to indicate that it has been selected. A Vertical Position window will also appear in the upper right portion of the screen. If the set is variable speed, a Velocity window will appear in the lower right of the screen. If the set is multi-axis, pitch and roll windows will appear in the lower right of the screen.

The operator may now push and hold the GO UP or GO DOWN pushbutton on the console to run the set. The set will stop when the operator releases the pushbutton, or when the set arrives at its limit. The 3-D display will update to reflect the reported position of the set - however, the display can't hurt anyone. While the set is moving, remember - WATCH THE PIECE!

If the set is variable-speed, the operator can increase the speed of the set during the move by pushing the left joystick (toward the GO UP button), and can decrease the speed by pulling the left joystick (toward the GO DOWN button). When the left joystick is centered the set will run at the default speed.

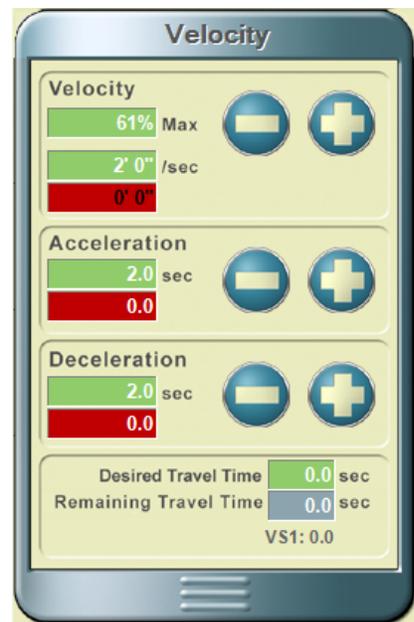
SINGLE TARGET OPERATION - SHORTCUT

Using the 3-D display, select a set (or sets) for operation by touching the graphic corresponding to the set on the touchscreen. The set label will change from white to green to indicate that it has been selected. A Vertical Position window will also appear in the upper right portion of the screen.



The operator can adjust the target for the set by touching and dragging the green slider up or down the vertical position bar. Fine incremental adjustment of the target position may be done by touching the + or – buttons. The blue arrow on the left side of the vertical position bar indicates the current position of the set. On the 3-D display, the set name will be shown in **bold** characters, to indicate that the target is now different from the current position. The current position of the set will appear as a solid blue figure, while the target position will be indicated by a green wire-frame.

If the set is variable speed, a Velocity Window will appear in the lower right of the screen. The desired velocity of the move can be adjusted by touching the – or + velocity buttons. Similarly, the acceleration and deceleration times can be adjusted.



If a set has been selected and a target designated, you can undo the target designation by touching the "Clear Target" icon at the top of the screen. Clearing the target will clear the target wire-frame and the blue solid icon, and will return the set designation to a standard weight typeface

Once a target has been designated for a set, the set is said to be **enabled**. A set must be enabled to run to a target. Once a set has been enabled, the operator pushes and holds the violet GO TARGET button to run the set to the target. If the set is variable-speed, the operator can increase the speed of the set during the move

by pushing the joystick (toward the GO UP button) - the speed increases proportionately, with full speed at this end of the joystick travel. The operator can decrease the speed by pulling the joystick (toward the GO DOWN button) - the speed decreases proportionately, with the axis barely moving when the joystick is at this end of its travel.

During the move, the blue arrow indicator on the left of the Vertical Position window will move to indicate the set motion toward target; the blue solid icon on the 3-D display will move to indicate the set motion toward target. At the bottom of the Velocity window, the travel time indicators will update to reflect the move time remaining. All of which is very interesting, but your job as operator is... WATCH THE PIECE!

MULTIPLE TARGET OPERATION - SHORTCUT

It is possible to run multiple winches to multiple targets on a temporary preset move using the following procedures. Using the 3-D display, select a set by touching the graphic corresponding to the set on the touchscreen. The set label will change from white to green to indicate that it has been selected. A Vertical Position window will also appear in the upper left portion of the screen.

The operator can adjust the target for the set by touching and dragging the green slider up or down the vertical position bar. Fine incremental adjustment of the target position may be done by touching + or - adjustment buttons. The blue arrow indicator on the left side of the vertical position bar indicates the current position of the set. On the 3-D display, the set name will be indicated in bold letters, to indicate that the set is enabled (target is now different from the current position). The target position for the set will be shown as a green wire-frame, while the current position will appear as a solid blue icon

If the set is variable speed, a velocity display will appear in the lower left of the screen. The desired velocity of the move can be adjusted by touching the - or + velocity adjustment buttons. Similarly, the acceleration and deceleration can be adjusted using the adjustment buttons in those areas.

Once the settings have been completed for the first set, the operator touches the first set on the screen to unselect it (set label will turn from green to white, to indicated that it is no longer selected, but set label will remain bold, and wire frame will remain on screen at the designated target position, indicating that the set is still enabled). Alternatively, the operator may also touch the "Unselect" button at the bottom left of the screen to make the first set inactive. If you designate a target and want to undo it, select the set then touch the "Clear Target" icon at the top of the screen.

To designate a target for another set, the operator touches the graphic of the other set (or sets) to select them, and then designates the target using the procedures outlined above.

Once all targets have been designated, all sets that are enabled (target position different from current position) may be run. The operator pushes and holds the active GO TARGET button to run the enabled set(s) to the target(s). If there are variable-speed motors involved in the preset, their speed may be varied using the joystick, as described in previous section.

During the move, the blue arrow indicators on the left of the Vertical Position display will move to indicate the motion of the sets toward their targets; the green wire-frames on the 3-D display will move to indicate the motion of the selected sets toward their targets. If a variable-speed winch is involved in the move, the travel time indicators in the Velocity window will update to reflect the move time remaining. All of which is very interesting, but your job as operator is...WATCH THE PIECE!

RELATIVE TARGET OPERATION - SHORTCUT

The following procedure is used to run sets to a relative target. Using the 3-D display, select a set (or sets) by touching the graphic corresponding to the set on the touchscreen. The set label will change from white to green to indicate that it has been selected. A position display will also appear in the upper left portion of the screen.



The operator can set a relative target for the selected sets by touching the Relative Move button in the Vertical Position window. This will open a keypad with distance units. The operator keys

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in the distance that the selected sets must move - a positive number will set the target above the current position, and a negative number set the target below the current position. When the operator touches the "Done" key, the targets will be updated accordingly. On the 3-D display, the set name will appear in bold letters on the green wire-frame icon indicating the specified target position, while the current position of the set will be indicated by a solid blue icon.

If the set is variable speed, the operator may use the procedures outlined previously to change the velocity for the move. Once these settings have been selected, the operator pushes and holds the active GO TARGET button to run the set to the target, as described in other sections of this manual. Oh, yes - WTP!

CURRENT POSITION AS TARGET - SHORTCUT

The following procedure is used to run sets in deadman mode, and then return them to their starting positions. This feature can be very useful for bringing in an electric set to adjust a lamp, then returning it to its original trim.

Using the 3-D display, select a set (or sets) for operation by touching the graphic corresponding to the set on the touchscreen. The set label will change from white to green to indicate that it has been selected. A position display will also appear in the upper left portion of the screen.



The operator can set the current position of the selected set(s) as target by touching the Match Current button in the Vertical Position window. This will assure that the current position of the selected set is the target for a move. The operator now uses the deadman Up or Down console pushbuttons to drive the set(s) to the desired position. When the required adjustments are finished, the operator uses the active GO TARGET button (violet or yellow) to move the set(s) back to trim. By the way, did I say Watch the Piece?

DISPLAY VIEW

QUICK VIEWPOINT CHANGE



As noted above, the default view of the stage is from the operator's position. There are a couple of ways to change the view displayed in the 3-D window of the main screen. The first is to use the "Eyeball" icon at the lower right of the screen.

Touching this icon will open a viewpoint window in the status pane at the right of the screen. The Views tab on this menu shows the names of preset views of the stage. .





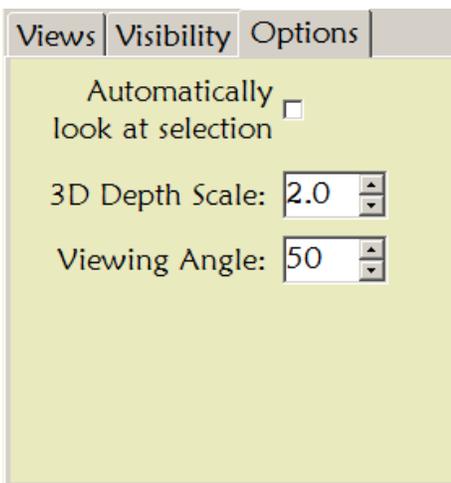
Touching the “Top View” selection on the list shown will shift the view to a plan view of the stage, as if the operator were on the grid looking down at the stage.

The “From House” selection in this list will shift to the viewpoint of a person seated in the orchestra level seats.

The “Default” selection will return the viewpoint to the starting perspective.

Custom viewpoints may be created by an operator with Edit Level privileges – this will be covered in a later section of this manual.

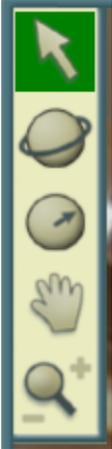
When the “eyeball” icon is used to open the viewpoint window, the Visibility tab can be used to select which sets are displayed. In the list shown, touching the “Electrics” entry would display only the Electric sets, shutting off the set identifications for all other sets. Again, this list can be customized by an operator with Edit Level privileges.



The Options tab in the viewpoint window provides some choices for the way the 3D image is displayed on the screen. The 3D Depth Scale can be used to exaggerate the depth of the stage house – this can be useful to distinguish between sets when they are closely placed. The Viewing Angle setting changes the “lens” through which the stage is seen – a setting of 50 is roughly equivalent to the view through a 50mm lens (normal perspective). A setting of 30 gives a broader field of view (like a wide-angle lens), while a setting of 80 gives a narrower view with flatter perspective (like a telephoto lens). The “Automatically look at selection” checkbox shifts the display to center on any set which is selected as it is selected. This viewpoint shift can be disconcerting to an operator, so this setting should be used judiciously.

CUSTOMIZED VIEWPOINT

The stage view can also be altered using the operators at the upper left corner of the 3-D display. These are the "Orbit", "Walk", "Grab" and "Zoom" buttons. The "Arrow" button at the top of this toolbar is used to return to cursor mode after using the other tools to manipulate the view.



