Ovation NT Control Builder User Guide

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Summary of Changes

This revision of “Ovation NT Control Builder User Guide” (NT-0080) describes the following new features:

- Print Toolbar (Section 2).
- Libraries Toolbar (Section 2).
- CALCBLOCK(D) algorithm (Section 3).
- Enhanced Control Builder configuration (Section 5).
- Macros (Section 7).
- Control Builder Utilities (Section 8).
  - — Compile Control Sheets
  - — Copy Control Sheets
  - — Export Control Sheets
  - — Import Control Sheets
  - — Order Control Sheets
  - — Symbol Builder
- Ladders (Section 9).

Section 1. Introduction

1-1. Overview

The Ovation NT Control Builder (OCB) is an AutoCAD™ based graphical editor that is used to create the control logic that runs in the Ovation Controller.

Note

The use of the Control Builder requires proficiency in the use of AutoCAD.

The functional drawings produced and edited by the Control Builder represent portions of Controller logic. Typically, there are many different control drawing sheets linked together to form the complete control structure.

The drawings display information about the algorithms that are used to build the control logic. The Control Builder User Interface (U/I) and a sample functional drawing are shown in Figure 1-1.

1-2. High-Level Functions

In addition to editing, the Control Builder provides integration support for the Controller. The following high-level functions are performed by the Control Builder:

- Edits Control Sheets
  - — Edits SAMA Control Drawings of the actual control in a Controller.
- Modifies Database
  - — Edits accounting and cross reference information in an SQL database.
- Monitors Control
  - — Produces animated monitor graphic files similar to the control sheets. These allow feedback and tuning.
- Reconciles Tuning by updating drawings with tuning parameter changes.

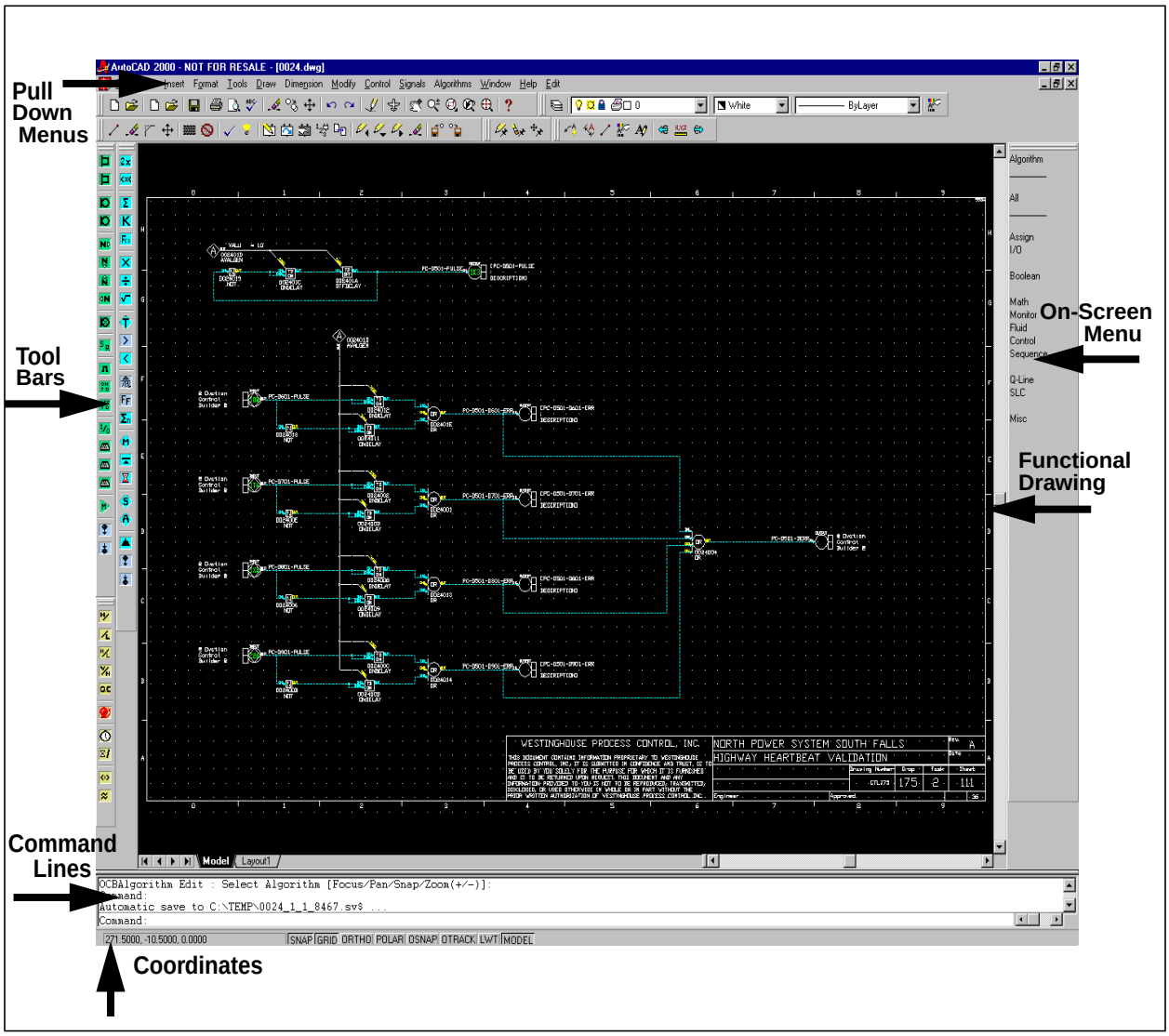


Figure 1-1. Control Builder User Interface with Sample Functional Drawing

1-3. Features

The Ovation NT Control Builder has the following features:

- OCB can be evoked from the Ovation Developer Studio or from the AutoCAD icon.
- OCB can stand alone or run as part of the Ovation Developer Studio.
- Uses AutoCAD 2000.
- Can handle multiple sheets in a single session.
- Toolbars and menus can be moved and customized.
- Control is location independent.
- Page connectors are not drop specific.
- Lines can be configured for improved visibility.

1-4. Configuring AutoCAD

AutoCAD should already be installed as described in "Ovation NT Software Load Kit" (NT-0010). Do **NOT** install AutoCAD under the NT Programs folder.

Before you can begin to use the Ovation NT Control Builder, you need to perform the following recommended AutoCAD configurations:

Modify AutoCAD Options

1. Bring up AutoCAD and if the Startup box appears, select **Cancel**.
2. Select the **Tools** menu.
3. Select **Options**.

4. Select the **Display** tab (shown in Figure 1-2).

   A. Put a check mark in the **Display screen menu** box in the Window Elements section.

   B. Set the **Crosshair size** value to **100**.

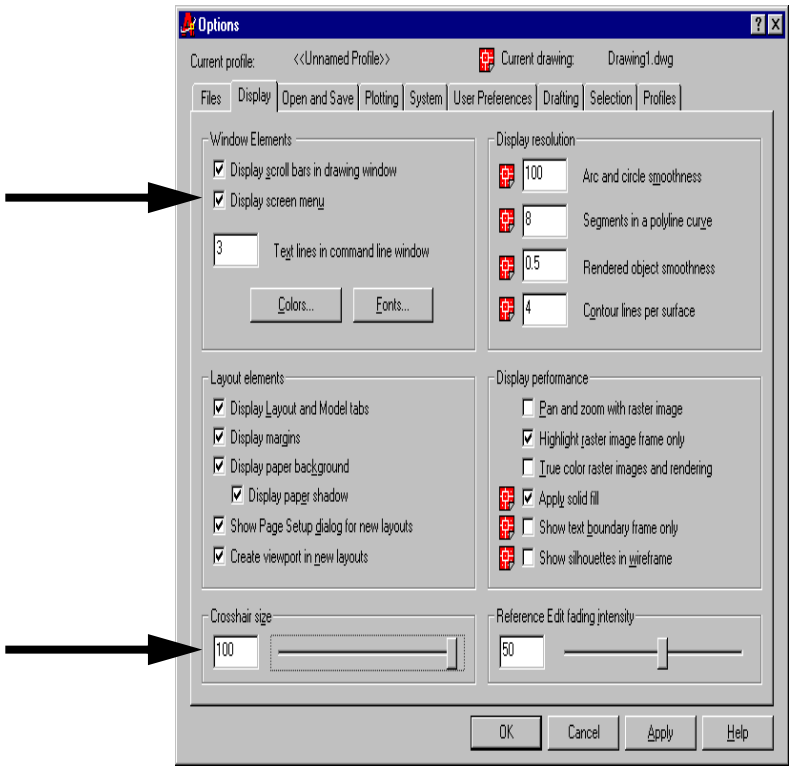


Figure 1-2. Display Tab

5. Select the **Open and Save** tab.

   A. Go to the **File Safety Precautions** section.

   B. Set the **Minutes between saves** value to **5** or **10** minutes (required setting).

   C. Remove the check mark in front of **Create backup copy with each save**.

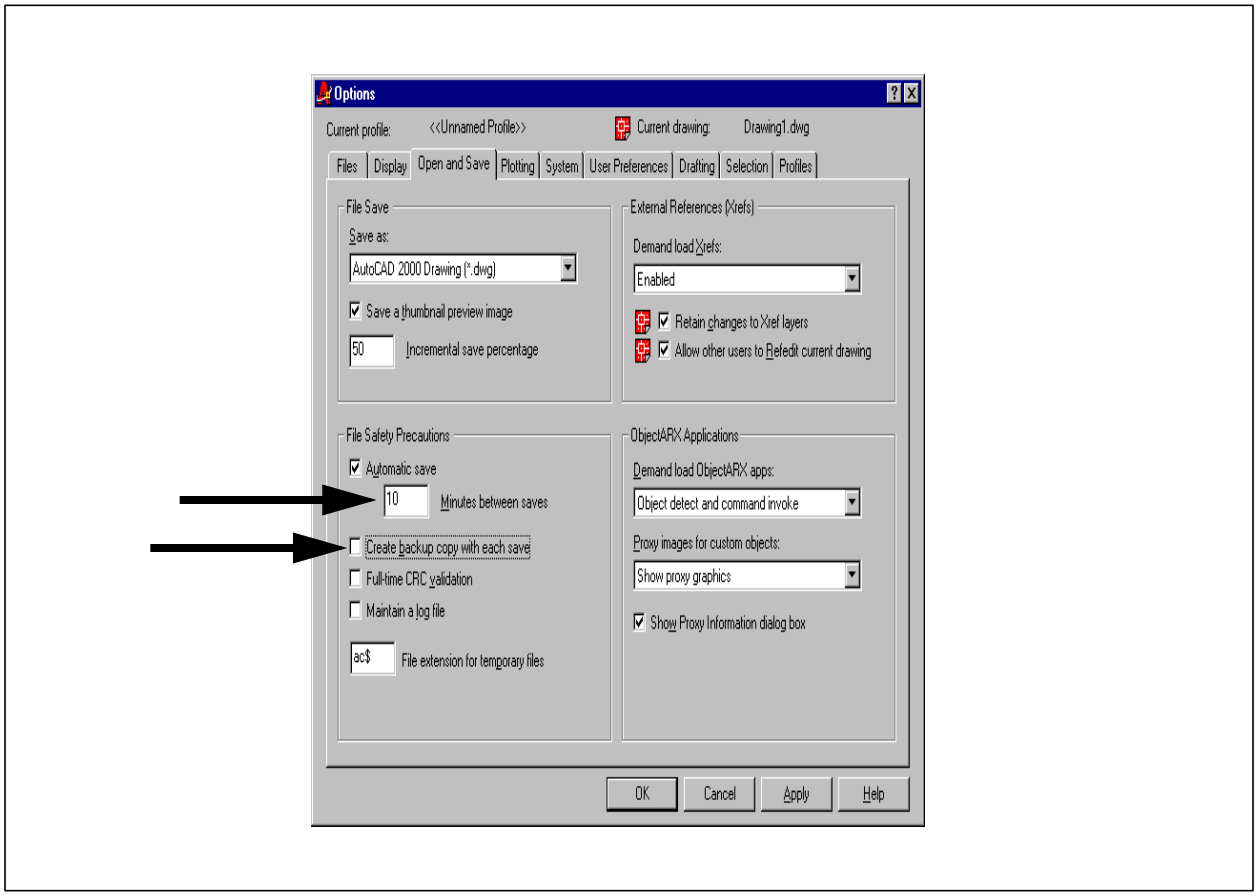


Figure 1-3. Open and Save Tab

6. Select the **User Preferences** tab:

   Under Window Standard Behavior, select **Right-Click Customization** (see Figure 1-4).

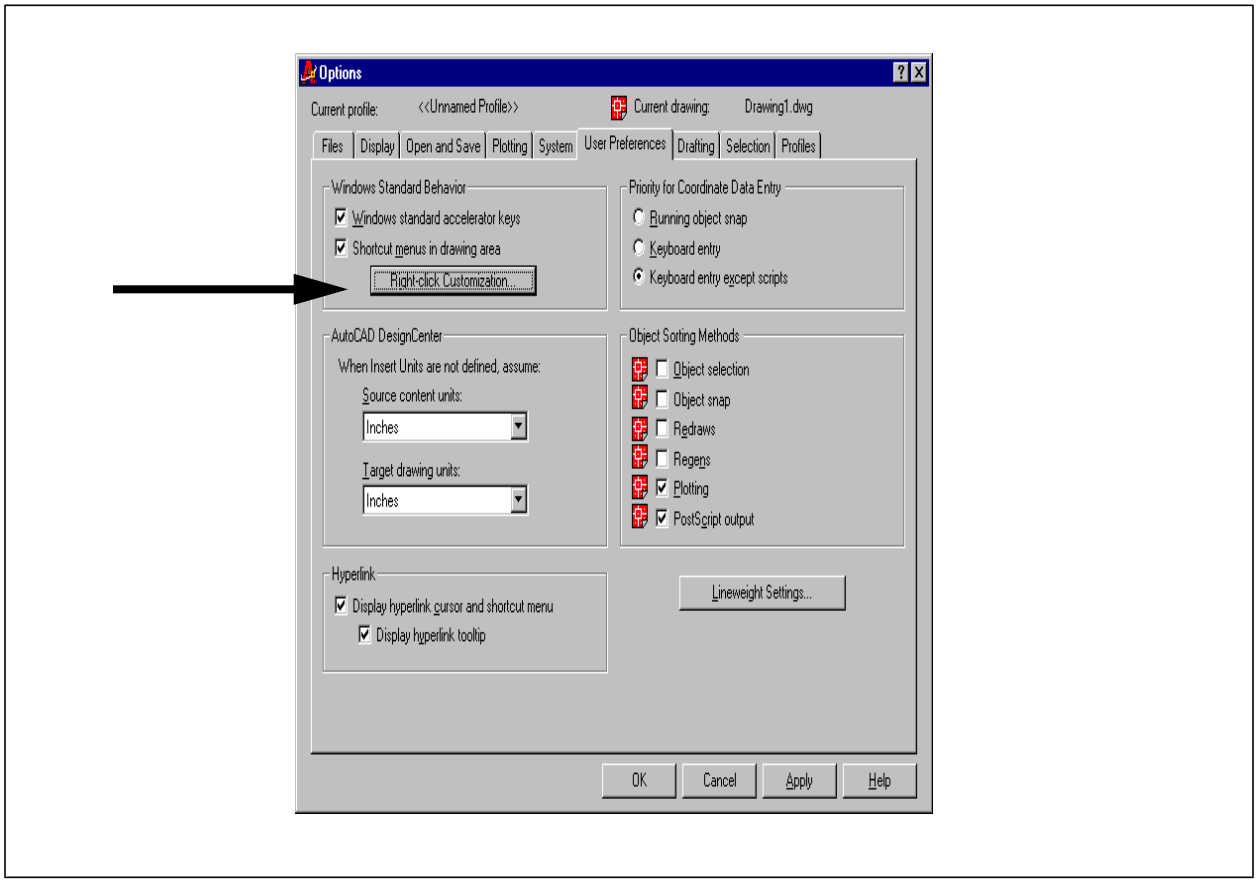


Figure 1-4. User Preferences Tab

7. The Right-Click Customization window appears (Figure 1-5). Select the following:

   - Under Default Mode, select **Repeat Last Command.**
   - Under Edit Mode, select **Shortcut Menu.**
   - Under Command Mode, select **ENTER**.
   - Select the **Apply** & **Close** button.

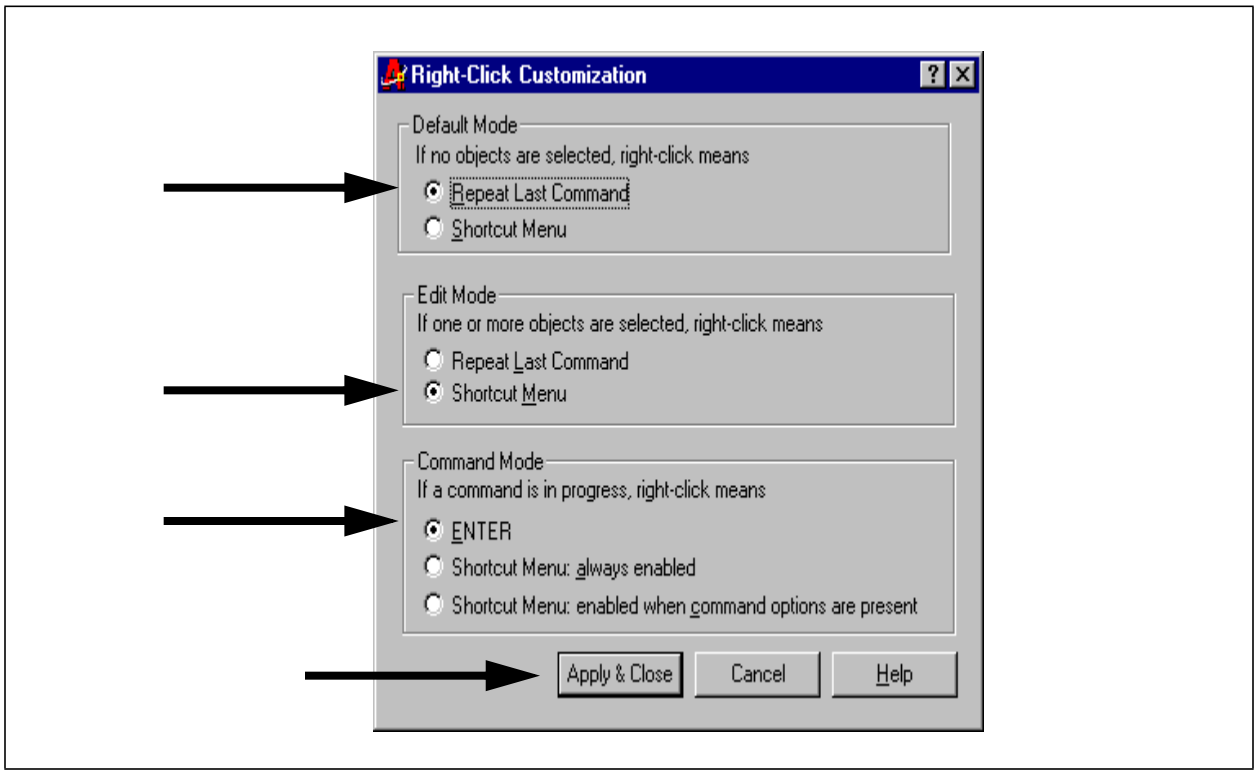


Figure 1-5. Right-Click Customization Window

8. Return to the Options window and select **OK** to close the Options window.

Modify the Status Bar

9. On the bottom of the AutoCAD Window is a status bar that contains eight status buttons. They are **ON** when pressed in, and **OFF** when not pressed in.

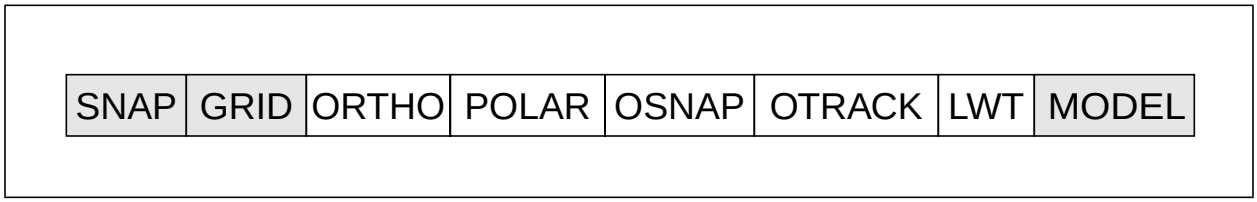


Figure 1-6. Status Bar

Set them as follows (required settings):

Table 1-1. Status Bar Settings

Button	Status	Description
SNAP	On	AutoCAD function that permits cursor to move (snap) between points on a grid. Aligning objects is easier with snap on. Grid size can be changed.
GRID	On	AutoCAD function that displays Imaginary vertical and horizontal lines in the drawing area that help to align items in the drawing.
MODEL	On	AutoCAD function. Model space tab toggles with Paper space tab. Model space is a two/three dimensional coordinate space where drawing is created. Paper space is where a layout of the drawing can be created.
ORTHO	Optional	Orthogonal mode. When on, only orthogonal (horizontal/vertical) lines can be drawn. These are lines drawn at 0, 90, 180, and 270 degrees. Also, objects can only be moved horizontally and vertically. Refer to AutoCAD manuals for additional information.
POLAR	Off	Not used by Control Builder
OSNAP	Off	Not used by Control Builder
OTRACK	Off	Not used by Control Builder
LWT	Off	Not used by Control Builder

1-5. Startup

After AutoCAD has been configured, the Control Builder can be started. It can be started using the AutoCAD icon, but the recommended method is to start OCB from the Ovation Developer Studio (refer to (NT-0060) for information about the Studio functions). Control Sheets are located in the studio hierarchy under the Control Tasks of a drop. The OCB is started when a Control Sheet is opened.

Note

An Oracle Database Client must also be installed on the drop where the Control Builder is loaded if the drop is not a Server (refer to "Ovation Load Kit" (NT-0010) for additional information).

Use the following procedure to start the Control Builder from the Studio. Refer to Figure 1-7. The numbered arrows correspond to the steps in the procedure.

1. Access the Studio System Tree.
2. Select the **Controller drop** where the Control Sheets are located.
3. Select the desired **Control Task**.
4. Select **Control Sheets**.

Note

If the Control Builder is **not** installed and reconciled to run as an extension of AutoCAD, a dialog box will appear. Select the **Install** button to automatically install and reconcile Control Builder with AutoCAD.

5. The **existing** Control Sheets will appear in the bottom Work Pad window. Right-click on a Control Sheet and select **Open** from the pop-up menu, or double-click on a Control Sheet. The selected sheet will open in the Control Builder window.
6. If a **new** Control Sheet is desired, right click on the Control Sheet folder in the System Tree.

   The New Controller Sheets window will appear. Fill in the following:

   - Sheet name - How sheet is described in the system (maximum 38 characters).
   - Sheet Number - Short reference number (maximum 4 characters).
   - Revision - Maximum 3 characters.

7. OCB/AutoCAD opens with the existing or new sheet. OCB reads the database and updates the Default Title Box, if needed (Section 1-5.1 discusses the functions that OCB performs when a sheet is opened).

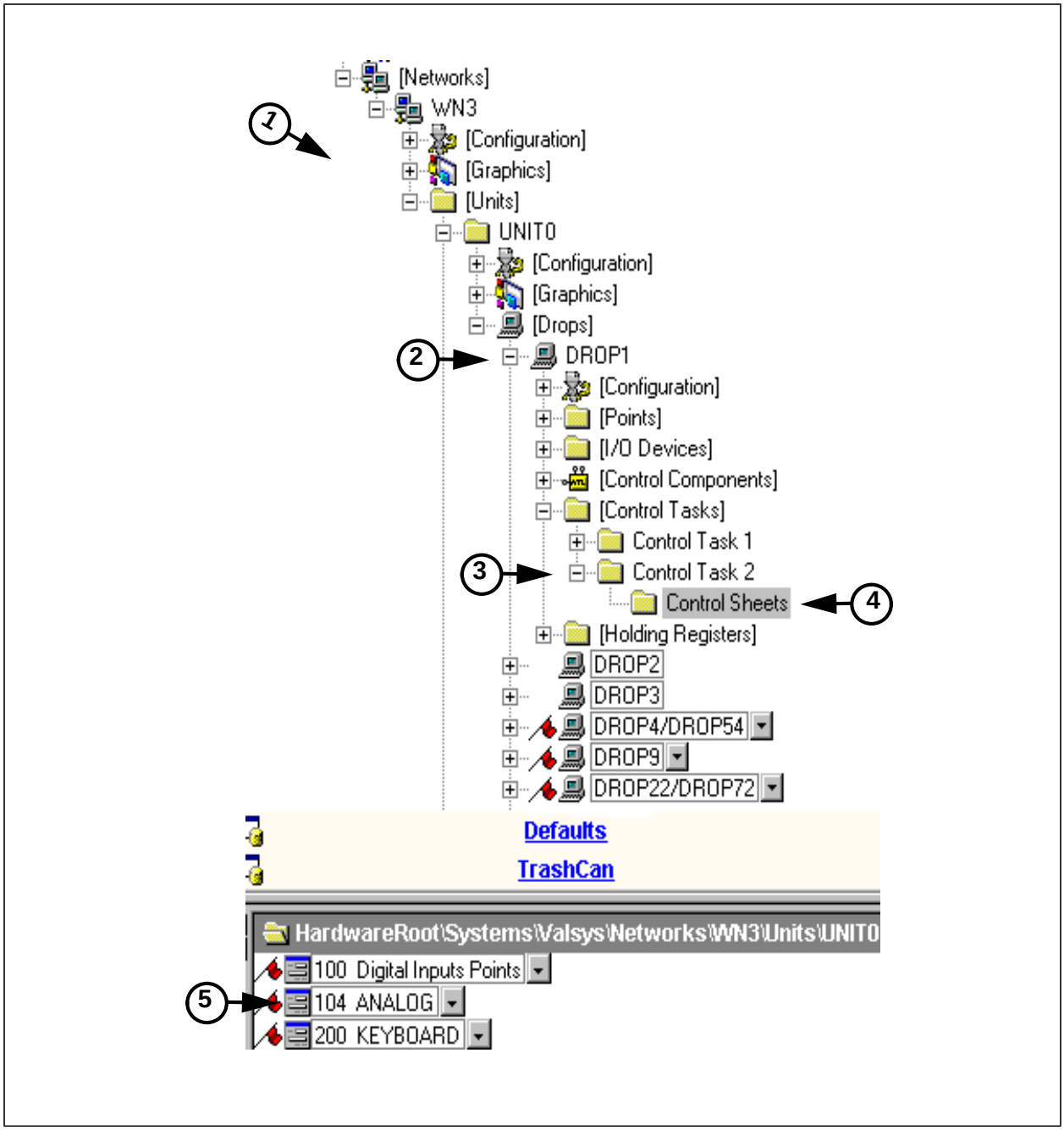


Figure 1-7. Studio System Tree Hierarchy

1-5.1. Opening a Functional Drawing

When a sheet is opened in the Control Builder, the following functions are performed automatically:

- **Title Block** - Title information is reconciled with the database. This allows the Studio's Search feature to update drawing items such as the title, number, and so forth.

- **Tuning Reconcile** - The algorithms on the sheet are compared with the algorithm records in the Oracle database. Differences are considered to be tuning changes. Ovation Developer's Studio's Reconcile function must be performed to migrate the changes from the Controller to the Oracle database.

- **Sheet Audit** - The drawing is checked for internal consistency and for syntax errors. A list of errors is displayed (Figure 1-8). Refer to Table 1-2 for error message descriptions.

  Internal consistency is the verifying of graphical signals, tags, and algorithm connections. Syntax errors are mistakes in the content-based data within an algorithm, data such as point record types and value ranges.

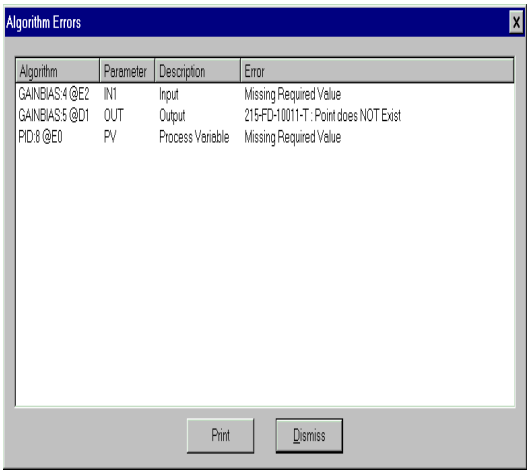


Figure 1-8. Algorithm Errors Window Displaying Syntax Errors

1-5.2. Saving a Functional Drawing

When a functional drawing is saved, the Control Builder performs the following:

- **Syntax Checking** - The algorithms are checked for any content errors (such as required pins that are not connected). If syntax errors are found, a list of errors is displayed (Figure 1-9). Refer to Table 1-2 for error message descriptions. The drawing file will be written to the disk, but OCB will not proceed with the save. An error message will also appear advising you that Control has not been saved.

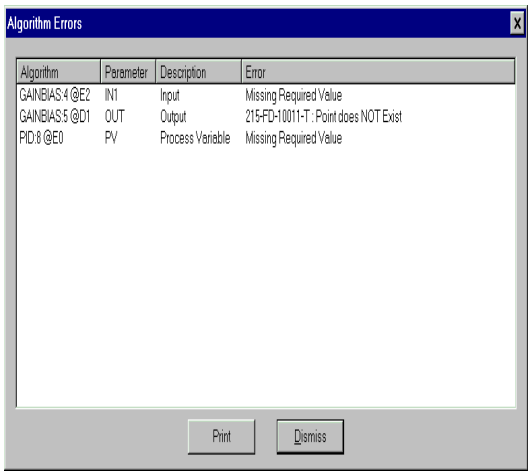


Figure 1-9. Algorithm Errors Window Displaying Syntax Errors

- **Update Oracle Database** - The control from the sheet is saved into the Oracle database. Load the Controller via the Studio to activate the control logic on the sheet.

- **Create Monitor Graphic** - The monitor graphic is created and compiled. To use the graphics, the various NT Workstations must be downloaded via the Studio.

1-5.3. Error Messages

The messages in Table 1-2 may appear in the following places whenever there is an OCB error:

- Whenever you open or save a control sheet (Section 1-5.1 or Section 1-5.2).
- Whenever you use the Audit Service (Section 7).
- In error logs (Section 8).
- In the Edit Algorithm dialog box (Section 3).

Table 1-2. Error Messages

Message	Description
Already Originated in Drop <Drop ID>, Title <Sheet Title>	A point can be originated, or written, by one algorithm. The point defined is already originated on the other sheet defined in an error message. To resolve this problem, select another point either on this sheet or the other sheet that originated the point. Control will NOT be updated under this condition.
Bit Out of Range	An algorithm's output is logical and a packed point name is defined. The bit defined is not addressable. Packed points only support 16 (0 - 15) uniquely addressable values. Control will NOT be updated under this condition.
Bit Required	An algorithm's output is logical but only a packed point name is defined. To use a packed point for a logical output, both the point name and a unique bit must be defined. Control will NOT be updated under this condition.
Default NOT Found On Sheet	An algorithm with editable inputs, for example, BALANCER's TRK1 - 16, will accept default points. This error represents a default point not originated on the same sheet as the BALANCER algorithm. If the point is not originated on the sheet, use a user-defined tracking point. Control will NOT be updated under this condition.
Fast Boolean Present On Sheet	Due to Controller limitation, fast Boolean algorithms (AND, FLIPFLOP, NOT, OR, XOR) and ladders cannot co-exist on the same sheet. Either remove all the ladders, or all the fast Boolean algorithms. Control will NOT be updated under this condition.
Invalid Originating Drop	An algorithms' output point is not originated from the same drop as the sheet. It is not possible to write values into points received in the Controller. To resolve this problem, move the point or sheet, or use a different point. Control will NOT be updated under this condition.

Table 1-2. Error Messages (Cont'd)

Message	Description
Invalid Point Name	An algorithm's output point name contains invalid characters. Valid characters are all characters, except \, **$**, **%**, **&**, *****, **@**, **~**, and **"**. Control will NOT be updated under this condition.
Invalid Record Type	An algorithm's output contains a point whose record type is incompatible with the algorithm's definition. For example, a digital point is used as the output for an algorithm requiring an analog point. Control will NOT be updated under this condition.
Ladder Present On Sheet	Due to Controller limitation, fast Boolean algorithms (AND, FLIPFLOP, NOT, OR, XOR) and ladders cannot co-exist on the same sheet. Either remove all the ladders, or all the fast Boolean algorithms. Control will NOT be updated under this condition.
Missing Required Value	An algorithm's input (required by the algorithm's definition) is not defined. Control will NOT be updated under this condition.
Name Used on Another Sheet	A user-defined algorithm name is currently used by another algorithm on another sheet. Control will NOT be updated under this condition.
Not a Valid Enumeration Value	The current value for the enumeration is not valid. The default value will be used instead. Control WILL be updated under this condition.
Out of Range	An algorithm parameter is outside a reasonable range. Parameters are numerical arguments for an algorithm. Some parameters have functional ranges (for example, a Function Generator's Number of Break Points (BPTS)). Other parameters are limited by allocation units (for example, parameters stored in byte fields are limited to 0 - 255). Control will NOT be updated under this condition.
Point does NOT Exist	An algorithm's output contains a point name that is not currently defined in the database. The point should be created or a new point should be selected. Control will NOT be updated under this condition.
Point Not Originated	An algorithm's input is not a hardware point and is not written to by any currently defined control. This means control is using a point as an input whose values will not change. This is provided for informational purposes. Control WILL be updated under this condition.
User Defined Point	An algorithm input/output requires a user-defined point. This is typically associated with input and output connectors. May also occur with algorithms such as ASSIGN, which output multiple record types. The Control Builder cannot determine the correct record type for a default point. Control will NOT be updated under this condition.

