SEMI E95-0200
SPECIFICATION FOR HUMAN INTERFACE FOR SEMICONDUCTOR MANUFACTURING EQUIPMENT

This specification was technically approved by the Global Information and Control Committee and is the direct responsibility of the North American Information and Control Committee. Current edition approved by the North American Regional Standards Committee on September 3, 1999. Initially available on SEMI OnLine December 1999; to be published February 2000.

1 Purpose

1.1 This standard addresses the area of processing content with the direct intention of developing common software standards, so that problems involving operator training, operation specifications, and efficient development can be resolved more easily.

1.2 This standard is written to be "tool-neutral" without reference to, or reliance on, specific capabilities of platforms or operating systems. Neither is it intended that choices of software tools or detailed implementation strategies be dictated.

1.3 Note that all figures in this standard are schematic, are not drawn to scale, and unless otherwise specified, are not intended to provide implementation details about number of Buttons, Button sizes, Panel sizes, etc.

2 Scope

2.1 This standard specification applies to manufacturing equipment used in the production of semiconductors.

2.2 This standard may be applicable to other areas such as the manufacture of flat panel displays, but specific application to these areas is outside the scope of this document.

2.3 This standard does not purport to address safety issues, if any, associated with its use. It is the responsibility of the users of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

3 Referenced Standards

None.

4 Terminology

4.1 *dialog box control buttons* — user selection of a Dialog Box Control Button controls the dismissal of the Dialog Box and, when applicable, controls whether the user accepts or rejects information or choices displayed, or desires no action be performed.

4.1.1 *"Apply" dialog box control button* — a Dialog Box Control Button which, when selected by the user, indicates acceptance of any choices or user inputs made, if any, but does not dismiss the Dialog Box.

4.1.1.1 This Button shall be disabled until one or more user choices or inputs are made. After user selection of this Button, it shall be disabled until additional choices or user inputs are made, if any.

4.1.2 *"Cancel" dialog box control button* — a Dialog Box Control Button which, when selected by the user, indicates no action should be taken, causes the dismissal of the Dialog Box, and returns the user to the state that existed prior to the invocation of the Dialog Box.

4.1.3 *"Close" dialog box control button* — a Dialog Box Control Button displayed (often as the only Dialog Box Control Button) when the Dialog Box message contains only information and does not require the user to make or accept choices, and shall be used instead of an "OK" Dialog Box Control Button in this case.

4.1.3.1 The "Close" Dialog Box Control Button shall also be used instead of a "Cancel" Dialog Box Control Button when the user cannot be returned to the state that existed prior to the invocation of the Dialog Box. User selection indicates no action should be taken and causes the dismissal of the Dialog Box.

4.1.4 *"No" dialog box control button* — a Dialog Box Control Button displayed when the Dialog Box message is in the form of a question.

4.1.4.1 User selection indicates no action should be taken, causes the dismissal of the Dialog Box, and returns the user to the state that existed prior to the invocation of the Dialog Box.

4.1.5 *"OK" dialog box control button* — a Dialog Box Control Button which, when selected by the user, indicates acceptance of any choices or user inputs made, if any, and causes the dismissal of the Dialog Box.

4.1.5.1 If no choices or user inputs were made, selecting this Button indicates acceptance of any default values displayed. If user choices or inputs are required, this Button shall be disabled until the choices or inputs are made.

4.1.6 *"Yes" dialog box control button* — a Dialog Box Control Button displayed when the Dialog Box message is in the form of a question.

4.1.6.1 User selection indicates a positive response to the question asked and causes the dismissal of the Dialog Box.

4.2 *dialog boxes* — dialog boxes are used to provide additional information to the user; to display detailed information not shown on the Information Panel for controlling the system, and to display detailed information for monitoring system operation.

4.3 *display objects* — user interface elements displayed on the screen, such as function selection Buttons, keyboard input Buttons, graphics representing the equipment, etc.

4.3.1 Some are selectable by the user to initiate or execute an action. Non-selectable graphics and user interface elements (such as pipes and text field labels, respectively) are read only, and no action is initiated or executed.

4.4 *functional area* — a grouping of one or more views presenting information and control capabilities to the user.

4.4.1 The grouping reflects the natural flow of information, events, and tasks in a way that is familiar to the user and that directly supports the attainment of successful process and equipment performance goals. The group is user task oriented, collecting together logically related monitoring and control functions, reducing the need to navigate between views.

4.5 *icon* — an icon (diagrammatic image) is a bitmap or other image used in GUI environments such as windowing systems to show different types of objects.

4.5.1 The function of icons in this standard is to improve operability. Use of icons will help the user better understand the functionality underlying Buttons.

4.6 *navigation model* — the navigation model determines how a user interacts with a system to access functionality and information.

4.6.1 This standard specifies a simple navigation model designed specifically to minimize the number of actions and the amount of time required of the user.

4.7 *salience* — a Salience is a solid (or textured), colored border shown around a Display Object to indicate an alarm, warning, or other status, or to draw the user's attention to the Display Object.

4.7.1 A Salience shall not hide the Display Object it surrounds. Saliences shall not be used to indicate the state (open, closed, on, off, etc.) of Display Objects.

5 Requirements

5.1 Each of the following sections is designated with one of the following labels:

5.1.1 Sections designated:

Description provide background information and set the context for subsequent specifications;

Mandatory provide a specification of a requirement which shall both be present and implemented as specified;

Conditional provide a specification of a requirement which shall be implemented as specified if such a feature is implemented on the tool;

Recommended provide a recommended capability and implementation of that capability, but neither their presence nor their implementation is required.

5.2 *Basic Display Objects* *Description*

5.2.1 This section specifies the general appearance and behavior of basic Display Objects used throughout the interface, including Buttons, Saliences, and Dialog Boxes. It is intended that the use of other types of Display Objects (choose lists, data display and data entry fields, scroll-bars, etc.) is specifically allowed, and their use is at the discretion of the implementers.

5.2.2 *Buttons* *Mandatory*

5.2.2.1 When a touchscreen device is used, Button sizes must be large enough (for square Buttons, approximately 1.5 cm on a side) to ensure reliable selection. If a smaller size is used, the space between Buttons must be increased to avoid selection errors. For installations where a keyboard and a mouse, light pen or other pointing device is available, Button sizes in the Navigation Panel and the Command Panel may made somewhat smaller (approximately 1–1.25 cm), and the size of the Information Panel increased proportionally.