The "Orbit" button looks like a planet with an orbital ring around it. The center of this "planet" is the center of the stage house, and the viewpoint moves around this center, but is always looking toward the center. To activate this tool, touch the button – the button's background will turn green to indicate the tool is active. Touching the screen and dragging down will move the viewpoint down while still looking at the center of the stage house, as if the viewer were climbing to a fly gallery. Touching the screen and dragging left will move the viewpoint as if the viewer were moving to the right while still looking at the center of the stage house. These motions can also be accomplished with the touchpad, clicking and holding the left mouse button while dragging.



The "Walk" icon is a globe with an arrow within it. This tool simulates the operator moving his head to change the view. Touch the Walk button to make this tool active (button background will turn green), then touch the screen and drag up will to shift the focus of the view toward the stage floor. Dragging down will cause the view to look up toward the grid. Touching and dragging to the right will cause the focus of the view to shift to the left (as if the operator were turning left), while touching and dragging left will cause the focus of the view to shift to the right (as if the operator were turning right). These motions can also be accomplished with the touchpad, clicking and holding the left mouse button while dragging.



The "Grab" button shifts the image on the screen while maintaining the current operator's viewpoint. Touch the Grab button to make this tool active (button background will turn green). The operator can now touch the screen and drag the entire image left, right, up or down, as desired. These motions can also be accomplished with the touchpad, clicking and holding the left mouse button while dragging across the touchpad.



The "Zoom" icon is a magnifying glass. This tool changes the point of view by moving the viewer closer to or further from the focus of the view. Touch this icon to activate the tool, then touch the screen and drag up to shift the viewpoint closer (zoom in), or drag down to shift the viewpoint further away (zoom out). These motions can also be accomplished with the touchpad, clicking and holding the left mouse button while dragging.

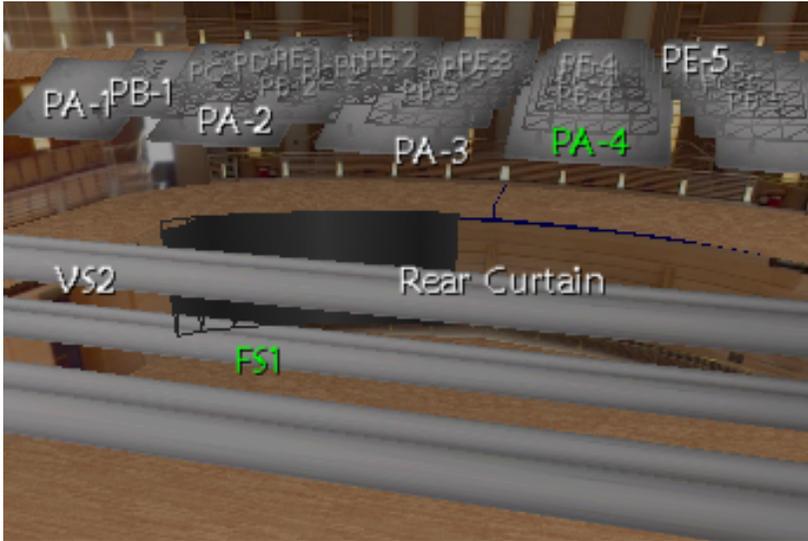


When done changing the 3-D screen view, touch the cursor icon to de-activate the viewpoint tools and return to normal operation.

DETAILED OPERATION

DEADMAN OPERATION - DETAILS

When the system boots up, the display screen will show the stage as viewed from the operator's position. If desired, the operator may change the display viewpoint using the tools described above.

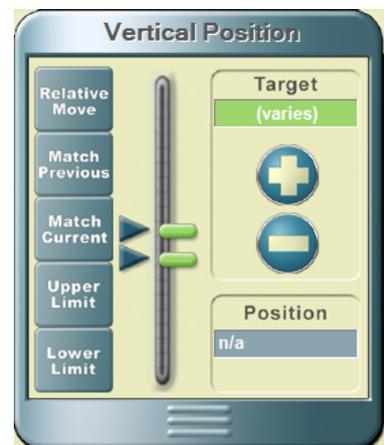


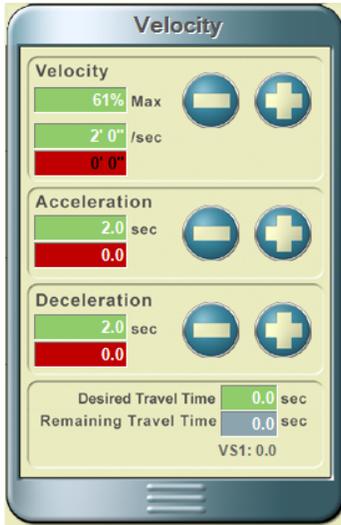
To select a set (or sets) for deadman operation, the operator touches the set label on the touchscreen. As an alternative, the operator can use the touchpad on the console to move the cursor and select sets for operation. Each set label will change from white to green to indicate that it has been selected.



The position display will also appear in the upper right portion of the screen. This display will show the position(s) of the selected set(s). If a single set is selected, the position will be shown numerically and graphically, as shown.

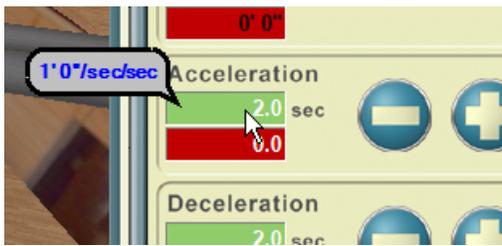
If multiple sets are selected, the set positions will only be displayed graphically. The graphic position display represents the position of each winch axis relative to its soft upper and soft lower limits. Each blue arrow on the left of the slider represents the current position of a set, while each green indicator on the right represents the target position for a set. On the 3-D display, the selected set labels will change from white to green.





If a selected set is variable speed, a velocity display will appear in the lower right of the screen. When it first opens, this window shows the default velocity of the selected set, and the default acceleration and deceleration values. The velocity of the selected set can be adjusted using the – and + buttons in the velocity display window.

The velocity can also be directly set by touching one of the velocity numeric fields, at the top of the window. Touching the percentage window will cause a numeric keypad to pop up. The operator keys in the desired velocity in percent of maximum speed, and then presses the DONE key to enter the value into the system and close the keypad window. Touching the distance per second window will open a keypad with distance units, permitting the operator to enter the desired speed in feet and inches per second, or meters per second. The selected value will automatically be converted to the prevailing measurement system when the DONE key is pressed to enter the value.



There are two components to the acceleration and deceleration parameters. First is the rate of acceleration or deceleration. This is expressed in distance per second per second, and can be displayed by “floating” the cursor arrow over the acceleration or deceleration numeric field without clicking it). The accel and decel rates are the “slope of the curve” on these parameters.

For a given velocity, a higher accel rate will equate to a shorter accel time, and a lower accel rate will equate to a longer accel time.

The acceleration time is the amount of time needed for the set to get to the selected velocity at the current acceleration rate. Touching the + acceleration adjustment button will increase the acceleration time, meaning that the set will start more gradually. Touching the - acceleration button will reduce the acceleration time, meaning that the set will come up to speed more abruptly. Similar to the velocity, the desired acceleration time or deceleration time can also be directly entered by touching the numeric field associated with these values. Once the desired sets have been selected, the operator can push and hold the GO UP or GO DOWN pushbutton on the console to run the set.

If the set is variable-speed, and no changes have been made to the velocity setting, the set will run at the default speed. The operator can increase the speed of the set during the move by pushing the joystick (toward the GO UP button) - the speed increases proportionately, with full speed at this end of the joystick travel. The operator can decrease the speed by pulling the joystick (toward the GO DOWN button) - the speed decreases proportionately, with the axis standing still when the joystick is at this end of its travel.

The set will stop when the operator releases the pushbutton, or when the set arrives at its limit. The 3-D display and the vertical position display will update to reflect the reported position of the set - however, the display can't hurt anyone. While the set is moving, remember - WATCH THE PIECE!

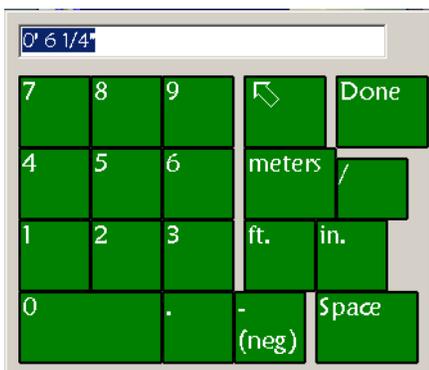
SINGLE TARGET OPERATION - DETAILS

A Target move can be assigned to either the violet or yellow GO TARGET buttons. By default, the violet button is the first to be activated, unless the operator designates otherwise, by touching the yellow button to make that target button active. All of the adjustments described below will be assigned to the active button to make that target button active. All of the adjustments described below will be assigned to the active button, until the other target button is activated. The adjustments we will describe will be assigned to the default temporary preset, named (Temporary).



Using the 3-D display, select a set (or sets) by touching the graphic corresponding to the set on the touchscreen. The set label will change from white to green to indicate that it has been selected. A Vertical Position window will also appear in the upper right portion of the screen.

As noted in the Shortcut section, the target can be adjusted by touching and dragging the green target slider at the right of the window, or by touching the + or – buttons to the right of the target slider. The operator may also key in a numeric position directly, by touching the Target position numeric field, at the bottom right of this window.



Touching the Target position field will cause a keypad to pop up. The operator keys in a target position on this keypad, using the appropriate keys to indicate whether the position being entered is in feet and inches, or in meters (the control system will convert all values to the current display units). When the value is keyed in, the operator touches the DONE key to enter the value into the system and close the keypad window.

There are five buttons at the left of the vertical position window that may be used in setting targets, as well. The Match Current will set the current position of the selected set as its target. The SUL button will set the selected set's Soft Upper Limit as its target; the SLL button will set the selected set's Soft Lower Limit as its target. The Match Previous button is only used when running pre-recorded cues, so we won't go into it now.

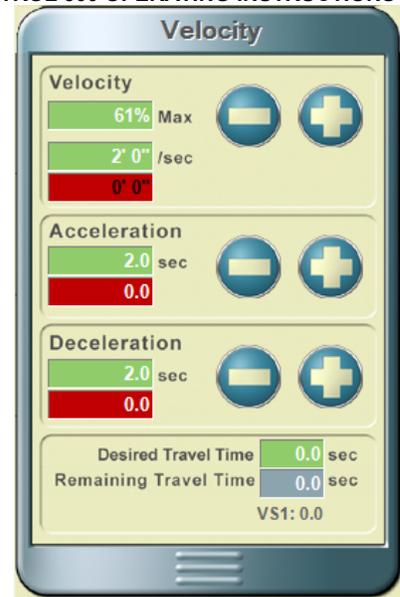
The Relative Move button is used to change the selected set's target **by** a specified amount. Touching this button will pop up a numeric keypad. When the operator keys in a distance and presses the "Done" key, the selected winch's target will change by the distance entered. If, for example, the current winch target is 3'6", and the operator uses the Adjust Targets keypad to enter 7'0", then the winch target will be updated to 10'6". The - (neg) key on the keypad can be used to adjust the target down to a lower position.