1-6. Contents of this Document

- **Section 1. Introduction** provides an overview of this document, explains AutoCAD configuration, and lists reference documents that may be helpful.
- **Section 2. Control Builder Overview** provides an overview of the Ovation NT Control Builder.
- **Section 3. Components of the Functional Drawings** describes using the Control Builder functions to build and edit drawing sheets.
- **Section 4. Using Control Builder Command Lines** describes using the Control Builder command lines to build and edit drawing sheets.
- **Section 5. OCB Configuration** describes the configuration changes that can be made to the Control Builder.
- **Section 6. Monitor Graphics** describes the Monitor Graphics and their use.
- **Section 7. Using the Ovation NT Control Builder Services** describes Ovation NT Control Builder services (available through the Control Builder).
- **Section 8. Using the Ovation Control Builder Utilities** describes Ovation NTControl Builder utilities (available through the Developer Studio).
- **Section 9. Using Ladder Control Logic** describes the editing of ladder logic through the Control Builder.
- **Appendix A. AutoCAD Features** describes the AutoCAD features that can be used by the Control Builder.
- **Appendix B. Trouble-Shooting** provides some examples of trouble-shooting the Control Builder.

1-7. Reference Documents

The following documents may be helpful to Control Builder users:

Table 1-3. Reference Documents

Document Number	Title	Description
NT-0010	Ovation NT Load Kit	Describes installation of software for the Ovation NT system.
NT-0060	Ovation NT Developer Studio	Describes usage of the Developer Studio.
R3-1100	Ovation Algorithms Reference Manual	Lists and describes algorithms used in Ovation systems.
	AutoCAD Vendor Manuals	Describes the functions and use of AutoCAD.

Section 2. Control Builder Overview

2-1. Section Overview

This section presents an overview of the Ovation NT Control Builder and provides the following information:

- Defines the terms associated with the Control Builder (Section 2-2).
- Describes the Developer Studio hierarchy (Section 2-3).
- Defines the Control Builder User Interfaces (toolbars, menus, and command lines) (Section 2-4).
- Describes the Control Builder toolbars (Section 2-5).
- Describes the AutoCAD menus (Section 2-6).
- Describes the Control Builder menus (Section 2-7).
- Describes the command line functions (Section 2-8).

2-2. Descriptions of Terms

Table 2-1. Control Builder Terms

Term	Description
Algorithms	Set of rules, procedures, and mathematical formulas that define a control strategy. Refer to "Ovation Algorithms Reference Manual" (R3-1100) for information about algorithms used in Ovation systems.
Batch Processing or **Run Scripts**	Performs same operation on multiple functional drawings. Refer to Appendix A for information on running batches.
Command Line	Text area below AutoCAD window where AutoCAD and Control Builder commands can be entered. Messages also appear here.
Control Sheet (also known as file or functional drawing)	AutoCAD drawing that contains a graphical representation of a control scheme.
Control Task (also known as Set or Area)	Refers to a specific Controller area where all the control sheets in that area are scanned at the same frequency. Up to **five** Control Tasks can be defined. All the sheets in the Control Task 1 area are scanned every **0.1 second** (also known as fast time). All the sheets in the Control Task 2 area are scanned every **1 second** (also known as slow time). The scan times for sheets in Control Task 3, 4, and 5 are **user-defined.**
Database (also known as PowerTools database)	Contains information about the system configuration, the system points, and control strategies. Information is entered by the Ovation Power Tools (including the Control Builder).
Deadspace	Area in window or screen where no icons or text are displayed. Typically, by right clicking on this area, a menu will appear.
Default Points (see also User-Defined Points)	Points created by OCB that have the following naming convention: **OCBssssaaa-pppp**, where: **ssss** = Unique sheet identifier (Hex) **aaa** = Unique algorithm identifier (Hex) **pppp** = Parameter mnemonic (for example, OUT)
Monitor Graphics	Directory containing graphic source files and object files that are graphics displayed in PDS windows (W1 - W8) with point values and tuning interfaces.

Table 2-1. Control Builder Terms (Cont'd)

Term	Description
Multi-Document Interface (MDI)	More than one drawing can be displayed in one AutoCAD window.
Named Algorithms	Typically, OCB assigns unique identifiers for each algorithm. These identifiers are based on sheet and algorithm identifiers (see the description for Default Points). However, the user may define the unique identifiers, thereby creating a "named algorithm" (see Section 3-5.4 for limitations and guidelines for naming algorithms).
Offline editing	Control Builder is not connected to the system database, so changes are not saved to the database.
Online editing	Control Builder is connected to the system database, so changes are saved to the database.
Operating Modes	Development Mode and Running System Mode
PDS	Process Diagram System contains the graphics that are displayed on the Ovation Operator Station.
Redundant Pair Mismatch	When Control information between a pair of redundant Controllers is different.
Scratchpad	Temporary library file.
Signal	Lines connecting algorithms on a sheet. Signals start from an algorithm output pin and connect to one or more algorithm input pins. They are comprised of one or more segments.
Signal Doughnut	Circle representing multiple downstream connections.
Signal Junction	Where two or more signal segments connect. If more than two signal segments connect, a signal doughnut is visible.
Signal Segment	Primary building block of a signal. Straight line with a start point and an end point.
User-Defined Points (see also Default Points)	Points created by the user through the Ovation Developer Studio. Do NOT begin these point names with OCB.

Table 2-1. Control Builder Terms (Cont'd)

Term	Description
Workspace	Directory that contains the working files (such as functional drawings, src files, obj files).
Zoom	Changes magnification (larger or smaller) of objects or of complete drawings. Zoom options are: **Zoom Realtime** - Use cursor to position cross-hair on the object that is to be zoomed. Provides a center focus on the object. **Zoom Window** - Use cursor to draw box around object that is to be zoomed. **Zoom Previous** - Return to the last Zoom view. **Zoom Extends** - Provide full-screen view of drawing.

2-3. Studio Folder Hierarchy

The functional drawings (sheets) are stored in the Developer Studio directory structure (see "Ovation NT Developer Studio" ((NT-0060) for details about the use). The path for sheet storage is shown in Figure 2-1, which depicts the location of the Control Builder sheets for a drop (Drop1) in the System Tree. The illustrated hierarchy from top to bottom is:

- System (Valsys)
- Network (WN3)
- Unit (Unit 0)
- Drop (Drop 1)
- Control Task 2
- Control Sheets (for Drop 1) in Control Task 2

2-3.1. Sheets Folder (NT Explorer)

There is also a Sheets folder in the NT Explorer hierarchy that contains all the functional drawings for the Unit. The hierarchy for this folder from top to bottom is:

- System
- Network
- Unit
- Sheets

Every time a drawing is created and saved in a Unit, Control Builder gives it a unique name, and stores it in the Sheets directory where it is location independent. This is a Master directory for all the sheets in an entire Unit and enables Control Builder to display the correct drawing when requested and to avoid duplication of drawing numbers.

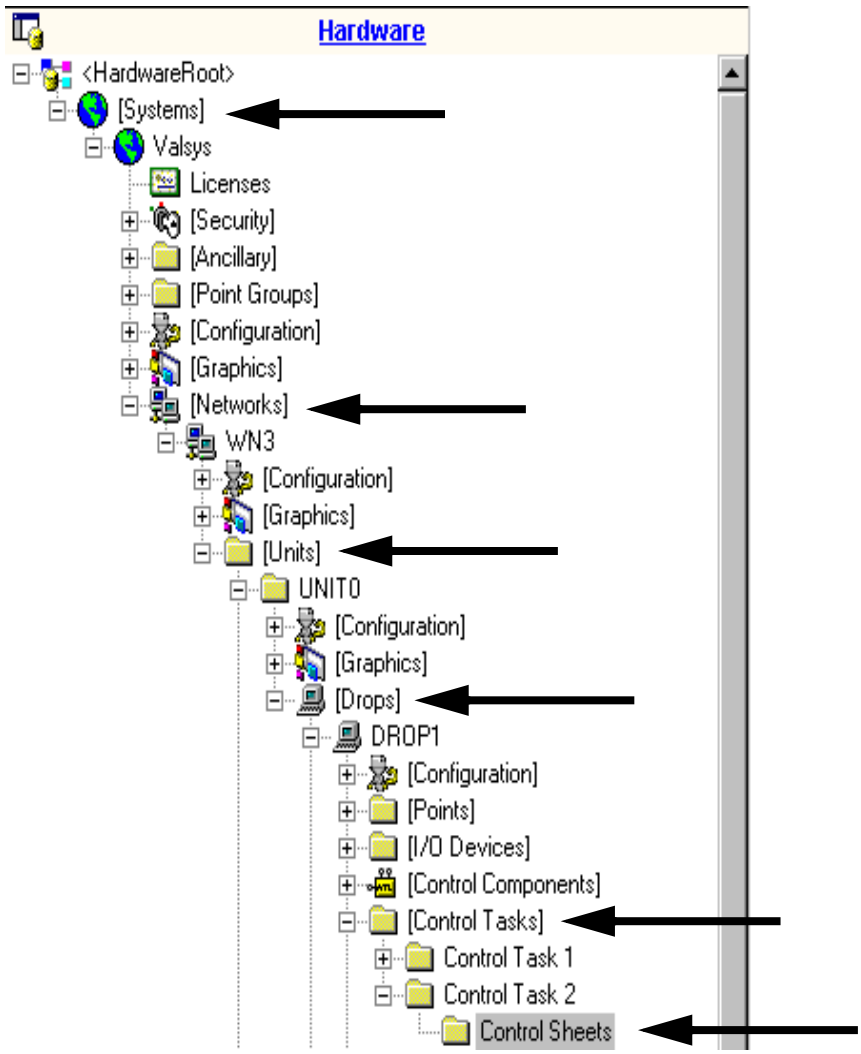


Figure 2-1. Sheet Storage Locations

2-4. Control Builder Interfaces

The Control Builder provides different methods for interfacing between the user and the Control Builder functions.

These methods are illustrated in Figure 2-2:

- Toolbars (Section 2-5).
- Menus (Section 2-6 and Section 2-7).
- Command line (Section 2-8).

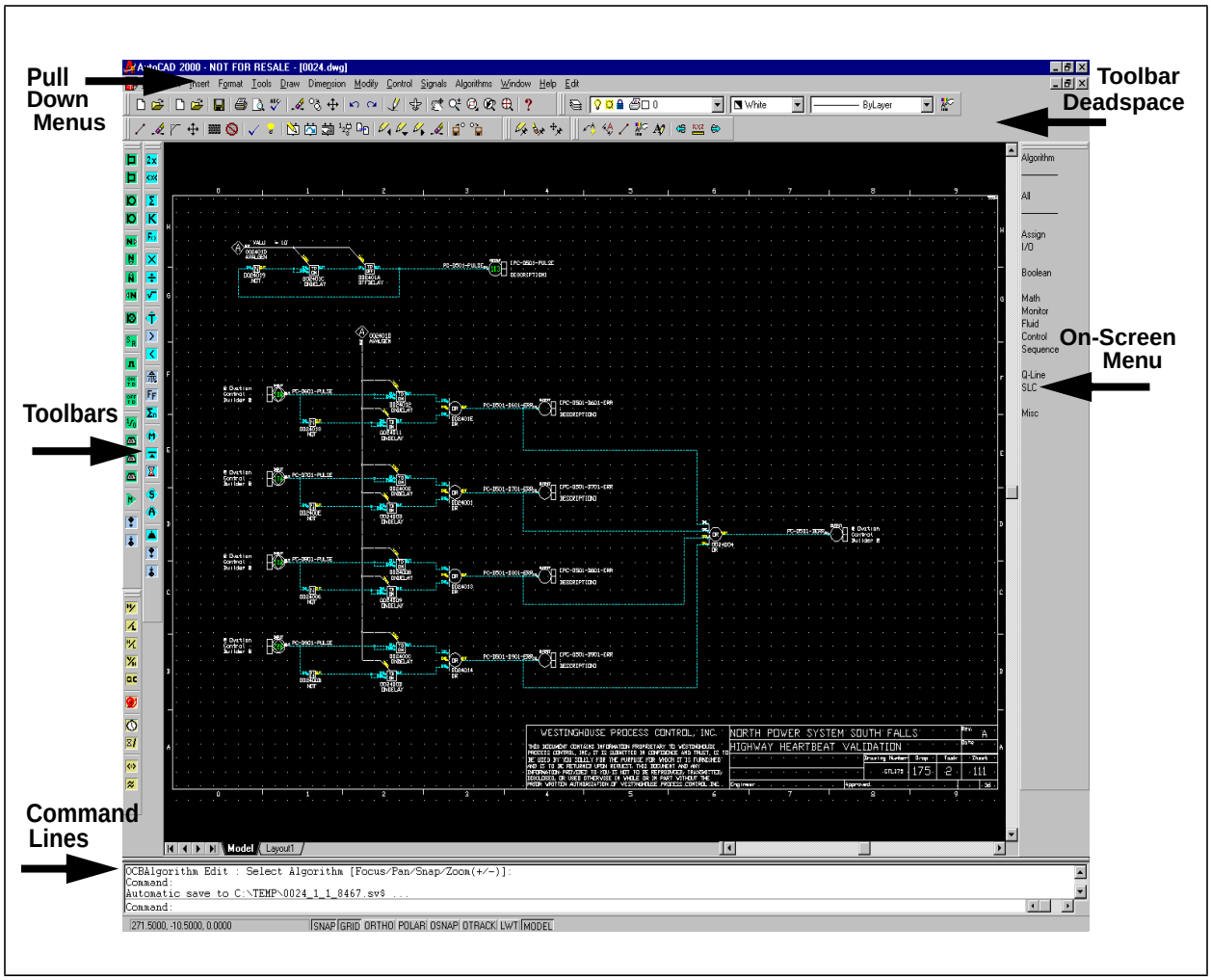


Figure 2-2. Control Builder Main Window

2-5. Control Builder Toolbars

The Ovation NT Control Builder (OCB) provides toolbars that are added to the AutoCAD toolbars and enable the user to create and edit drawings faster and easier.

Toolbar Placement

The recommended positions for the Algorithm toolbars are to the left of the drawing window, and the other toolbars are positioned or “docked” above the drawing window. However, toolbars can be “undocked” and moved to different locations.

Toolbar Configuration

Toolbars can be configured by using the **Toolbars** item from the AutoCAD **View** pull-down menu (refer to the “Modifying Toolbars” section in the AutoCAD User Guide for detailed information about configuring toolbars).

Toolbar Enable/Disable

In order to enable or disable a toolbar, right-click in the toolbar deadspace to display a list of all the available toolbars. Select a toolbar to enable it, and deselect a toolbar to disable it. If a toolbar disappears from the window, use this method to re-enable the toolbar.

Toolbars Described in This Section

The following toolbars are illustrated and described in this section:

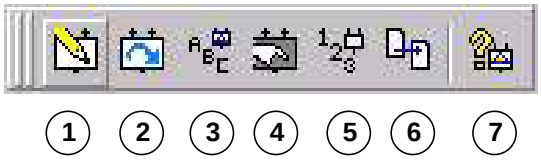
- Algorithm toolbar (Section 2-5.1).
- Analog algorithm toolbar (Section 2-5.2).
- Comment toolbar (Section 2-5.3).
- Digital algorithm toolbar (Section 2-5.4).
- Libraries toolbar (Section 2-5.5).
- Macro toolbar (Section 2-5.6).
- Monitor algorithm toolbar (Section 2-5.7).
- Object Properties toolbar (Section 2-5.8).

- Pin toolbar (Section 2-5.9).
- Print toolbar (Section 2-5.10).
- Signals toolbar (Section 2-5.11).
- Standard toolbar (Section 2-5.12).
- Tags toolbar (Section 2-5.13)

2-5.1. Algorithm Toolbar

The Algorithm toolbar provides functions for algorithms in the Control Sheets. Refer to Section 3 for additional information on algorithms.

Table 2-2. Algorithm Toolbar



Icon	Description
1	Edit Existing Algorithm
2	Add Another Algorithm
3	Displays alphabetic list
4	Name algorithm
5	Order algorithm execution
6	Determine where a connector is used
7	Displays online Help

2-5.2. Analog Algorithm Toolbar

The analog algorithm toolbar (blue) contains the most commonly used analog algorithms. Click on an algorithm button and place it in a drawing. All signals enter the algorithm from the **top** unless otherwise specified. Pins can be added or removed from the algorithm. Refer to R3-1100 for algorithm descriptions.

Table 2-3. Analog Algorithm Toolbar

Icon	Description
	
1	1. 2 Transmitter Selector (input on top and right) (2XSELECT algorithm)
2	2. Median Selector (MEDIANSEL algorithm)
3	3. Sum (SUM algorithm)
4	4. Gain Bias (GAINBIAS algorithm)
5	5. Function Generator (FUNCTION algorithm)
6	6. Multiply (MULTIPLY algorithm)
7	7. Divide (DIVIDE algorithm)
8	8. Square Root (SQUARE ROOT algorithm)
9	9. Transfer (TRANSFER algorithm)
10	10. High Selector (HISELECT algorithm)
11	11. Low Selector (LOSELECT algorithm)
12	12. PID Controller (PID algorithm)
13	13. PID Feed Forward Controller (PIDFF algorithm)
14	14. Reset Sum (RESETUM algorithm)
15	15. Manual/Auto Station (MASTATION algorithm)
16	16. Balancer (BALANCER algorithm)
17	17. Lead Lag Compensator (LEADLAG algorithm)
18	18. Set Point (SETPOINT algorithm)
19	19. Analog Value Generator (AVALGEN algorithm)
20	20. Field Algorithm (FIELD algorithm)
21	21. Input Connector
22	22. Output Connector

2-5.3. Comment Toolbar

The Comment toolbar provides for the addition and editing of comments that are entered by the user to describe objects in a drawing. Refer to Section 7-3 for additional information on the Comment service.

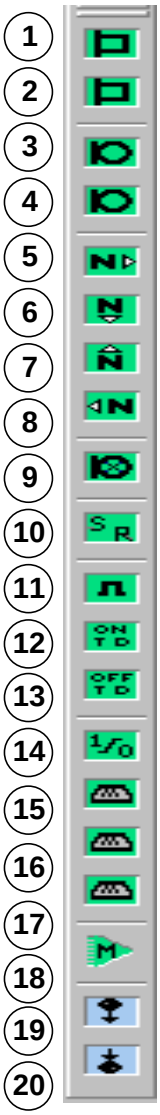
Table 2-4. Comment Toolbar

Icon	Description
1	Set comment rotation in degrees (typically 0).
2	Set comment size (1.0 or 2.5 are the options). Size is fixed for standardization.
3	Line. OCB sets a unique line type and color so a comment will not be mistaken for a signal.
4	Comment Attributes. Current comment settings.
5	Comment Edit Dialog Box. Used to edit comments on a sheet.
6	Left Justify Comment.
7	Center Justify Comment.
8	Right Justify Comment.

2-5.4. Digital Algorithm Toolbar (Boolean)

The digital algorithm toolbar (green) contains icons that represent commonly used digital algorithms. Click on an algorithm button and place it in a drawing. Pins can be added or removed from the algorithm as desired. All signals enter the algorithm from the **left** unless otherwise specified. Refer to "Ovation Algorithms Reference Manual" (R3-1100) for algorithm descriptions.

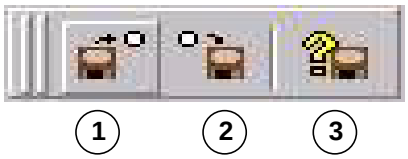
Table 2-5. Digital Algorithm Toolbar

Icon	Description
	
1	1. 3 Input And Gate (AND algorithm)
2	2. 8 Input And Gate (AND algorithm)
3	3. 3 Input Or Gate (OR algorithm)
4	4. 8 Input Or Gate (OR algorithm)
5	5. Not algorithm (input on left, output on right) (NOT algorithm)
6	6. Not algorithm (input on top, output on bottom) (NOT algorithm)
7	7. Not algorithm (input on bottom, output on top) (NOT algorithm)
8	8. Not algorithm (input on right, output on left) (NOT algorithm)
9	9. Xor algorithm (XOR algorithm)
10	10. Flip Flop algorithm (FLIPFLOP algorithm)
11	11. One Shot timer (ONESHOT algorithm)
12	12. On Delay timer (ONDELAY algorithm)
13	13. Off Delay timer (OFFDELAY algorithm)
14	14. Digital Value Generator (DVALGEN algorithm)
15	15. Keyboard open/close/auto/manual/PK1/PK2 (KEYBOARD algorithm)
16	16. Keyboard all pins (KEYBOARD algorithm with all possible pins)
17	17. Keyboard empty (KEYBOARD algorithm with no pins))
18	18. MAMode Algorithm (MAMODE algorithm)
19	19. Input Connector
20	20. Output Connector

2-5.5. Libraries Toolbar

The Libraries toolbar provides functions to import or export files to/from a library. Refer to Section 7-2 for additional information on the Library services.

Table 2-6. Libraries Toolbar



Icon	Description
1	Import Control - Imports a library file into the current drawing.
2	Export Control - Exports a section of a drawing or an entire drawing into a library file.
3	Displays online Help

2-5.6. Macro Toolbar

The Macro toolbar provides functions to define or explode a macro. Refer to Section 7-9 for additional information on Macros.

Table 2-7. Macro Toolbar

Icon	Description
1	Define - Defines a new menu or edits an existing macto.
2	Explode - Displays the original components (algorithms) of the macro.
3	Displays online Help

2-5.7. Monitor Algorithm Toolbar

The Monitor algorithm toolbar (yellow) contains the most commonly used monitor algorithms. Click on an algorithm button and place it in a drawing. Pins can be added or removed from the algorithm. Refer to "Ovation Algorithms Reference Manual" (R3-1100) for algorithm descriptions.

Table 2-8. Monitor Algorithm Toolbar

Icon	Description
	1. High Monitor (HIGHMON algorithm)
	2. Low Monitor (LOWMON algorithm)
	3. High/Low Monitor (HIGHLOWMON algorithm)
	4. Rate Monitor (RATEMON algorithm)
	5. Quality Monitor (QUALITYMON algorithm)
	6. Alarm Monitor (ALARMMON algorithm)
	7. System Time (SYSTEMTIME algorithm)
	8. Time Monitor (TIMEMON algorithm)
	9. Compare (COMPARE algorithm)
	10. Deadband Equals (DBEQUALS algorithm)

2-5.8. Object Properties Toolbar

The Object Properties toolbar defines the layers of a drawing and the objects on a layer. You always draw on a layer. Each layer has an associated color and linetype.

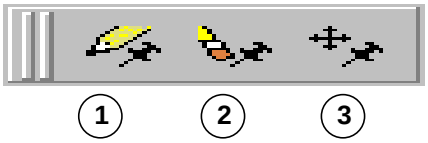
Table 2-9. Object Properties Toolbar

Icon	Description
1	Layers - Used to create a new layer, or makes a layer current and any objects created are associated with the current layer.
2	Turn a Layer On or Off - When a layer is off, objects on that layer are invisible, but do regenerate.
3	Freeze or Thaw in All Viewpoints - When a layer is frozen, objects on that layer are invisible, and do **NOT** regenerate.
4	Lock or Unlock a Layer - When a layer is locked, its objects cannot be edited, but they can be viewed.
5	Make a layer plottable or non-plottable - When a layer is non-plottable, objects on that layer will not print.
6	Color of Layer - Color assigned to a layer.
7	Color Control - Displays “Select Color” dialog box, used to assign color to a layer.
8	Linetype Control: By layer - By block Continuous Other → Opens dialog window
9	Lists the properties of entire drawing, including layers.

2-5.9. Pin Toolbar

The OCB Pin toolbar provides for the adding, deleting, and moving of pins on the algorithms in Control Sheets. Refer to Section 3 for additional information on pins.

Table 2-10. OCB Pin Toolbar

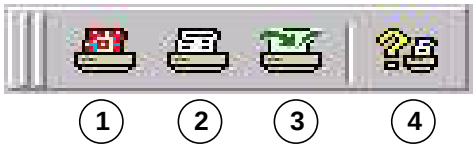


Icon	Description
1	Add Pin - Adds any pin not already on an algorithm symbol. OCB checks to determine if another pin can be added to the algorithm, and displays a message if you cannot add a pin.
2	Delete Pin - Deletes any pin on an algorithm symbol that is not connected to a signal and is not required. OCB checks to determine if a pin can be deleted from the algorithm, and displays a message if you cannot delete a pin.
3	Move Pin - Moves any pin on an algorithm symbol that is not connected to a signal.

2-5.10. Print Toolbar

The Print toolbar provides for the printing of information about the control sheets, as well as the sheets themselves. Refer to Section 7-4 for additional information on the Print service.

Table 2-11. Print Toolbar

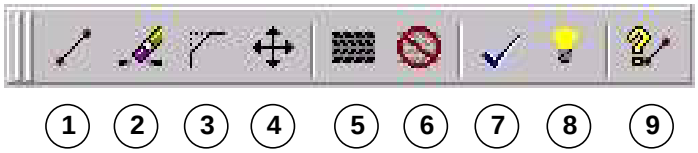


Icon	Description
1	Prints the functional drawing just as it is displayed (WYSIWYG) on the Control Builder window.
2	Prints the details (such as parameters and algorithm names) about the current sheet.
3	Prints information about the sheet connectors.
4	Provides online Help for Print functions.

2-5.11. Signals Toolbar

The Signals toolbar provides tools for using signals in a Control Sheet. Refer to Section 3 for additional information on signals.

Table 2-12. Signals Toolbar

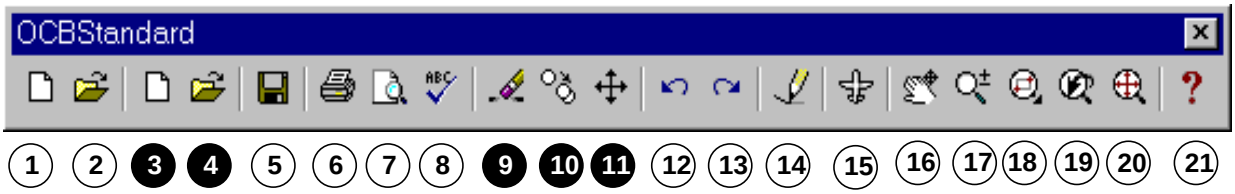


Icon	Description
1	Add Signal to Drawing
2	Delete Down Stream Segment - Removes the selection and all signals downstream or to the right of the selection.
3	Bend an Existing Segment - Adds a junction to a segment.
4	Move Segment or Junction of an Existing Signal
5	Set Tracking for an Existing Signal
6	Clear Tracking Along an Existing Signal
7	Verify an Existing Signal
8	Highlight an Existing Signal
9	Displays online Help

2-5.12. Standard Toolbar

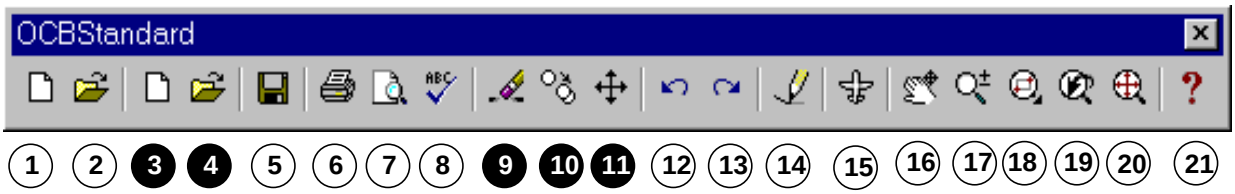
The Standard toolbar provides quick access to the basic drawing functions needed to create Control Sheets.

Table 2-13. Standard Toolbar



Icon	Description
1	New Drawing - Open a new AutoCAD drawing.
2	Open Drawing - Open an existing AutoCAD drawing.
3	New Control Sheet - Open a new Control Builder drawing that is formatted as an Ovation NT Control Builder drawing (Control Builder function).
4	Open Control Sheet - Open an existing Control Builder drawing that is formatted as an Ovation NT Control Builder drawing (Control Builder function).
5	Save Drawing - Saves the drawing and any edits to the database.
6	Print - Prints the drawing.
7	Print Preview - Displays drawing (black on white) without grid lines.
8	Spelling - Spell checker.
9	Erase Objects - Deletes “selected” objects (algorithms, signals, pins) (Control Builder function).
10	Copy Objects - Used for copy-paste operations, using left/right mouse buttons (Control Builder function).
11	Move Objects - Moves “selected” objects in drawing (Control Builder function).
12	Undo - Removes all edits in a session, one at a time, from last edit to first.
13	Redo - Removes only the last undo.
14	Redraw All - Refreshes entire drawing without saving it to the database.
15	Aerial View - Navigation and magnification tool that displays view of drawing in a separate window.
16	Pan Realtime - Moves view of drawing, but scale remains the same.

Table 2-13. Standard Toolbar (Cont'd)

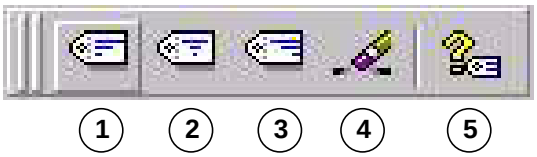


Icon	Description
17	Zoom Realtime - Uses cursor as a center focused cross-hair on the object that is being zoomed.
18	Zoom Window - Uses cursor to put a box around the object that is to be zoomed.
19	Zoom Previous - Returns to the last zoom operation.
20	Zoom Extents - Zooms the drawing to a full-view display.
21	Help - Provides AutoCAD Help.

2-5.13. Tags Toolbar

The Tags toolbar provides tools for using tags in a Control Sheet. Refer to Section 3 for additional information on tags

Table 2-14. Tags Toolbar



Icon	Description
1	Add Point Tag (Left Justified)
2	Add Point Tag (Center Justified)
3	Add Point Tag (Right Justified)
4	Delete Point Tag
5	Displays online Help

2-6. AutoCAD Pull-Down Menus

AutoCAD provides pull-down menus at the top of the main drawing window (see Figure 2-3) Control Builder menus are also included in the Menu Bar.

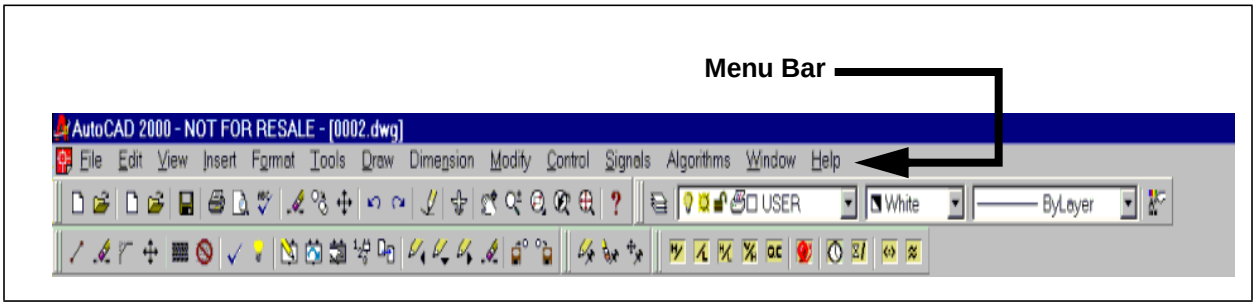


Figure 2-3. Menu Bar

AutoCAD menus are available to the Control Builder user, but their use is typically not recommended. These menus are listed below and are illustrated in Figure 2-4. For additional information about these menus, consult the AutoCAD manuals.

- File
- View
- Insert
- Format
- Tools
- Draw
- Dimension
- Modify
- Window
- Help

These AutoCAD menus are shown in the figure below.