5.2.2.2 One type of Button behavior is momentary; that is, user selection of a Button causes a brief display of the down (selected) state of the Button, followed immediately by a display of the up (unselected) state. The other Button behavior is two-state; the Button remains in the down state after user selection. User re-selection of the Button, and/or selection of another Button, and/or selection of another Display Object restores the display of the up state. In some cases, the software will control the display of the down state or restore the up state, without direct user interaction.

5.2.2.3 For 2-D Buttons, the down state shall be indicated by hatching, cross-hatching, or otherwise texturing the Button in such a manner that does not obscure the Button label.

5.2.2.4 Text for all Button labels shall have the first letter of words capitalized unless it is an article or preposition not occurring at the beginning or end of the label, or unless the word's conventional usage is not capitalized. Button labels that are all capital letters are harder to read than mixed case labels. Additionally, text in all capitals appears larger, and the user may attach more importance to the Button than necessary simply because the label is visually distracting.

5.2.3 *Saliences* *Conditional*

5.2.3.1 Saliences, colored, textured, or both shall be displayed around Buttons and other Display Objects to indicate their status, which may include warning, alarm, user attention required or requested, processing, unfinished task notification, and other statuses.

5.2.3.2 A Salience is displayed to draw the user's attention to a Display Object when its status is *not* normal or OK (in this case, the absence of a displayed Salience shall indicate a normal or OK status), or when the Salience provides information that benefits the user in the performance of tasks or the monitoring of equipment functions and operations.

5.2.3.3 On color displays, alarm Saliences shall appear bright red, warning Saliences shall appear bright yellow, and processing and unfinished task Saliences shall appear medium blue. User attention required or requested Saliences, (for example, "Ready to Load," or "Ready to Unload") shall appear medium green.

5.2.4 *Dialog Boxes* *Description*

5.2.4.1 Dialog Boxes are secondary windows used to display supplemental information, solicit information from the user, or report errors.

5.2.5 *Dialog Boxes* *Mandatory*

5.2.5.1 Dialog Boxes (which are always temporary) are displayed in response to some action initiated by the user. When displayed, a Dialog Box shall overlay a portion of the Information Panel, and shall not obscure the Title Panel. If invoked by user selection of a Display Object on the Information or Command Panels, all the Display Objects on those two Panels shall be disabled until the Dialog Box is dismissed. The Title and Navigation Panels remain enabled. At the explicit request of the user, the Dialog Box is dismissed, and the underlying information is refreshed.

5.2.5.2 Dialog Boxes contain a Title Bar at the top, a display (free use) area, and one or more Dialog Box window Control Buttons arranged horizontally at the bottom. The Title Bar text reflects the command or the nature of the event that invoked the Dialog Box. Dialog Box window Control Buttons are centered on the width of the Dialog Box, with any other Buttons (Apply, Log-out, etc.) right-aligned and visually separated from the window Control Buttons. If the underlying operating system will not allow this alignment, then it is allowed that other alignments may be used, but only if the alignment is consistent across all Dialog Boxes.

5.2.5.3 Dialog Boxes may not be resized or moved, but may display a Button equivalent to the Cancel Button in the Title Bar.

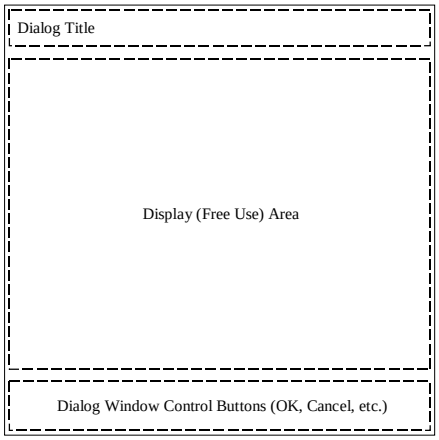


Figure 1
Dialog Box

5.2.5.4 Dialog Boxes are classified into the following three types:

- Information Dialog Box
- Data Input/Selection Dialog Box
- Message Dialog Box

5.2.5.5 To be compliant with this specification, at least one of these Dialog Box types shall be supported.

5.2.6 *Information Dialog Box* *Conditional*

5.2.6.1 This Dialog Box type is used to provide additional information to the user about some Display Object or topic addressed by the Information Panel. User selection of a Display Object on the Information Panel invokes an Information Dialog Box, if appropriate for the Display Object selected. The window Control Button to dismiss the Dialog Box shall be Close Button. Use of an OK Button in this case is not allowed.

5.2.6.2 Implementation of this Dialog Box type shall be conditional on the equipment having the capability of providing the required information.

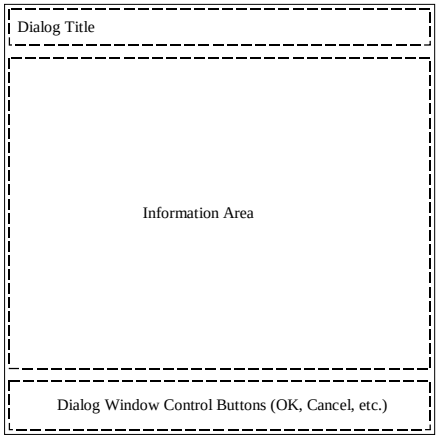


Figure 2
Information Dialog Box

5.2.7 *Input/Selection Dialog Box* *Conditional*

5.2.7.1 This Dialog Box type is used to request data input or selection from the user. If no keyboard or keypad is available, and the user must input characters, an on-screen representation ("mimic") of one or both shall be displayed as part of the Dialog Box. The window Control Buttons are the OK and Cancel Buttons.

5.2.7.2 Implementation of this Dialog Box type shall be conditional on the presence of Display Objects that allow user input or selection.

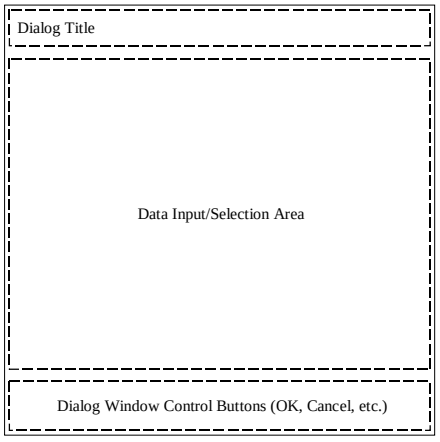


Figure 3
Data Input/Selection Dialog Box

5.2.8 *Message Dialog Box* *Conditional*

5.2.8.1 This Dialog Box type is used to provide a message to the user (including the reporting of errors) or to request confirmation of a user initiated action. The message text is located to the right of the icon. It is recommended that icons from the underlying operating system be used to represent the message type as follows:

- Information in the form of a simple message
- Progress, informing the user of an ongoing process
- Attention, alerting the user of possible danger, or inability to execute a command, or requesting confirmation (either as a statement or as a question)
- Error, informing the user of danger or inability to execute a command (if effect is severe)

5.2.8.2 Note that most style guides no longer recommend the use of a question mark icon when the message is phrased as a question, as its meaning could be ambiguous in some cases. The attention icon should be used instead.