On the 3-D display, once a target has been designated for a set, the set name will be displayed in bold characters on a green wire-frame figure that represents the target position. The bold characters, and the green wire-frame target representation indicate that the set is enabled. The current position of the set will appear as a solid blue figure

If the selected set is variable-speed, the velocity window will pop up. As noted in the Shortcut section, the velocity of the winch can be adjusted by touching the + or – velocity buttons in this window.

The velocity can also be directly set by touching one of the velocity numeric fields, at the top of the window. Touching the percentage window will cause a numeric keypad to pop up. The operator keys in the desired velocity in percent of maximum speed, and then presses the DONE key to enter the value into the system and close the keypad window. Touching the distance per second window will open a keypad with distance units, permitting the operator to enter the desired speed in feet and inches per second, or meters per second. The selected value will automatically be converted to the prevailing measurement system when the DONE key is pressed to enter the value.

There are two components to the acceleration and deceleration parameters. First is the rate of acceleration or deceleration. This is expressed in distance per second per second, and can be displayed by touching the acceleration or deceleration adjustment wheel without dragging to change the control (or "floating" the cursor arrow over the control without clicking it). The accel and decel rates are the "slope of the curve" on these parameters. For a given velocity, a higher accel rate will equate to a shorter accel time, and a lower accel rate will equate to a longer accel time.



The acceleration time is the amount of time needed for the set to get to the selected velocity at the current acceleration rate. Touching the + acceleration adjustment button will increase the acceleration time, meaning that the set will start more gradually. Touching the - acceleration button will reduce the acceleration time, meaning that the set will come up to speed more abruptly. Similar to the velocity, the desired acceleration time or deceleration time can also be directly entered by touching the numeric field associated with these values.

The desired travel time for a move can be entered by touching the Recorded Travel Time numeric field at the bottom of the screen. A keypad will pop up that the operator may use to key in the desired number of seconds for a move. When this is done, the system will calculate the required maximum velocity, and will display the acceleration time and deceleration time at the current accel and decel rates. These values will appear in the appropriate fields in this window.

If an operator enters a value that is inappropriate (i.e. time too short for the set maximum speed) the system will calculate the actual time required for the move. The requested velocity will be adjusted to 100% and the acceleration and deceleration times will be displayed for the current rates. The acceleration and deceleration rates will not change until the operator changes them, using the adjustment wheels.

Velocity values are entered after entering target values. When the operator enters a velocity number, the system checks to make sure it is possible to attain the requested velocity in the space between the current position and the target. If the requested speed is too fast for the distance, a box will pop up showing the maximum speed that will be attained in the space allotted, given the current acceleration and deceleration rates. This box will also indicate the actual acceleration time and deceleration times at the current accel and decel rates.

⚠ Caution!

Decreasing the acceleration and deceleration times will result in more abrupt starts and stops for the set. Extreme settings of these values can result in greatly increased shock load on the flown equipment, particularly when using high set velocities.

Once the settings for target, velocity and accel/decel (or run-time) have been entered, the operator may run the active preset by pushing and holding the active GO TARGET button. Alternatively, a second preset may

be set up by touching the other button icon on the lower right corner of the screen, then assigning values to this preset. When done assigning values, the operator pushes and holds the desired GO TARGET button to run the set to the target. If there are variable-speed motors involved in the preset, their speed may be varied using the joystick, as described in the Shortcut section, above.

The Deadman Button (DMB) can be used to continue execution of a target move. Once the GO TARGET button has been pressed, the operator may press and hold the DMB button to continue execution of the move. The next cue may now be loaded onto the GO TARGET button, and the GO TARGET button pressed, to begin the next cue. Once the next cue has begun, the control of this cue can be passed to the DMB, as long as the DMB remains pressed.

During the move, the blue position arrow(s) on the left of the Vertical Position display will move to indicate the set motion toward target; the blue solid figure(s) on the 3-D display will move to indicate set motion toward target. At the bottom of the Velocity window, the travel time indicators will update to reflect the move time remaining. All of which is very interesting, but your job as operator is...WATCH THE PIECE!

MULTIPLE AXIS SETS



Some sets (e.g. acoustic panels) have three axes of motion – vertical position (raise and lower), pitch (tilt upstage-downstage), and roll (tilt stage left – stage right). When an acoustic panel is selected, indicators for vertical position, pitch and roll will appear at the right of the screen.

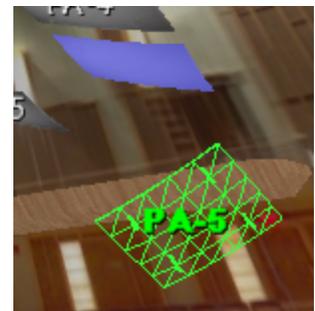
The vertical position indicator is identical to all other sets. The pitch and roll indicators show the current position and target values in degrees. To set a target value, click and drag the end of the green indicator bar and drag it to the desired position, or touch the Target: numeric field to enter the target with a keypad. The target is entered in degrees of tilt; 0 degrees represents the panel flat (parallel to the stage).

It is also possible to set relative target for pitch and roll. Use the Relative Move button to call up a numeric keypad, and use this to enter a positive or negative numeric value. This value will be summed with the current target value for all selected panels to result in new target values for these sets.

The Match Previous button is used to change the current target to match the previously selected target. The Match Current button is used to change the current target to match the current position.

When the new targets for vertical position, pitch and roll have been entered, the display graphics for the set on the 3-D display will show the current set position as a blue solid figure, and the target position as green wire-frame. The operator may run the enabled set(s) by pressing and holding the active GO TARGET button to run the set(s).

During the move, the position indicators on the Vertical Position, Pitch, and Roll displays will move to indicate the set's motion toward target; the blue solid on the 3-D display will move to indicate the set motion toward target. This will impress the folks looking over your shoulder – but I am confident at this point that you will be watching the piece!



MULTIPLE TARGET OPERATION - DETAILS

A Target move can be assigned to either the violet or yellow GO TARGET buttons. By default, the violet button is the first to be activated when the screen first opens. The operator may touch the yellow button icon at the top of the screen to make that preset active. All of the adjustments described below will be assigned to

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this button, until the violet target button is re-activated by touching it again. This will be a temporary preset, which will have the name (Temporary).

Using the 3-D display, select a set (or sets) for operation by touching the graphic corresponding to the set on the touchscreen. The set label will change from white to green to indicate that it has been selected. A position display will also appear in the upper left portion of the screen.

As noted in the Shortcut section, the target can be adjusted by touching and dragging the green target slider at the right of the position bar, or by touching + or – target buttons. The operator may also key in a numeric position directly, by touching the Target position numeric field, at the bottom right of this window.

Touching the Target numeric position field will cause a keypad to pop up. The operator keys in a target position on this keypad, using the appropriate keys to indicate whether the position being entered is in feet and inches, or in meters (the control system will convert all values to the current display units). When the value is keyed in, the operator touches the DONE key to enter the value into the system and close the keypad window.

NOTE: If multiple winches are to be run to the same target, they may be selected and set simultaneously. These can then be de-selected, and another set (or group of sets) selected to designate another target.

If the selected set is variable-speed, the velocity window will pop up. As noted in the Shortcut section, the velocity of the winch can be adjusted by touching the – or + velocity adjustment buttons in this window.

The velocity can also be directly set by touching one of the velocity numeric fields, at the top of the window. Touching the percentage window will cause a numeric keypad to pop up. The operator keys in the desired velocity in percent of maximum speed, and then presses the DONE key to enter the value into the system and close the keypad window. Touching the distance per second window will open a keypad with distance units, permitting the operator to enter the desired speed in feet and inches per second, or meters per second. The selected value will automatically be converted to the prevailing measurement system when the DONE key is pressed to enter the value.

There are two components to the acceleration and deceleration parameters. First is the rate of acceleration or deceleration. This is expressed in distance per second per second, and can be displayed by "floating" the cursor arrow over the numeric window without clicking it. The accel and decel rates are the "slope of the curve" on these parameters. For a given velocity, a higher accel rate will equate to a shorter accel time, and a lower accel rate will equate to a longer accel time.

The acceleration time is the amount of time needed for the set to get to the selected velocity at the current acceleration rate. Touching the + acceleration adjustment button will increase the acceleration time, meaning that the set will start more gradually. Touching the - acceleration button will reduce the acceleration time, meaning that the set will come up to speed more abruptly. Similar to the velocity, the desired acceleration time or deceleration time can also be directly entered by touching the numeric field associated with these values.

The desired travel time for a move can be entered by touching the Recorded Travel Time numeric field at the bottom of the screen. A keypad will pop up that the operator may use to key in the desired number of seconds for a move. When this is done, the system will calculate the required maximum velocity, and will display the acceleration time and deceleration time at the current accel and decel rates. These values will appear in the appropriate fields in this window.

If an operator enters a value that is inappropriate (i.e. time too short for the set maximum speed) the system will calculate the actual time required for the move. The speed will be adjusted to 100% and the acceleration and deceleration times will be displayed for the current rates. The acceleration and deceleration rates will not change until the operator changes them, using the adjustment wheels.

Velocity values are entered after entering target values. When the operator enters a velocity number, the system checks to make sure it is possible to attain the requested velocity in the space between the current

position and the target. If the requested speed is too fast for the distance, a box will pop up showing the maximum speed that will be attained in the space allotted, given the current acceleration and deceleration rates. This box will also indicate the actual acceleration time and deceleration times at the current accel and decel rates.

Caution!

Decreasing the acceleration and deceleration times will result in more abrupt starts and stops for the set. Extreme settings of these values can result in greatly increased shock load on the flown equipment, particularly when using high set velocities.

Once the settings have been completed for the first set, the operator touches the first set on the screen to make it inactive (set label turns from green to white). Alternatively, the operator may also touch the "Unselect" bottom at the bottom left of the screen to make the first set inactive. The operator may then select the next set and adjust its target, velocity, accel and decel or run time. This set may then be de-selected, and another set selected and adjusted.