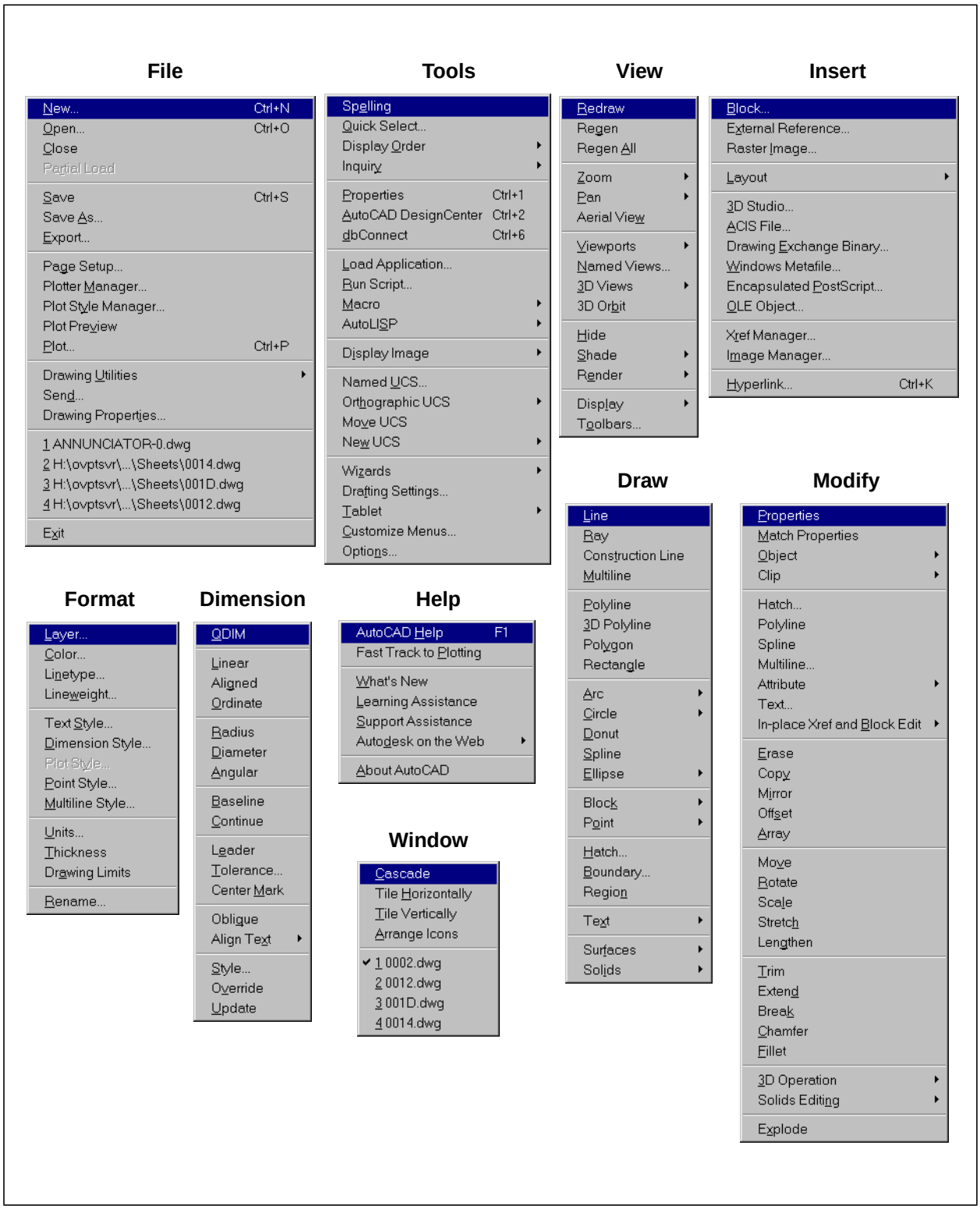


Figure 2-4. AutoCAD Menus

2-7. Control Builder Menus

The Control Builder function menus are:

- Edit (Section 2-7.1)
- Control (Section 2-7.2)
- Signals (Section 2-7.3)
- Algorithms pull-down menu (Section 2-7.4)
- Algorithm on-screen menu (Section 2-7.5)

Note

If Control Builder menus should be accidentally removed from the pull-down menu bar, a message will appear instructing you to **restart** AutoCAD. This will reconcile the Control Builder menu display with AutoCAD and the menus will appear again.

2-7.1. Edit Menu

The Edit menu provides five basic AutoCAD functions along with OCB functions.

Figure 2-5 illustrates the Edit menu and Table 2-15 defines the menu functions

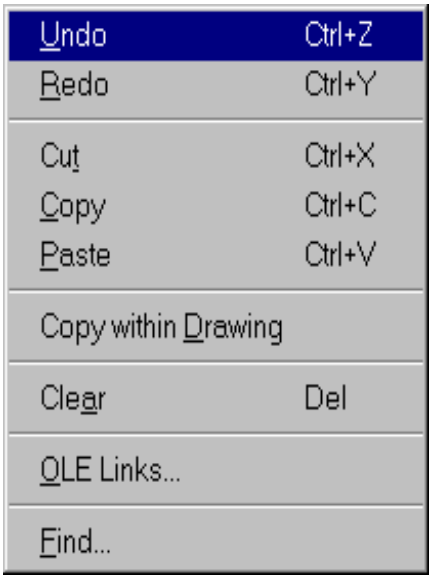


Figure 2-5. Edit Menu

Table 2-15. Edit Menu Functions

Function	Description
Undo	Clears the last edit. (AutoCAD function)
Redo	Redraws the last edit that was removed with the Undo command. (AutoCAD function)
Cut	Removes selected item(s) from drawing and puts into Scratchpad.
Copy	Copies selected item(s) from drawing and puts into Scratchpad.
Paste	Pastes item(s) stored in Scratchpad into drawing. Unlimited number of paste operations allowed.
Copy within Drawing	Copies selected item(s) from a drawing into the same drawing without storing the item(s) in Scratchpad.
Clear	Deletes selected item(s). (AutoCAD function)
OLE Links	Object Linking and Embedding links. AutoCAD feature used to combine data from different applications into one document. (AutoCAD function)
Find	Locates specified items. (AutoCAD function)

2-7.2. Control Menu

The Control menu provides functions that are used to edit and configure the Control sheets. It is typically used for operations that manipulate more than one object.

When an item is selected from the Control menu, a dialog box appears that enables you to define or edit some component of the Control Sheet.

Figure 2-6 illustrates the Control menu and Table 2-16 defines the menu functions.

Figure 2-6. Control Menu

Table 2-16. Control Menu Functions

Function	Description
Library	**Import Control** - Imports control or drawing items from a library drawing file into a sheet being edited. **Export Control** - Exports control or drawing items from a drawing being edited into a library drawing file for future use in another drawing.
Title Box	**Edit** - Displays a Sheet Parameters dialog box used to edit the parameters in the Title Box on the sheet. **Replace** - Replace Title Box and Disclosure statement with D:\OvPtSvr\System\template.dwg. **Add Text** - Add dynamic text to drawing. Text will be updated as the Title Box is modified.
Points	**Edit Output Points** - Displays a Point Edit dialog box used to edit a point name and the point bit. **Connector Where Used** - Displays "Where Used" information for a user defined point. **Create User Points** - Select to create user-defined points. **Security** - Displays the Enable Point Security dialog box.
Audit Sheet	Checks for errors in sheet. Displays a dialog box of syntax errors in algorithms.
Print	**Functional** - Prints the current functional drawing or sheet just as it is displayed in the Control Builder window. **Connectors** - Prints all the information about the page connectors on the sheet. **Details** - Prints all the details about the sheet. **Titles** - Prints all the sheet titles for a Controller. This can be used as a Table of Contents for the project.
Find	**Algorithm** - Displays a window containing a list of algorithms. **Point** - Displays a window containing a list of points.
Configuration	Displays a Configuration dialog box containing six tabs used to configure: Database Connections Options Project Details Signal Display Plot Details Text Defaults
Online Help	Displays online help for the Control Builder.

2-7.3. Signals Menu

The Signals menu provides functions that are used to implement or edit the control signals that connect algorithms on a Control Sheet. Figure 2-7 illustrates the Signals menu and Table 2-17 defines the menu functions.

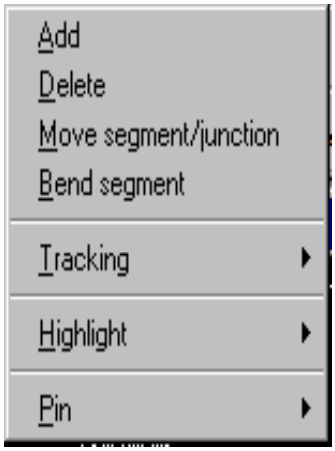


Figure 2-7. Signals Menu

Table 2-17. Signals Menu Functions

Function	Description
Add	Adds a signal segment to a pin or existing signal. Signal lines typically appear as green (tracking), blue (digital), or white (analog) dotted lines.
Delete	Deletes a segment and all downstream segments.
Move Segment/Junction	Moves a signal segment or junction. Useful when signals need minor modifications.
Bend Segment	Add a junction in the middle of an existing signal.
Tracking	**Set** - Sets tracking relationship between two algorithms. White colored lines change to green. **Clear** - Removes tracking from a signal line. Green colored lines change to white. **Clear All** - Clear all the tracking on a sheet.
Highlight	**Set** - Changes the color of the selected signal to purple. Useful when determining where a signal is connected. **Clear** - Removes the highlight color from the selected signal.
Pin	**Add** - Adds a pin to an algorithm block. **Delete** - Removes a pin from an algorithm block. **Move** - Moves a pin from an algorithm block.

2-7.4. Algorithms Pull-down Menu

Algorithms can be selected from the Algorithm tool bars, the pull-down menu, and the on-screen menus. The Algorithms pull-down menu provides functions that are used to add or edit the algorithms on the Control Sheets.

The algorithms are grouped by functions that are listed in the menu. These algorithm groups are based on functions defined in "Ovation Algorithms Reference Manual" (R3-1100). Refer to R3-1100 for complete algorithm descriptions.

Figure 2-8 illustrates the Algorithms menu and Table 2-18 defines the menu items.

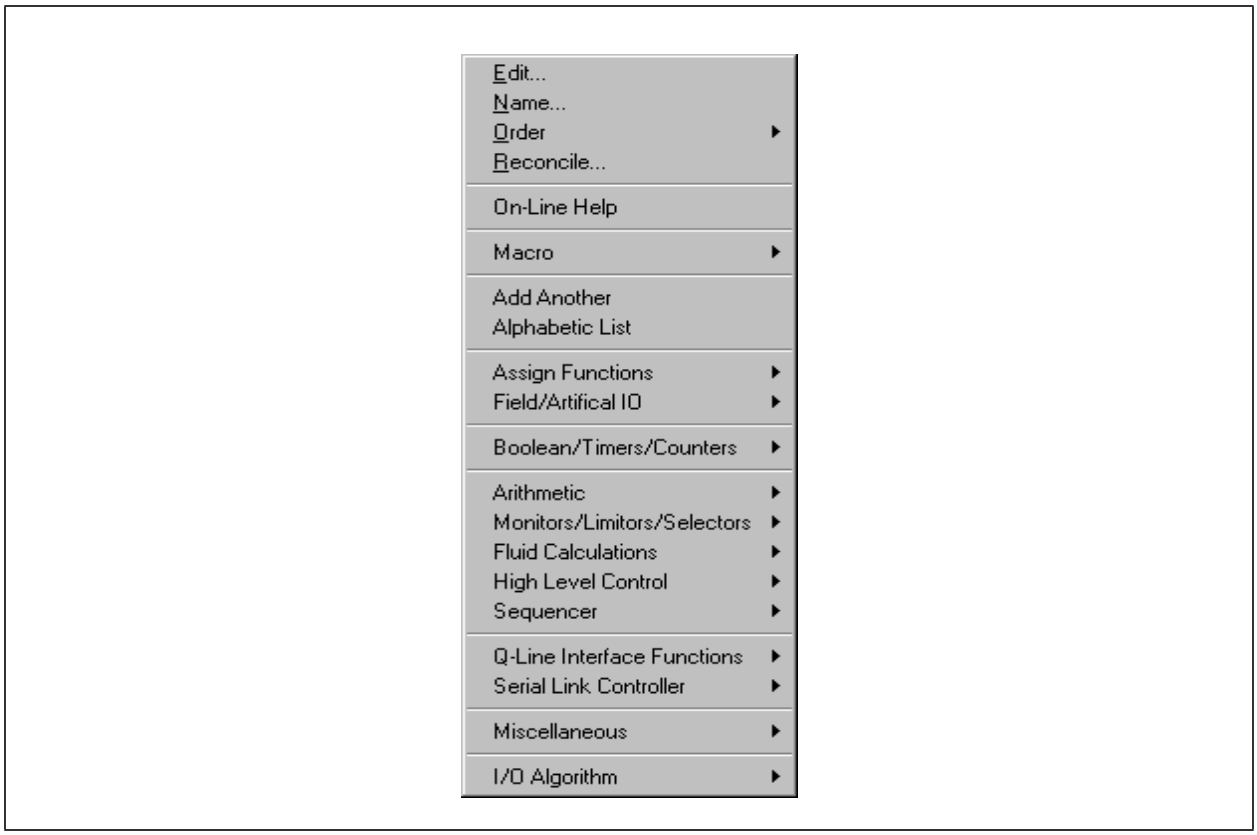


Figure 2-8. Algorithms Pull-Down Menu

Table 2-18. Algorithms Pull-Down Menu Functions

Function	Description
Edit	Displays the Edit Algorithm dialog box used to edit algorithm parameters and outputs. See Section 3 for procedure.
Name	Used to name an algorithm.
Order	Defines the execution order for the algorithms on the sheet. **Automatic** - Orders the algorithms on the drawing automatically. **User Defined** - Orders the algorithms on the drawing according to a custom ordering scheme created in the Order Algorithms dialog box. **View** - Displays the current algorithm ordering scheme for the drawing.
Reconcile	Reconcile tuning changes from database into sheet.
Online Help	Displays online help for the Control Builder.
Macro	**Define a macro** - Creates a new macro or edits an existing one. **Explode a macro** - Breaks a macro into its original algorithms.
Add Another	Adds another algorithm to the sheet that is the same as the last algorithm that was added to the sheet.
Alphabetic List	Displays the Select Function Name dialog box that contains an alphabetized list of all the algorithms. **Note** Some algorithms in this list are no longer part of the standard set of algorithms. Attempting to add them to a control sheet will have no impact on the sheet.
Assign Functions	Displays various dialog boxes that contain pictures of algorithm symbols that can be selected and added to the drawing. The algorithm choices are: Assign Value (**ASSIGN** algorithm) Packed to Analog (**SPTOSA** algorithm) Analog to Packed (**SATOSP** algorithm) Input N BCD Digits (**BCDNIN** algorithm) Output N BCD Digits (**BCDNOUT** algorithm) Point Status (**PNTSTATUS** algorithm) Drop Status (**DROPSTATUS** algorithm) 16 Digitals to Packed (**PACK16** algorithm) Packed to 16 Digitals (**UNPACK16** algorithm) Latch Point Quality (**LATCHQUAL** algorithm)

Table 2-18. Algorithms Pull-Down Menu Functions (Cont'd)

Function	Description
Field/Artificial IO	Displays various dialog boxes that contain pictures of algorithm symbols that can be selected and added to the drawing. The algorithm choices are: Analog Value Generator (**AVALGEN** algorithm) Digital Value Generator (**DVALGEN** algorithm) Keyboard Interface (**KEYBOARD** algorithm) Manual/Auto Mode (**MAMODE** algorithm) Manual/Auto Station (**MASTATION** algorithm) Set Point Interface (**SETPOINT** algorithm) Hard Analog/Digital Trend (**ATREND** algorithm) Write Analog Value (**FIELD** algorithm) RPA Count (**RPACNT** algorithm) X3 Step (**X3STEP** algorithm)
Boolean/Timers/Counters	Displays various dialog boxes that contain pictures of algorithm symbols that can be selected and added to the drawing. The algorithm choices are: Logical And (**AND** algorithm) Logical Not (**NOT** algorithm) Logical Or (**OR** algorithm) Logical Exclusive Or (**XOR** algorithm) Flip Flop (**FLIPFLOP** algorithm) Alternate Action Flip Flop (**AAFLIPFLOP** algorithm) Off Delay Timer (**OFFDELAY** algorithm) On Delay Timer (**ONDELAY** algorithm) One Shot Timer (**ONESHOT** algorithm) Counter (**COUNTER** algorithm) Pulse Counter (**PULSECNT** algorithm) Digital Counter (**DIGCOUNT** algorithm) Truth Table (**TRUTHTABLE** algorithm)

Table 2-18. Algorithms Pull-Down Menu Functions (Cont'd)

Function	Description
Arithmetic	Displays various dialog boxes that contain pictures of algorithm symbols that can be selected and added to the drawing. The algorithm choices are: Absolute Value (**ABSVALUE** algorithm) AntiLogarithm (**ANTILOG** algorithm) Logarithm (**LOG** algorithm) Natural Logarithm (**NLOG** algorithm) Square Root (**SQUAREROOT** algorithm) Cosine (**COSINE** algorithm) ArcCosine (**ARCCOSINE** algorithm) Sine (**SINE** algorithm) ArcSine (**ARCSINE** algorithm) Tangent (**TANGENT** algorithm) ArcTangent (**ARCTANGENT** algorithm) Gain Bias Single Point (**GAINBIAS** algorithm) Sum 4 Point Together (**SUM** algorithm) Multiply 2 Points (**MULTIPLY** algorithm) Divide 2 Points (**DIVIDE** algorithm) Function Generator (**FUNCTION** algorithm) 5th Order Polynomial (**POLYNOMIAL** algorithm) Average up to 8 Analogs (**QAVERAGE** algorithm) Rate Change (**RATECHANGE** algorithm) Reset Sum (**RESETSUM** algorithm) Running Average (**RUNAVERAGE** algorithm) Smooth Value Transform (**SMOOTH** algorithm)
Monitors/Limiters/Selectors	Displays various dialog boxes that contain pictures of algorithm symbols that can be selected and added to the drawing. The algorithm choices are: Transfer (**TRANSFER** algorithm) Selector (**SELECTOR** algorithm) High Monitor (**HIGHMON** algorithm) High Low Monitor (**HIGHLOWMON** algorithm) Low Monitor (**LOWMON** algorithm) Rate Monitor (**RATEMON** algorithm) Quality Monitor (**QUALITYMON** algorithm) Hi Select (**HISELECT** algorithm) Low Select (**LOSELECT** algorithm) Median Select (**MEDIANSEL** algorithm) 2 Transmitter Select (**2XSELECT** algorithm) Compare Analog Values (**COMPARE** algorithm) Deadband Equals (**DBEQUALS** algorithm) Alarm Monitor (**ALARMMON** algorithm) Rate Limit (**RATELIMIT** algorithm) Translator (**TRANSLATOR** algorithm)

Table 2-18. Algorithms Pull-Down Menu Functions (Cont'd)

Function	Description
Fluid Calculations	Displays various dialog boxes that contain pictures of algorithm symbols that can be selected and added to the drawing. The algorithm choices are: Gas Flow Compensation (**GASFLOW** algorithm) Steam Flow Compensation (**STEAMFLOW** algorithm) Level Compensation (**LEVELCOMP** algorithm) Compressed Liquid Region (steamtables) Calculate Entropy/Enthalpy (**HSCLTP**) Calculate Volume (**VCLTP**) Saturated Liquid Region (steamtables) Calculate Enthalpy (**HSLT**) Calculate Entropy (**SSLT**) Calculate Volume (**VSLT**) Calculate Pressure (**PSLT**) Calculate Temperature Given Pressure (**TSLP**) Calculate Temperature Given Enthalpy (**TSLH**) Saturated Vapor Region (steamtables) Calculate Pressure (**PSVS**) Calculate All Given Pressure (**HSTVSVP**) Super Heated Region (steamtables) Calculate Entropy, Enthalpy and Volume (**HSVSSTP**)
High Level Control	Displays various dialog boxes that contain pictures of algorithm symbols that can be selected and added to the drawing. The algorithm choices are: Balance Downstream Algorithms (**BALANCER** algorithm) First In First Out (**FIFO** algorithm) Lead Lag Compensator (**LEADLAG** algorithm) PID Controller (**PID** algorithm) PID Controller w/Feed Forward (**PIDFF** algorithm) Interpolation Function (**INTERP** algorithm) Predictor Function (**PREDICTOR** algorithm) Transport Time Delay (**TRANSPORT** algorithm)
Sequencer	Displays various dialog boxes that contain pictures of algorithm symbols that can be selected and added to the drawing. The algorithm choices are: Analog Drum (**ANALOGDRUM** algorithm) Digital Drum (**DIGDRUM** algorithm) Master Sequencer (**MASTERSEQ** algorithm) Device Sequencer (**DEVICESEQ** algorithm) Automatic Step Timer (**STEPTIME** algorithm)

Table 2-18. Algorithms Pull-Down Menu Functions (Cont'd)

Function	Description
Q-Line Interface Functions	Displays various dialog boxes that contain pictures of algorithm symbols that can be selected and added to the drawing. The algorithm choices are: QPA Write Command (**QPACMD** algorithm) QPA Write Comparator (**QPACMPAR** algorithm) QPA Read Status (**QPASTAT** algorithm) QSD Write Demand (**QSDDEMAND** algorithm) QSD Read Mode (**QSDMODE** algorithm) QSR M/A Interface (**QSRMA** algorithm) QVP (**QVP** algorithm) XMA2 - Soft/Hard Q-line M/A I/F (**XMA2** algorithm) XML2 - Soft/Hard Q-line Manual Loader (**XML2** algorithm)
Serial Link Controller	Displays various dialog boxes that contain pictures of algorithm symbols that can be selected and added to the drawing. The algorithm choices are: Read Analog Inputs (**SLCAIN** algorithm) Read Digital Inputs (**SLCDIN** algorithm) Read Packed Inputs (**SLCPIN** algorithm) Write Analog Outputs (**SLCAOUT** algorithm) Write Digital Outputs (**SLCDOUT** algorithm) Write Packed Outputs (**SLCPOUT** algorithm) Read SLC Status (**SLCSTATUS** algorithm)
Miscellaneous	Displays various dialog boxes that contain pictures of algorithm symbols that can be selected and added to the drawing. The algorithm choices are: Time Functions System Time (**SYSTEMTIME** algorithm) Time Change (**TIMECHANGE** algorithm) Time Detector (**TIMEDETECT** algorithm) Time Monitor (**TIMEMON** algorithm) Nuclear Applications Annunciator (**ANNUNCIATOR** algorithm) Digital Rod Pos. Indicator (**DRPI** algorithm) Transfer by Index (**TRNSFNDX** algorithm)
I/O Algorithm	Displays various dialog boxes that contain pictures of connector symbols that can be selected and added to the drawing. The connector choices are: Input (**INPUT** connectors) Output (**OUTPUT** connectors)

2-7.5. Algorithms On-screen Menu

The on-screen algorithm menu appears to the right of the main drawing window of the Control Builder (refer to Figure 2-2 for the location of this menu). This menu can also be used to select algorithms for placement on Control Sheets. This menu is shown in Figure 2-9. Menu choices are described in Table 2-19.

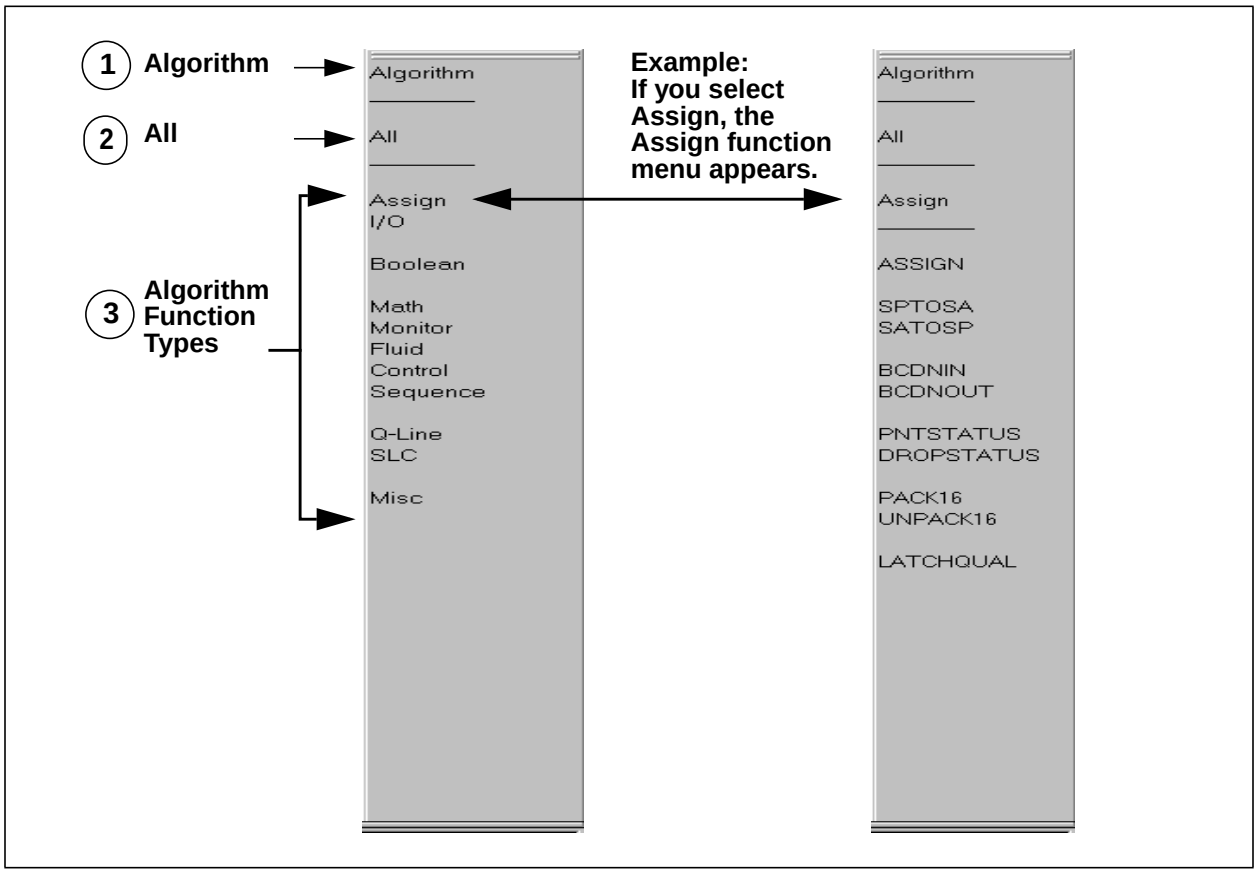


Figure 2-9. On-Screen Menu

Table 2-19. Algorithms On-Screen Menu Functions

Function	Description
1. Algorithm	Name of menu. Also used to return to this screen from an algorithm function sub-screen.
2. All	Displays the Select Function Name dialog box which contains a list of all the algorithms.
3. All the different algorithm function types.	Select a function type to display the algorithms that are available for that function type.

2-8. Command Line Interface

The command line at the bottom of the main drawing window can be used to access many of the functions that the menus and toolbars perform (refer to Figure 2-2 for the location of the command lines).

It is designed to work the way you work, providing options for each command you enter. This allows you to continue working quickly since options are presented immediately.

When you enter a command, the options you can choose from are displayed in a pop-up dialog box or in brackets on the screen.

Refer to Section 4 for information about using the Control Builder command lines.

Section 3. Components of the Functional Drawings

3-1. Section Overview

This section describes the components of the functional drawings (or sheets), and how the Control Builder uses these components to create the drawings needed by the Controller.

This section includes the following:

- AutoCAD Objects (Section 3-2).
- Title Boxes for Functional Drawings (Section 3-3).
- Coordinate System (Section 3-4).
- Algorithms (Section 3-5).
- Page Connectors (Section 3-6).
- Pins (Section 3-7).
- Signals (Section 3-8).
- Tags (Section 3-9).

3-2. AutoCAD Objects

All AutoCAD drawing objects are valid in the Control Builder, but typically, only the text objects are used. Refer to the Auto CAD documentation for additional information.

3-3. Title Boxes for Functional Drawings

When creating a new drawing within the Control Builder, a frame and title box are automatically created for the drawing. The initial values for the frame and title box are defined in the Controller configuration file. The following sections describe how to edit those elements.

The Frame Template file is located in the following path:

D:\OvPtSvr\<Your SystemName>template.dwg

This file can be edited through AutoCAD.

3-3.1. Drawing Frame

The Control Builder creates a standard frame for each drawing sheet (see Figure 3-1). The frame is composed of:

- A box around the entire drawing sheet.
- A group of smaller boxes in the lower right side corner of the drawing sheet.
- The Westinghouse Process Control, Inc. name and Proprietary Statement in the smaller boxes. The Statement can be edited through the **template.dwg** file.

The larger box serves as a border around the drawing, and the smaller boxes provide a place to enter information about the drawing (title, drawing number, and so forth).

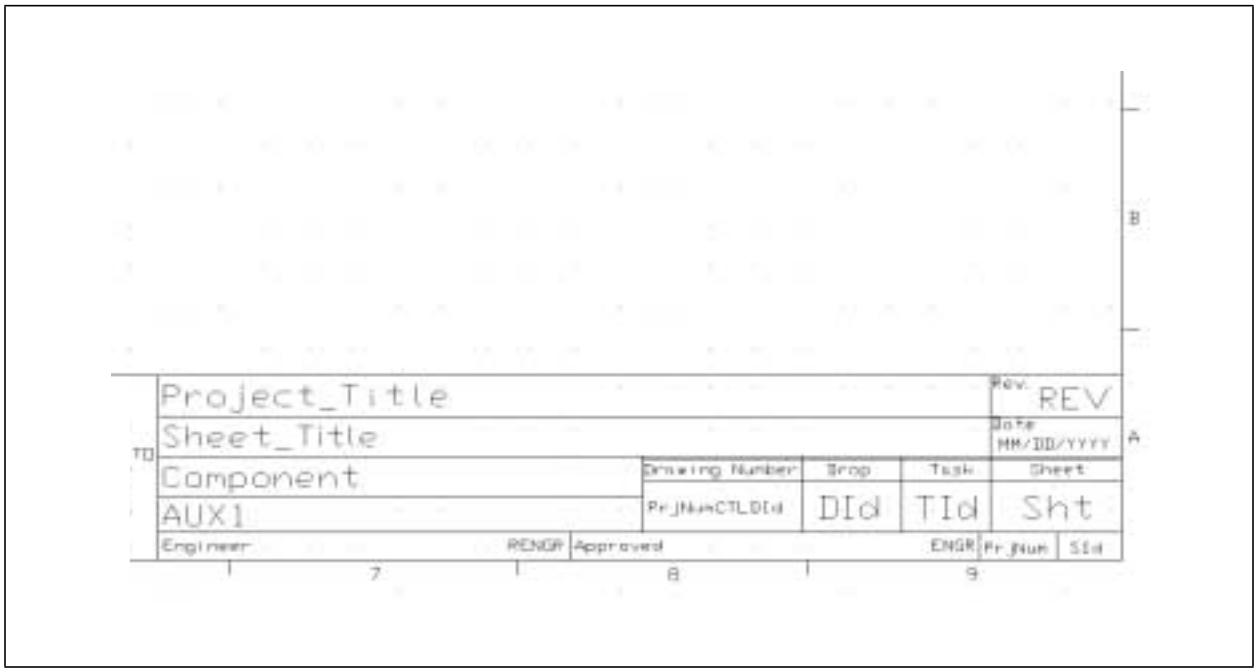


Figure 3-1. Title Box Sample

3-3.2. Editing Title Box Fields

Use the following procedure to add or change information in the title box for one drawing:

1. Select the **Control pull-down menu** from the Control Builder main window.
2. Select the **Title Box** item.
3. Select **Edit**.

   The Sheet Parameters dialog box appears (see Figure 3-2).

Note

When a New drawing is selected, the Sheet Parameters dialog box appears automatically.

.

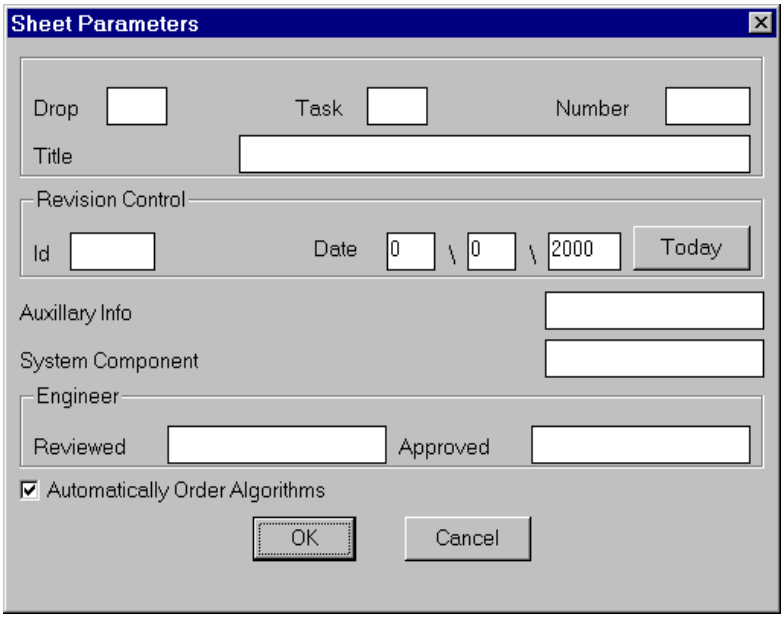


Figure 3-2. Sheet Parameters Dialog Box

4. Enter the desired information in the appropriate entry fields. These fields correspond to the fields in the Title Box (Figure 3-1). Refer to Table 3-1 for descriptions of the fields.