5.2.8.3 The first two message types use the Close window Control Button. The second two use OK and Cancel, or Yes and No (and sometimes Cancel) if the message is phrased as a question. It is recommended that Buttons or other Display Objects that would cause an error message be disabled in those circumstances.

5.2.8.4 Implementation of this Dialog Box type shall be conditional on the equipment having the capability of providing the required information.

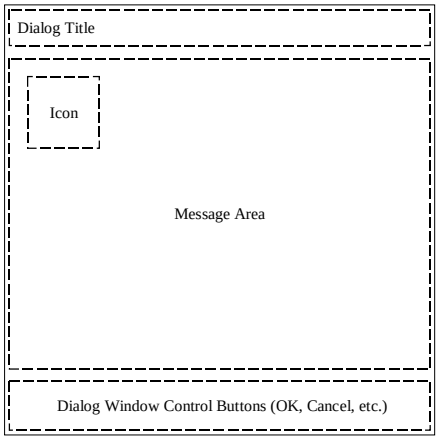


Figure 4
Message Dialog Box

5.3 *Basic Network Navigation Model* *Mandatory*

5.3.1 The basic network navigation model is capable of displaying a number of views within a single level of hierarchy. The user does not have to traverse up and down menu or view "trees" when exercising control and monitoring tasks. As shown in the figure below, the basic navigation model is a network, supporting horizontal (lateral) transfer, at any time, between any of the Functional Areas in the interface. The basic network navigation model does not support more than one view in any Functional Area. Expansion of detail for views is typically implemented using Dialog Boxes.

5.3.2 Note that the diagram is schematic; it shows that user selection of a Functional Area shall display its associated Information Panel. Only one Information Panel shall be displayed at any time.

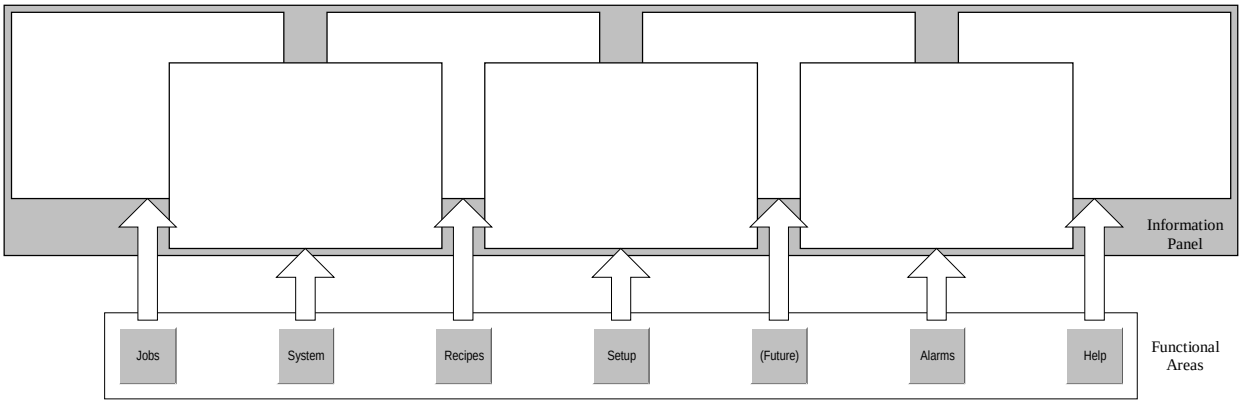


Figure 5
Basic Network Navigational Model

5.3.3 *Network Navigation Model with Sub-navigation* *Conditional*

5.3.3.1 While maintaining the same basic structure, this navigation model supports multiple views within Functional Areas on the network. If any Functional Area has more than one view, all Functional Areas in the interface shall consistently use one of the two view sub-navigation methods described below. Lateral transfer between any of the views within a Functional Area is supported either by providing a single row of tabs which may be selected to change views (Figure 6), or by providing view Sub-navigation Buttons (Figure 7) in a separate screen area dedicated solely to sub-navigation. Expansion of detail for each of these views is typically implemented using Dialog Boxes.

5.3.3.2 Note that the diagrams are schematic; they show that user selection of a Functional Area shall display its associated Information Panel. Only one Information Panel shall be displayed at any time. Similarly, user selection of a tab or Sub-navigation Button displays only one of the views available at any time.