Once the settings for target, velocity and accel/decel (or run-time) for all sets have been accomplished, the enabled sets may be run (whether they are currently selected or not). To do this, the operator pushes and holds the active GO TARGET button to run the sets to their targets. If there are variable-speed motors involved in the target, their speed may be varied for all moving pieces, using the joystick, as described in the Shortcut section, above.

During the move, the blue arrow indicators on the left of the Vertical Position display will move to indicate set motion toward targets; the selected blue solid figures on the 3-D display will move to indicate set motion toward target. At the bottom of the Velocity window, the travel time indicators will update to reflect the move time remaining. All of which is very interesting, but your job as operator is...WATCH THE PIECE!

Using Preset and Cues

ACCESS LEVEL PRIVILEGES

So far, we have looked at how to run scenery directly (deadman mode) and how to create temporary presets. These tasks require Access level password privileges. An operator with Access level password privileges can also recall and run pre-recorded Presets and Cues. An operator with Edit level password privileges can also record presets and cues. The recording process will be covered in a later section of the manual.

PRESETS AND CUES

A recorded preset is similar to a temporary preset. A recorded preset contains selected sets and targets for those sets. If a selected set is variable-speed, the preset will also contain velocity, acceleration and deceleration times for that set. In this way, a recorded preset is no different from a temporary preset.

Cues are subordinate to presets. At first glance, a cue appears similar to a recorded preset. It contains selected sets, targets for those sets, and speed information for variable-speed sets. The powerful difference is that each cue also has a sequential relationship with the base preset, and with the preceding and following cues.

Cues are designed to be run in sequence. Each cue contains information about the positions of all of the sets that are part of its "master" preset. Each cue, therefore, knows where the selected sets must be when the cue completes, and where all of the other sets in the preset should have been at the beginning of that cue. To use an analogy from lighting consoles, cues "track". If a cue is run out of sequence, then all of the sets in the preset will move to the positions required for the complete scenic "look" that is defined at the end of that cue, even though some of these sets were not selected to move in this cue.

Cues are very useful tools in running shows, as they can be linked to follow one after the other. They may be even more powerful in rehearsals, where an operator can jump quickly to a setup requested by the director.

LOADING PRESETS



A preset is loaded onto one of the Go Preset buttons (violet or yellow). The operator can select a preset by touching the button with three dots next to one of the Go Preset buttons, and the list of

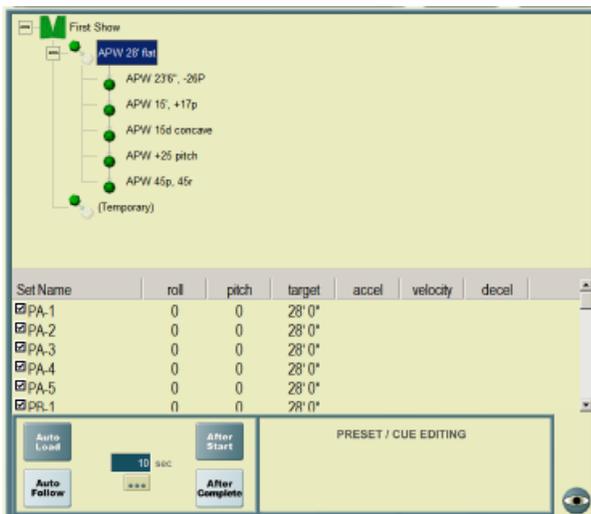
Presets and Cues for the current show will be displayed. When the screen first opens, the (Temporary) preset will be highlighted, as this is the active preset.

This list is organized in outline form. The top level of the outline is the show. The next level of the outline contains presets. The third level of the outline contains cues. In the illustration shown here, the show is named "First Show". It contains two presets, named "APW 28' Flat" and "Manual P1". Each preset contains five cues. The "(Temporary)" preset is a system preset, so it will appear on every show list..

The operator can select a preset or cue by touching a name in the list. The preset or cue name will be highlighted, and the view will then switch back from the list to the stage view. The preset name will appear under the active Target button icon at the top of the screen. To run the preset, the operator simply has to press and hold the active Go Target button. When running a preset from the main screen, the 3-D display will update to reflect the positions of the axes. If none of the sets are selected for editing (i.e., there is not an open Vertical Position or Velocity window), then an alphanumeric display will appear in the right pane of the screen showing winch status, motor current draw (as a percentage of full load), and position for each of the winches in motion. As each winch reaches its target, its information will disappear from the display. Of course, you won't see this, because you'll be watching the piece during the move – right?

PRESET AND CUE LIST

You can examine the contents of cues and presets by switching to the List page. This is done by touching the list button, above the "eyeball" at the bottom right of the stage view pane. This opens the Preset and Cue list page.



The main pane of this page shows the list of the loaded show, the Presets that are part of that show, and the cues that are part of each preset. The pane below this contains a list of all of the sets that are part of the show. If either the preset/cue list or the sets list is long enough, a scroll bar will appear at the right of that pane to let you scroll down to see the rest of the list.

Touching (or clicking on) a preset or show title will load the cue onto the active target button. The set list in the middle pane will change to show which sets are part of that cue or preset.

In the set list, a checkbox at the left of each line may be checked to indicate that a set is part of the selected cue or preset. The target values and speed values are displayed for each set in the preset. The scroll bar at the

right of the set list is used to scroll down to display the remainder of the set list.

CUE SEQUENCING

As mentioned before, a cue is designed to run in sequence. The area at the lower left of the preset/cue screen displays the sequence selections that are part of the preset or cue. The settings there affect the relationship between the selected cue or preset, and the next cue on the list.



The top left button in the sequence box is Auto Load. This function is selected by default. If it is selected, and the current cue is run to completion, when the Go Target button is released at the end of the cue, the next cue will automatically load on the active Go Target button.

The bottom left button in the sequence box is Auto Follow. If this is selected, the next cue will execute automatically, as long as the Go Target button is held. The timing for the start of the next cue is set by the other buttons in the sequence box. The next cue can be set to start a given number of seconds after the start of the current cue (or preset), or after the completion of the current cue (or preset). The next cue will be executed if the operator continues to hold the active Go Target button through the waiting period, then holds the Go Target or Deadman button through the duration of the next cue.

System Configuration

ACCESS LEVEL PRIVILEGES



There is a button at the top of the screen labeled "System Config". This button is used to open a system configuration tool screen. This tool can be used to log in to a different password level, to change the display units, or to blank the screen when the system is not to be used for a period of time. The System Config tool screen is displayed below, and the following sections explain its use. Buttons that are grayed out indicate functions that are not accessible under Access Level password privileges. The "Close" button on the System Config window closes this display and returns to the main screen.

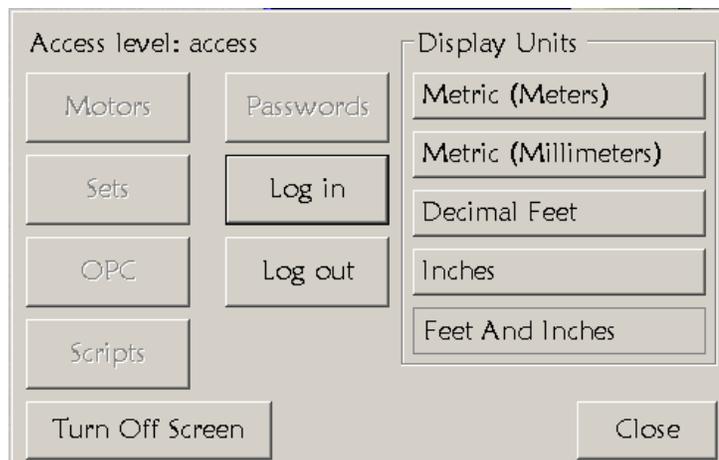
CHANGE DISPLAY UNITS

The Display Units area of the System Config tool provides the following choices for display units:

Metric (Meters) – Displays all distances in meters and thousandths. Displays velocities in meters and thousandths per second.

Metric (Millimeters) – Displays all distances in millimeters and thousandths. Displays velocities in millimeters and thousandths per second.

Decimal Feet – Displays all distances in feet and thousandths. Displays velocities in feet and thousandths per second.



Inches – Displays all distances in inches and thousandths. Display velocities in inches and thousandths per second.

Feet and Inches – Displays all distances in Feet and fractional inches (resolution to 1/8"). Displays all velocities in feet and fractional inches per second.

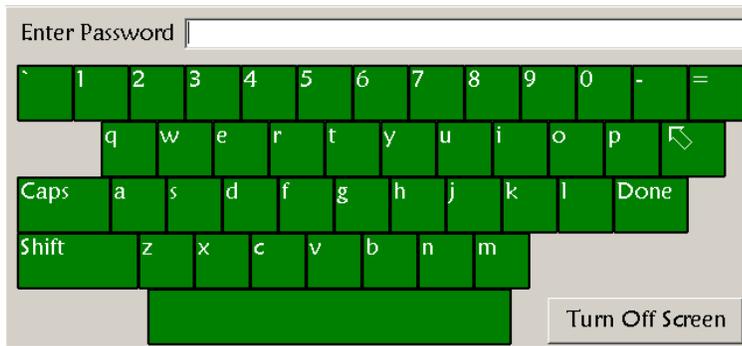
When entering a target with the numeric keypad, targets can be specified using either metric or imperial units. They will be converted and displayed in the units selected on the System Config window.

TURN OFF SCREEN

"Turn Off Screen" is a button that appears here and on the password entry window. This button can be used to blank the display screen, putting the system into standby mode when it is not in use for a while. Touch the screen to "wake the system up".

LOG IN / LOG OUT

"Log In" is used to open the password entry window to permit the operator to change privilege levels. This is used when the operator needs to record cues or load a new show, or when accessing other maintenance functions.



If no password is required for Access Level privileges, then the operator simply touches "Done" to return to the main screen

"Log Out" is useful if there is an Access Level password and the operator wishes to disable the console without shutting off the system. "Log Out" will suspend the current operator session, and will require that a valid password be keyed in before resuming operation.

SYSTEM SHUT DOWN

At the end of the day, use the "Log Out" button to close the work session. When the operator logs out, the system goes through a backup routine, saving the current system data to a backup drive within the console. Prompts appear in the lower left corner of the screen to track this backup's progress. When the prompt, "Saved" appears, the operator touches the "SHUT DOWN" button on the screen to start a Windows shutdown. Once this is complete, the screen will go black; and the console keyswitch may be turned off to complete the system shutdown.