Note

The drawing number (.dwg) is assigned by OCB.

Table 3-1. Sheet Parameters for Title Box

Entry Field	Description
Drop	Drop number (1 -254) for the Controller
Task	Control Task Area in Controller (1 -5) that determines how frequently the points in the sheet will be scanned. Task 1 = every 0.1 of a second. Task 2 = every 1 second, Tasks 3,4, and 5 are user-defined.
Number	Sheet number
Title	Title of drawing named by user
ID	Revision number of drawing
Date	Date drawing was created
Auxiliary Info	Additional title information

Table 3-1. Sheet Parameters for Title Box (Cont'd)

Entry Field	Description
System Component	Additional title information
Reviewed	Name of engineer who reviewed drawing
Approved	Name of engineer who approved drawing
Automatically Order Algorithms	When checked, algorithms will be automatically ordered by the Control Builder. If not checked, the title box lines turn magenta to indicate that algorithms will have to be manually ordered.
OK button	Saves the title box information and any changes
Cancel button	Cancels any current changes

3-4. Coordinate Systems

Ovation NT Control Builder has two types of coordinate systems that it uses to determine the locations of objects on the functional drawing.

The first type uses the grid that overlays the main drawing screen (Figure 3-3). The grid consists of numbers 0 - 9 (left to right) at the top/bottom of the screen, and letters A - H (bottom to top) at the sides of the screen.

This grid is used to identify the positions of objects on the drawings, and identifies the algorithm location for the Edit Algorithm and Order Algorithm dialog boxes. It is also very useful as a troubleshooting feature by detecting and locating algorithms with errors.

This coordinate type uses the format **LN**,

where
L = letter (A - H)
N = number (0 - 9)

An example of a coordinate value would be **C2** (shown in Figure 3-3). This method is helpful, but is not as accurate as the second type of coordinate system.

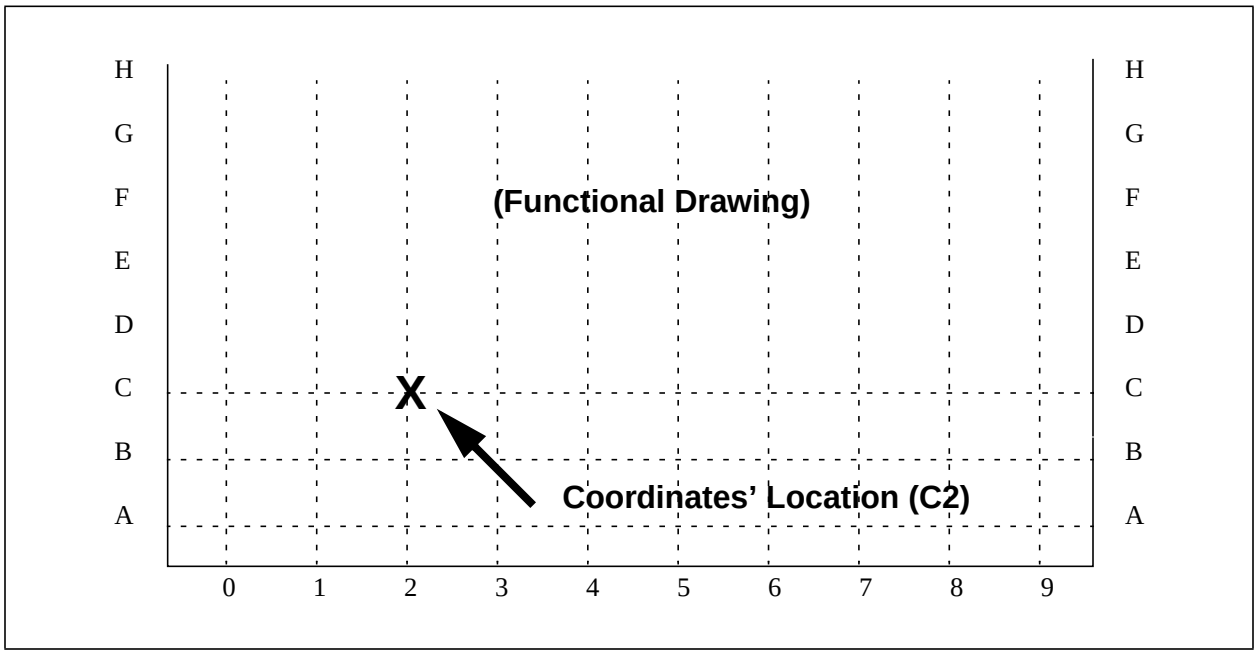


Figure 3-3. Screen Coordinates (A - H, 0 - 9)

The second type of coordinate system is a fixed Cartesian system called the World Coordinate System (WCS). This system is very accurate and uses values that do not appear along the sides of the drawing window. They are part of the AutoCAD system and appear in the lower left corner of the drawing window (see Figure 3-4). The numbers change to indicate the location of the cursor as you move it around the screen.

This coordinate type uses the format **`n.nnnn, m.mmmm, 0.0000`**,

where
x.xxxx = x-coordinate value
y.yyyy = y-coordinate value
0.0000 = coordinate for third dimension figures (currently not used by OCB)

An example of a coordinate value would be **40.000, 39.5000** (shown in Figure 3-3). This method is used when writing script files since it provides a very accurate method for placing objects on a drawing (refer to Section 4 for information about using commands to write script files).

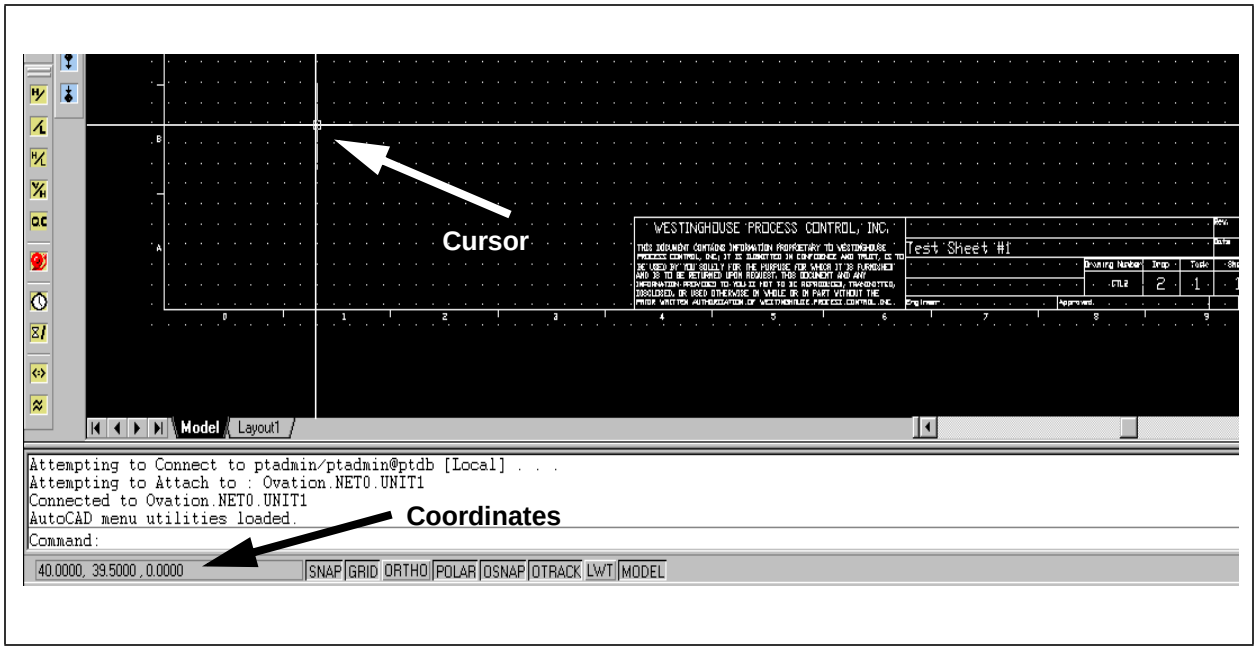


Figure 3-4. Screen Coordinates (40.0000, 39.5000, 0.0000)

3-5. Algorithms

Algorithms are mathematical formulas that define a specific control strategy. The Ovation NT Control Builder allows you to combine algorithms to create an entire control strategy for a system process. For complete information about algorithms, refer to the "Ovation Algorithms Reference Manual" (R3-1100).

Note

Page connectors are similar to algorithms, but are not used in control, and are not sent to the Controller. They are graphical representations that depict how signals are connected between sheets. See Section 3-6 for information about page connectors.

In the Monitor Graphics, OCB uses the following colors for an algorithm body to indicate the condition of the algorithm:

- White - analog value is normal or digital value is low
- Green - algorithm is tracking
- Red - analog is in manual or digital output is in high
- Orange - algorithm has reached its limit
- Cyan (blue green) - fast Boolean logic is calculated in the graphic

3-5.1. Algorithm Parts

When an algorithm is inserted into the Control Builder, it is composed of different parts (see Figure 3-5). The following is a list of possible parts:

- Algorithm Body -Inserted on the SYMBOLS layer of the diagram, a pictorial symbol that is used to recognize the algorithm.
- Algorithm Function Name - The algorithm function name, such as PID, is displayed on the FUNC_NAME layer.
- Algorithm Name - When assigned by the Control Builder, displays only **SSSSNNN** in the drawing (**SSSS** is the sheet name, and **NNN** is the order that the algorithm was placed on the sheet.) Entire name may also be entered by the user and prefixed with **OCB** (refer to Section 3-5.4 for additional information).
- Input and Output Pins

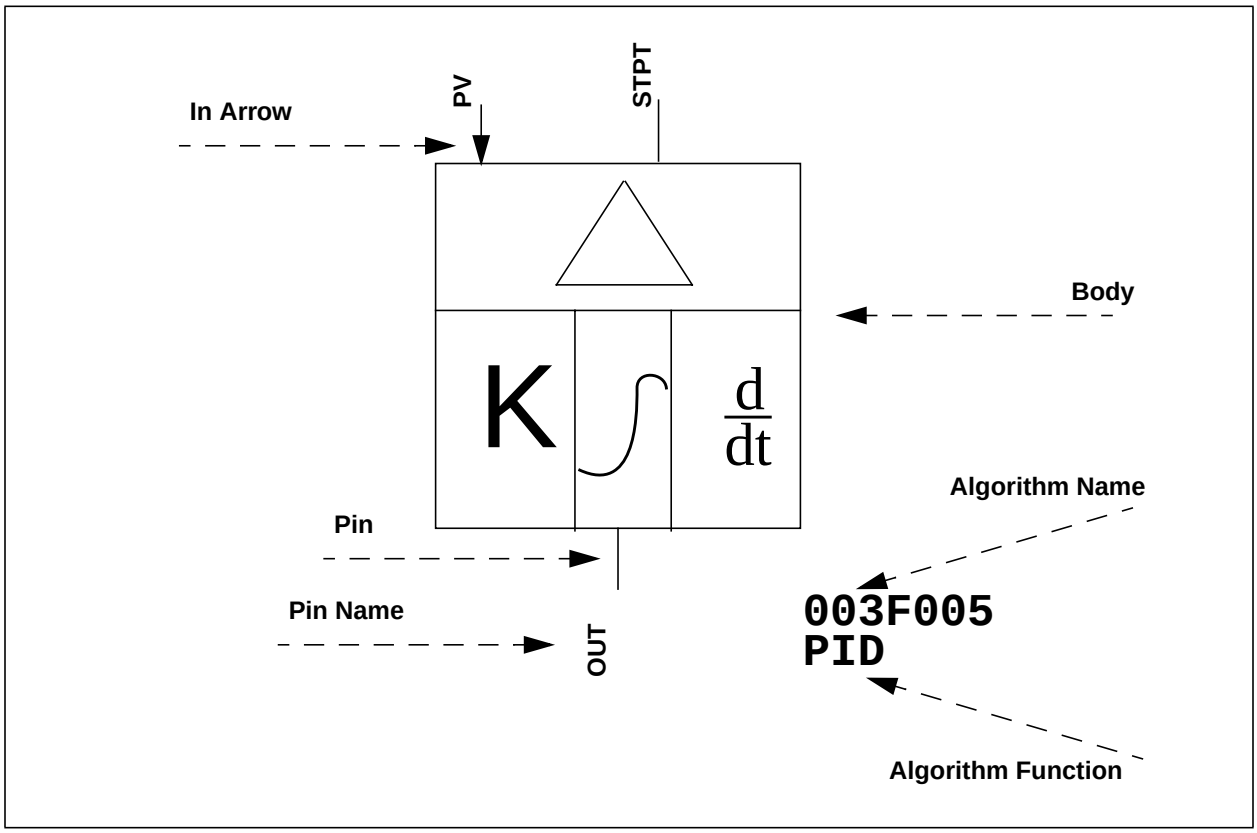


Figure 3-5. Example of an Algorithm View

3-5.2. Adding Algorithms

Algorithms can be added to a control sheet in various ways:

- Using the algorithm toolbars (Algorithm, analog, digital, or monitor as described in Section 2).
- Using the Algorithms pull-down menu.
- Using the Algorithm Command line (see Section 4 for command information).
- Using the Algorithm Screen menu.

Procedure for Toolbar

1. Use the desired **algorithm toolbar** (analog, digital, or monitor) to add an algorithm to an OCB control sheet.
2. Select the desired **algorithm icon**.

Note

When using the Algorithm toolbar, select the **Alphabetic List button**, and then select the desired algorithm.

3. Click in the **control sheet** where you want to place the algorithm.
4. The new algorithm will appear in the sheet.

Procedure for Pull-Down Menu

1. Use the **Algorithm** pull-down menu (shown in Figure 3-6) to add an algorithm to an OCB control sheet.

2. Select the **Alphabetic List** item or select the appropriate **algorithm function**. (Refer to Section 2 for details about the Algorithm pull-down menu.).

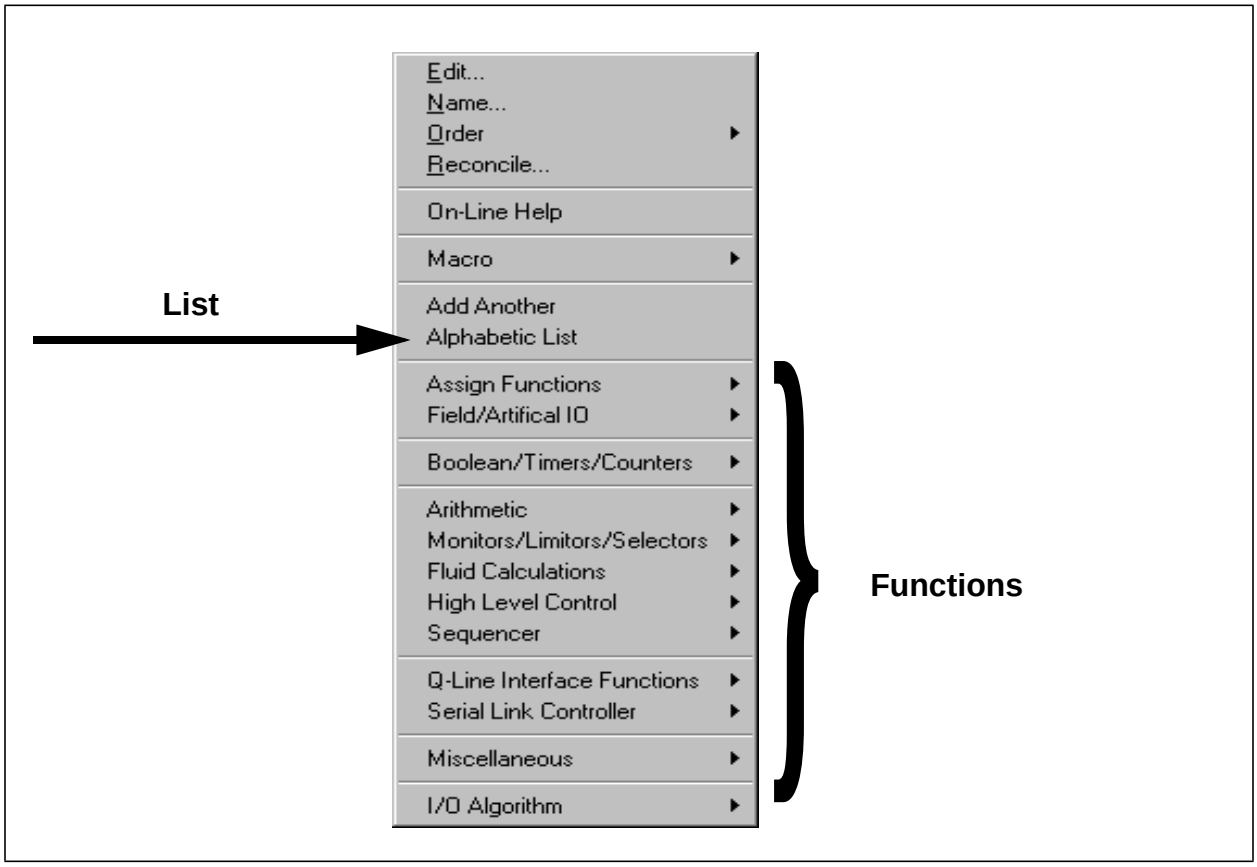


Figure 3-6. Algorithm Pull-down Menu

3. If you select one of the **algorithm functions**, skip to Step 5.

4. If you select the **Alphabetic List** item, a box containing the names (in alphabetical order) of all the algorithms appears. Select the **Standard** View Type to display a list of all the Standard algorithms. Select the **desired algorithm**. Proceed to Step 5.

Note

In order to add a macro to the sheet, select the **Macros** View Type and select the desired macro.

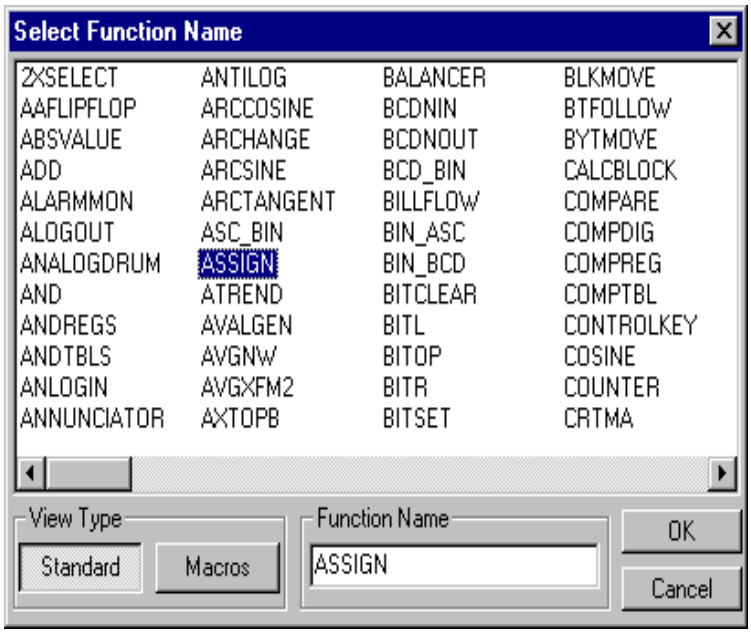


Figure 3-7. Alphabetic List

5. After you have selected an algorithm from the list or from the algorithm function choices, an algorithm choice display screen will appear containing all the different views for that algorithm (see Figure 3-8). Select the **desired algorithm view** and the **OK** button to place the algorithm on the right side of the control sheet.

Note

A choice display screen will **NOT** appear if the selected algorithm has only one possible view. Instead, the selected algorithm will be placed immediately on the control sheet.

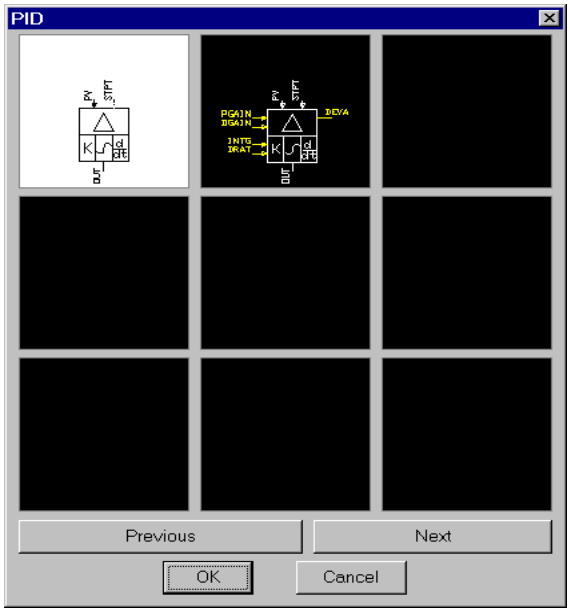


Figure 3-8. Algorithm Choice Display Screen (PID Example)

Procedure for On-Screen Menu

1. Use the **On-Screen menu** to add an algorithm to an OCB control sheet.
2. Select the desired **algorithm name** from the algorithm On-screen menu. The algorithm will become attached to the cursor.
3. Click in the **control sheet** where you want to place the algorithm.
4. The new algorithm will appear in the sheet.

3-5.3. Editing Algorithms

Algorithms can be edited in various ways:

- Using the Algorithm toolbar.
- Using the Algorithms pull-down menu.
- Using the Command line (see Section 4 for information on using Algorithm commands).

Procedure for Toolbar

1. Use the **Algorithm Toolbar** to edit an **algorithm** on an OCB control sheet.

Figure 3-9. Algorithm Toolbar

2. Select the **Edit icon** and the **algorithm** on the control sheet that is to be edited. The Edit Algorithm box appears (see Figure 3-10).
3. Make the desired changes (see Table 3-2 for field descriptions).

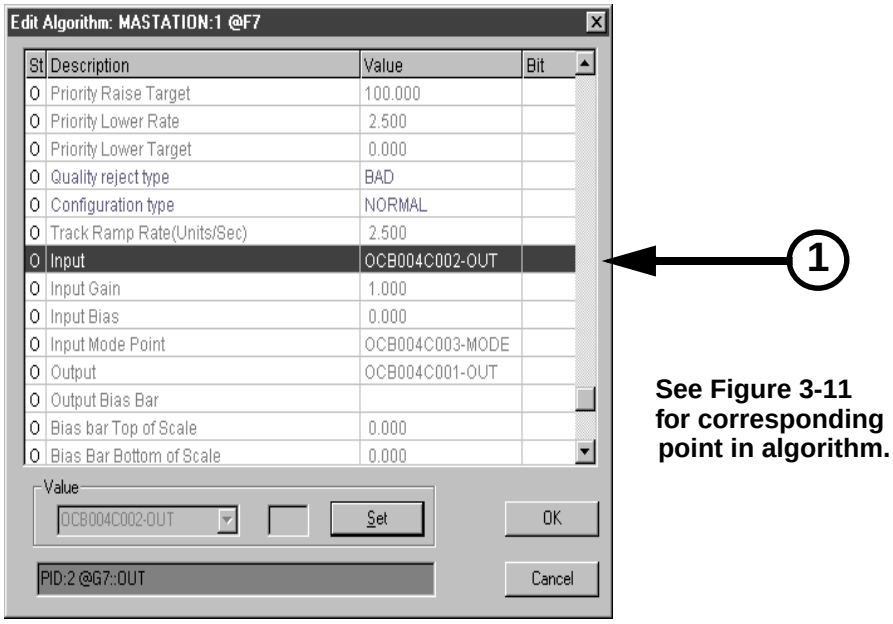


Figure 3-10. Edit Algorithm Box

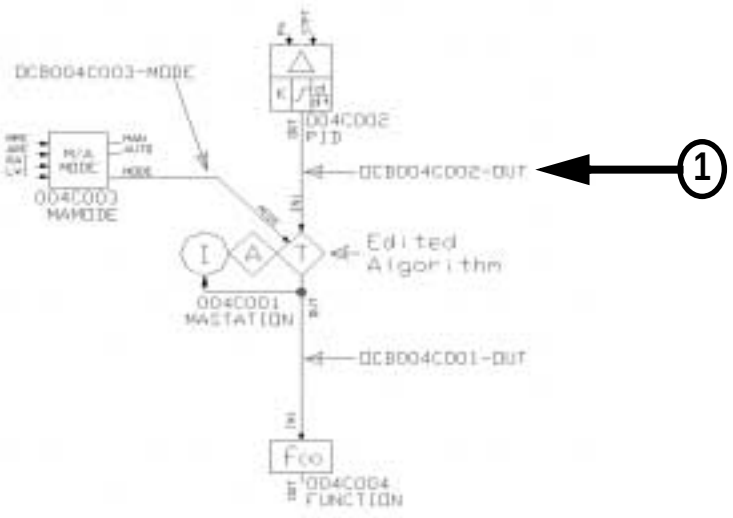


Figure 3-11. MASTATION Algorithm

Table 3-2. Edit Algorithm Box

Field	Description
Title	Identifies algorithm. For example, **MASTATION:1@F7** where: MASTATION = Name of algorithm function 1 = Unique identifier assigned by OCB, **NOT** the execution order. F7 = Coordinate location of algorithm
St	0 = Item is normal (green font) X = Item has an error (red font) Error messages are displayed in the bottom of the box. Refer to Section 1-5.3 for error message descriptions.
Description	Description of algorithm parameter. When parameter is selected, it is highlighted and a description flag appears. This flag defines what type of point is required as output for that parameter. Refer to "Ovation Algorithms Reference Manual" (R3-1100) for information about algorithm parameters. Each algorithm parameter is displayed in an appropriate color: where: Gray = Input Red = Output Green = Option selected from Value pull-down menu Blue = Actual numerical value of parameter
Value	Value of parameter or name of point. **Changing Values** 1. Select the desired **row**. 2. Change the **Value** in the Edit Box. 3. Press **Enter** to move to the next field.
Bit	Bit in question if item is a packed point
Up/Down	Displays the upstream (input) algorithm, and all the downstream (output) algorithms for the algorithm being edited.

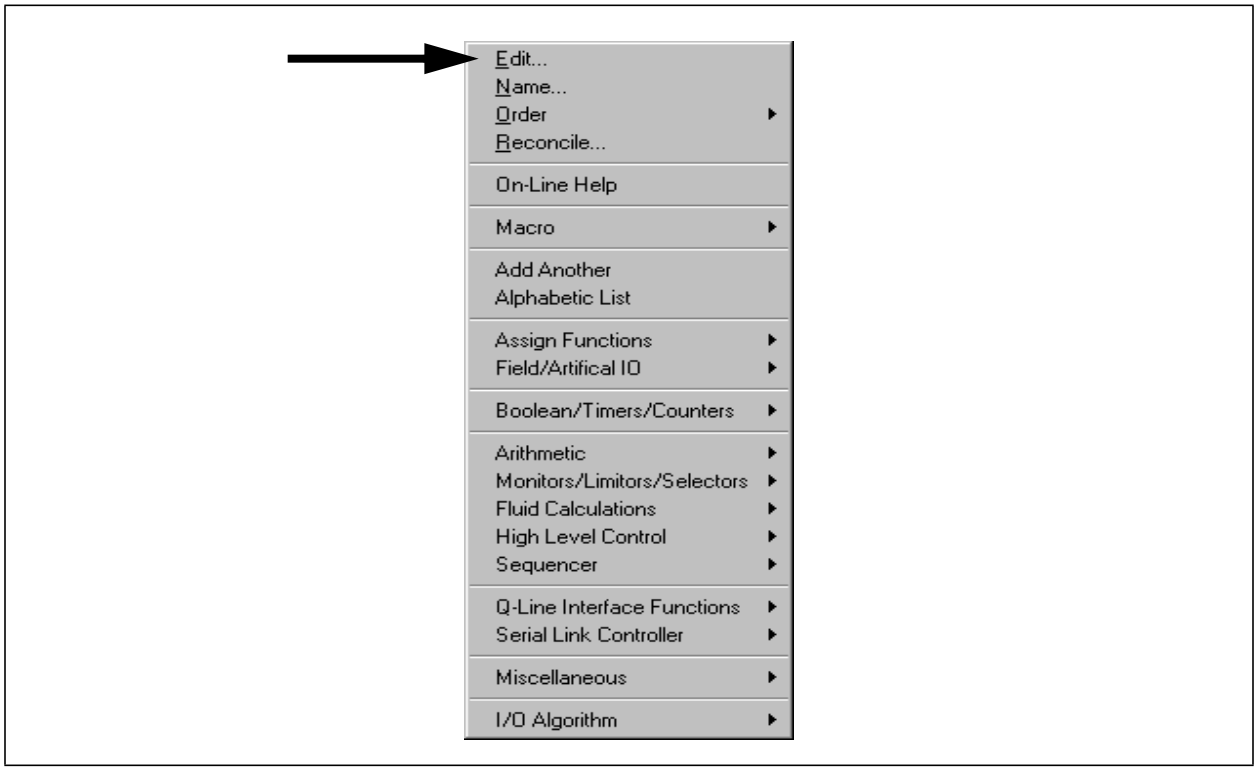
The Edit Algorithm box provides the following error checks:

- Checks for reasonable ranges
- Point error checking integrated to edit

The Edit Algorithm box auto-advances through the parameters.

Procedure for Pull-Down Menu

1. Use the pull-down **Algorithm** menu to edit an **algorithm** on an OCB control sheet.



2. Select the **Edit** item and the **algorithm** on the control sheet that is to be edited. The Edit Algorithm box appears (see Figure 3-10).

3. Make the desired changes (see Table 3-2 for field descriptions).

3-5.4. Naming Algorithms

The algorithm name is assigned to the algorithm by combining OCB and up to seven characters. The name can be changed if desired, and all default point names will be based on the user-defined algorithm name.

Guidelines for Naming Algorithms

1. In order to isolate control and graphic implementation, name any algorithm whose algorithm record will be used in a custom graphic (for example, Keyboards, Set Points, and M/A Stations).

2. The default point format for a **normal** algorithm is **OCBssssaaa**,

   where:
   OCB = Inserted by OCB
   ssss = Unique sheet identifier assigned by Control Builder (Hex)
   aaa = Unique algorithm identifier (Hex) based on the order in which the algorithm was placed on the sheet.

3. The point format for a **named** algorithm is **OCBnnnnnnn**,

   where:
   OCB = Inserted by OCB
   nnnnnnn = User-defined algorithm name (replaces the 7 character unique identifier used in default points).

4. The algorithm name is limited to 7 characters, but may be shorter. If the name is 7 characters, it must have one character that is not between 0 and 9, and not between A and F. This is to ensure that the Control Builder does not create another algorithm with the same name.

5. The algorithm's control record is created as a default point. Do NOT create a point in the algorithm record with the Developer Studio. OCB ignores algorithm records created by the user.

6. Default points will use the user defined name as the base, appending the parameter name to the end, that is, **OCBnnnnnnn-pppp**

   where:
   OCB = Inserted by OCB
   nnnnnnn = User-defined algorithm name
   pppp = Parameter name

3-5.5. Deleting Algorithms

Algorithms can be deleted in various ways:

- Using the OCB Standard toolbar.
- Using the Command line (see Section 4 for information on using the Algorithm commands).

Note

When you delete an algorithm, all signals connected to **output** pins will also be deleted.

Procedure for Toolbar

1. Use the **OCB Standard Toolbar** to delete an algorithm.

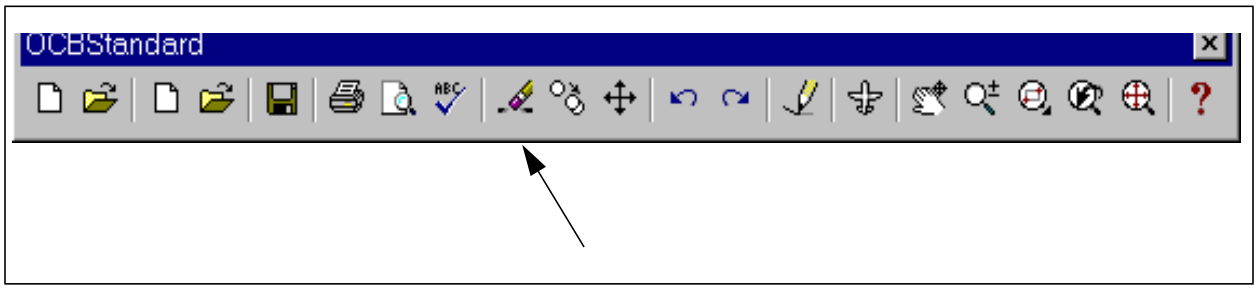


Figure 3-12. OCB Standard Toolbar

2. Select the **Eraser icon** and the **algorithm** on the control sheet that is to be deleted.
3. Make a square around the algorithm by clicking at one corner and then at the opposite corner. This will select the algorithm.
4. Press the **Enter** button and the algorithm will be deleted.