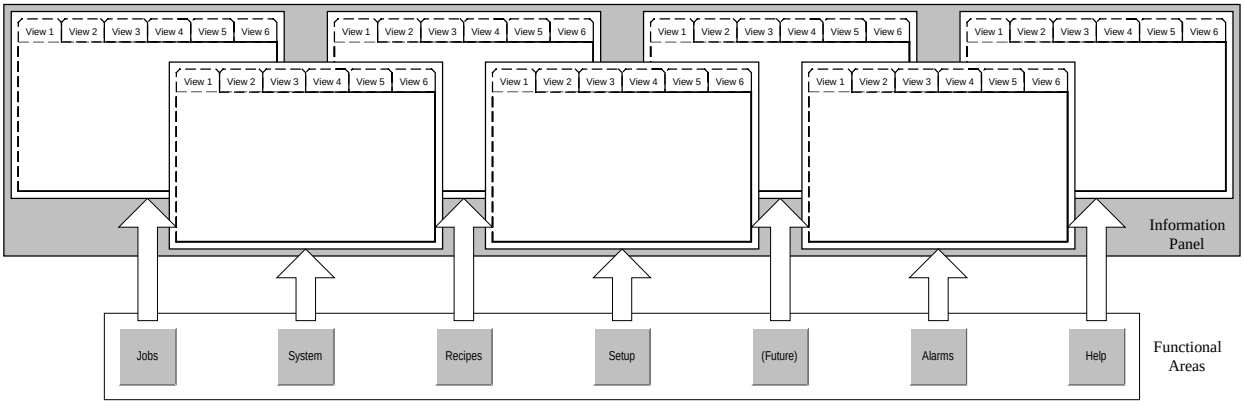


Figure 6
Network Navigation Model — Tab Sub-navigation

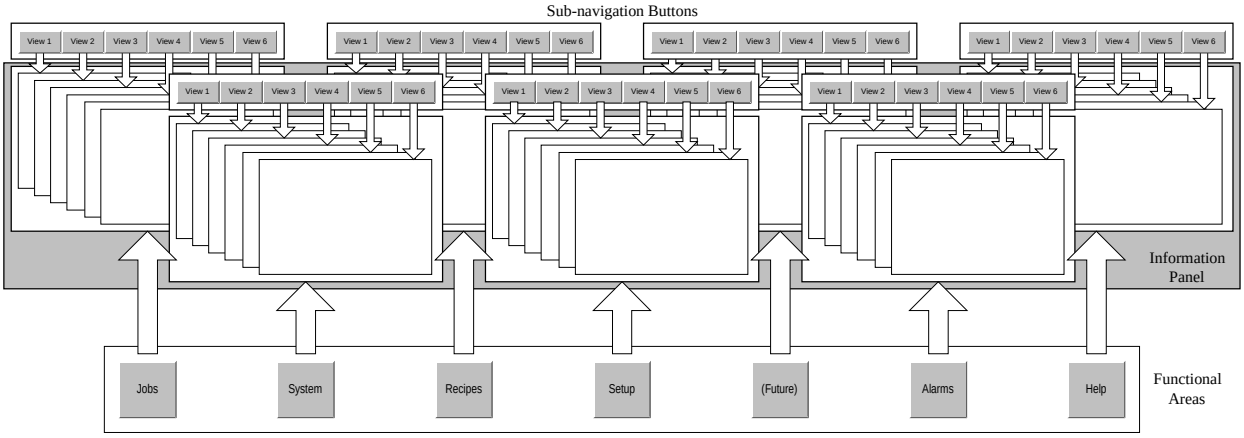


Figure 7
Network Navigation Model — Button Sub-navigation

5.3.4 *Display Layout* *Description*

5.3.4.1 The display layout is designed for ease of use with touchscreen input devices and does not require a keyboard or other pointing device. By dividing the screen into rectangular Panels, provision is made to accommodate the display and input of information organized by the tasks users must accomplish in managing and monitoring processing, maintaining and repairing the equipment, and other relevant work.

5.3.5 *Basic Layout* *Mandatory*

5.3.5.1 The basic layout shall contain four panels as shown and oriented in Figure 8. At a minimum, the interface shall support the orientation of the Command Panel on the right-hand side, unless the enhanced layout (Section 5.3.6) is implemented.

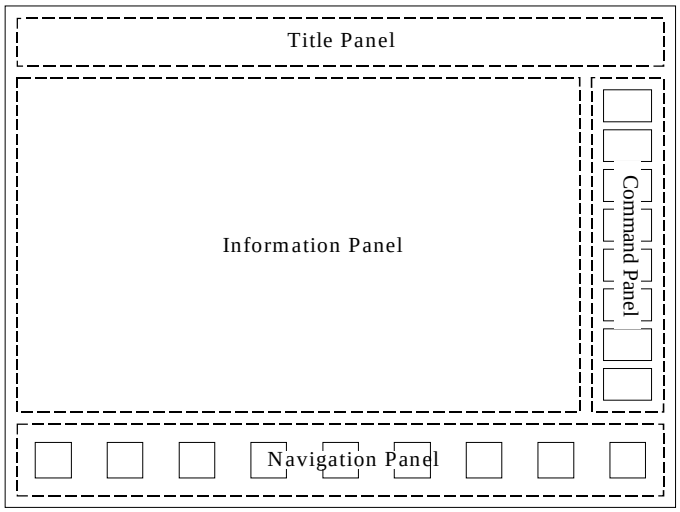
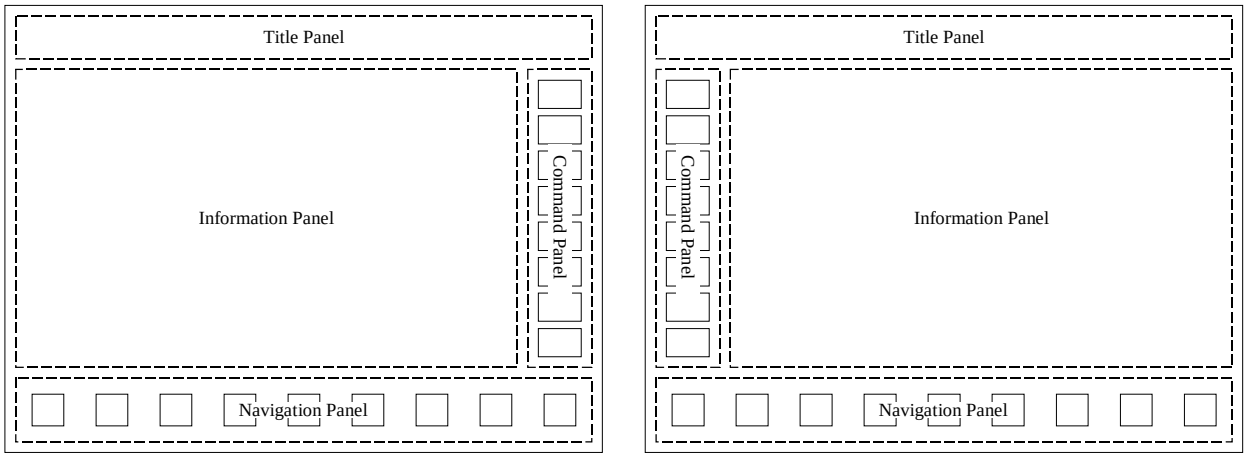


Figure 8
Basic Layout

5.3.5.2 All the Panels are tiled edge to edge to create the display, and only the relative position of the Panels is specified in this standard. Panels may or may not display a visible border. For an interface that is the primary display (typically, but not always at the front of equipment), an outer window frame allowing window resizing, closing, or positioning shall not be shown or enabled. This is to prevent the user from mistakenly "losing" the window, which may result in a dangerous condition. If desired, a logged-in user with sufficient privileges may be allowed to resize, but not minimize or close, the primary display window. Secondary instances of the interface (e.g., displayed at a maintenance node or displayed at a remote node) may show and enable the outer window frame.

5.3.6 *Enhanced Layout* *Recommended*

5.3.6.1 It is strongly recommended that left-handed users be allowed to change the location of the Command Panel to the left-hand side (see Figure 9(b)) to avoid obscuring the screen when reaching with their left hand to make selections on the Command Panel when it is located on the right-hand side of the screen.