Edit Level Functions

EDIT LEVEL PASSWORD PRIVILEGES

The Edit Level password is used to add or make changes to the Cues and presets. A user with Edit Level password privileges can:

- record, edit, and/or delete presets and cues
- Select and load a show previously saved
- create a new show
- delete an existing show
- edit show specific soft upper and soft lower limits
- turn load sensing on and off for individual winches, and run the load learning routine on individual winches when a set's weight has changed.

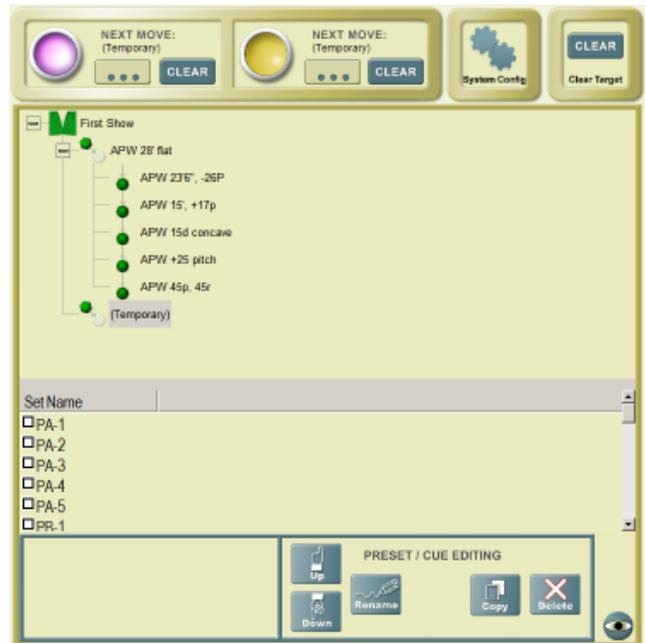
To enter the Edit Level, the operator opens the System Config window, and then uses the Log In button to open the password entry window. The operator keys in the Edit Level password and touches the "Done" key on the keypad, then the "Close" key on the System Config window, to enter Edit Level. Note that the borders on the screens are gold while the system is in edit level or above.



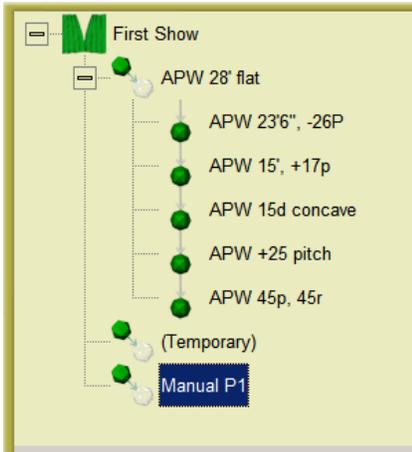
RECORDING A PRESET

Once logged in with Edit Level password privileges, the operator goes to the Preset page to create a preset. The screen will have a couple of tools that were not available at the Access Level, but the basic screen layout is the same. The main part of the screen displays the show list. The show that is loaded in this example is called "First Show". Below that, the preset "APW 28' flat" is listed. This preset has five cues associated with it.

To create a Preset, the operator clicks on the show icon at the top of the list. This will cause the New Preset icon to appear at the bottom right of the screen.



Click on this icon, and a new preset will appear at the bottom of the Preset list in the center pane. The keyboard will also appear, so that a new name for the preset can be entered.



Since this is the manual for this system. We'll call this preset manualP1. The next step is to return to the main screen to set up the winches to be used in the preset. The Eyeball icon at the bottom of the screen is used to make this move.

NOTE!
A preset contains the starting positions for all winches that are part of the preset AND ANY CUES THAT ARE SUBORDINATE TO IT. If a winch is not included in the preset, and is later added into a cue, the winch target designated in the cue will be incorporated into the preset as the starting position for the winch.

Once the preset has been named, select the winches that are to be part of the preset, and designate targets for them. This is done using the same procedures outlined for doing target moves in the earlier section of the manual. As each set is selected and a target designated, the unit will be incorporated into the preset. Once all targets have been designated, we can unload the current preset by pressing the CLEAR button in the active NEXT MOVE box, or return to the Preset list using the three dots button.

NOTE!
While in edit mode, any changes done while a preset is loaded are being actively recorded to that preset. Be very careful to note which preset is loaded while making changes, in order to avoid trashing a good preset. If you are experimenting with a look, or want to try something out first, you may unload the current preset or cue using the CLEAR button in the active NEXT MOVE box. This will make the Temporary preset active. You may then use the Temporary preset as your "scratch pad". If the settings you select work out and you want to save them, you can switch to the Preset List, rename the Temporary preset to a new name and move it to the appropriate spot in the cue list, using the tools outlined below. Once the Temporary cue has been renamed, a new, empty Temporary cue will be created (don't worry, we'll make more!).

Preset ManualP1 moves all of the acoustic panels to the same height, at the same pitch and roll values. The following cues will start from there.

RECORDING A CUE

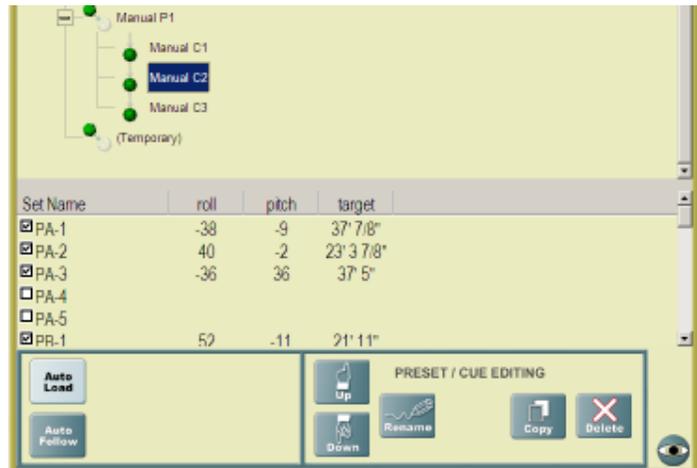
Recording a cue is much the same as recording a preset. To record, the operator must be logged in with Edit Level password privileges, and must be on the preset page to begin the process.

Since a cue is subordinate to a preset, click on the preset that will be the "master" for the desired cue. In our example, we click on the icon for preset ManualP1.



This will bring up the "New Cue" icon in the box at the bottom right of the page. Clicking on this icon will create a new cue in the cue list, and open the keyboard so that the cue can be named. Again, since this is the manual, we'll call this cue ManualC1.

As with the preset, we now use the eyeball icon at the bottom right of the preset screen to move back to the main screen, and set up the winches that will be part of ManualC1. This cue will move the stage left acoustic panels to different heights and pitch and roll values. Once the targets are designated, we then return to the preset screen to load a new cue, or use the CLEAR button to unload the current cue.



To add another cue, again click on the preset that will be the "master" for the new cue – preset ManualP1 in our example. This brings up the "New Cue" icon in the Preset/Cue Editing pane at the lower right of the screen. Clicking on this creates another cue. I named this cue ManualC2 (there seems to be a pattern emerging...). On the stage view page, the stage right acoustic panel winches are moved to different heights and pitch and roll values. Again, once the targets are designated, these values become part of the cue.

To finish this set of cues, we move back to the Preset page, click on the ManualP1 preset, and click on the "New Cue" icon once again. This cue will be named (Wait for it...) Manual C3. On the Stage page, we select all of the acoustic panels, and send them to the same target height and the same target roll and pitch – making sure this ending position is a little different from the starting position in preset ManualP1.

CHANGING THE ORDER OF CUES

Just at this point, the director walks in and says, "Oh, by the way, the Stage Right Acoustic Reflectors need to go to their random positions before the Stage Left ones. You got that memo, didn't you?". Smile pleasantly and nod.

Now go to work. On the Preset page, highlight cue ManualC2 (the one that moves the Stage Right acoustic reflectors). With that cue highlighted, go to the Preset/Cue Editing pane at the lower right of the screen, and touch the UP button (with the hand pointing up). Cue Manual C2 will now appear before cue Manual C1 in the cue list.

PRESET/CUE SEQUENCING

The area at the bottom left of the screen holds the sequence information. The sequence information affects the relationship between the highlighted preset or cue and the subsequent cue. There are two buttons in this area – AUTO LOAD, and AUTO FOLLOW. By default, each new cue will be set to Auto Load the subsequent cue. This means that, when the current Preset or Cue is completed, the next cue will load as soon as the operator releases the GO TARGET button. If we don't want the cue to automatically load, touching the AUTO LOAD button will turn this function off.



Touching the AUTO FOLLOW button will turn off the Auto Load function (if it is on), and turn on the Auto Follow function. The Auto Follow function is used to play back a series of cues in a timed sequence. The settings in this area include two buttons: AFTER START and AFTER COMPLETE; and a timer window, in which the time for the Auto Follow is set. To define an Auto Follow, the operator first selects whether the next cue should follow after the start or after the completion of the current cue, and then defines the time before the next cue begins. To define the time, the operator touches the timer numeric field (or the three-dot button below it), and a numeric keypad will pop up. The operator keys in the desired interval in seconds, and touches DONE.



keypad will pop up. The operator keys in the desired interval in seconds, and touches DONE.

To execute an auto-follow move, the operator needs to continue holding the GO TARGET or DMB button through the move and the auto-follow timer. If the operator releases the button, the timer will stop, and the move will stop. Pressing the button again will continue the timers and/or the move from where it stopped.

Note that sequencing can occur from a Preset to its subordinate cue. You cannot sequence from one Preset to another preset. The second preset must be loaded separately in order to run sequentially.

The last cue in a preset will loop back to the “master” preset for that cue, if a sequence instruction is set for that cue. To avoid this loopback, the sequence instruction buttons (AUTO LOAD and AUTO FOLLOW) may both be turned off for the last cue in a preset.

RENAMING CUES

Next, we want to rename cues Manual C2 and Manual C1 to maintain the system we started with. Click on the name Manual C2 in the list to highlight it, then click the "Rename" icon at the bottom of the screen. A keyboard will pop up, with the name Manual C2 highlighted in the display. Using the backspace key on the keyboard (arrow pointing up to the left), we'll rename this cue ManualC1. Next we'll do the same thing for the second cue (also currently named Manual C1), renaming it Manual C2.

EDITING CUES

About this time, the director walks back in and says, "You know, I think the panels need to be around 35' at the start of that move, not 30'." Again, smile and nod.

On the preset screen, click on Preset Manual P1. The lower middle pane will show that all of the targets are 30' 1-1/4". You may click on an individual target number field and a numeric keypad will appear. Using the numeric keypad, enter 35'. When you hit the “Done” key, the target will update.