3-5.6. Ordering Algorithm Execution

Algorithm execution order within a sheet is ordered according to location and connections. This is done automatically by OCB when a sheet is saved, unless explicitly overridden by the user on a per sheet basis.

Algorithms can also have their order defined by the user

Use one of the following procedure to view or order the algorithms on a sheet:

- Use the Algorithm toolbar to view the current algorithm execution order.
- Use the Algorithms pull-down menu to order the algorithms.
- Use the Command line to order the algorithms (see Section 4 for information on using the Algorithm commands).

Note

If user-defined ordering is selected, the automatic ordering is **disabled** until automatic ordering is manually selected. Once the user-defined ordering is performed, Automatic Ordering at Save Time is disabled. This is denoted by a **magenta frame** around the algorithm.

In order to override user-defined ordering, select **Order** from the Algorithm pull-down menu, and then select **Automatic**.

Viewing the Algorithm Order

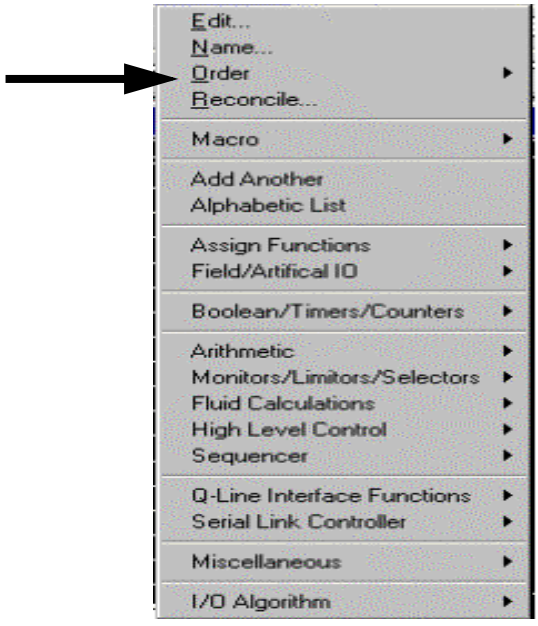
1. Use the **Algorithm Toolbar** to view the current algorithm execution order on an OCB control sheet.

2. Select the **Order Algorithms icon**. The algorithm order numbers are displayed on the control sheet in place of the algorithms. Algorithms that are not orderable are not numbered and will not be displayed. This includes:

   - Input/output algorithms. These algorithms do not execute in Controllers.
   - Fast Boolean algorithms (AND, OR, NOT, XOR) that are connected to another Fast Boolean algorithm. These algorithms are executed, as needed, to slow Fast Boolean algorithms that are ordered. Use a user-defined output point to manually order a Fast Boolean algorithm.

Defining the Algorithm Order

1. Use the **Algorithm** pull-down menu (shown in the following figure) to order the **algorithms** on an OCB control sheet.



2. Select the **Order** item.

3. If you want OCB to order the algorithms, select **Automatic**. OCB will number the algorithms according to the control logic on the sheet.

4. If you want to order the algorithms manually, select **User Defined.**

5. If you selected User Defined, the **Order Algorithms** dialog box appears (see Figure 3-13).

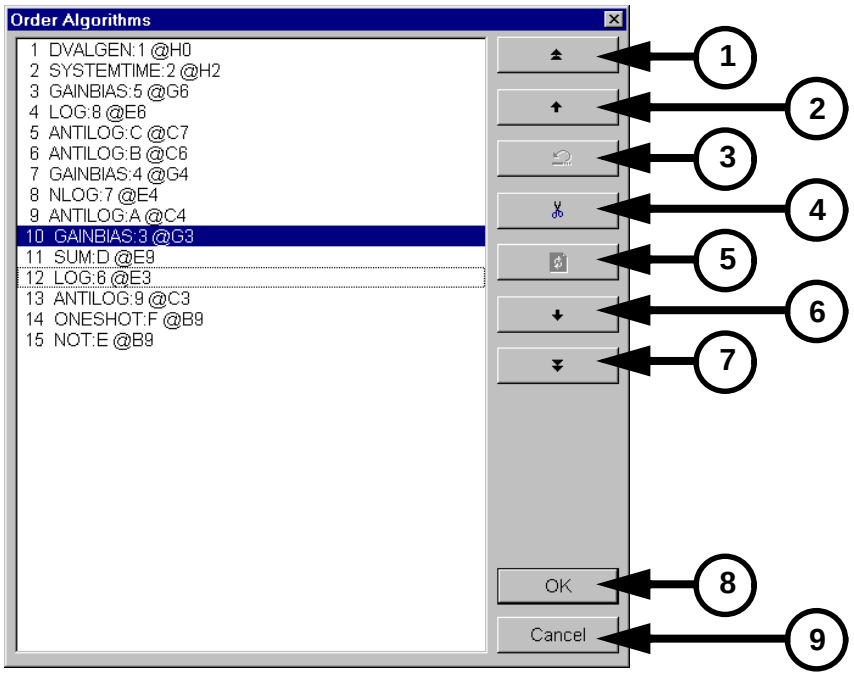


Figure 3-13. Order Algorithms Dialog Box

The Order Algorithms box contains a list of the names and locations of all the algorithms on the drawing sheet.The names are displayed in this format:

`N ALG:N @XY`

where **N** = execution order position of algorithm
ALG = algorithm function
N = unique HEX identifier set by OCB
XY = coordinates that define algorithm location on sheet

For example: **10 GAINBIAS:3 @G3** (as highlighted in Figure 3-13). In this example, the algorithm GAINBIAS will execute 10th on the sheet. It is identified by the number 3, and is located at the intersection of coordinates G and 3.

6. Arrange the algorithms in the desired execution order using the following keys (identified by arrows in Figure 3-13):

   - **1** = Moves selected algorithm(s) to top of list
   - **2** = Moves selected algorithm(s) one position higher
   - **3** = Undo changes
   - **4** and **5** = Not Applicable
   - **6** = Moves selected algorithm(s) one position lower
   - **7**= Moves selected algorithm(s) to bottom of list
   - **8** = Save changes
   - **9** = Cancels changes made after last save.

7. Select one or more lines by using the standard Windows technique: **Shift key** plus **Control key**.

8. Make the desired changes and select the **OK** button to save the changes.

3-5.7. Editing the CALCBLOCK(D) Algorithm

CALCBLOCK is a special algorithm designed to allow the user to solve mathematical equations within a control sheet. CALCBLOCK is edited through the CALCBLOCK Editor dialog box and available operations are listed in Table 3-3.

CALCBLOCKD is a special digital version of the CALCBLOCK algorithm and is designed to allow the user to solve logical operations (Boolean) within a control sheet. CALCBLOCKD is edited through the CALCBLOCKD Editor dialog box and available operations are listed in Table 3-4.

CALCBLOCK(D) algorithms can be cascaded together for more complex operations. Refer to "Ovation Algorithms Reference Manual" (R3-1100) for more information about CALCBLOCK(D).

Table 3-3. CALCBLOCK Operations

Keypad		Standard		Scientific	
Add	(a + b)	*Square Root	$\sqrt{a}$	*Cosine	(Cos (a))
Subtract	(a - b)	*Reciprocal	(l/a)	*Sine	(Sin (a))
Multiply	(a * b)	Max	(max (a,b))	*Tangent	(Tan (a))
Divide	(a / b)	Min	(min (a,b))	*Arccos	(arccos (a))
		*Negate	(-a)	*Arcsin	(arcsin (a))
		Remain	(rem (a,b))	*Arctan	(arctan (a))
		*Round	(round a)	*Hyperbolic Cos	(cosh (a))
		*Truncate	(trunc a)	*Hyperbolic sin	(sinh (a))
		*Absolute value	(abs a)	*Hyperbolic Tan	(tanh (a))
				*Natural Log	(1n (a))
				*Log base 10	(log (a))
				*Antilog	(alog (a))
				Power	(a^b)
				*Exp	(e^a)
				*Square	(a^2)
				*Cube	(a^3)

(*) = Unary Operator (Takes only one argument.)

Table 3-4. CALCBLOCKD Operations

Logical (Boolean)	
And	(a && b)
Nand	(a ^& b)
Or	(a || b)
Nor	(a ^| b)
Xor	(a xor b)
Not	(not a)

Editor Dialog Box

CALCBLOCK(D) is added to a control sheet just as any algorithm is added (see Section 3-5.2). After CALCBLOCK(D) has been added to the sheet, the CALCBLOCK(D) **Editor dialog box** appears. Use this box to modify the calculations that will be carried out by CALCBLOCK(D). Save the calculations as a **.calc** file to be used later.

The Editor dialog box has two tabs:

- Calculations tab (shown in Figure 3-14 and described in Table 3-5).
- Points tab (shown in Figure 3-15 and described in Table 3-6).

The **Calculations tab** is used to define the calculations and parameters for CALCBLOCK(D).

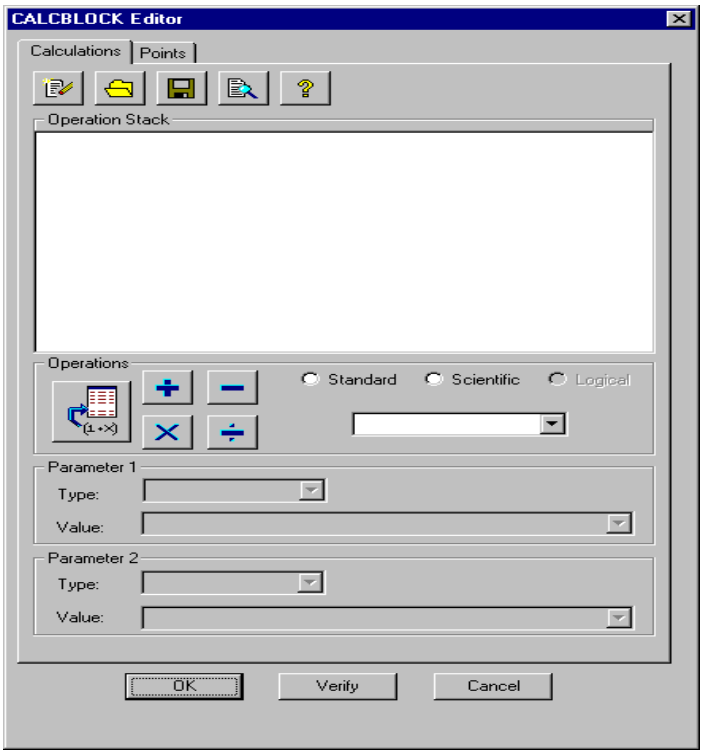


Figure 3-14. Calculations Tab

Table 3-5. Calculations Table

Item	Description
	Clear Stack. Removes all the calculations in the Operation Stack box.
	Opens a dialog box where you can select an existing **.calc** file to edit.
	Saves the calculations for the CALCBLOCK(D) algorithm to a **.calc** file.

Table 3-5. Calculations Table (Cont'd)

Item	Description
	Displays the last calculation in the stack so it can be viewed in a pop-up box.
	Displays the online Help for CALCBLOCK(D).
Operation Stack Window	Window where the calculations are stacked from top to bottom.
	Inserts the calculation into the Operation Stack.
Plus Sign	Adds two functions together. (Not applicable for CALCBLOCKD.)
Minus Sign	Subtracts one function from another. (Not applicable for CALCBLOCKD.)
Multiplication Sign	Multiplies one function by another function. (Not applicable for CALCBLOCKD.)
Division Sign	Divides one function by another function. (Not applicable for CALCBLOCKD.)
Standard Button	Selects the Standard set of available functions. (Not applicable for CALCBLOCKD.)
Scientific Button	Selects the Scientific set of available functions. (Not applicable for CALCBLOCKD.)
Logical Button	Selects the Logical (Boolean) set of available functions. (Not applicable for CALCBLOCK.)
Parameter Type	Select the appropriate type of parameter: Constant Input Numeric Result
Parameter Value	Displays the calculation for the Parameter.
OK	Accepts the calculation.
Verify	Verifies the calculation to determine that all inputs are connected and all calculations are valid.
Cancel	Ends the operation and does not save it.

The **Points tab** is used to display the current point names for CALCBLOCK(D) and to allow the user to create user-defined points.

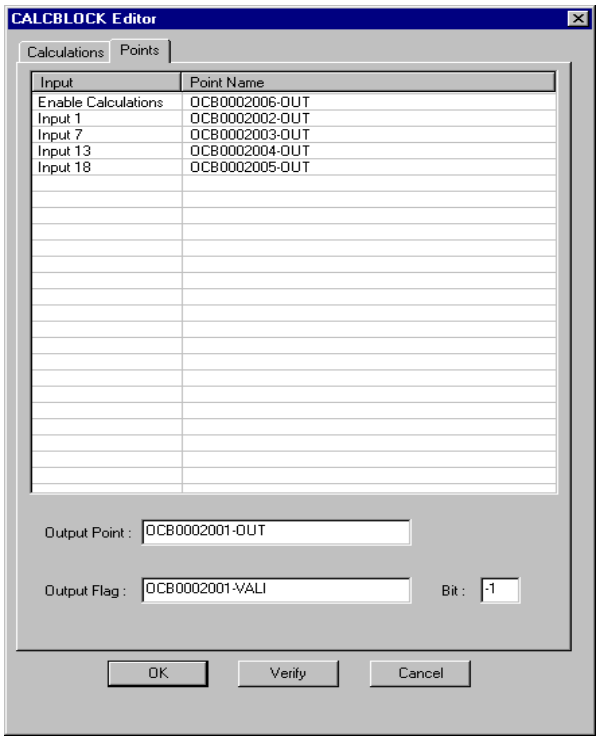


Figure 3-15. Points Tab

Table 3-6. Points Table

Item	Description
Input Field	Parameter input name
Point Name Field	Name of output point
Output Point Field	Result of calculation
Output Flag Field	Enables another CALCBLOCK(D)
Bit Field	Used if Output Flag is a packed point
OK	Accepts the calculation.
Verify	Verifies the calculation to determine that all inputs are connected and all calculations are valid.
Cancel	Ends the operation and does not save it.

Exporting a Calculation

Use the following procedure to edit a CALCBLOCK(D) algorithm and export the calculation to a **.calc** file:

1. Add the **CALCBLOCK(D) algorithm** to a control sheet. The CALCBLOCK(D) Editor dialog box appears (Figure 3-14).
2. Select the **type of operation** needed (described in Table 3-3 and Table 3-4):
   - CALCBLOCK
     - — Basic math functions from the keypad (add, subtract, multiply, or divide).
     - — Standard functions selected from the pull-down menu.
     - — Scientific functions selected from the pull-down menu.
   - CALCBLOCKD
     - — Logical functions selected from the pull-down menu.
3. Identify the **parameters**:
   - Type
   - Value
4. Use the **Insert** button to place the resulting calculation into the Operation Stack (calculations stack from top to bottom). If needed, you can use the **Clear Stack** button to remove all the calculations from the stack, or use the **Delete** key to remove an individual calculation.

Note

If the last calculation in the stack becomes too long to display in the Operation Stack, select the **View** button and the Final Calculation will be displayed in a pop-up box.

5. If there are inputs that are not connected, a Calculation Status box will appear that provides the status of the current calculation. You can edit the inputs in the Calculation field or connect the inputs in the functional drawing.

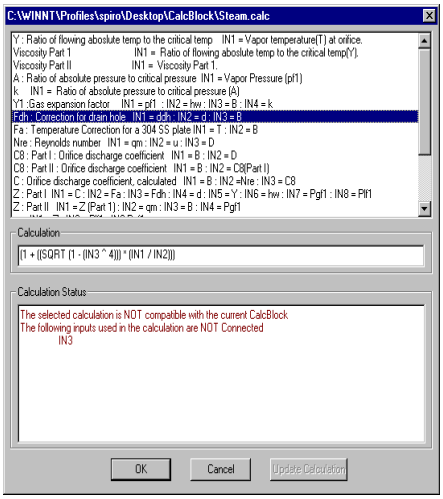


Figure 3-16. Calculation Status Dialog Box

6. After you have made the corrections, click the **Update Calculation** button to verify the calculation. After the calculations are verified, you can save the calculations to a **.calc** file by selecting the **Save** button.

7. The Save Calculation dialog box will appear. Enter a **Description** and **Calculation File** path and name in the required entry fields and select **Save**. The file will be exported to the designated location.

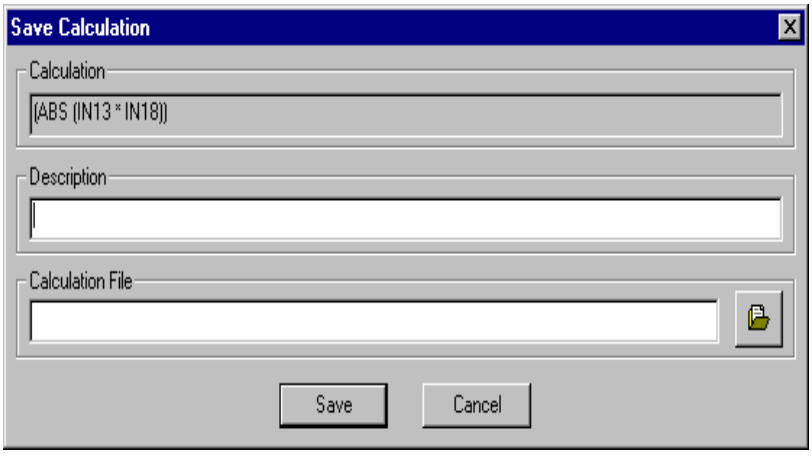


Figure 3-17. Save Calculation Dialog Box

8. If you want to use an existing calculation file, select the **Open** button in the Editor box (Figure 3-14). The Select Calculation file dialog box will appear. Select the desired **.calc** file. Make the applicable edits.

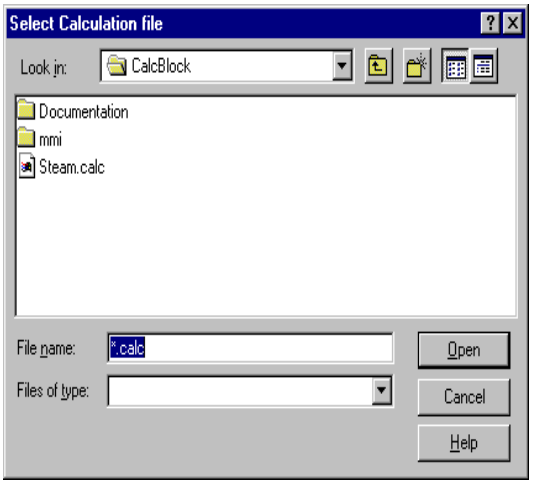


Figure 3-18. Select Calculation File Dialog Box

9. If desired, use the Points tab (Figure 3-15) to view the current point names for CALCBLOCK(D) or to create user-defined points

Importing a Calculation

Use the following procedure to edit a CALCBLOCK(D) algorithm by importing calculations from an existing **.calc** file:

1. Add the **CALCBLOCK(D) algorithm** to a control sheet. The CALCBLOCK(D) Editor dialog box appears (Figure 3-14).

2. Select the **Open** button.

3. The Select Calculation file dialog box (Figure 3-18) will appear. Select the desired **.calc** file and import the calculations into the CALCBLOCK(D) Editor box.

Note

If the last calculation in the stack becomes too long to display in the Operation Stack, select the **View** button and the Final Calculation will be displayed in a pop-up box.

4. The Calculation Status dialog box (Figure 3-16) will appear. This box provides a list of descriptions of all the available calculations from the selected **.calc** file. When you select a calculation from the list, it is displayed in the Calculation box, and the status of the calculation is given:

   - If the calculation is compatible with the current CALCBLOCK(D), a message will appear stating that it is compatible.

   - If the calculation is **not** compatible with the current CALCBLOCK(D), a message will appear stating that it is not compatible, and will list the inputs that are not connected. You can edit the inputs in the Calculation field or connect the inputs in the functional drawing.

5. After you have made any necessary corrections, click the **Update Calculation** button to verify the calculation.

6. After the calculations are verified, you can save the calculation to a **.calc** file by selecting the **Save** button.

7. The Save Calculation dialog box (Figure 3-17) will appear. Enter a **Description** and **Calculation File** path and name in the required entry fields and select **Save**. The file will be exported to the designated location.

8. If desired, use the Points tab to view the current point names for CALCBLOCK(D), or to create user-defined points.

3-6. Page Connectors

Page connectors are similar to algorithms and can be added, deleted, and edited like algorithms. However, page connectors play no actual role in the control process and are therefore not loaded into the Controller. They are graphical representations of the input and output between sheets.

Page connectors are used to connect signals from one sheet to another within a single Controller, between Controllers, or between a Controller and its I/O.

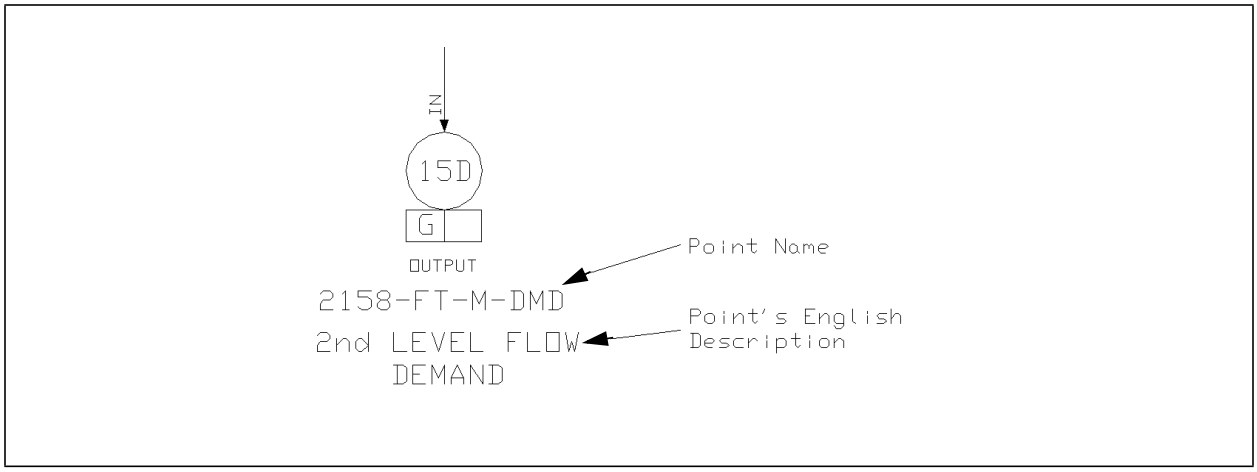


Figure 3-19. Example of Page Connector on Sheet

3-6.1. Guidelines for Page Connectors

1. A page connector is an input/output point for a sheet.
2. **Input** page connectors graphically accept points into a sheet.
3. **Output** page connectors graphically pass points out of a sheet.
4. Page connectors may or may not have a mating page connector on another sheet.
5. Page connectors reflect the points usage and configuration and are automatically updated by the Control Builder.
6. Page connectors are not sensitive to record types. There is not an analog connector nor a digital connector.
7. It is illegal use a page connector to pass default points. By definition, default points are not meant to be used outside the originating sheet.
8. By default, a page connector contains a tag for both the point name and the point's English Description.

3-6.2. Page Connector Descriptions

Refer to Figure 3-20. A basic page connector (**A**) is represented by a circle with an input or an output signal connection to or from another sheet.

The circle has two boxes attached to it (**B**) that contain a “G” if the point is used in a custom graphic, and an “A” if the point is configured for alarming.

If the circle has a box around it (**C**), then the point is a hardware point with values coming or going to a device.

If the circle has a diamond in it (**D**), then an input point is a highway point that is originated in another drop, or an output point that is used in another drop.

If the circle has a diamond in it and a box around it (**E**), then the point is a hardware point that is originated in another drop.

If the circle has text in it (**F**) (up to four characters), then the point is used elsewhere in control. This text is a unique point identifier defined by the Control Builder and will be the same throughout the system no matter where the point is used.

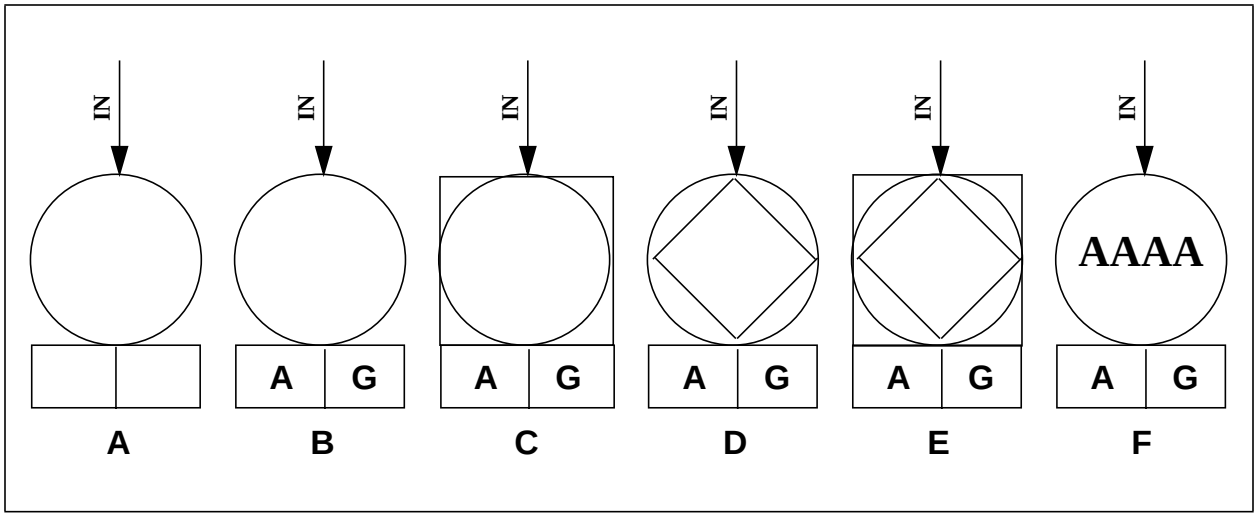


Figure 3-20. Page Connectors

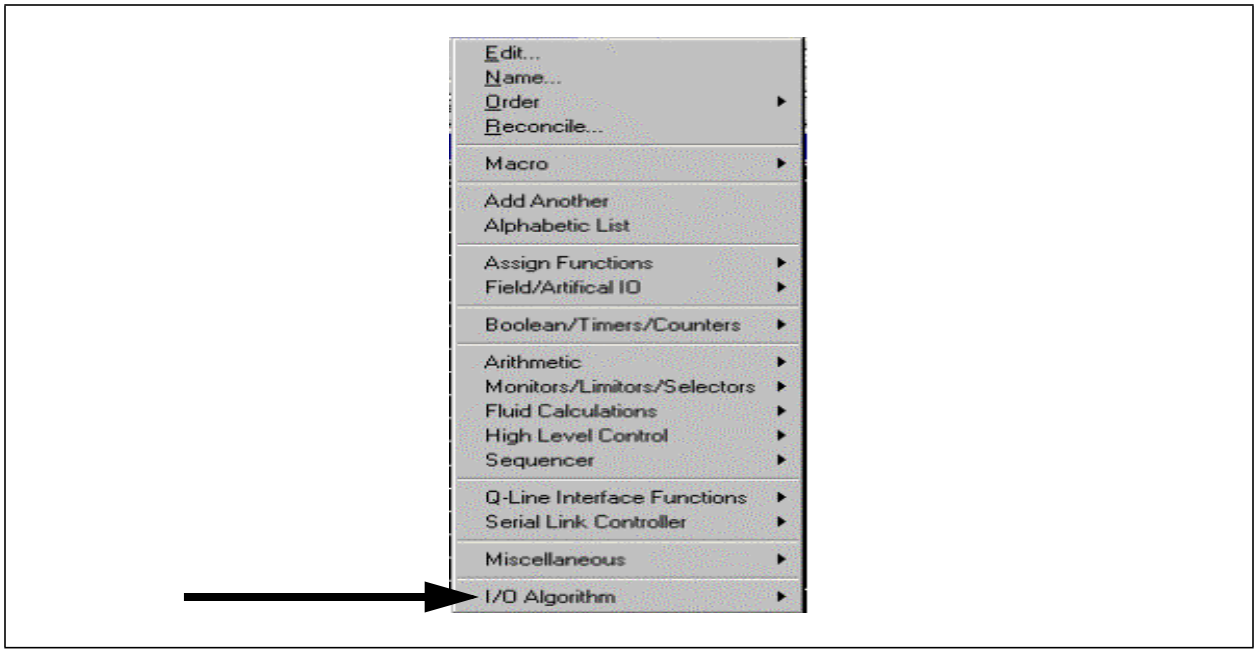
3-6.3. Inserting a Page Connector

Use one of the following procedures to insert a page connector between algorithms:

- Use the Algorithms pull-down menu.
- Use the Digital Algorithm or Analog Algorithm toolbar.
- Use the Command line (see Section 4 for information on using the Algorithm commands).

Procedure for Pull-Down Menu

1. Use the **Algorithms** pull-down menu (shown below) to insert an **input** or **output** connector.



2. Select the **I/O Algorithm** item (Section 2 provides details about the Algorithms menu).
3. Select the **Input** or **output** option.

   The appropriate Choice Display screen appears.
4. Select the **connector view** that you need for the type of signal you are connecting and select **OK**.
5. Place the **connector** on the sheet.

6. Perform the following for an **input** connector:

   A. Use the Edit Algorithm dialog box (from Edit option in the Algorithm menu) to put a point name into the Input connector. Possible points are:

      — Hardware point.

      — Point from another sheet but in the same drop.

      — Received point (Highway Point) from a sheet in another drop.

   B. Connect it to an **algorithm**.

   C. **Save** the sheet.

7. Perform the following for an **output** connector:

   A. Connect the appropriate **signal line** to the output connector.

   B. **Save** the sheet.

Procedure for Algorithm Toolbars

1. Use the Analog Algorithm or Digital Algorithm toolbar to insert a page connector.

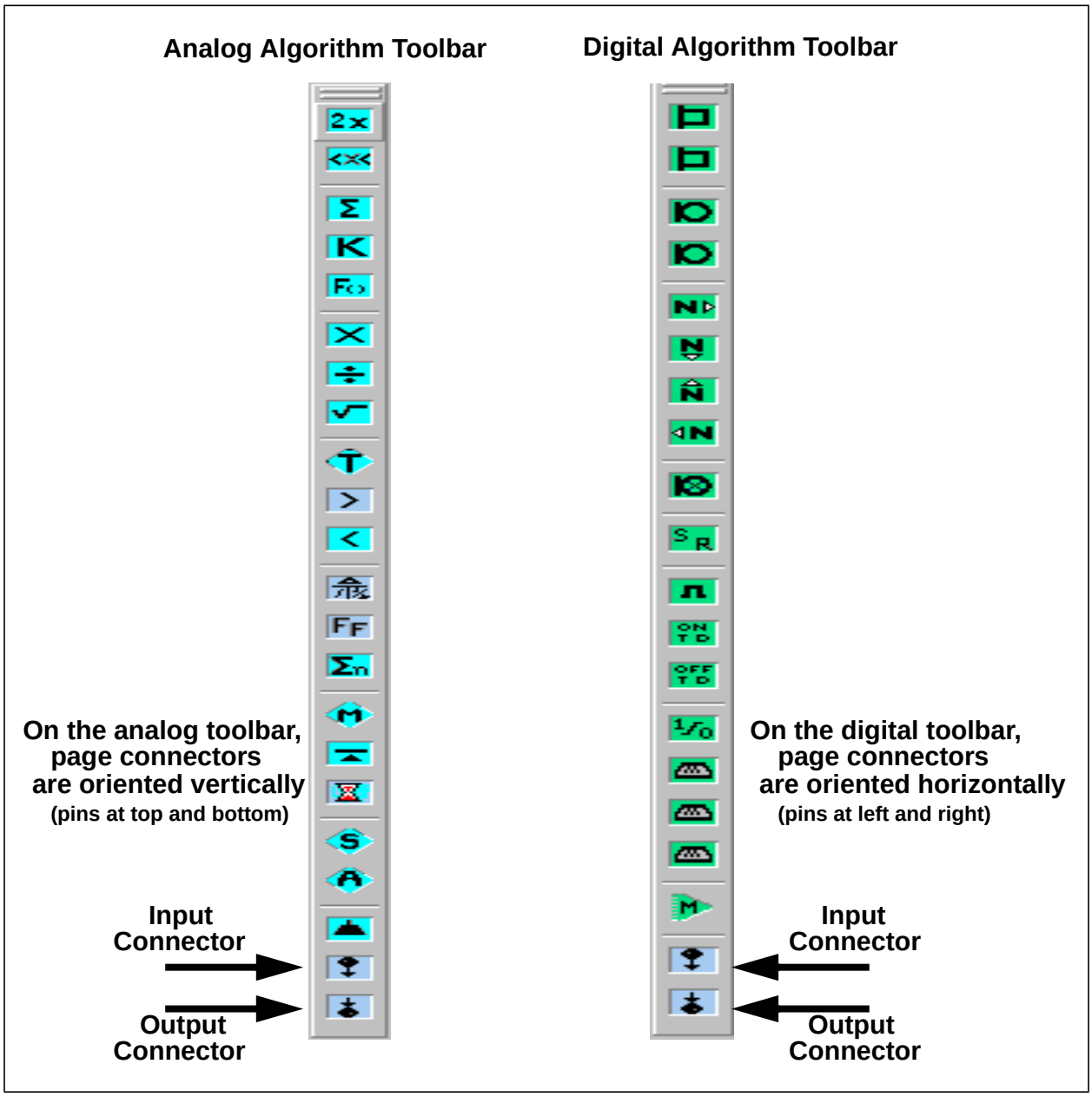


Figure 3-21. Analog and Digital Algorithm Toolbars

2. Select the appropriate **Page Connector icon**.

3. Place the **connector** on the sheet.

4. Perform the following for an **input** connector:

   A. Use the Edit Algorithm dialog box (from Edit option in the Algorithm menu) to put a point name into the Input connector. Possible points are:

      — Hardware point.