(a) (b)

Figure 9
Enhanced Layout – Right and Left Command Panel Orientation

5.3.7 *Title Panel* *Description*

5.3.7.1 The Title Panel is a horizontal area above the Information and Command Panels, at the top of the interface window. It is always displayed and contains the host communications status display (if host communications is supported), date/time display, Login/Logout Button (if security is supported), message display area, and the name of the current view. It may optionally contain a corporate identifier or logo, a display of critical parameters, an audible alarm silencing Button, orientation graphics, a light tower representation, and other items that should always be displayed to ensure effective operation.

5.3.8 *Title Panel Basic Information* *Mandatory*

5.3.8.1 Shown below is the Title Panel with the mandatory Display Objects. The relative positions shown, with the top portion of the Title Panel containing the date/time display at the left, the Current View Name to its right, and with the Message Area below the top portion, are mandatory.

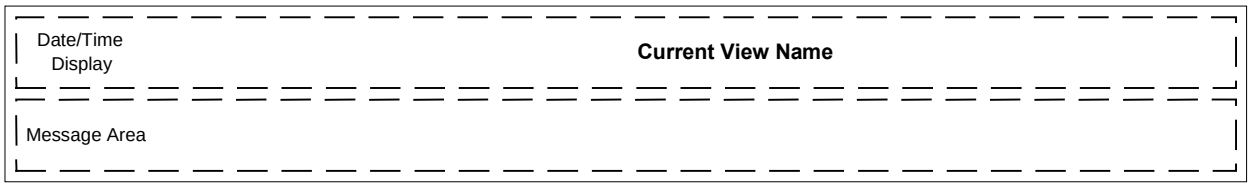


Figure 10
Title Panel

5.3.9 *Title Panel with Conditional Information* *Conditional*

5.3.9.1 Shown below is the Title Panel with the mandatory Display Objects, plus the conditional host communications status display and the conditional Login/Logout Button. The relative positions shown, with the host communications status display left-most, and the Login/Logout Button at the upper right, are mandatory.

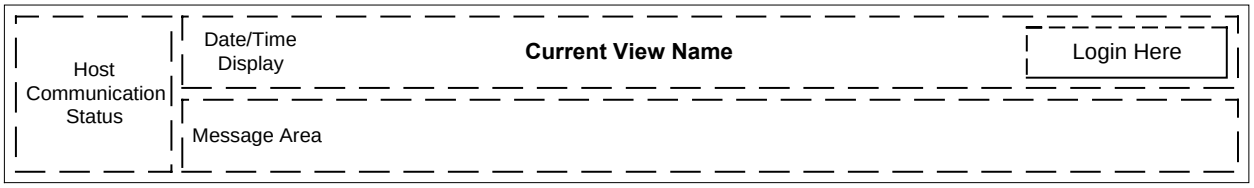


Figure 11
Title Panel

5.3.9.2 *Title Panel Host Communications Status* *Conditional*

5.3.9.2.1 If the equipment supports host communication then status information shall be included in the title panel. Information such as communications status (i.e., whether communications is active), communications state (i.e., connected, disconnected, etc.), and whether the equipment is in a local or remote mode may be displayed here. The display of specific information is dependent on the host communication protocol which may impose additional specific requirements on what is displayed.

5.3.9.3 *Title Panel Login/Logout Button* *Conditional*

5.3.9.3.1 The Login/Logout Button label reads “Login Here” until a user is logged in, then displays a user identifier until the user logs out. User selection of the Login/Logout Button invokes a Dialog Box where the user may enter a user identifier and password, or, if already logged in, may select a Button to log out. If required by the implementation, when this Dialog Box is displayed, all other functions in the interface window may be disabled, including the Navigation Panel.

5.3.10 *Title Panel with Additional Information* *Recommended*

5.3.10.1 Shown below is an example of a layout for the Title Panel incorporating some recommended Display Objects and their relative positions.

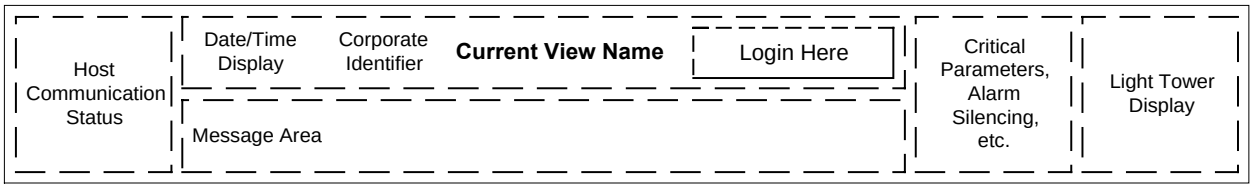


Figure 12
Title Panel with Some Additional Display Objects

5.3.10.2 *Title Panel Alarms Button* *Recommended*

5.3.10.2.1 Although not recommended for new designs, the Title Panel may also contain an Alarms Button that allows the user to respond to warnings and severe alarms. In this case, the Alarms navigation Button in the Navigation Panel shall be omitted, and any alarms accessed through a Title Panel Alarms Button shall be displayed in a Dialog Box, not as an Information Panel and its Command Panel.

5.4 *Navigation Panel* *Mandatory*

5.4.1 Navigation Buttons shall have a text label. In addition, they may also include an icon to graphically represent their function. When no icon is present, the Button label shall be centered on the Button. If an icon is present, the label shall be centered below the icon. Navigation Buttons are arranged horizontally along the bottom of the display, in the Navigation Panel, which shall always be present.

5.4.2 *Required Navigation Functions* *Mandatory*

5.4.2.1 At a minimum, the user shall always be able to immediately access and respond to alarm and warning notifications, even when a Dialog Box is displayed on the current view. Dialog Boxes shall not obscure the Navigation Panel. Additionally, the user shall always be able to immediately access other parts of the interface if such access is required to ensure the safe operation of the equipment. Only when prohibited by the operating system or other implementation limitations such that a displayed Dialog Box cannot be maintained during, or redisplayed after navigation, it is allowed that such access may be accomplished by displaying another Dialog Box that completely covers the originally displayed Dialog Box. When the overlaying Dialog Box is dismissed, the underlying Dialog Box is redisplayed, in the same state it was in prior to the invocation of the overlying Dialog Box (i.e., given the stated prohibition or limitations, it is not mandatory that access be provided through navigation using the Navigation Panel). Immediate access shall mean that the user shall not have to dismiss or otherwise interact with any displayed Dialog Box in order to perform the required access. When the user navigates back or otherwise returns from the required access, the last selected view shall be displayed, along with any Dialog Box that was displayed, in the same state it was in. If no Dialog Box was displayed, the last selected view shall be displayed.