Since we have to update the position of many winches for this change, it is easier to highlight Preset Manual P1, then go to the Stage page, select all of the sets, and touch the Target field on this page. When this numeric keypad pops up, enter 35' and DONE.

NOTE!

The change to the cue or preset targets may not become visible until the next time the cue or preset is loaded. To confirm that the targets are updated, unload the cue using the CLEAR button, then go back and select the cue or preset to display the saved target values.

CHECKING THE SHOW

The final step is to go through the cues and confirm that the sequencing works. For the sake of rehearsals, we decide that we will not use any auto-follows, but that each cue will load when the previous one has

completed. Once we figure out the timing during rehearsals, we can go back and add in auto-follows, if needed. Accordingly, we set all of the cues to "Auto Load".

We can now try our sequence out. We touch the violet "Go Target" icon to make it active, and then touch the preset Manual P1 to load it onto the Violet Go Target button.

At the top left of the screen, the violet "Go Target" icon will have the label "Manual P1" next to it. When we press and hold the violet GO TARGET button, the sets will move to the Manual P1 targets. When all sets arrive at their targets, we release the violet GO TARGET button, and the label on the violet "Go Target" icon updates to reflect that Manual C1 is now loaded. We can proceed through the cues, with each successive cue loading when the preceding one is complete. At the completion of cue Manual C3, the label on the violet icon will update to Manual P1 if cue Manual C3 was set for Auto Load. The status displays will show information for the sets that are in motion as each move is executed, as shown previously.

CHANGE SHOW

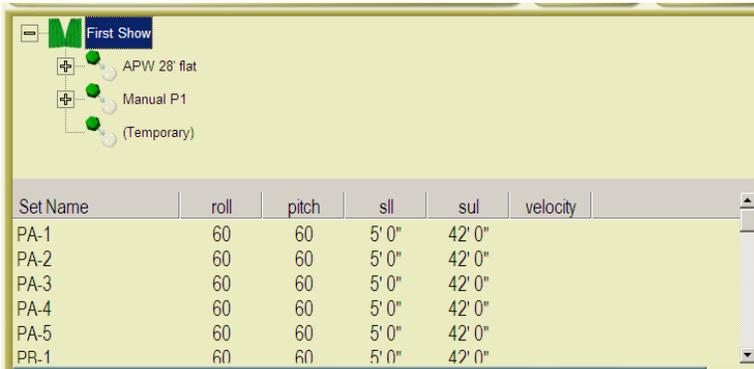
The Edit Level password allows the operator to change the show that is active. A show includes a group of sets, the soft upper and lower limits for those sets, the Presets and Cues that have been defined for the show. The first step in changing shows is to open the System Config tool, using the SYSTEM CONFIG button at the top of the screen. When this tool is open, click the Change Show button to open the change show file access screen.

Touch a show in the main pane to highlight it. Once a show is highlighted, touching the DELETE button at the right of the screen will delete the highlighted show. Touching the RENAME button will open an alphanumeric keyboard so that the new name of the show can be typed in. Touching the COPY button will make a copy of the selected show, and open an alphanumeric keyboard so that the new name of the copy can be typed in. Touching the Select button will load the highlighted show.



Touching a folder icon in the main pane will select that folder, and bring up to new buttons at the right of the screen. The NEW SHOW button will create a new show in that folder, and will pop up an alphanumeric keypad so that the new name of the show can be typed in. The NEW FOLDER button will create a new folder, and will pop up an alphanumeric keypad so that the new name of the folder can be typed in.

By highlighting the show "First Show" and touching the Select button at the upper right of the screen, we can load this show.



The screenshot shows the 'First Show' interface. At the top, there are three set icons: 'APW 28' flat', 'Manual P1', and '(Temporary)'. Below this is a table with columns for Set Name, roll, pitch, sll, sul, and velocity.

Set Name	roll	pitch	sll	sul	velocity
PA-1	60	60	5' 0"	42' 0"	
PA-2	60	60	5' 0"	42' 0"	
PA-3	60	60	5' 0"	42' 0"	
PA-4	60	60	5' 0"	42' 0"	
PA-5	60	60	5' 0"	42' 0"	
PR-1	60	60	5' 0"	42' 0"	

The preset page displays the sets that are part of this show. By touching the Show icon in the upper middle pane to highlight it, each set's soft limits are displayed in the lower middle pane. SLL refers to the Soft Lower Limit, and SUL refers to the Soft Upper Limit. A soft limit can be redefined by touching (or double-clicking) the limit you want to change. A position keypad will pop up, and the operator can key in a new limit value. When the "Done" key is pressed, the keypad will disappear and the new value will appear in the limits list.

CREATE AND SAVE SHOW

Under the Edit Level password, an operator can create a new show. This process begins on the Change Show page. To create a new show, highlight the Hard Drive icon at the top of the left pane. This will bring up the New Folder and New Show icons at the right of the screen. Touch (double-click) the New Show icon to create a new show.

As a new show is being created, a screen prompt will appear, asking "Would you like to use the current show's sets in the new show?" The buttons on this screen are "Yes", "No", and "Cancel".

As you are logged on with the Edit level password, touch the "Yes" key. This will cause the sets in the current show to be copied into the new show. Touching "No" will create the new show without any sets. It is possible for a System Level operator to add new sets to a show, but an Edit Level operator does not have this capability.

After responding to the screen prompt, a keyboard will appear. Use this keyboard to write the name of the new show, and then click the "Done" key. Again, since this is the Manual, we'll name this new show "Manual S1". We can now load this new show by using the SELECT button at the top right of the screen.

The 3-D view on the main screen will display the sets that are part of the show. Changing to the Load Preset screen will display the list of sets, and permit changes to the soft limits, as shown above. This page is also used to add new presets and cues to the show.

LOAD SENSING – EDIT LEVEL PRIVILEGES

Load sensing is a system function that is described in great detail in a later section. Under the Edit Level password, an operator can turn load sensing on or off for individual winches, and can run individual winches through the Load Learning process when the weight of a set is changed. Full details of these functions are found in the "Load Sensing" section of this manual, below.

System Level Functions

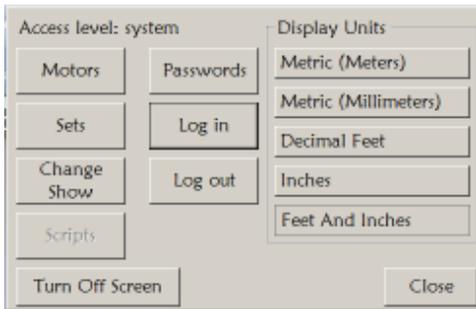
SYSTEM LEVEL PASSWORD PRIVILEGES

The System Level password allows the operator to do all of the Access Level and Edit Level functions previously shown. In addition, a user with System Level password privileges can:

- edit, delete, create sets
- edit motors

To enter the System Level, the operator opens the System Config window, and then uses the Log In button to open the password entry window. The operator keys in the System Level password and touches the "Done" key on the keypad, then the "Close" key on the System Config window, to go into System Level. Note that the borders on the screens are gold while the system is in Edit level or above.

EDIT SETS



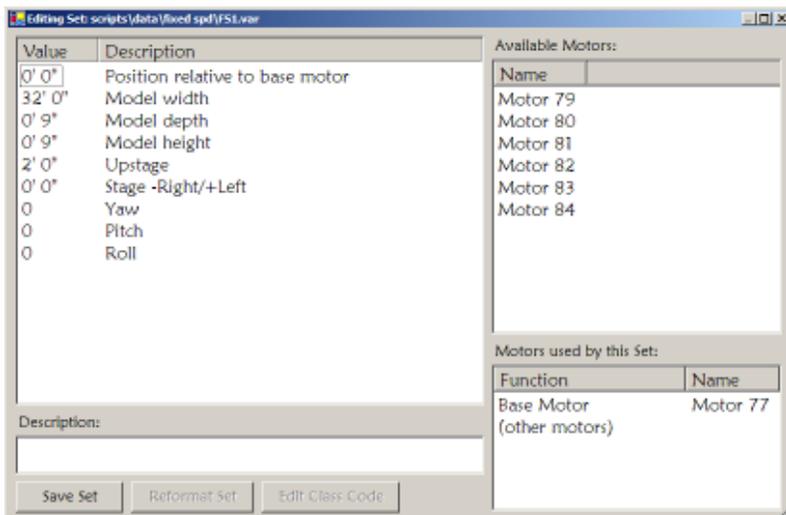
Once logged in with System Level password privileges, the operator goes to the System Config window and touches the Sets button to get to the list of sets.

Touching the Sets button opens a list of the sets as defined in the current show.

To edit a set, touch (click on) a set name to highlight the row, then click the "Edit Set..." button. Let's try doing this to take a look at a fixed-speed set, such as set 5 (Elec 1). We touch the name FS1 to highlight it, and touch the "Edit Set..." button to open the Edit Set display. If the set was defined as a Fundamental set during system commissioning, then will not be allowed to edit it. Instead, we will touch the "Duplicate" button, which will open a copy of the set. We can then edit the copy.