      — Point from another sheet but in the same drop.

      — Received point (Highway Point) from a sheet in another drop.

   B. Connect the output pin to an **algorithm**.

   C. **Save** the sheet.

5. Perform the following for an **output** connector:

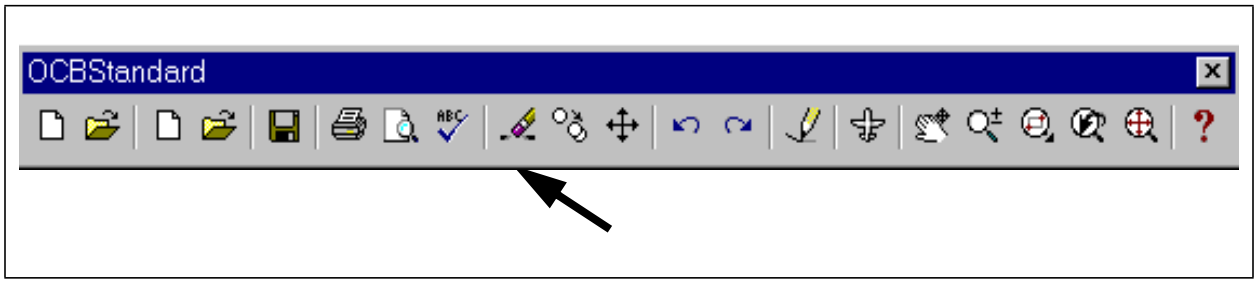
   A. Connect the appropriate **signal line** to the output connector.

   B. **Save** the sheet.

3-6.4. Erasing a Page Connector

Procedure for Toolbar

1. Use the **OCB Standard toolbar** to erase connectors on a control sheet.
2. Select the **Erase Objects** icon.



3. Select the **desired connector** and left-click to highlight the connectors.
4. Select the **Enter** button.

   The selected connector will be deleted.

3-6.5. Determining Connector Usage

1. Use the **Algorithm toolbar** to determine where a connector is used.
2. Select the **Page Connectors** icon.

3. Select the **desired connector**.

   The **Where Used** dialog box appears containing a list of all the locations where the connector is used.

   The box identifies the Sheet title, Drop number, and whether the point is read (R) or originated (O). Double-click on a Drop number in the dialog box and the sheet appears.

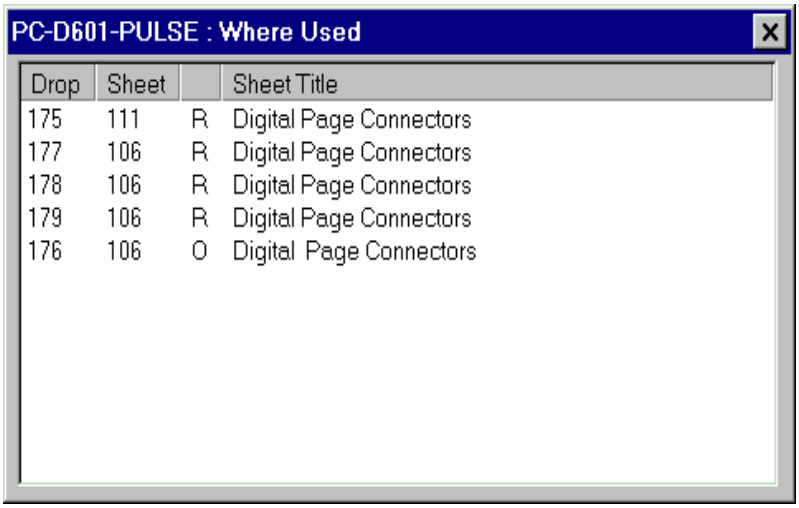


Figure 3-22. Where Used Dialog Box

3-7. Pins

Pins are part of the algorithm symbol (see Figure 3-5) and connect to signals. The Ovation NT Control Builder allows pins to be added, deleted, or moved.

- **Add Pin** - Adds any pin not already on an algorithm symbol. OCB checks to determine if another pin can be added to the algorithm, and displays a message if you cannot add a pin.
- **Delete Pin** - Deletes any pin on an algorithm symbol that is not connected to a signal and is not required. OCB checks to determine if a pin can be deleted from the algorithm, and displays a message if you cannot delete a pin.
- **Move Pin** - Moves any pin on an algorithm symbol that is not connected to a signal.

Refer to “Ovation Algorithms Reference Manual” (R3-1100) for complete descriptions of algorithms and their associated pins.

3-7.1. Pin End-Point Placement

Since SNAP in the Status Bar should already be turned **on**, pins can be moved (snapped) into place based on the sheet grid lines. The lines are assigned values in relationship to the algorithm. The angle of the pin is determined by the value of the grid line where the pin is attached. OCB manages the snap size.

Refer to Figure 3-23. The end of the pin that the **signal** attaches to must be on a whole number boundary for both x and y coordinates (for example, 1.0, 1.0). The other end of the pin, that attaches to the **algorithm**, may be on a fractional boundary for both x and y coordinates (for example, 0.5, 0.5).

A. Place the pin on a whole numbered grid line (counted from the corners of the algorithm symbol) to create a **straight** line.

B. Place the pin on a fractional grid line (counted from the corners of the algorithm symbol) to create a **diagonal** line.

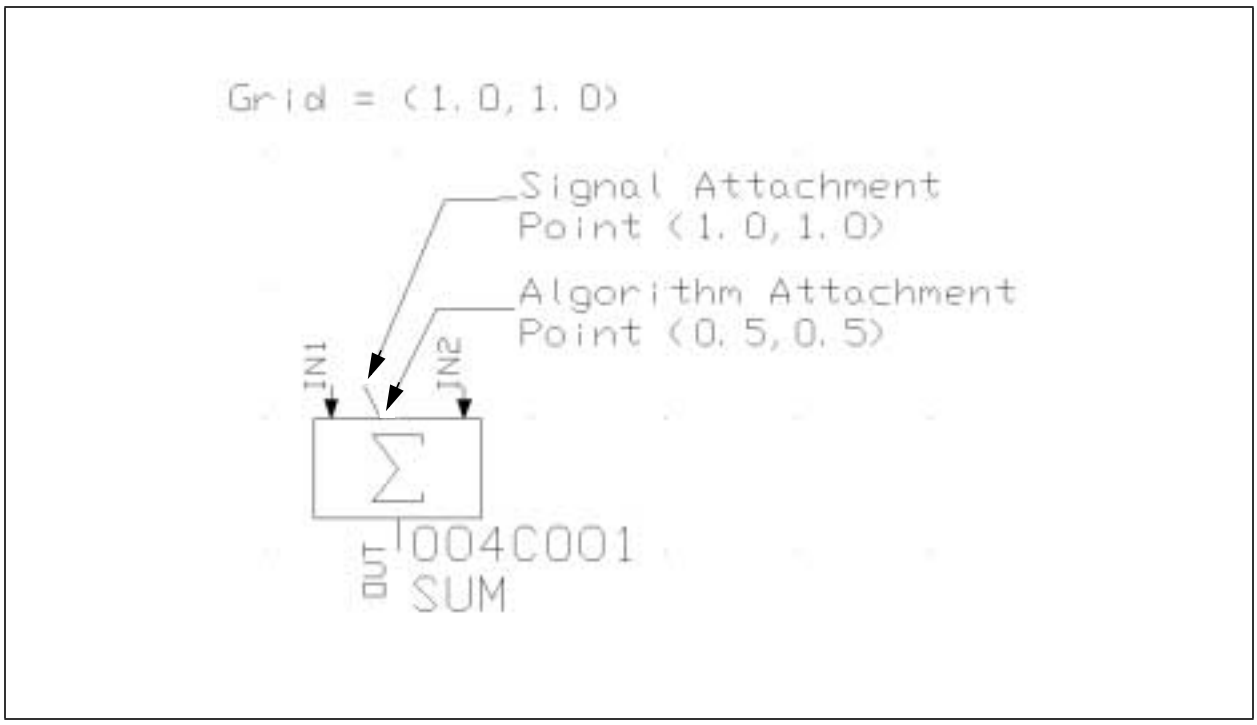


Figure 3-23. Pin Placement

3-7.2. Adding a Pin

Use one of the following procedures to add pins to an algorithm on a sheet:

- Use the Signals pull-down menu.
- Use the OCB Pin toolbar.
- Use the Command line (see Section 4 for information on using the Pin commands).

Pins can be added to an algorithm on a drawing sheet. When Add is selected, a list of valid pins that can be added to the algorithm appears. If NO pins can be added to the algorithm, a message appears stating that no pins can be added.

Figure 3-24. Cannot Add Pin Message

Procedure for Pull-Down Menu

1. Use the Signals pull-down menu (shown in Figure 3-25) to add a pin to an algorithm.

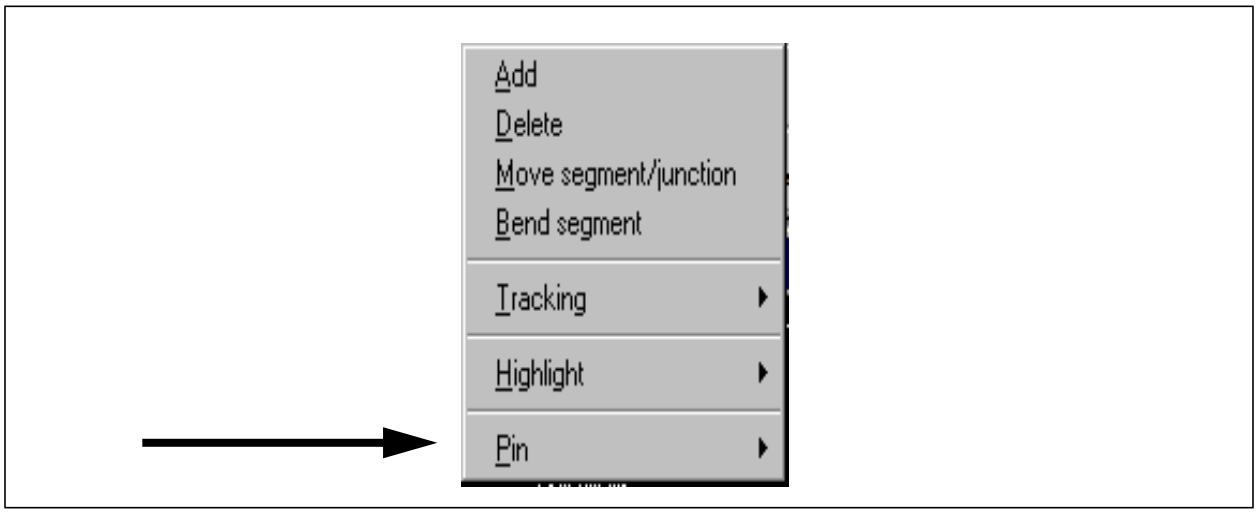


Figure 3-25. Signals Menu

2. Select the **Pin** item (Section 2 provides details about the Signals menu).
3. Select the **Add** item.
4. Use the mouse to select the **algorithm**.
5. The Ovation Control Builder zooms into the selected algorithm to display an enlarged view of the algorithm.

6. At the same time, the “Select Pin to Add” list appears containing the names of all the pins that can be added to the algorithm (see Figure 3-26). Select the **desired pin** from the list.

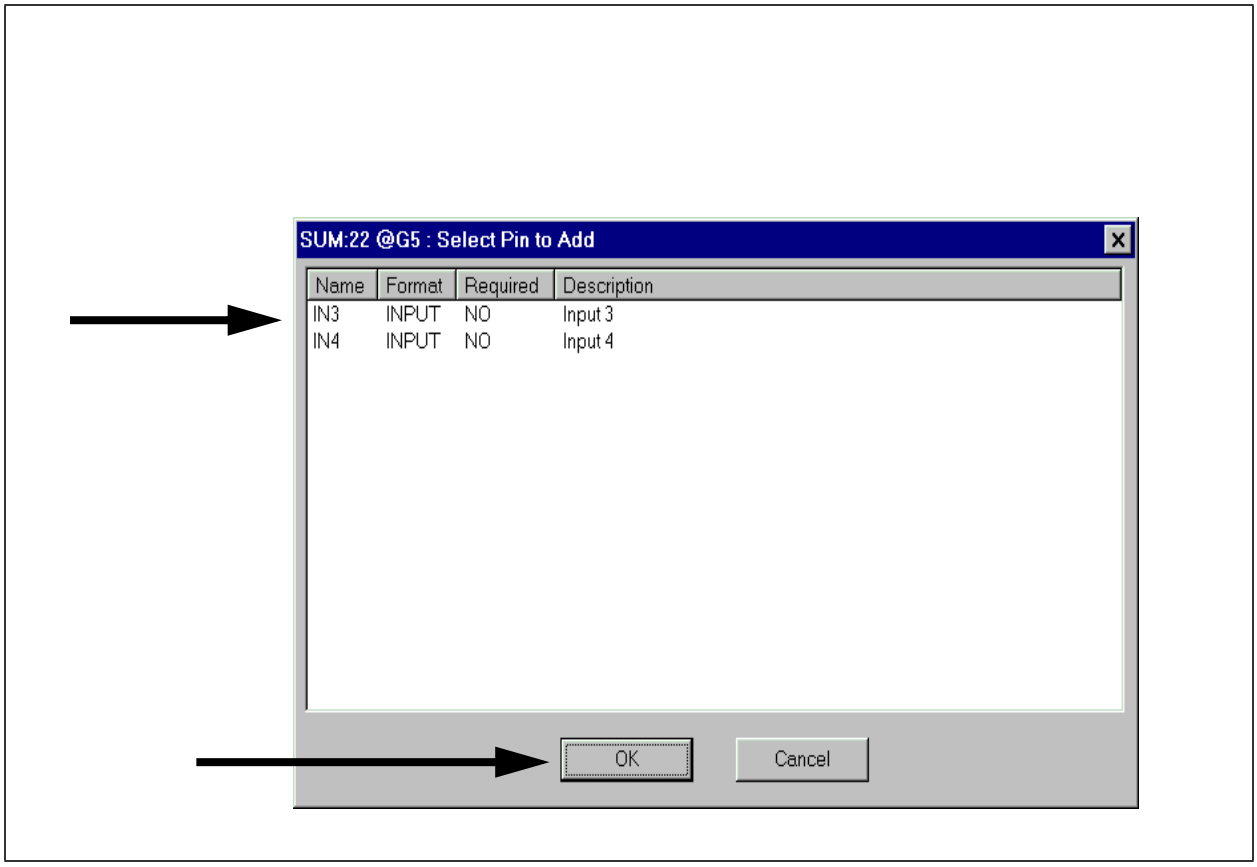


Figure 3-26. Select Pin to Add List

7. Select the **OK** button.

8. Position the **cursor** on the algorithm where you want to place the pin. Left click for the beginning of the pin, and left click again for the end of the pin.

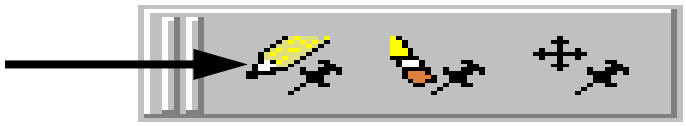
   Refer to Section 3-7.1 for pin placement information.

9. Refer to the Command lines at the bottom of the OCB window for the prompts that appear asking you to accept or reject the new pin. Since the default is Yes, you can simply press the **Enter** key to add the pin.

   If you do not accept the pin, it will NOT be added to the algorithm.

Procedure for Toolbar

1. Use the **OCB Pin toolbar** to add a pin to an algorithm.



2. Select the **Add icon**.
3. Use the mouse to select the **algorithm**.
4. The Ovation Control Builder zooms into the selected algorithm to display an enlarged view of the algorithm.
5. At the same time, the “Select Pin to Add” list appears containing the names of all the pins that can be added to the algorithm (see Figure 3-26). Select the **desired pin** from the list.Select the **OK** button.
6. Position the **cursor** on the algorithm where you want to place the pin. Left click for the beginning of the pin, and left click again for the end of the pin.

   Refer to Section 3-7.1 for pin placement information.
7. Refer to the Command Lines at the bottom of the OCB window for the prompts that appear asking you to accept or reject the new pin. Since the default is Yes, you can simply press the **Enter** key to add the pin.

   If you do not accept the pin, it will NOT be added to the algorithm.

3-7.3. Deleting a Pin

Use one of the following procedures to delete pins from an algorithm on a sheet:

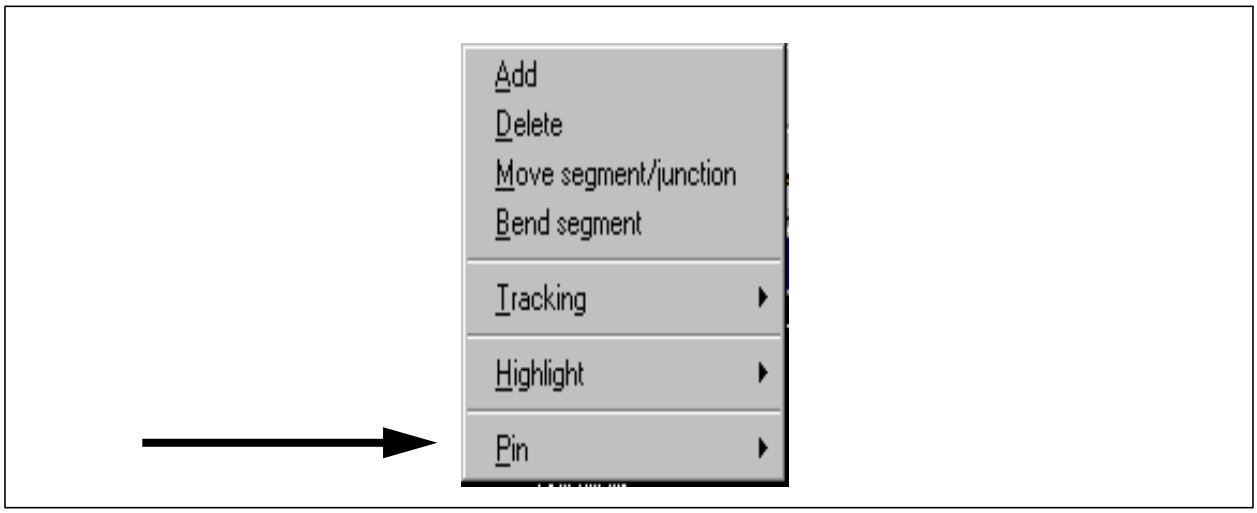
- Use the Signals pull-down menu.
- Use the OCB Pin toolbar.
- Use the Command line (see Section 4 for information on using the Pin commands).

Pins can be deleted from an algorithm on a drawing sheet. When Delete is selected, a list of valid pins that can be deleted from the algorithm appears. If NO pins can be deleted from the algorithm, a message appears stating that no pins can be deleted.

Figure 3-27. Cannot Delete Pins Message

Procedure for Pull-Down Menu

1. Use the **Signals** pull-down menu (shown below) to delete a pin from an algorithm.



2. Select the **Pin** item (Section 2 provides details about the Signals menu).
3. Select the **Delete** item.
4. Use the mouse to select the **algorithm**.
5. The Ovation Control Builder zooms into the selected algorithm to display an enlarged view of the algorithm.

6. At the same time, the “Select Pin to Delete” list appears containing the names of all the pins that can be deleted from the algorithm (see Figure 3-28). Only pins that are not connected and are not required can be deleted. Select the **desired pin** from the list.

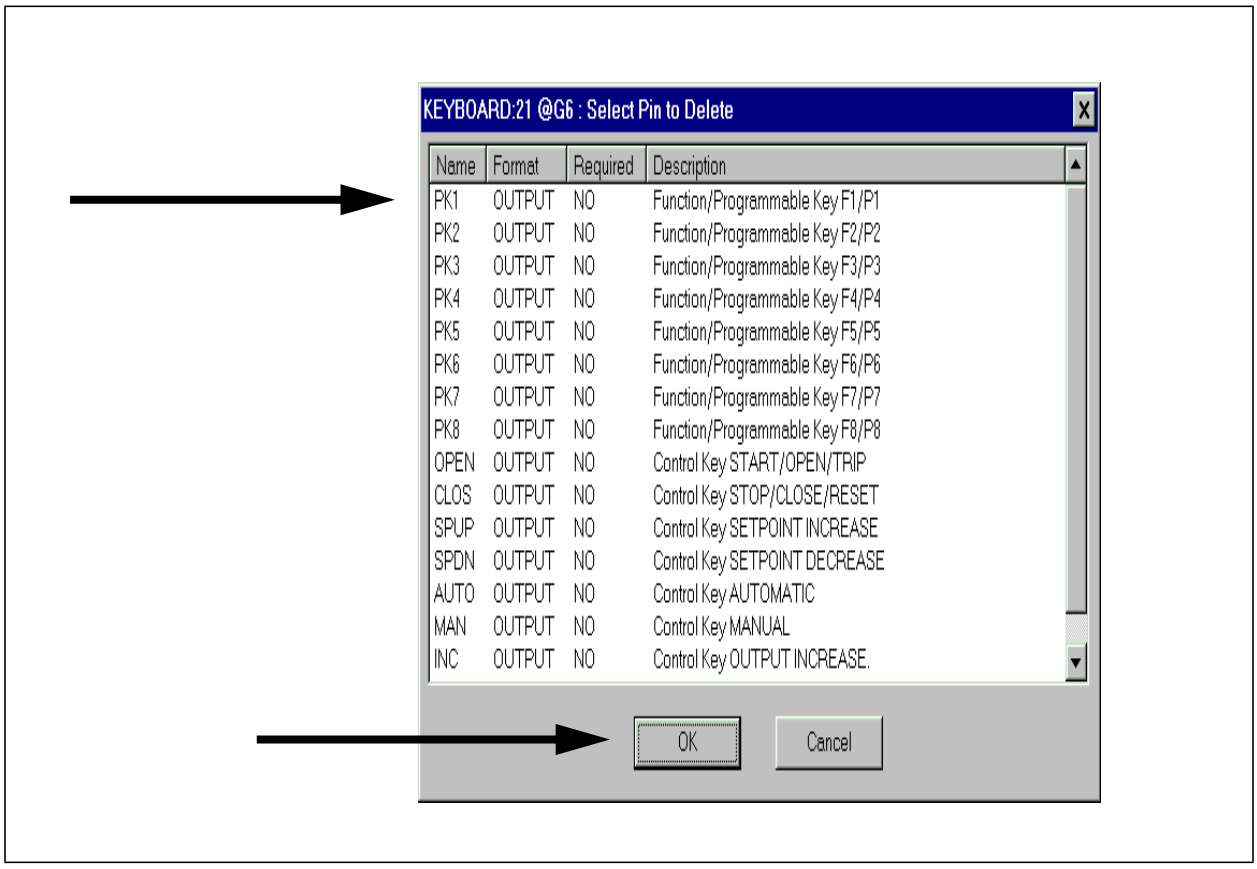


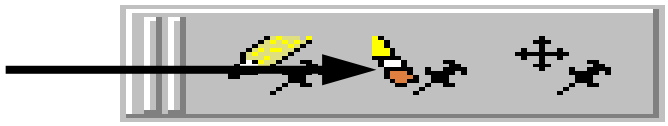
Figure 3-28. Select Pin to Delete List

7. Select the **OK** button.The selected pin will no longer appear on the list.

8. Close the list by selecting the **Cancel** button and the selected pin will be removed from the algorithm on the drawing.

Procedure for Toolbar

1. Use the **OCB Pin toolbar** to delete a pin from an algorithm.



2. Select the **Delete icon**.
3. Use the mouse to select the **algorithm**.
4. The Ovation Control Builder zooms into the selected algorithm to display an enlarged view of the algorithm.
5. At the same time, the “Select Pin to Delete” list appears containing the names of all the pins that can be deleted from the algorithm (see Figure 3-28). Select the **desired pin** from the list.
6. Select the **OK** button.The selected pin will no longer appear on the list.
7. Close the list by selecting the **Cancel** button and the selected pin will be removed from the algorithm on the drawing.

3-7.4. Moving a Pin

Use one of the following procedures to move algorithm pins on a sheet:

- Use the Signals pull-down menu.
- Use the OCB Pin toolbar.
- Use the Command line (see Section 4 for information on using the Pin commands).

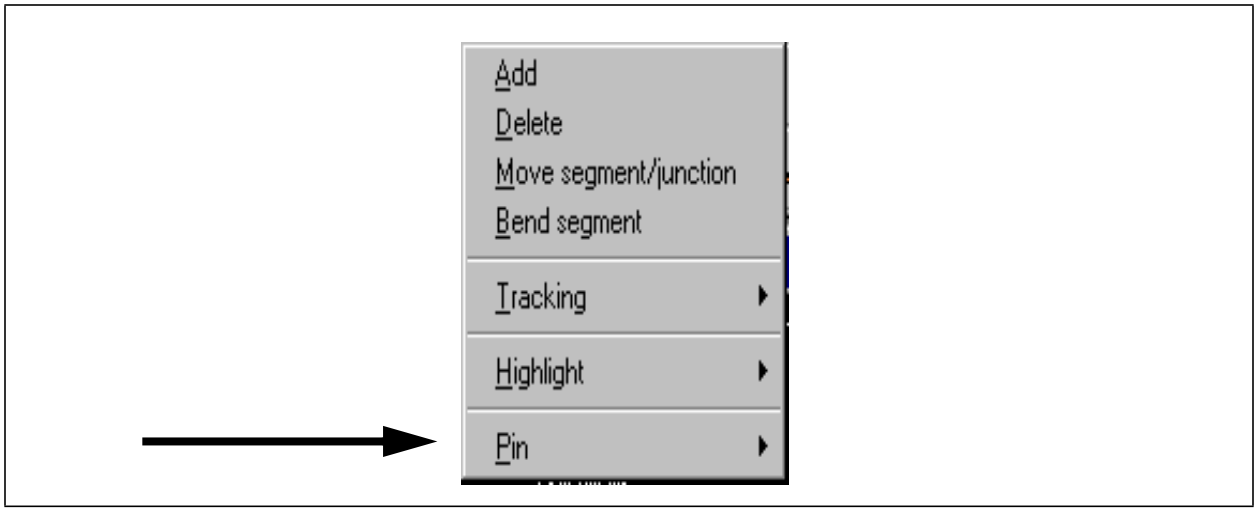
  Pins can be moved on an algorithm on a drawing sheet. When Move is selected, a list of valid pins that can be moved for that algorithm appears.

  If NO pins can be moved for the algorithm, a message appears stating that no pins can be moved.

Figure 3-29. Cannot Move Pins Message

Procedure for Pull-Down Menu

1. Use the **Signals** pull-down menu (shown below) to move an algorithm pin.



2. Select the **Pin** item (Section 2 provides details about the Signals menu).
3. Select the **Move** item.
4. Use the mouse to select the **algorithm**.
5. The Ovation Control Builder zooms into the selected algorithm to display an enlarged view of the algorithm.

6. At the same time, the “Select Pin to Move” list appears containing the names of all the algorithm pins that can be moved (see Figure 3-30). Only pins that are not connected to a signal can be moved. Select the **desired pin** from the list.

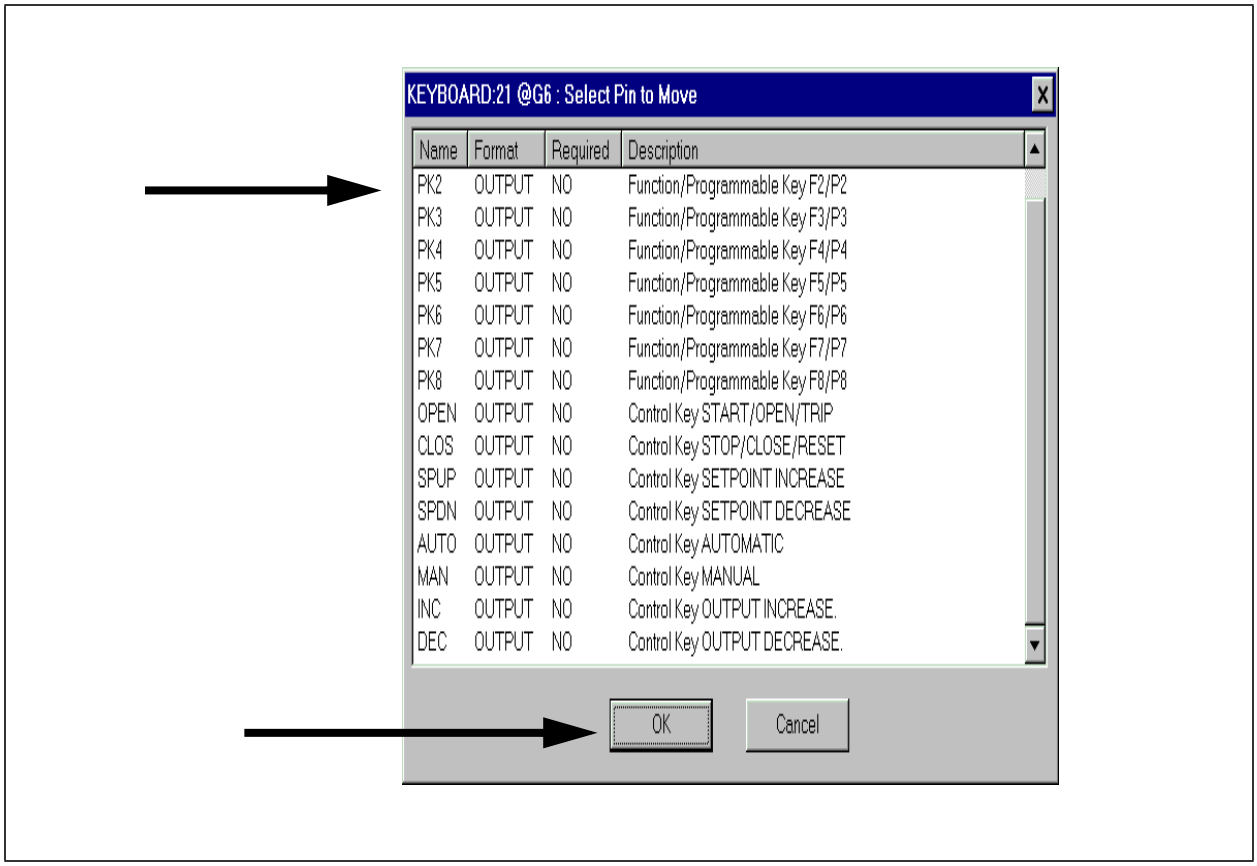


Figure 3-30. Select Pin to Move List

7. Select the **OK** button.

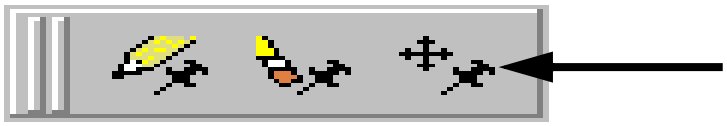
8. Refer to the Command Lines at the bottom of the OCB window for the prompts that appear asking you to select the endpoints for the pin. The prompt also asks you if you accept the position. Since the default is Yes, you can simply press the **Enter** key to accept the pin position.

   Refer to Section 3-7.1 for pin placement information.

9. Close the list by selecting the **Cancel** button and the selected pin will be moved on the algorithm in the drawing.

Procedure for Toolbar

1. Use the **OCB Pin toolbar** to move an algorithm pin.



2. Select the **Move icon**.
3. Use the mouse to select the **algorithm**.
4. The Ovation Control Builder zooms into the selected algorithm to display an enlarged view of the algorithm.
5. At the same time, the “Select Pin to Delete” list appears containing the names of all the pins that can be moved from the algorithm (see Figure 3-30). Select the **desired pin** from the list. Select the **OK** button.
6. Refer to the Command Lines at the bottom of the OCB window for the prompts that appear asking you to select the endpoints for the pin. The prompt also asks you if you accept the position. Since the default is Yes, you can simply press the **Enter** key to accept the pin position.