5.4.2.2 An allowed exception is a login and/or logout Dialog Box or screen if an implementation requires modal operation while logging in or out.

5.4.3 *Conditional Navigation Functions* *Conditional*

5.4.3.1 Except when absolutely prevented by the operating system or implementation limitations, the Navigation Panel shall always be available for user selection, even when a Dialog Box is displayed on the current view. This makes it possible for the user to directly and immediately access any Functional Area from anywhere within the user interface. Immediate access shall mean that the user shall not have to dismiss or otherwise interact with any displayed Dialog Box in order to perform the required access. When the user navigates back to a Functional Area, the last selected view is displayed, along with any Dialog Box that was displayed, in the same state it was in.

5.4.3.2 An allowed exception is a login and/or logout Dialog Box or screen if an implementation requires modal operation while logging in or out.

5.4.4 *Navigation Panel Layout* *Mandatory*

5.4.4.1 The figure below shows the Navigation Panel, with three Buttons labeled "(Future)" indicating the positions where Buttons may be placed if required by the specific implementation of the interface, or as a result of modifications or enhancements in future releases of the software. It is recommended that the Navigation Panel contain no more than ten Buttons.

5.4.4.2 The navigation Buttons shall be sequenced from left to right in descending order of expected frequency of use. The most frequently selected navigation Button shall be left-most within the Navigation Panel; and the least frequently selected Button shall be right-most.

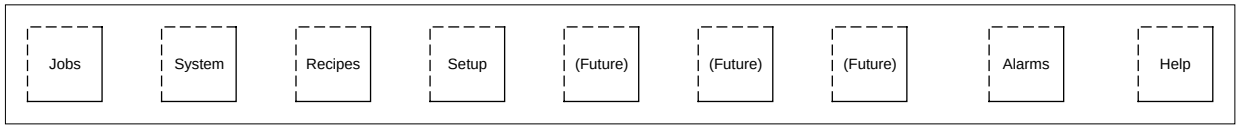


Figure 13
Navigation Panel

5.4.5 *Navigation Panel Alarm and Help Buttons* *Conditional*

5.4.5.1 The two exceptions to the above ordering are the Alarms and Help navigation Buttons, which, when they are supported in an implementation, shall be the next to right-most and right-most Buttons, respectively. This placement ensures that the position of these Buttons shall remain unchanged, even if subsequent interface modifications or enhancements require additional Buttons. The Alarm Button shall be placed so that the spacing between it and adjacent Buttons is larger than the spacing between other Buttons, to allow its selection quickly, and without error.

5.4.6 *Navigation Button Labels* *Conditional*

5.4.6.1 For each Functional Area, there is a corresponding navigation Button identified by a text label (mandatory) and icon (recommended) identifying the functionality and information provided. The table below shows text labels (conditional) for the navigation Buttons, a description of each Functional Area, and some recommended alternative labels.

Table 1 Functional Areas

Navigation Button Label	*Description*	*Alternate Labels*
Jobs	Operations related to product processing, including any pre- and post-production equipment setup	Lot Operations, Operation, Operations, Processing, Main, Run
System	Equipment status, manual move, maintenance, service, calibration, & other engineering-level functions	Overview, Service, Status, System Status, Maintenance
Recipes	Recipe management, including creation, editing, storing, etc.	None
Datalog	Data histories, event logs, SPC functions (If supported)	History, Analysis, Logs, Data
Setup	User account administration, host communications control, user preferences, parameters, hardware configuration/options, light tower programming, etc.	Configuration, Options
Alarms	Alarm and warning summary to acknowledge and clear posted alarms, current event log	None (see Section 5.4.5)
Help	Help files on operations, procedures, and the interface	None (see Section 5.4.5)

5.4.6.2 The top to bottom ordering of the Table reflects the left to right ordering of navigation Buttons. Also allowed, but not recommended for new designs, is a left to right ordering of: System, Jobs, Equipment Setup, Recipes, History, Maintenance, and Configuration. The alternative labels specified in the Table may be applied to this ordering also. Additional Buttons, if required for a particular implementation, shall be added between the Setup and Alarm Button positions.

5.4.7 *Navigation Panel Saliences* *Conditional*

5.4.7.1 Only one navigation Button at a time shall display a pressed appearance. Additionally, navigation Buttons shall display colored Salience coding for a number of purposes: 1, to indicate the user is viewing a Functional Area (medium blue Salience); 2, to indicate an unfinished task (typically an open Dialog Box) in a Functional Area not currently displayed (medium blue Salience); and 3, to inform the user that there are new or unacknowledged warnings or alarms (saturated yellow or saturated red Salience, respectively). The warning and alarm Saliences are displayed on the Alarms navigation Button only. As an example, if the user has opened a Dialog Box in the Jobs Functional Area, and then selects the Recipes navigation Button, the Recipes Button shall display a pressed (down) appearance *and* a medium blue Salience, and the Jobs Button shall display an unpressed (up) appearance *and* a medium blue Salience (Figure 14). This reminds the user that there is an open Dialog Box in the Jobs Functional Area. More than one navigation Button may display the unfinished task Salience.

5.4.7.2 The Jobs Button may also display a medium green Salience (not shown) to notify the user that the equipment is "Ready to Load," "Ready to Unload," "Ready to Run," or is in a similar state such that the user's attention is requested in the Jobs Functional Area. This is useful when the user has navigated to another Functional Area of the interface. If there is an unfinished task, its medium blue Salience shall remain displayed, even if the user's attention is requested.

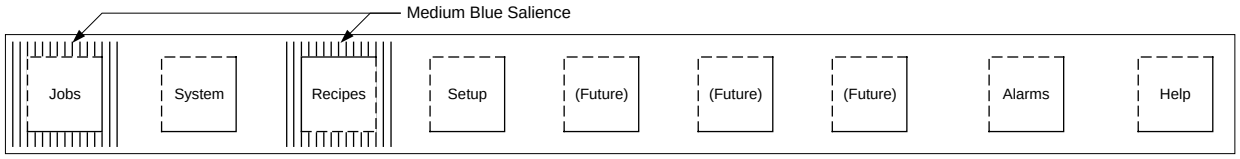


Figure 14
Navigation Button Saliences

5.4.7.3 The Alarm navigation Button, in addition to the medium blue Salience, displays a saturated (bright) yellow Salience when there are new or unacknowledged warnings, or displays a saturated red Salience when there are new or unacknowledged alarms. Only the severest level is displayed. That is, when there are both warnings and alarms, the red alarm Salience shall be displayed. When there are no alarms and only warnings, the warning Salience shall be displayed. The figures below show the same situation as Figure 14, with Figure 15 showing a warning Salience, and Figure 16 showing an alarm Salience. If there are no warnings or alarms, the Alarm Button displays a medium blue Salience if the user is viewing the Alarms Functional Area, or if there is an unfinished task and another Functional Area is being viewed. If a warning or alarm occurs, the medium blue Salience is replaced with the appropriate Salience, and is only re-displayed when all warnings and alarms have been acknowledged or cleared.