Name	Motors	Load	Class	Description	
1	1	0	C:\Stage\classes\variable spd.ssc		Load Sense
2	1	0	C:\Stage\classes\variable spd.ssc		Load Learn
3	1	0	C:\Stage\classes\variable spd.ssc		Load Disable
4	1	0	C:\Stage\classes\variable spd.ssc		
5	1	0	C:\Stage\classes\basic class.ssc	Elec 1	Deactivate
6	1	0	C:\Stage\classes\variable spd.ssc		Edit Set...
7	1	0	C:\Stage\classes\basic class.ssc	Shell 1	Create New
8	1	0	C:\Stage\classes\variable spd.ssc		Disassociate Set
9	1	0	C:\Stage\classes\variable spd.ssc		Duplicate
10	1	0	C:\Stage\classes\variable spd.ssc		
11	1	0	C:\Stage\classes\basic class.ssc	Elec 2	Move Up
12	1	0	C:\Stage\classes\variable spd.ssc		Move Down
13	1	0	C:\Stage\classes\variable spd.ssc		
14	1	0	C:\Stage\classes\variable spd.ssc		
15	1	0	C:\Stage\classes\basic class.ssc	Shell 2	
16	1	0	C:\Stage\classes\variable spd.ssc		
17	1	0	C:\Stage\classes\variable spd.ssc		
18	1	0	C:\Stage\classes\basic class.ssc	Elec 3	
19	1	0	C:\Stage\classes\variable spd.ssc		
20	1	0	C:\Stage\classes\variable spd.ssc		

The parameters in the left-hand window control the appearance of the set model in the 3-D display on the main screen. These are as follows:



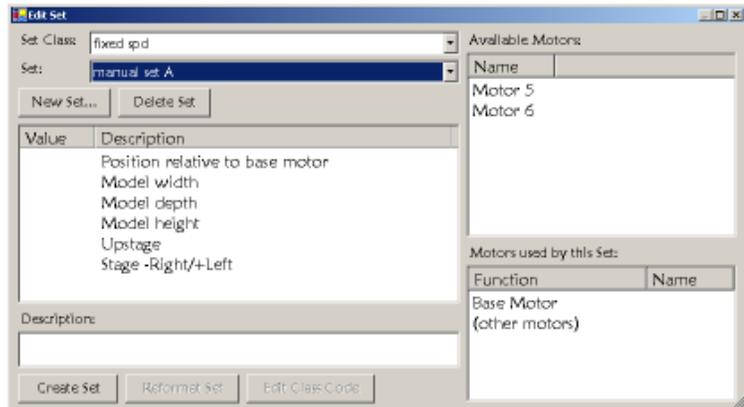
- Position relative to base motor – The base motor height is the position of the batten. The model height is the height of the batten. This setting adjusts the position of the model height relative to the base motor height (use a negative number for the distance the set extends below the batten, or a positive number for something extending above the batten).
- Model width - represents the length of the batten/set from stage left to stage right end
- Model depth - represents the width

of the batten/set from upstage to downstage

- Model height - represents the height of the batten and set in the vertical axis
- Upstage - represents the distance that the (center) of the set is upstage of the proscenium / reference line.
- Stage -Right/+Left – represents the distance that the (center) of the set is with reference to the center line of the stage, with the center line at 0, positive numbers going up toward Stage Left, and negative numbers toward Stage Right.

This example shows a single-axis fixed-speed unit. Variable-speed units have a couple of additional parameter relating to the set speed. These include:

- Default velocity (per second) - sets the default set speed when the unit is first selected or enabled.
- Default acceleration (in seconds) - sets the default acceleration time when the unit is first selected or enabled.
- Default deceleration (in seconds) - sets the default deceleration time when the unit is first selected or enabled.



For multi-axis sets (such as acoustic reflectors) there are additional parameters relating to the hanging points. These include:

- Width between mounts – set for the stage left to stage right distance between hanging points.
- Depth between mounts – set for the upstage-downstage distance between hanging points.

To change a parameter, click on the numeric value in the left-hand column. An appropriate keypad will pop up to permit a new value to be entered. When done changing values, touch the "Save Set" button at the bottom of the window to save the new values.

DELETE SETS

To remove a set from the current show, highlight the set and touch the "Dissociate Set" button. The confirmation prompt will ask whether you want to remove the set permanently. If the set is removed permanently, all information about the model dimensions and default speed values will be purged from the show. If the set is not removed permanently, then the set will be excluded from the list of sets in active use within the current show. If need be, the set can easily be added back in at a later time.

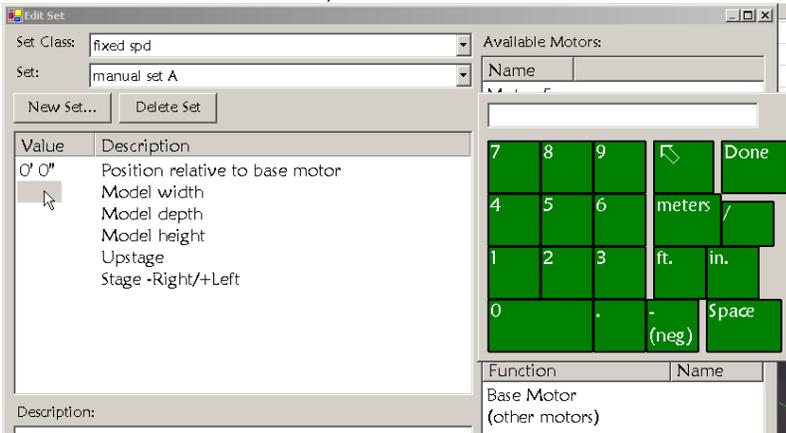
CREATE SETS

To create a set, touch the "Create New Set" button on the Sets list window. This will open up a blank Edit Set window. The first step is to designate the Set Class, using the pull-down menu. In the current configuration of the system, there are two set classes: fixed speed, and variable speed. Other set classes are available, including travelers, reflectors with 1, 2 or 3 axes of motion (pitch, roll, elevation), etc. This example shows a fixed speed set.

The next step is to enter a set name. If the desired set name is not available on the pull-down, touch the "New Set..." button to open a keyboard and enter a new name. When the Done key is pressed, the keyboard disappears, and the new set name will appear on the "Set:" pull-down list. Pop up this list, scroll down and highlight the new name to select.

The list of dimension (and speed, if variable-speed) parameters will appear in the left-hand pane in this window. The values in the value column will be blank. Touch the blank space in the value column next to

each parameter description to pop up a keypad and enter new values. The parameter values are as described under "Edit Sets", above.



When done entering the parameters, a motor is assigned to the set. A motor can only be assigned to one active set at a time in a given show, so the available motors will be listed in the upper right pane of the Edit Set window. To assign a motor, the operator touches (or clicks and holds) the desired motor, and drags the motor to the "Motors used by this set" pane at the lower right corner. Once a motor is assigned, touch the "Create Set" button to save this set.

EDIT MOTORS

Once logged in with System Level password privileges, the operator goes to the System Config window and touches the Motors button to get to the list of motors.

Motor	Position	SUL/SSL	SLL/SDL	Max Velocity	RatioN	RatioD	RunTime	Status	UpOffset	DnOffset	Load	LdWndw	LdMin	LdMax	LdBearing	LdBase
Mtr1	27' 2 1/2"	38' 0"	3' 3"	120' 0"	18292	100	0.0	REF	0' 0"	0' 0"	0	50	395	462	1250	427
Mtr2	38' 0"	38' 0"	3' 3"	120' 0"	18292	100	0.0	REF	0' 0"	0' 0"	7	50	283	350	1250	315
Mtr3	38' 0"	38' 0"	3' 3"	120' 0"	18292	100	0.0	REF	0' 0"	0' 0"	-4	50	275	342	1250	307
Mtr4	38' 0"	38' 0"	3' 3"	120' 0"	18292	100	0.0	REF	0' 0"	0' 0"	-8	50	403	470	1250	435
Mtr5	38' 0"	38' 0"	3' 3"	120' 0"	18292	100	0.0	REF	0' 0"	0' 0"	12	50	287	354	1250	319
Mtr6	38' 0"	38' 0"	3' 3"	120' 0"	18292	100	0.0	REF	0' 0"	0' 0"	6	50	643	710	1250	675
Mtr7	38' 0"	38' 0"	3' 3"	120' 0"	18292	100	0.0	REF	0' 0"	0' 0"	-6	50	386	453	1250	418
Mtr8	36' 9"	36' 9"	3' 3"	120' 0"	18292	100	0.0	REF	0' 0"	0' 0"	-10	50	483	550	1250	515

The columns displayed on this window show a number of motor parameters. They are as follows:

- Motor - the motor channel number
- Position - current set position, referenced to that set's reference point (generally the stage floor).
- SUL/SSL - Soft Upper Limit (or Soft Stored Limit) position. This limit is set for the motor, and will take precedence over any show-specific soft limits - show limits can be set at this value or lower, but cannot be set higher than this point.
- SLL/SDL - Soft Lower Limit (or Soft Deployed Limit) position. This limit is set for the motor, and will take precedence over any show-specific soft limits - show limits can be set at this value or higher, but cannot be set lower than this point.
- Max Velocity - The maximum velocity possible for a set. Expressed in units per second (in the example, 8" per second - 40fpm).
- RatioN - Numerator of the encoder ratio. Value set at system startup, **must not be changed**.
- RatioD - Denominator of the encoder ratio. Value set at system startup, **must not be changed**.
- RunTime - Cumulative run time for the motor, since system startup.
- Status - Status message regarding motor operation. This is the same status message that is displayed in the left pane of the main screen while a recorded Preset or Cue is being played. Messages include:

Brake Released - motor brake is released

Motor Turning - motor is in motion

At Target - set is at move target

- UpOffset - targetting distance for fixed speed sets; distance between the end of a "Go Up" signal and the point where the set stops. Value set at system startup, must not be changed.
- DownOffset - targetting distance for fixed speed sets; distance between the end of a "Go Down" signal and the point where the set stops. Value set at system startup, must not be changed.

The following parameters relate to Load Sensing, on systems so equipped.

- Load - The net weight carried on the batten (entered by user following load learn process). If LdBase is set for 0, this will be the total load held by the winch.
- LdWndw – The window of acceptable variations in load (entered by user following load learn process)
- LdMin – The minimum load on the set (calculated by system during load learn process)
- LdMax – The maximum load on the set (calculated by system during load learn process)
- LdBearing – The winch capacity (entered during system setup)
- LdBase – The weight of the batten (entered during system setup). May be set to 0 to allow Load to reflect the total winch load.

Load Sensing

Background

Load sensing is a powerful feature that is incorporated into some Scenecontrol systems. The load sensing system takes in load information from load cells that are built into the winch system, and processes that information to stop winch operation in response to sudden load changes, such as would occur if a batten or set catches on or lands on an obstruction.

A batten hoist system may seem fairly simple to a theatre person. The loads imposed on such a system are, in fact, rather complicated. Each system incorporates a number of separate lines, running through separate pulleys, attached to different points in a building, and bearing different amounts of weight. The weight of the system changes as the batten moves (due to the changing length of wire rope). Even in a variable-speed system with gentle acceleration and deceleration ramps, there are major fluctuations in the measured load at the start and stop of each move. As a consequence, load sensing uses a number of complex algorithms to integrate and act on this information. The process of gathering this information is called “Load Learning”.

Load Learning

Every time the load on a set is changed, the load profile must be re-learned by the system. This must be done by an operator logged in with Edit Level privileges or above.