   Refer to Section 3-7.1 for pin placement information.
7. Close the list by selecting the **Cancel** button and the selected pin will be moved on the algorithm in the drawing.

3-8. Signals

Signals are the lines on a drawing that connect the algorithms. Signals are drawn in colors and line types that are defined through OCB configuration (described in Section 5). You can set the colors and line types so that different inputs can be more easily distinguished.

3-8.1. Signal Guidelines

Observe the following guidelines when using signals:

1. Signals start from a source (an algorithm output pin or a point on an existing line) and then proceed toward the destination.
2. Up to three signals can come from one signal intersection point.
3. Signals are erased downstream from the selected segment (from output to input).
4. If a signal leaves a sheet, it must be user-defined.
5. The following default colors are used to identify signals in the OCB drawings:
   - **Cyan** indicates digital signals.
   - **White** indicates analog signals.
   - **Red** indicates the signal is not connected.
   - **Green** indicates a tracking signal.
   - **Magenta** is used to highlight a signal for quick visual tracking.

Note

Signal colors can be changed, but the release default colors are the recommended colors. If you change the colors, you must use the **Audit** function to save the changes. (Audit is accessed from the **Control** menu or from the **Sheet** command line.)

6. The following colors are used to identify signals on the Monitor Graphics:

- **Yellow** indicates Point Off Scan, if digital True Value is **Off**.
- **Orange** indicates Point Off Scan, if digital True Value is **On**.
- **White** indicates Point On Scan, if digital True Value is **Off**.
- **Red** indicates Point Off Scan, if digital True Value is **On**.

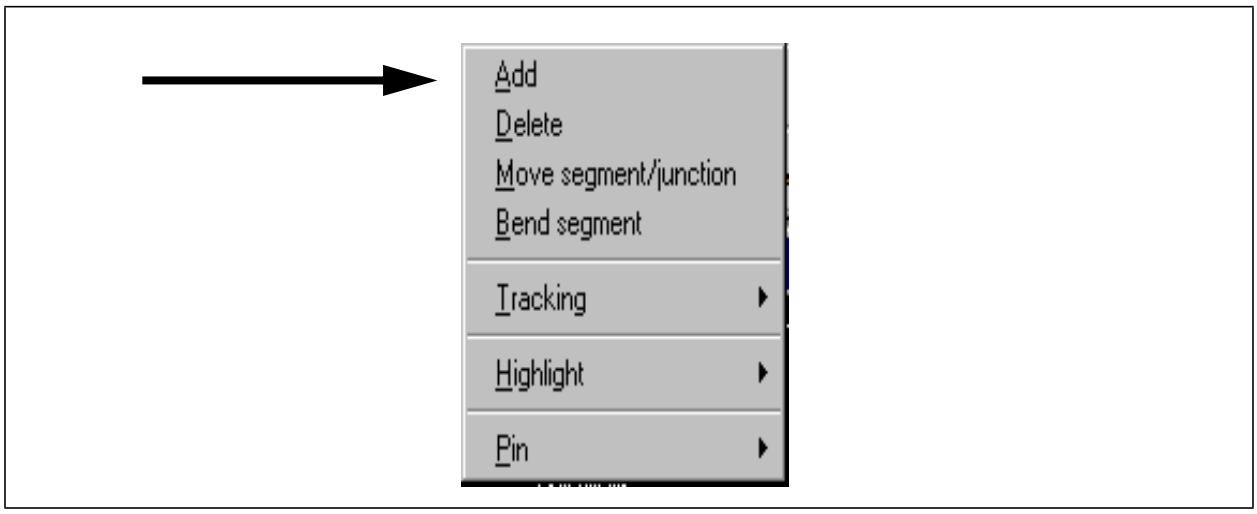
3-8.2. Adding Signals

Use one of the following procedures to add signals between algorithms:

- Use the Signals pull-down menu.
- Use the Signals toolbar.
- Use the Command line (see Section 4 for information on using the Signal commands).

Procedure for Pull-Down Menu

1. Use the **Signals** pull-down menu (shown below) to add a signal.



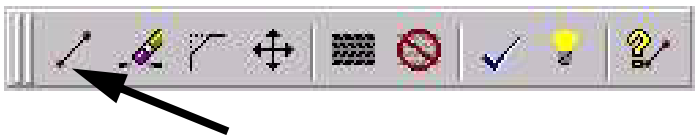
2. Select the **Add** item (Section 2 provides details about the Signals menu).
3. Use the mouse to select an **Out pin** or an existing segment on an algorithm and left-click on it.
4. Select an **In pin** on the algorithm you want to connect to the first algorithm and left-click on it. A signal will be placed between the two algorithms.

Note

If you want to add a signal that is not connected to a second algorithm, start the signal at the algorithm Out pin, put the cursor where you want to end the signal, and press the **Escape** button.

Procedure for Toolbar

1. Use the **Signals toolbar** to add a signal to an algorithm.



2. Select the **Add Signal icon**.

3. Use the mouse to select an **Out pin** or an existing segment on an algorithm and left-click on it.

4. Select an **In pin** on the algorithm you want to connect to the first algorithm and left-click on it. A signal will be placed between the two algorithms.

Note

If you want to add a signal that is not connected to a second algorithm, start the signal at the algorithm Out pin, put the cursor where you want to end the signal, and press the **Escape** button.

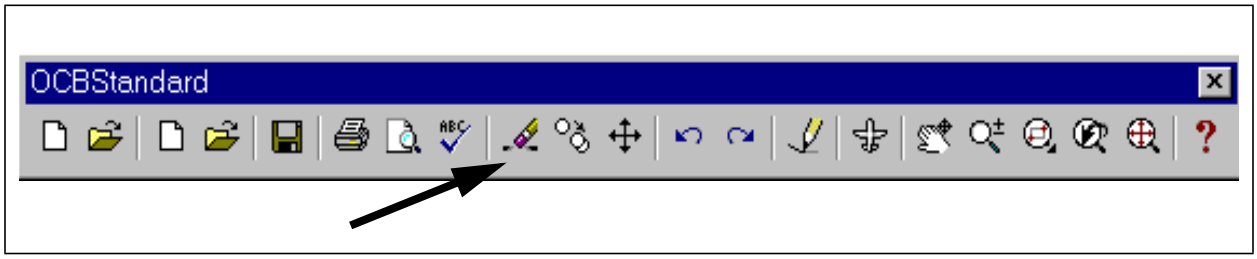
3-8.3. Deleting Signals

Use one of the following procedures to delete signals between algorithms:

- Use the OCB Standard toolbar (preferred method).
- Use the Signals pull-down menu.
- Use the Signal toolbar to delete **one** signal (only needs one mouse click).
- Use the Command line (see Section 4 for information on using the Signal commands).

Procedure for Standard Toolbar

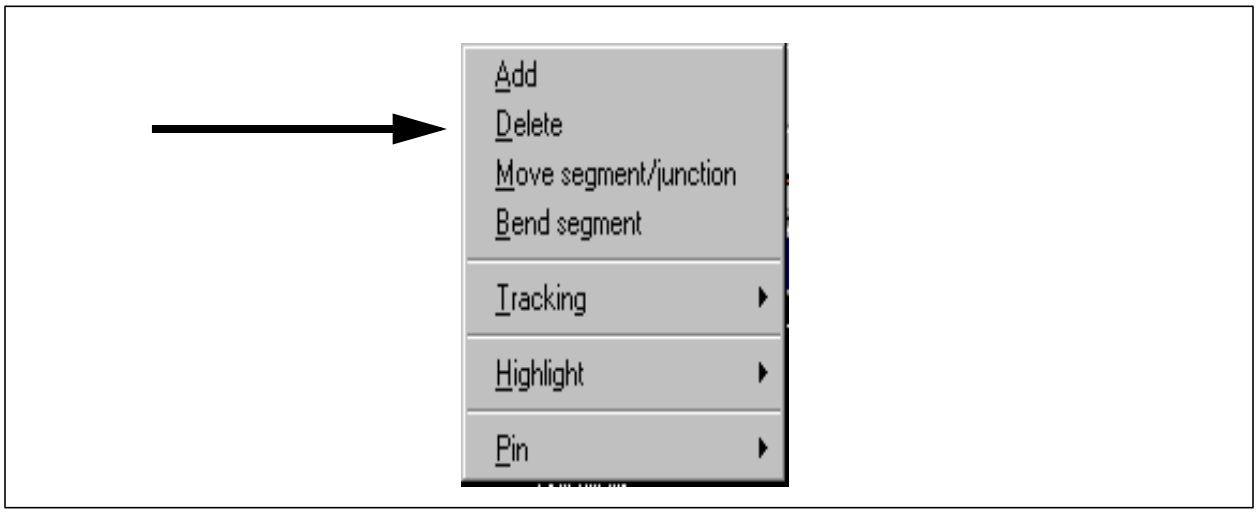
1. Use the **OCB Standard toolbar** to delete a signal between algorithms.



2. Select the **Erase Objects icon**.
3. Use the mouse to select the **signal(s)** to be deleted.
4. Follow the command line prompts.
5. The selected signal(s) and all related downstream signals will be deleted.

Procedure for Pull-Down Menu

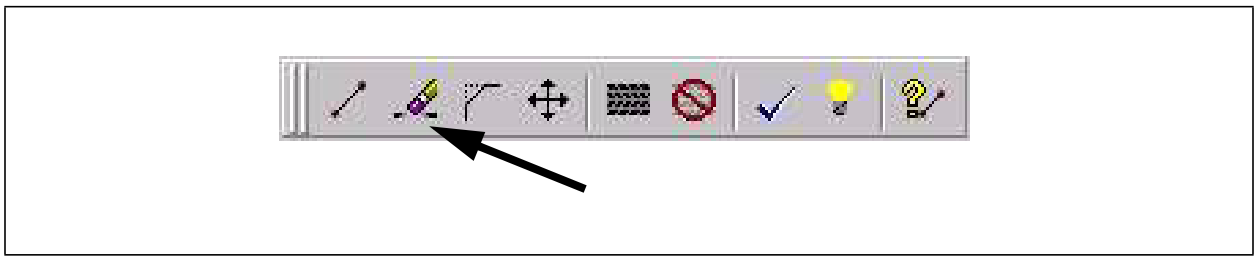
1. Use the **Signals** pull-down menu (shown below) to delete just one signal (requires only one mouse click).



2. Select the **Delete** item (Section 2 provides details about the Signals menu).
3. Use the mouse to select a **signal** between algorithms.
4. The selected signal and all related downstream signals will be deleted.

Procedure for Signal Toolbar

1. Use the **Signal toolbar** to delete just one signal (requires only one mouse click).



2. Select the **Delete Signal icon**.
3. Use the mouse to select the **signal** that is to be deleted.
4. The selected signal and all related downstream signals will be deleted.

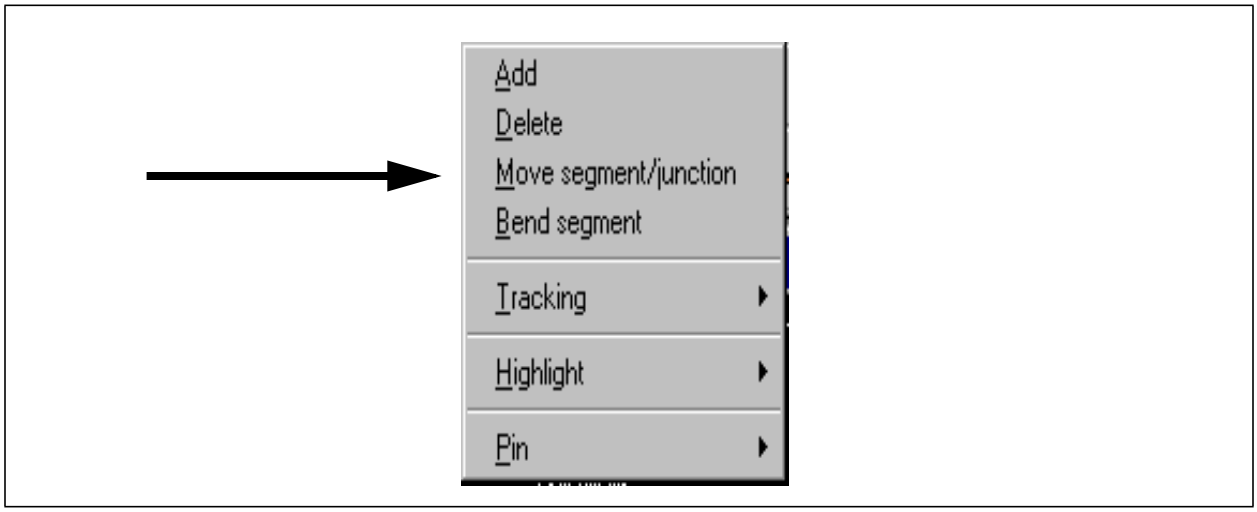
3-8.4. Moving Signals

Use one of the following procedures to move signals between algorithms:

- Use the OCB Standard toolbar.
- Use the Signals pull-down menu.
- Use the Signal toolbar.
- Use the Command line (see Section 4 for information on using the Signal commands).

Procedure for Pull-Down Menu

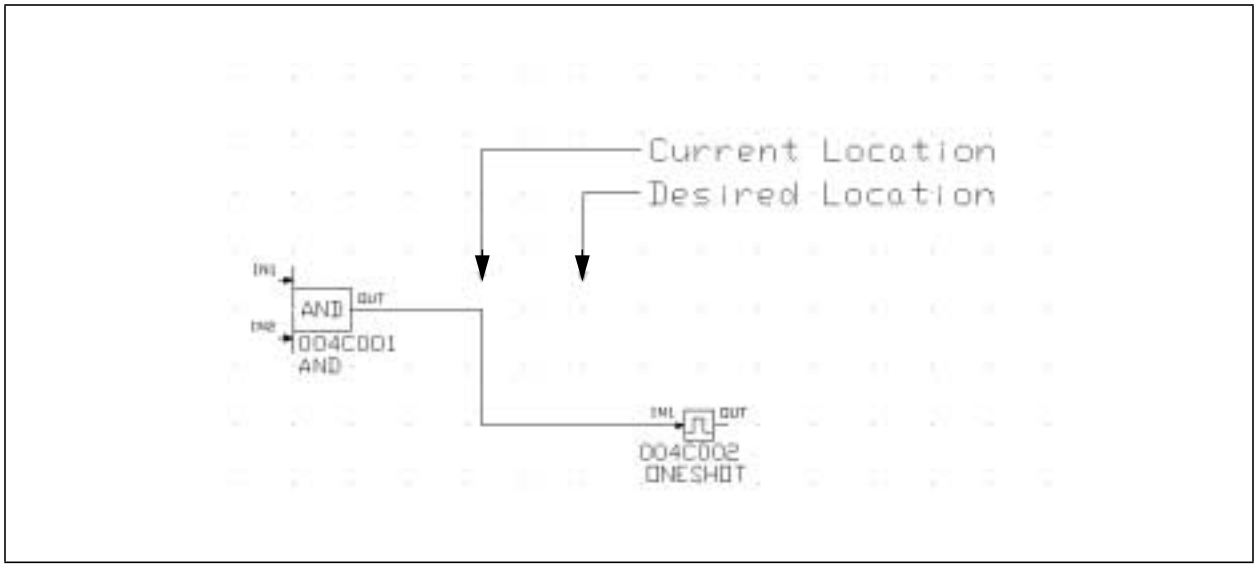
1. Use the **Signals** pull-down menu (shown below) to move a signal.



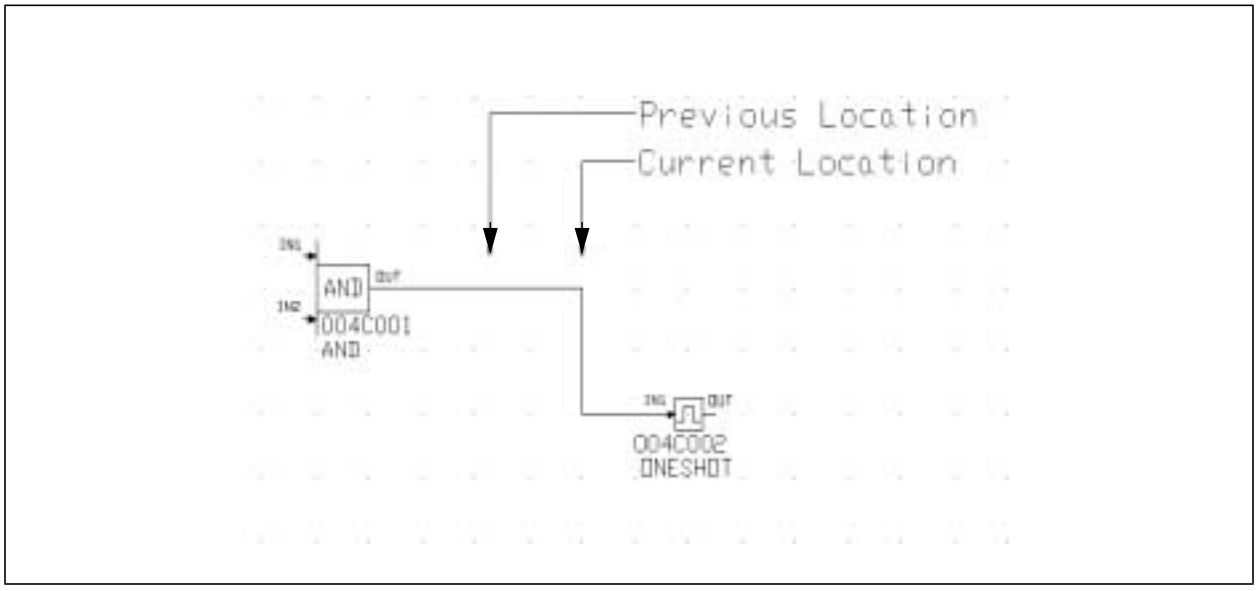
2. Select the **Move segment/junction** item (Section 2 provides details about the Signals menu).

Moving a Signal Segment

3. Use the mouse to select a **signal segment** between algorithms.

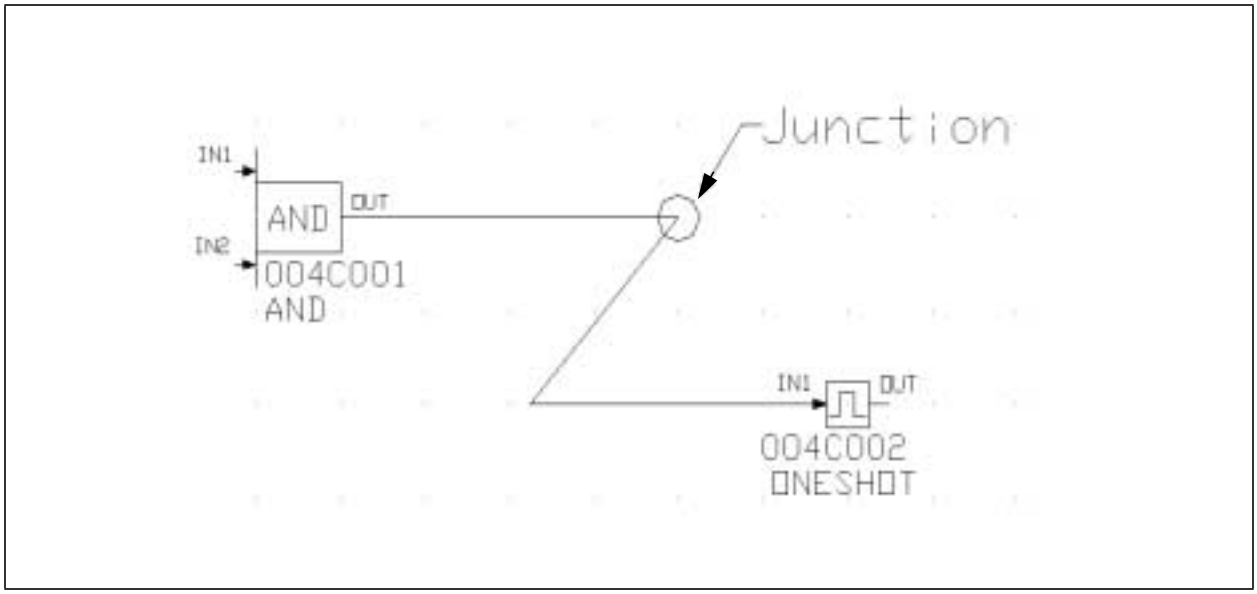


4. Left-click in the position where you want to place the signal, and the signal moves to the new location.

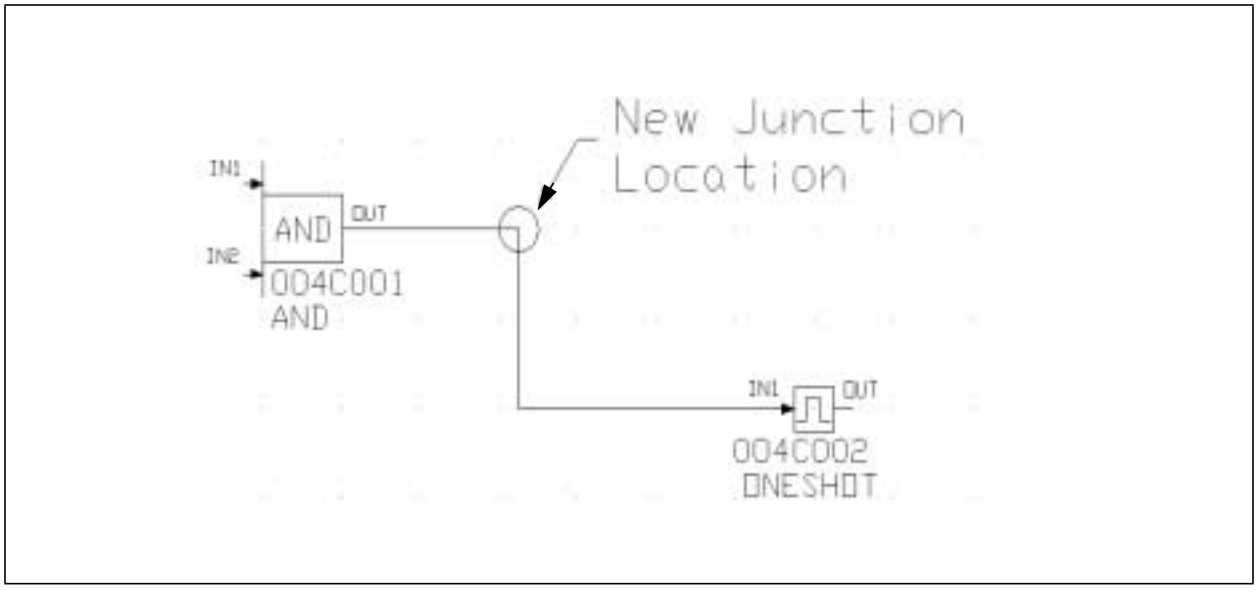


Moving a Signal Junction

5. Use the mouse to select a **signal junction** between algorithms.

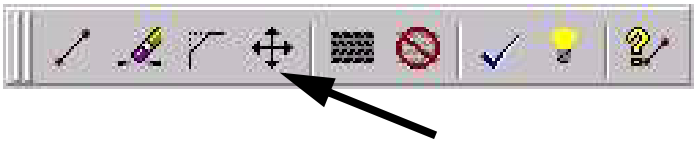


6. Left-click in the position where you want to place the signal junction, and the signal moves to the new location.



Procedure for Toolbar

1. Use the **Signal toolbar** to move a signal between algorithms.



2. Select the **Move Signal icon**.
3. Use the mouse to select the **signal** that is to be moved.
4. Left-click in the position where you want to place the signal, and the signal moves to the new location.

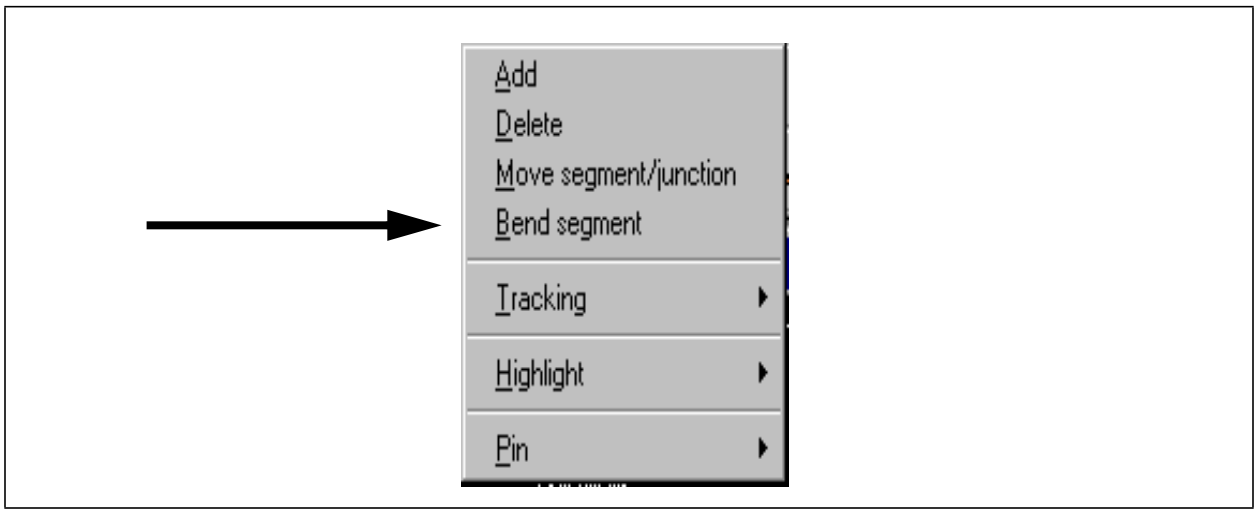
3-8.5. Bending Signals

Use one of the following procedures to bend a signal segment between algorithms:

- Use the Signals pull-down menu.
- Use the Signal toolbar.
- Use the Command line (see Section 4 for information on using the Signal commands).

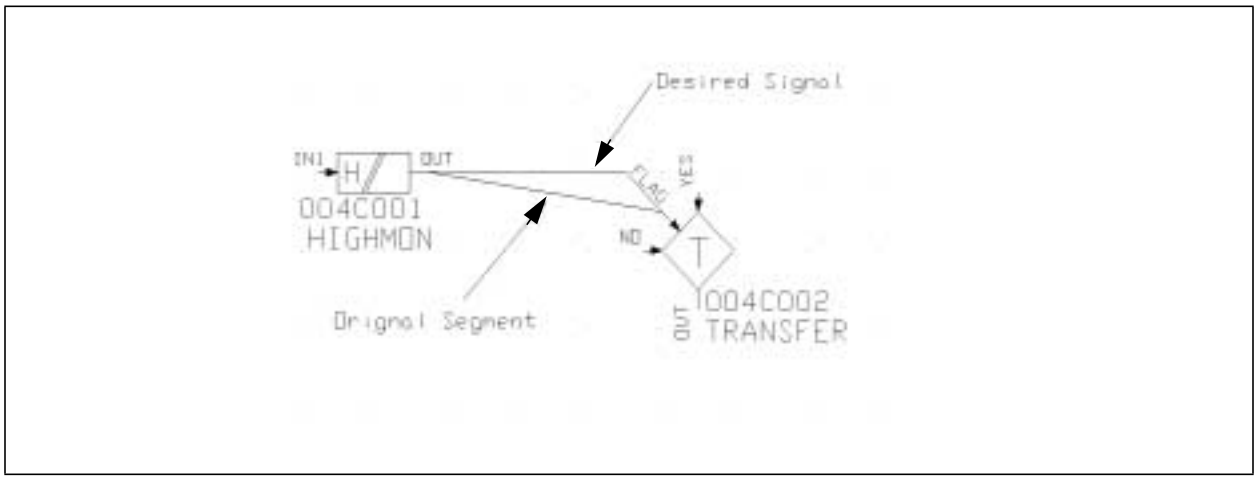
Procedure for Pull-Down Menu

1. Use the **Signals** pull-down menu (shown below) to bend a signal segment.

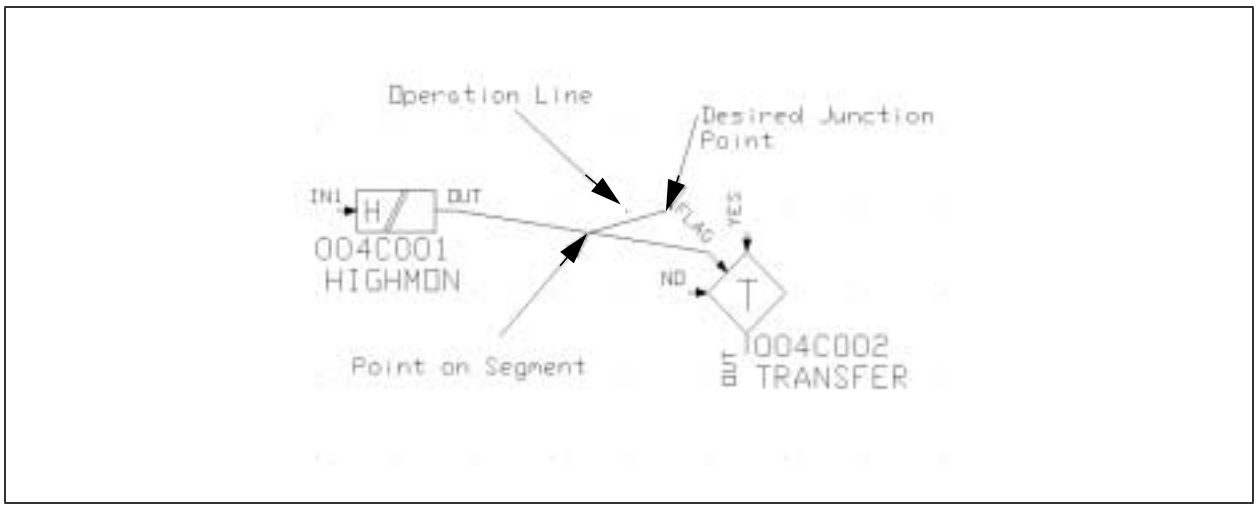


2. Select the **Bend Segment** item (Section 2 provides details about the Signals menu).
3. Use the mouse to select a **signal segment** between algorithms.

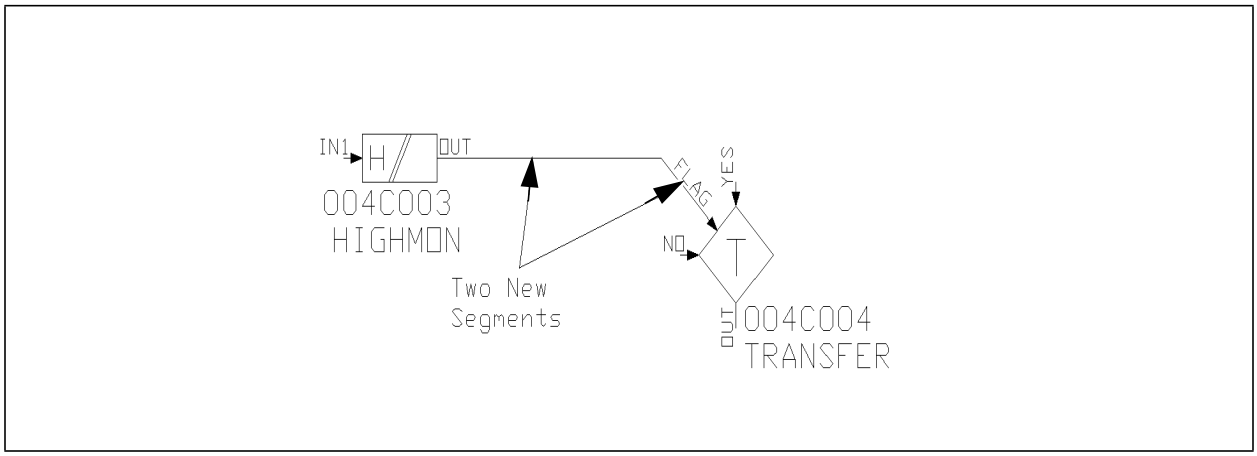
4. Left-click above the segment where you want the apex of the bend to be placed.



5. Note that an Operation Line appears during the segment-bending process.

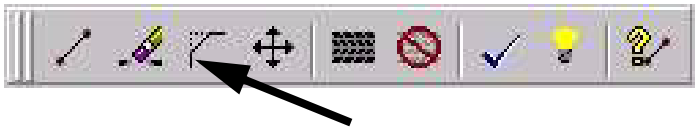


6. Two new segments now exist in place of the original single segment.



Procedure for Toolbar

1. Use the **Signal toolbar** to bend a signal segment.



2. Select the **Bend an Existing Segment icon**.
3. Use the mouse to select a **signal segment** between algorithms.
4. Left-click above or below the segment where you want the apex of the bend to be placed.
5. The signal is bent as described in “Procedure for Pull-Down Menu.”