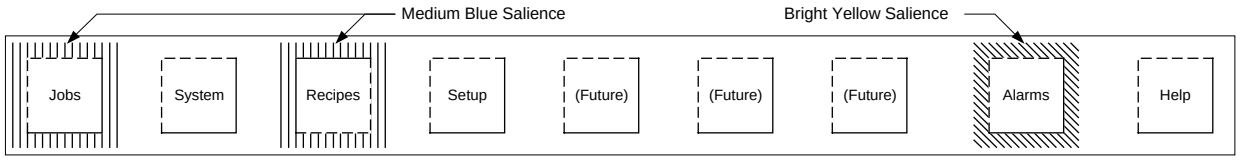


Figure 15
Warning Salience

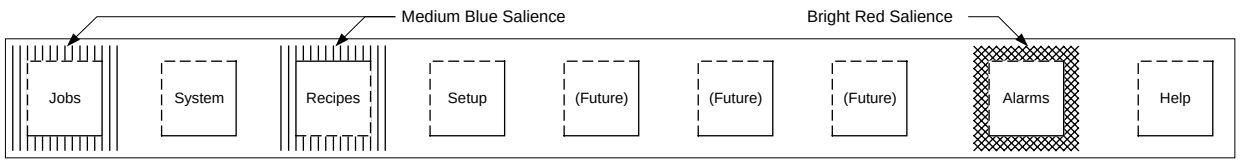


Figure 16
Alarm Salience

5.4.8 *Sub-navigation* *Conditional*

5.4.8.1 When Sub-navigation is supported it shall be by a single row of Tabs or Buttons in a Sub-navigation panel as shown below.

5.4.8.2 *Sub-navigation Layout A — Tabs*

5.4.8.2.1 Shown below are two orientations of the layout (right-hand and left-hand Command Panels), with sub-navigation using tabs. This is the preferred method for new designs where more than one view per Functional Area is needed. User selection of a tab brings the tab to the front, displays its information and Command Panel, and allows the user access to its Display Objects. Use of tabs in each Functional Area must be consistent throughout the interface, even if there is only one view in a Functional Area, and thus, one tab.

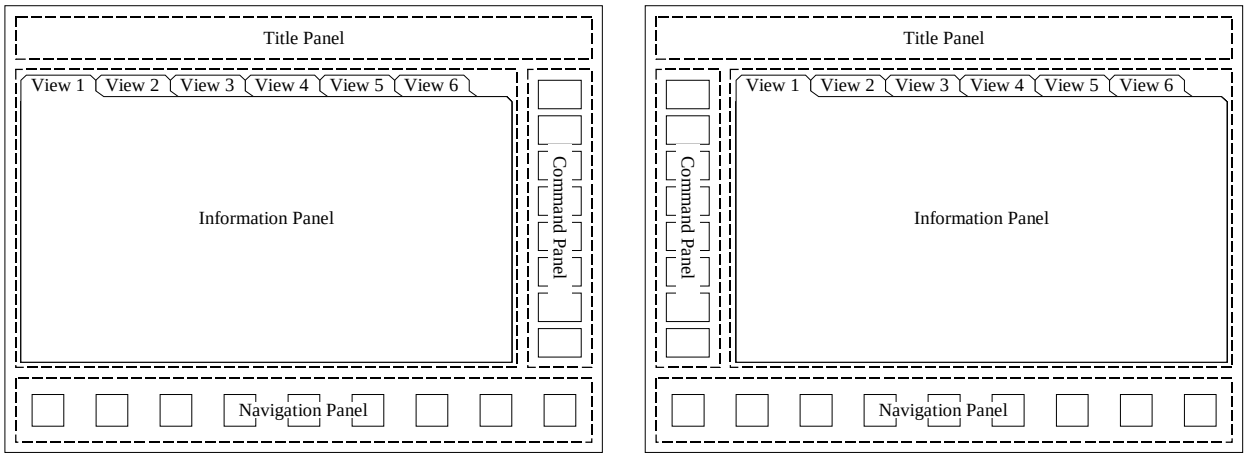


Figure 17
View Sub-navigation Using Tabs

5.4.8.3 *Sub-navigation Layout B — Sub-navigation Panel With Buttons*

5.4.8.3.1 Shown below are two orientations of the layout, with sub-navigation using view selection Buttons in a Sub-navigation Panel. The figure shows one possible relative location for a Sub-navigation Panel, but is not intended to restrict implementation. Other arrangements are allowed. However, if a Sub-navigation Panel is used, its size and location in each Functional Area must be consistent throughout the interface, even if there is only one view in a Functional Area, and thus, no Buttons in the Panel.