Name	Motors	Load	Class	Description	
1	1	0	C:\Stage\classes\variable spd.ssc		Load Sense
2	1	0	C:\Stage\classes\variable spd.ssc		Load Learn
3	1	0	C:\Stage\classes\variable spd.ssc		Load Disable
4	1	0	C:\Stage\classes\variable spd.ssc		
5	1	0	C:\Stage\classes\basic class.ssc	Elec 1	Deactivate
6	1	0	C:\Stage\classes\variable spd.ssc		
7	1	0	C:\Stage\classes\basic class.ssc	Shell 1	
8	1	0	C:\Stage\classes\variable spd.ssc		Edit Set...
9	1	0	C:\Stage\classes\variable spd.ssc		
10	1	0	C:\Stage\classes\variable spd.ssc		Create New
11	1	0	C:\Stage\classes\basic class.ssc	Elec 2	Disassociate Set
12	1	0	C:\Stage\classes\variable spd.ssc		
13	1	0	C:\Stage\classes\variable spd.ssc		Duplicate
14	1	0	C:\Stage\classes\variable spd.ssc		
15	1	0	C:\Stage\classes\basic class.ssc	Shell 2	
16	1	0	C:\Stage\classes\variable spd.ssc		Move Up
17	1	0	C:\Stage\classes\variable spd.ssc		
18	1	0	C:\Stage\classes\basic class.ssc	Elec 3	Move Down
19	1	0	C:\Stage\classes\variable spd.ssc		
20	1	0	C:\Stage\classes\variable spd.ssc		

Once logged in with Edit Level password privileges, the operator goes to the System Config window and touches the Sets button to get to the list of sets. To initiate load learning, the operator touches the desired set to highlight it, then touches the Load Learn button. Now return to the main operating page, select the selected winch, and operate it. The best operating sequence for load learning involves running the winch through successive up and down moves near each end of its travel. If the winch is variable-speed, the speed

should be varied during the test runs to simulate actual anticipated moves. Once these runs are completed, the operator returns to the Sets page, touches the set to highlight it, then touches the Load Sense button.

Once load sensing has been turned on, it is advisable to test the operation of the set. Returning to the main operating page, select the winch and run it up and down to assure that it can be run without false tripping. Once this is assured, test the load sensing by running the winch into a test obstruction to assure that it stops on a load fault. The fault can be reset from the main screen by touching the Reset Faults button.

Load	LdWndw	LdMin	LdMax	LdBearing	LdBase
0	50	395	462	1250	427
7	50	283	350	1250	315
-4	50	275	342	1250	307
-8	50	403	470	1250	435
12	50	287	354	1250	319
6	50	643	710	1250	675
-6	50	386	453	1250	418
-10	50	483	550	1250	515

The sensitivity of the system can be adjusted from the Motors page, by adjusting the LdWndw parameter. Access to the Motors page requires the System Level password. The LdWndw parameter may be decreased to make the system more sensitive, or may be increased to decrease the incidence of false tripping. After changing this parameter, be sure to re-test the system to assure that it is still responsive without false tripping. Access to the Motors page requires the System Level password.

Load Disable

There are times when it may not be possible to use load sensing. An example would be when loading or unloading a batten, or when the normal operation of a set will involve a sudden change in the load on the set. In such a case, load sensing may be turned off on one or more individual sets. Working on the Sets page, highlight the desired winch and touch the Load Disable button. On certain systems, the set color will change on the 3D screen when Load Sensing is disabled.

Glossary

- Acceleration rate - pertains to variable-speed sets. Expresses the rate of change of the velocity of a set as it increases toward full speed. Expressed in distance per second per second.
- Acceleration time - the number of seconds required for a variable-speed machine to achieve the specified velocity at the programmed acceleration rate. Expressed in seconds.
- Deceleration rate – pertains to variable-speed sets. Expresses the rate of change of the velocity of a set as it decreases toward a stop. Expressed in distance per second per second.
- Deceleration time – the number of seconds required for a variable-speed machine to come to a stop from the specified velocity, at the programmed deceleration rate. Expressed in seconds.
- Enable – A set is enabled if a target has been designated for it. When a set is enabled, the set name will appear in **BOLD** characters. A green wire-frame representation of the target position will appear in the designated target position on the 3-D screen, while a blue solid figure will represent the current position of the set. If the enabled set is also selected, the set name will appear in bold green letters; if the enabled set is not selected, the set name will appear in bold white letters. When a set is enabled, it can be moved using the active Go Preset button, whether or not the set is also selected.
- Normal (or hard) Limit - a point, defined by a hardware limit switch, beyond which an axis may not travel. When an axis stops at a normal limit, it may travel in the opposite direction to leave the normal limit.
- Overtravel Limit - a point, defined by a hardware limit switch, which serves as a backup to a normal limit. Striking an overtravel limit is a fault condition - if an axis strikes an overtravel limit, all power is cut off to that axis. A maintenance procedure is required to move an axis off an overtravel limit.
- Select – A set is selected by touching it. While the set is selected, its name on the 3-D display is shown in green letters, and a Vertical Position window shows position information. A set must be selected in order to move it with the Up and Down pushbuttons, or in order to designate a target (and velocity, if variable-speed) for it.
- Soft Limit - a point, defined within the control system software, beyond which an axis may not travel. When an axis stops at a soft limit, it may travel in the opposite direction to leave the soft limit
- Velocity - The speed of a set, expressed in distance per second (inches per second, meters per second).

Appendix I: Portable Pendant

FEATURES

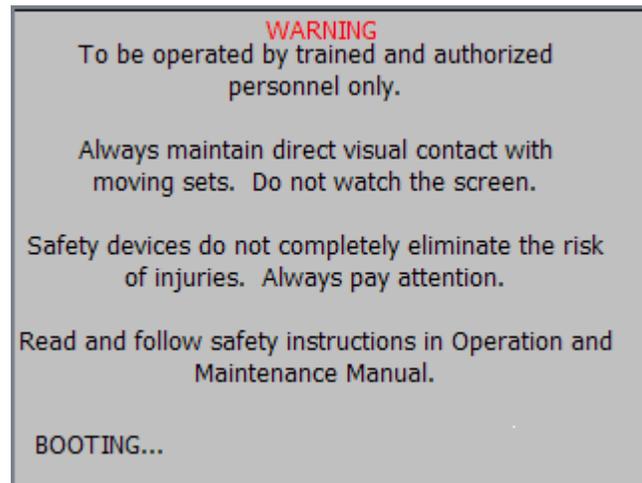
One option for the Scenecontrol 500 is a portable control pendant, which may be used to operate individual sets or to play back presets and cues. The pendant is equipped with a cable (usually 10m or 30' long, but optionally as much as 25m long). This cable is plugged into designated pendant receptacles.

The features and controls of the portable control pendant are as follows:

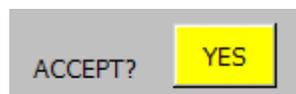
1. Speed wheel
2. Emergency Stop button
3. Liquid Crystal Display (5.7" diag. touchscreen)
4. Membrane type function keys
5. Keyswitch operator



The main control system must be powered on in order to use the portable control pendant. When the pendant is powering up, the following message screen will appear:



Once the system has completed its bootup routine, the word "BOOTING..." will disappear, and the "ACCEPT?" prompt will appear at the bottom of the screen.



Touch the YES button to open the presets operation screen.

PRESET PAGE

The preset operations screen is opened by default when the pendant boots up and the operator touches the YES button on the bootup screen. The preset operations page may also be opened by touching the PRST PAGE function key (F4) on the pendant.

The preset page opens to a list of the first eight presets and cues from the currently loaded show. To load a preset or cue, the operator touches the preset or cue name in the list at the left of the screen. The active cue name will be highlighted in yellow, and the appropriate indicators will appear in the upper right of the screen, showing the sequencing status of the cue. If, for example, the loaded preset or cue is set up so the next cue will load automatically when the current one completes, the Auto Load indicator will appear. If the loaded cue or preset is set up so that the subsequent cue will automatically follow 10 seconds after the current cue starts, the Auto Follow, 10 sec, and After Start indicators will appear.



There are two indicators that will appear at the lower right of the screen if they are needed. ESTOP FAULT indicates that a system Emergency Stop button has been pushed. MOTOR FLT indicates that a system motor is in a fault condition. Use the main console screen to obtain details about which motor is in a fault condition.

When a preset or cue has been loaded, the GO TRGT button (F7) is pushed and held to execute the move. (Note that the GO UP (F1) and GO DOWN (F3) buttons

are not active while on this page.) The speed wheel may be used to vary the speed of a move – rotate the wheel clockwise to increase the speed, or counterclockwise to decrease the speed. Remember to Watch the Piece while the move is going on!

There may be more than eight presets in the current show. Pressing the NEXT function key (F14) will advance from the current page of eight to the next full page of eight presets and cues. Pressing the INC (increment) function key (F13) will advance the entire list by one entry. Similarly, pressing the PREV (previous) function key (F9) will display the preceding page of eight presets and cues, and pressing the DEC (decrement) function key (F10) will back the list up by one entry.

If a preset or cue has been selected, but the operator does not wish to execute that move, the CLEAR SLCT function key (F8) is used to de-select that choice. If a preset or cue has been selected, this selection will also be cleared if the operator advances the list to the point where that preset or cue is no longer displayed on the screen, or if the operator switches to another page.

MANUAL PAGE

The MANL PAGE function key (F2) is used to switch to the Manual page for operation. This page is used to run an individual set in deadman operation.

This page opens to a list of the first eight sets that are active in the current show. The operator may select one of the sets for operation by touching the set name. The selected set name will be highlighted in yellow. To de-select the set, the operator may touch the set name again, and the selection will toggle off. The operator may also use the CLEAR SLCT function key (F8) to clear the current set selections.



There are two indicators that will appear at the upper right of the screen if they are needed. ESTOP FAULT indicates that a system Emergency Stop button has been pushed. MOTOR FLT indicates that a system motor is in a fault condition. Use the main console screen to obtain details about which motor is in a fault condition.

Once the desired set has been selected, the operator pushes and holds the GO UP (F1) or GO DOWN (F3) function key to drive the selected set in the desired direction. The

set will move until it comes to its programmed soft limit, or until the operator stops pushing the function key. (Note that the GO TRGT (F7) button is not active while on this page.) The speed wheel may be used to vary the speed of a move – rotate the wheel clockwise to increase the speed, or counterclockwise to decrease the speed. Remember to Watch the Piece during the move!

There may be more than eight sets in the current show. Pressing the NEXT function key (F14) will advance from the current page of eight to the next full page of eight sets. Pressing the INC (increment) function key (F13) will advance the entire list by one entry. Similarly, pressing the PREV (previous) function key (F9) will display the preceding page of eight sets, and pressing the DEC (decrement) function key (F10) will back the list up by one entry.

If a set has been selected, but the operator does not wish to move that set, the set name may be touched again to toggle the choice off, or the CLEAR SLCT function key (F8) may be used to de-select that choice. If a set has been selected, this selection will also be cleared if the operator advances the list to the point where that set is no longer displayed on the screen, or if the operator switches to another page.