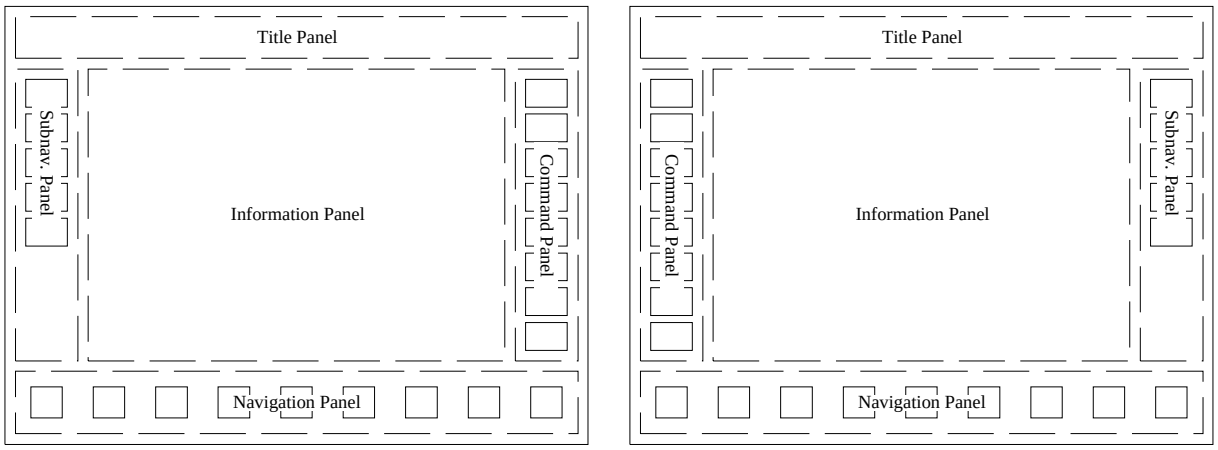


Figure 18
View Sub-navigation Using Buttons in Separate Panel

5.4.8.3.2 It is important in the Layout to separate sub-navigation methods from the global commands in the Command Panel. This limits the number of Buttons needed in the Command Panel; and reduces or eliminates the need for multiple columns of Buttons, which would alter the Information Panel display aspect ratio. If an Information Panel has a different aspect ratio than the others, its contents may appear to "jump" sideways when navigating, distracting the user. The separation of sub-navigation from commands accomplishes two important objectives; a) users do not become confused trying to differentiate sub-navigation from commands, and b) the aspect ratio of the Information Panel display is consistent for all views across all Functional Areas.

5.5 *Information Panel* *Mandatory*

5.5.1 The Information Panel displays a view or views of the information and graphics for each Functional Area. Graphics and other Display Objects are placed in this Panel to achieve the control and monitoring capabilities required. If necessary, multiple views of information may be displayed within a Functional Area, one at a time, in the Information Panel.

5.5.2 When any Functional Areas have more than one view, the user must be able to switch between those views while remaining within the context of the current Functional Area. The ways the user may select among multiple views presented in this standard are called sub-navigation methods to distinguish them from user navigation between Functional Areas using the Navigation Panel.

5.6 Command Panel *Mandatory*

5.6.1 The Command Panel is a vertical column of command Buttons located to the right of the Information Panel (to the left if switched to accommodate left-handed users). Only Buttons for common or global commands related to the current view displayed in the Information Panel shall be located in the Command Panel. If there are no common commands for an Information Panel, the Command Panel shall have no Buttons. Each view in a Functional Area shall have its own Command Panel. To limit the number of command Buttons needed in each Command Panel, user selection of a different view shall display that view and its associated Command Panel, with commands that apply only to the selected view. A Command Panel may be used for more than one view if it is suitable for that purpose. Command Buttons or other Display Objects that have a more limited scope shall be located in the Information Panel. Restricting locally-acting commands and functions to the Information Panel makes clear to the user that only general, global commands are located in the Command Panel. Buttons for navigation (i.e., that invoke the display of another view in the Information Panel) shall not be located in the Command Panel. It is recommended that multiple columns of Buttons in the Command Panel be avoided.

6 Compliance Statement

6.1 In order to be compliant with this specification, the documentation accompanying an equipment shall include a Human Computer Interface (HCI) Compliance Statement that accurately indicates compliance with the individual requirements defined in this document. Requirements and recommended capabilities are defined in Table 2.

6.2 In order to be compliant with HCI, equipment must meet all requirements in each of three categories, as follows:

6.2.1 Mandatory: In order to be compliant with this standard, all of the mandatory requirements shall be both implemented and compliant as defined in this specification.

6.2.2 Conditional: In order to be compliant with this standard, each conditional requirement shall either be implemented as defined in this specification or shall both not be implemented in the user interface and not be supported in some other way by the equipment. (i.e., no conditional capability which is present on the equipment shall be implemented in a manner other than as defined in this specification).

6.2.3 Recommended: Implementation of these feat-ures is at the discretion of the implementers. The only requirement for compliance with this specification for these capabilities is that they be accurately documented in the compliance statement for the equipment.

6.3 Each requirement/capability shall be marked "Yes" under "Implemented" if the equipment includes a feature which provides equivalent functionality as that defined in this specification even if that feature appears in a different form. Otherwise it shall be marked "No".

6.4 Each requirement/capability shall be marked "Yes" under "HCI Compliant" if the equipment includes a feature which conforms to all aspects of the requirement or recommended capability as defined in this specification. Otherwise it shall be marked "No".

Table 2 HCI Compliance Statement

HCI Compliance Statement			
Mandatory Requirements	*Reference*	*Implemented*	*HCI Compliant*
Buttons	5.2.2	Yes No	Yes No
Dialog Boxes	5.2.5	Yes No	Yes No
Basic Network Navigation Model	5.3	Yes No	Yes No
Basic Layout	5.3.5	Yes No	Yes No
Title Panel Basic Information	5.3.8	Yes No	Yes No
Navigation Panel	5.4	Yes No	Yes No
Required Navigation Panel Functions	5.4.2	Yes No	Yes No
Navigation Panel Layout	5.4.4	Yes No	Yes No
Information Panel	5.5	Yes No	Yes No
Command Panel	5.6	Yes No	Yes No
Conditional Requirements	*Reference*	*Implemented*	*HCI Compliant*
Saliences	5.2.3	Yes No	Yes No
Information Dialog Boxes	5.2.6	Yes No	Yes No
Input/Selection Dialog Box	5.2.7	Yes No	Yes No
Message Dialog Box	5.2.8	Yes No	Yes No
Network Navigation Model with Sub-navigation	5.3.3	Yes No	Yes No
Title Panel with Conditional Information	5.3.9	Yes No	Yes No
Title Panel Host Communications Status	5.3.9.2	Yes No	Yes No
Title Panel Login/Logout Button	5.3.9.3	Yes No	Yes No
Conditional Navigation Panel Functions	5.4.3	Yes No	Yes No
Navigation Panel Alarm & Help Buttons	5.4.5	Yes No	Yes No
Navigation Button Labels	5.4.6	Yes No	Yes No
Navigation Panel Saliences	5.4.7	Yes No	Yes No
Sub-navigation	5.4.8	Yes No	Yes No
Recommended Capabilities	*Reference*	*Implemented*	*HCI Compliant*
Enhanced Layout	5.3.6	Yes No	Yes No
Title Panel with Additional Information	5.3.10	Yes No	Yes No
Title Panel Alarm Button	5.3.10.2	Yes No	Yes No

7 Related Documents

7.1 *SEMATECH Documents*[1]

Computer Integrated Manufacturing (CIM) Application Framework Specification

SCC User-Interface Style Guide

NOTICE: SEMI makes no warranties or representations as to the suitability of the standard set forth herein for any particular application. The determination of the suitability of the standard is solely the responsibility of the user. Users are cautioned to refer to manufacturer's instructions, product labels, product data sheets, and other relevant literature respecting any materials mentioned herein. These standards are subject to change without notice.

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