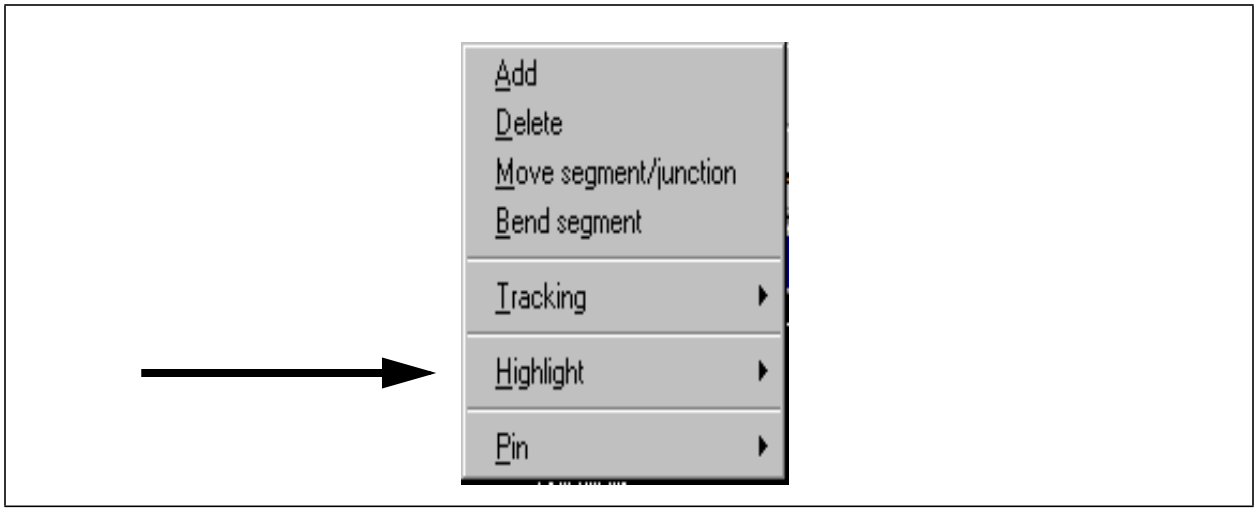
3-8.6. Highlighting and Verifying Signals

Use one of the following procedures to highlight and verify a signal between algorithms:

- Use the Signals pull-down menu.
- Use the Signal toolbar.

Procedure for Pull-Down Menu

1. Use the **Signals** pull-down menu (shown below) to highlight a signal.



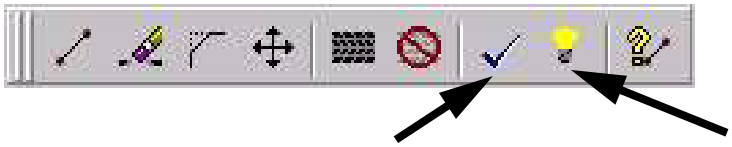
2. Select the **Highlight** item (Section 2 provides details about the Signals menu).
3. Select the **Set** option.
4. Select the **signal** you want to highlight. The signal will change color to match the "highlight" color option (typically magenta).
5. To **remove** the highlight color from the signal, select the **Highlight** item from the Signals pull-down menu, and then select the **Clear** option. Use the mouse to select the signal and it will return to its original color.

Note

If the signal is **not** a valid signal, or is not properly connected between two algorithms, the **Clear** option will remove the signal from the sheet.

Procedure for Toolbar

1. Use the **Signal toolbar** to highlight and verify a signal.



2. Select the **Highlight Existing Signal icon**.

3. Use the mouse to select a **signal** between algorithms. The signal will change color to match the “highlight” color option (typically magenta).

4. To **remove** the highlight color from the signal, select the **Verify** item (Clear) from the Signal toolbar. The signal will return to its original color.

Note

If the signal is **not** a valid signal, or is not properly connected between two algorithms, the **Verify** (Clear) option will remove the signal from the sheet.

3-8.7. Tracking Signals

Tracking is used to align the portion of a control system that is **not** in control to the portion of the control system that **is** in control. Tracking signals are sent between algorithms to tell the upstream algorithm whether or not to be in tracking mode, and what value is required by the downstream algorithm to maintain the current output coming from the upstream algorithm.

Tracking signals are always visible and are typically shown in green.

Tracking points are fully managed by OCB except when tracking crosses between sheets, and when tracking from a downstream algorithm into a BALANCER algorithm.

Note

Since the BALANCER algorithm tracks from many downstream algorithms, tracking connections between a BALANCER algorithm and any downstream algorithms are not graphically visible.

Tracking is used for two purposes:

- **Prevent bumps**. A bump in a control process is a noticeable change in the demand to a control element. This sudden change can damage control elements.
- **Reduce process upset**. An upset is when the control system causes the process to temporarily move to an operating point which differs from the desired point.

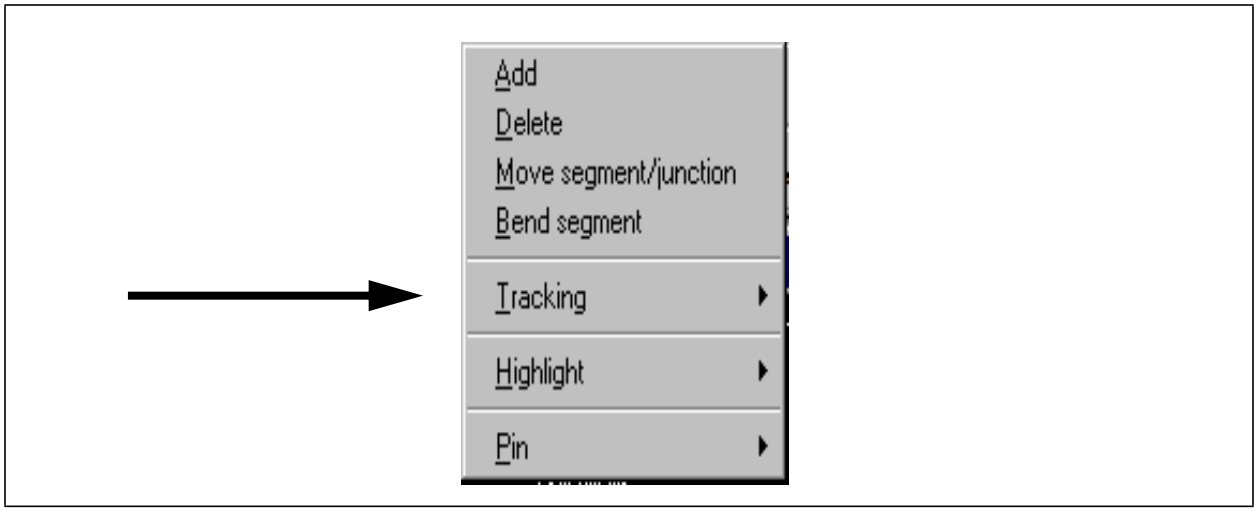
Setting Tracking between Algorithms

Use one of the following procedures to set tracking between algorithms:

- Use the Signals pull-down menu.
- Use the Signals toolbar.
- Use the Command line (see Section 4 for information on using the Signal commands).

Procedure for Pull-Down Menu

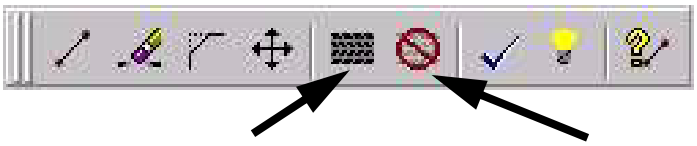
1. Use the **Signals** pull-down menu (shown below) to set tracking.



2. Select the **Tracking** item (Section 2 provides details about the Signals menu).
3. Select the **Set** option.
4. Select the **signal** to which you want to apply tracking. The signal will change color to match the “tracking” color option (typically green). Select the tracking path.
5. To **clear** tracking from the signal, select the **Tracking** item from the Signals pull-down menu, and then select the **Clear** option. Use the mouse to select the signal and it will return to its original color.

Procedure for Toolbar

1. Use the **Signal toolbar** to set tracking.



2. Select the **Set Tracking for an Existing Signal icon**.
3. Select the **signal** to which you want to apply tracking. The signal will change color to match the “tracking” color option (typically green).
4. To **clear** tracking from the signal, select the **Clear Tracking Along an Existing Signal icon**. Use the mouse to select the signal and it will return to its original color.

Setting Tracking between Sheets

You can set tracking across sheet boundaries. As with all points entering or leaving a sheet, track points used on multiple sheets must be user defined. Since the Control Builder manages the tracking connections, the tracking fields in the Edit Algorithm dialog box are typically hidden from the user.

Use the following procedure to set the tracking between a downstream sheet and an upstream sheet:

On the Downstream Sheet

1. Enable the tracking from the downstream algorithm to the **input** connector using the Signals menu or the Signal toolbar.
2. Edit the downstream algorithm using the Edit Algorithm dialog box. The tracking field is now visible and can be edited.
3. Enter the user-defined name and exit the Edit Algorithm dialog box.
4. Save the sheet.

On the Upstream Sheet

1. Enable the tracking from the **output** connector to the upstream algorithm using the Signals menu or the Signal toolbar.
2. Edit the **output** connector using the Edit Algorithm dialog box.
3. Enter the user-defined name and exit the dialog box.
4. Save the sheet.

3-9. Tags

Tags are text fields that are used in drawings by the Ovation NT Control Builder to identify point fields such as point names, English descriptions, point values, and algorithm parameter values.

3-9.1. Tag Guidelines

1. Tags are dynamic and will update as algorithm parameters and the database change.

   Comments are different from tags because comments are static text displays that do not change or update.

2. The Monitor Graphic will not dynamically update tags as functions are tuned.

3. You must Audit a sheet to ensure that database changes are reflected correctly in the tags. This can be done through the **Control menu** or through the **Sheet**, **Audit** command line.

4. If you edit an input point, it will not update until you audit the sheet or until you close the sheet and reopen it.

5. Set the default values for tags (alignment, height, and color) through the Tag Details tab in the Configuration dialog box (described in Section 5).

6. You may tie a tag to a signal to depict the point name, English description, or point value (only in the Monitor Graphic).

7. You may tie a tag to an algorithm parameter to depict the point value (either numeric or an enumerated string).

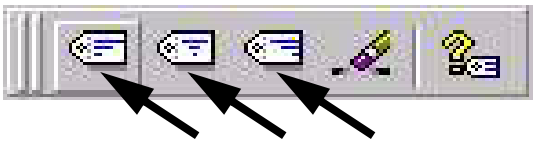
3-9.2. Inserting Tags

Use one of the following procedures to insert tags:

- Use the Tags toolbar.
- Use the Command line (see Section 4 for information on using the Signal commands).

Procedure for Toolbar

1. Use the **Tag toolbar** to insert tags.



2. Select the **desired tag** (left, center, or right justified).

Note

The lines inside the tag denote the type of justification.

3. Select the algorithm or output signal where you want to add a tag,
4. If you select an output signal, you will be prompted in the command line to select the name, description, or value of the signal.

   After you have selected what type of tag to use, use the cursor to move the tag to the desired location and left-click to place the tag. Skip to Step 6.

5. If you select an algorithm, a Select Parameter dialog box will appear (see Figure 3-31).

Note

When selecting an algorithm, select the body, NOT any of the algorithm pins.

6. Select the desired **parameter** for the tag. and use the cursor to move the tag to the desired location and left-click to place the tag. Proceed to Step 7.

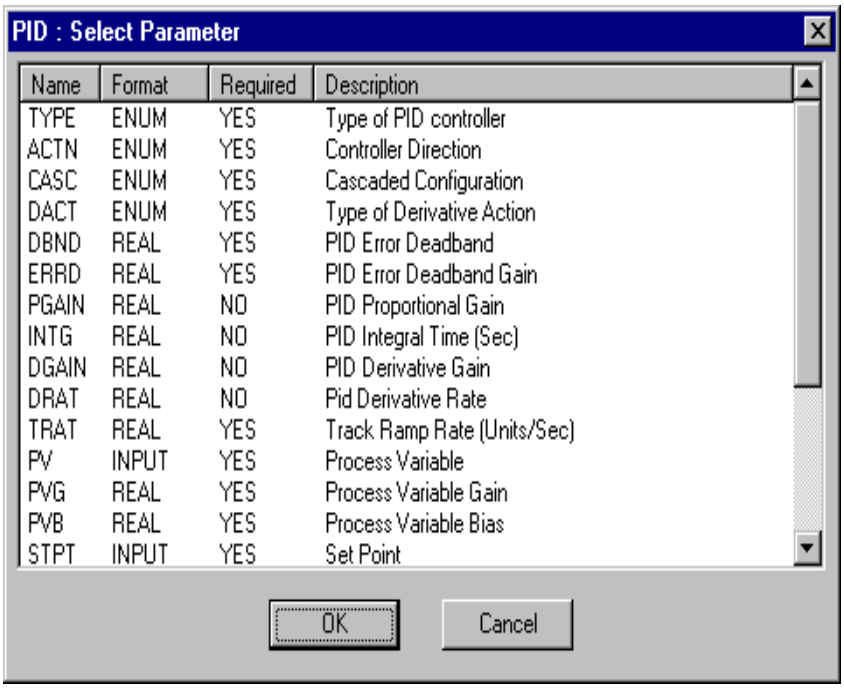


Figure 3-31. Select Parameter Dialog Box

7. Audit the sheet so that all the changes will be verified by OCB and the tags will be updated.

8. Save the sheet.

3-9.3. Deleting Tags

Use one of the following procedures to delete tags:

- Use the Tags toolbar.
- Use the OCB Standard toolbar.

Procedure for TagsToolbar

1. Use the **Tags toolbar** to delete tags.
2. Select the **Delete Point Tag** icon.

3. Select the **desired tag**.
4. Select the **Enter** button.

   The selected tag will be deleted.

Procedure for Standard Toolbar

1. Use the **OCB Standard toolbar** to delete a tag.

2. Select the **Erase Objects icon**.
3. Use the mouse to select the **tag(s)** to be deleted.

   The tag will be deleted and any other object selected with the tag will also be deleted.

Section 4. Using Control Builder Command Lines

4-1. Section Overview

The Control Builder provides a command line at the bottom of the main drawing window (as illustrated in Figure 4-1). This command line can be used to access many of the functions that the menus and toolbars perform.

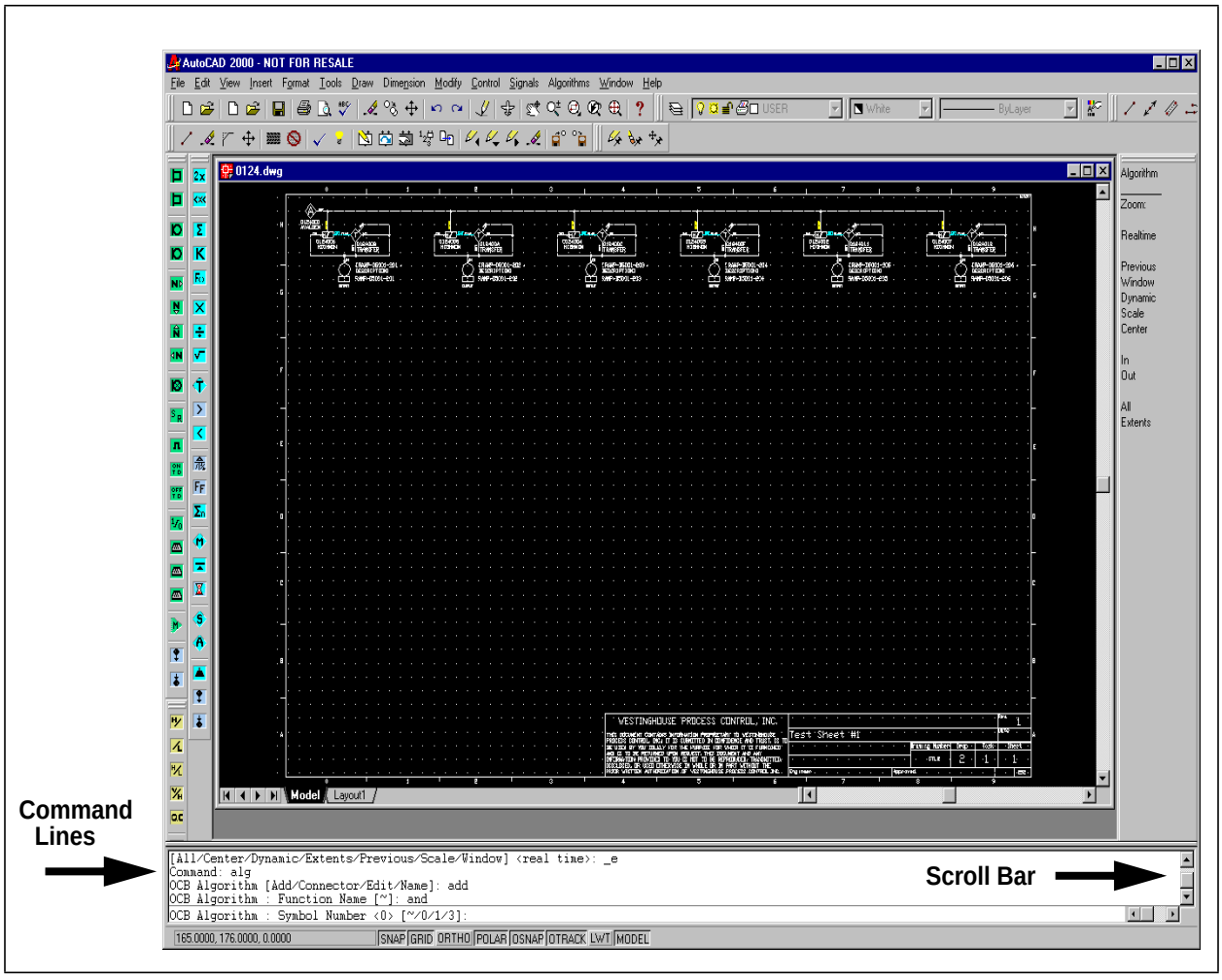


Figure 4-1. Command Line Location

You can use the scroll bar on the right side of the command line window to look at previously entered commands, or you can press **F2** to display the AutoCAD Text window containing all the commands entered for the current session (illustrated in Figure 4-2).

.

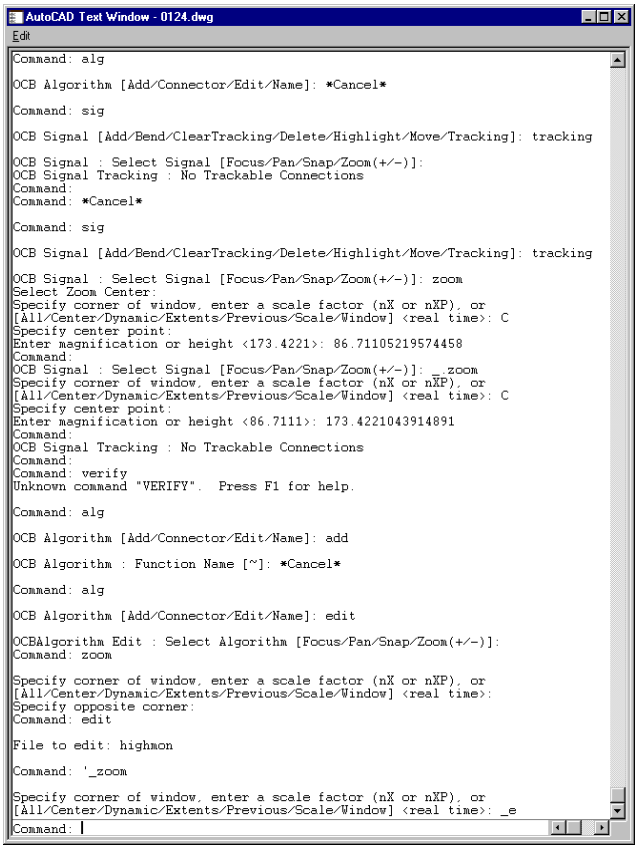


Figure 4-2. Commands in AutoCAD Text Window

This section contains the following information about Control Builder commands:

- Command Line Definitions (Section 4-2).
- Command Line Summary (Section 4-3).
- Command Usage (Section 4-4 through Section 4-13).
- Script Files (Batch Processing) (Section 4-14).

4-2. Command Line Definitions

When you enter a command, the options you can choose from are displayed in brackets on the screen. Table 4-1 lists the most common OCB commands and options.

Refer to Appendix A for definitions of AutoCAD commands that are also used by the Control Builder.

Table 4-1. Command Line Definitions

Command	Definition	Options
ALG	OCB Algorithm	[Add/Connector/Edit/Macro/Name/Order/Points/Reconcile]
CMDDIA (for dialog boxes that read and write to database) **FILEDIA** (for boxes that read and write to files)	Dialog box command	Used to suppress dialog boxes: If **CMDDIA/FILEDIA = 0**, then dialog box is suppressed, and options offered in box appear instead in command line. If **CMDDIA/FILEDIA = 1**, then dialog box appears, and options are selected from the box. Remains in effect until value is manually changed.
tilde sign (~)	Display dialog box	Used to temporarily override the CMDDIA/FILEDIA command that suppressed dialog box display.
OCBCONFIG	Configuration	OCB Configuration window appears
OCBCopy	Copy	[Copy/Import/Export]
OCBDelete	Delete	“Select entities” message appears
OCBMove	Move	“Select objects [All]” message appears
PIN	OCB Pin	[Add/Delete/Move]
QSAVE	Save to database	Will update database if no errors exist on sheet.
SHT	sheet	[Audit/Comments/Database/Locate//Print/Order/Title]
SIG	OCB Signal	[Add/Bend/Clear Tracking/Delete/Highlight/Move/Tracking/Verify]
TAG	OCB Point Tag	[Add/Delete/Existing]

Note

The options **[Focus/Pan/Snap/Zoom(+/-)]** that appear in many prompts are used to define how the object in question will be displayed.

4-3. Command Line Summary

Table 4-2. Summary of NT OCB Commands [1]

Command (Type at command line) **Sub-Command** (Available option under command) **Sub-Command** (Available option under sub-command)	**Description**
Algorithms [2]	Algorithm Specific Commands
Add	Add an algorithm to the control sheet
Edit	Edit an algorithm's parameters and outputs
Macro	Define a macro. Edit or explode an existing macro.
Connectors	Input/Output Specific Commands
Text	Set user defined text inside algorithm body
Usage	Show where used information for input/output
Name	Name an algorithm
Order	Set algorithm execution order for sheet
Points	Mass modify output points for algorithms on sheet.
Reconcile	Reconcile tuning changes from database into sheet
Pin	Pin Specific Commands
Add	Add one or more pins to an existing algorithm
Delete	Delete one or more optional pins from an existing algorithm
Move	Move one or more pins on an existing algorithm
Sheet	Sheet Specific Commands
Audit	Verify/Fix OCB specific data on the sheet
Comments	Manipulate text on comments layer
Database	Point Database Specific Commands
Create	Create undefined user defined points on sheet
Security	Set security group flags for OCB default points
Locate	Find an algorithm or point on the sheet
Print	Print the functional, details or connector information
Order	Set sheet execution order within task.

Table 4-2. Summary of NT OCB Commands (Cont'd) [1]

Command (Type at command line) **Sub-Command** (Available option under command) **Sub-Command** (Available option under sub-command)	**Description**
Sheet	Sheet Specific Commands
Title	Title / Frame Specific Commands
Edit	Edit title box fields
Replace	Replace title box and disclosure statement with D:\OvPtSvr*System*\template.dwg
Add	Add dynamic text to drawing, text will be updated as the title box is modified
Signal	Signal Specific Commands
Add	Add a signal segment to a pin or existing signal
Bend	Add a junction in the middle of an existing segment
ClearTracking	Clear all the tracking on a sheet
Delete	Delete a segment and all downstream segments
Highlight	Change signals color to highlight connections
Move	Move a segment or junction
Tracking	Tracking Specific Commands
Set	Set tracking relationship between two algorithms
Clear	Clear tracking for a signal
Verify	Verify/Fix a signals connections, segments, and donuts
Tag	Tag Specific Commands. A tag depicts dynamic database information
Add	Add a tag for a point field (e.g. point name, description, etc.,)
Delete	Delete tag from drawing (OCBDelete is the preferred means of deleting)
Existing	Convert existing TEXT or MTEXT into a TAG.
OCBCopy	Copy or Library Specific Commands
Copy	Copy control / drawing items within a drawing.
Import	Import control / drawing items from a library drawing file
Export	Export control / drawing items to a library drawing file

Table 4-2. Summary of NT OCB Commands (Cont'd) [1]

Command (Type at command line) **Sub-Command** (Available option under command) **Sub-Command** (Available option under sub-command)	**Description**
OCBDelete	Delete Control / Drawing Items from a Sheet
OCBMove	Move Control / Drawing Items on a Sheet
OCBConfig	Configure Ovation Control Builder Parameters
QSAVE	Standard AutoCAD Command, Will Update Database if no errors exist on sheet

[1] Commands and Sub-Commands are not Case Sensitive.

[2] Underscores represent the minimum response to a prompt. (for example, for "Add" type "a")

4-4. Algorithm (ALG) Command

Manipulates one algorithm. If you enter **ALG** at the command prompt, ALG displays prompts on the command line and provides the options that can be selected.

Note

Use the **Escape** key to cancel a command.

4-4.1. ALG Options

OCB Algorithm [**Add/Connector/Edit/Macro/Name/Order/Points/Reconcile**]:

Add

Adds an Algorithm to the Sheet.

Prompt - `OCB Algorithm: Function Name [~]`

Action - Enter Function Name and place algorithm on sheet. Default is the previous algorithm added. Enter (~) to display the Select Function Name list of available algorithms.

Prompt - `OCB Algorithm Edit: Symbol Number [~/0/1]`

Action - Enter (~) to display the Algorithm Choice Display screen that shows all the views or symbols for the selected algorithm. Default is previous symbol added.

Enter (0) to select the first view, (1) to select the second view, and so on.

Prompt - `Move selected entity.`

Action - Click on drawing to place algorithm on drawing.

Connector

Provides Input/Output specific commands.

Prompt - `OCB Connector [Text/Usage]`

Action - If **Text** is selected:

Prompt - `OCB Connector: [Select Connectors].`

Action - After connectors are selected, the user-defined text is placed inside the Connector algorithm.

Action - If **Usage** is selected:

Prompt - `OCB Select Connector [Focus/Pan/Snap/Zoom (+/-)]`. After Connector is selected, shows where input/output is used.

Edit

Used to change Algorithm parameters and output point names.

Prompt - `OCB Algorithm Edit: Select Algorithm`

Action - After the Algorithm is selected, the Edit Algorithm box appears.
Make the desired changes in the box and select OK to save the changes.

Macro

Used to create a custom interface (macro) for common functional drawings.

Prompt - `OCB Macro <Define/Explode>`

Action - If Define is selected, a new macro can be created, or an existing macro

can be redefined.

Prompt - `OCB Macro: Define: Macro Name:`

Action - Enter a name for the macro.

Prompt - `Define <Macro Name> Description`

Action - Enter a description for the macro.

Prompt - `Define Macro: <Points/Parameters/OK>`

Action - If Points is selected

Prompt - `Edit <Macro Name> Points: Point Name [Cancel/Display (?)/Done]`

(Cancel voids the operation, (?) displays a list of available points, Done completes

the process)

Action - Enter the name of the point to edit.

Prompt - `Edit (Macro Name> Points: New Parameter Name`

Action - Enter the new parameter name for the point.

Prompt - `Edit (Macro Name> Points: New Parameter Prompt`

Action - Enter a new prompt for the parameter.

Prompt - `Edit <Macro Name> Force Required Point`

Action - Enter "Y" or "N" to determine if the point is required or not.

Action - If Parameters is selected:

Prompt - `Select Algorithm`

Action - A list of available parameters is displayed. Select the algorithm that contains

the desired parameters from the current sheet.

Prompt - `Select Parameter`

Action - Select the desired parameter

Prompt - `Edit <Macro Name> Parameters: Parameter Name`

Action - Enter a new interface name for the selected parameter

Prompt - `Edit <Macro Name> Parameters: Parameter Template Name`

Action - Enter a name for the parameter template.

Prompt - `Edit <Macro Name> Parameters: Parameter Prompt`

Action - Enter a name for the parameter prompt.

Prompt - `Define Macro:<Macro Name> <Points/Parameters/OK>`

Action - Enter OK to define the macro.

Action - If Explode is selected:

Prompt - `Macro Name`

Action - Enter the name of the macro that is to be exploded.

Name

Replaces sheet ID for the Algorithm with a user defined name (see Section 3-5.4 for algorithm naming guidelines).

Prompt - `OCB Algorithm Name: Select Algorithm`

Action - Select algorithm and new prompt appears.

Prompt - `OCB Algorithm Name: Algorithm Name <Default> [: for None]:`

Action - Enter new name for algorithm.

Order

Modifies execution order of algorithms on a sheet.

Prompt - `OCB Sheet Order Algorithm [Automatic/UserDefined/View]:`

Action - If **Automatic** is selected, OCB orders the algorithms automatically by connection and graphic location.

If **User Defined** is selected, the Order Algorithm dialog box appears. Make desired changes.

If **View** is selected, a new prompt appears:

Prompt - `OCB View Sheet Order Algorithm [Toggle/Quit]:`

Action - If **Toggle** is selected, the algorithm execution order number on drawing is displayed or hidden.

If **Quit** is selected, the drawing returns to edit mode.

Points

Modifies output points (in mass) for the algorithms on the sheet.

Action - The Point Edit dialog box appears. Make desired changes.

Reconcile

Reconciles tuning changes from the database into the sheet.

Action - Displays the “Select Items to Reconcile” dialog box that compares values on the sheet with the values in the database. Reconcile from the **Control Builder** compares the records in the Oracle database with the algorithms on the sheet in order that the Control Builder can recognize any changes.

Reconcile from the **Studio** takes tuning changes from the Controller and updates the algorithm records in the Oracle database. Refer to “Ovation NT Studio Developer Studio” (NT-0060) for information on using Reconcile to make database changes through the Studio.

4-5. OCBConfig

Configures Control Builder parameters.

4-5.1. OCBConfig Options

OCBConfig

Action - Ovation NT Control Builder Configuration window appears. Make the desired changes and select OK.

4-6. OCBCopy Command

Performs copy and library functions. If you enter **OCBCopy** at the command prompt, OCBCopy displays prompts and provides the options that can be selected.

4-6.1. OCBCopy Options

OCB Copy <Copy> [Copy/Import/Export]:

Copy

Copies control or drawing items in a drawing and places them in a file.

Prompt - `OCB Copy: Select Entities [All]:`

Action - Select item and complete action by clicking the right mouse button. This process continues until the right mouse button or Enter is pressed.

Prompt - `OCB Copy: Select Base Point:`

Action - Select Base Point. Objects are attached to the cursor.

Prompt - `OCB Copy: Move selected objects:`

Action - Move objects into place and click the left mouse button.

Import

Import control or drawing items from a library drawing file.

Prompt - `OCB Copy: IMPORT: File Name <DefaultDirectory> Select new location.`

Action - Enter file to import. (All file names not beginning with "/" are located in default directory.)

Prompt - `OCB Copy: Move selected objects:`

Action - Move objects into place and click the left mouse button.

Export

Export control or drawing items from a library drawing file.

Prompt - `OCB Copy: EXPORT: File Name <DefaultDirectory>`

Action - Enter file to export from. (All file names not beginning with "/" are located in default directory.)

Prompt - `OCB Copy: Select Entities [All]:`

Action - Select item you want to export and complete action by clicking the right mouse button.

Prompt - `OCB Copy: Export: Select Base Point.`

4-7. OCBDelete Command

Mimics the Autocad “erase” command. If you enter OCBDelete at the command prompt, OCBDelete displays prompts on the command line

Note

Use the **Escape** key to cancel a command.

4-7.1. OCBDelete Options

Deletes control or drawing items from a sheet.

OCBDelete

Prompt - `Erase: Select entities`

Action - Select item(s) to be deleted. This process continues until the right mouse button or Enter is pressed.

4-8. OCBMove Command

Moves any object in the drawing (except pins, see Pin command for information about moving Pins). If you enter **OCBMove** at the command prompt, OCBMove displays prompts on the command line.

Note

Use the **Escape** key to cancel a command.

4-8.1. OCBMove Options

`OCB Move: Select Objects [All]:`

Action - Select object(s) to be moved.

Prompt - `Select Base Point`

Action - Select item to be moved and complete action by clicking the right mouse button.

Prompt - `Move Selected Objects`

Action - Select location on sheet where you want place item.

4-9. Pin Command

Manipulates pins on an algorithm. If you enter **Pin** at the command prompt, Pin displays prompts on the command line and provides the options that can be selected.

Note

Use the **Escape** key to cancel a command.

4-9.1. Pin Options

OCB Pin [Add/Delete/Move]:

Add

Adds one or more pins to an existing algorithm.

Prompt - `OCB Pin [Add]: Select Algorithm [Focus/Pan/Zoom(+/-)]:`

Action - Select algorithm and a new prompt appears.

Prompt - `OCB Pin: Enter Pin Name`

Action - The Select Pin to Add dialog box appears (if dialog box is suppressed, use the AutoCAD Text window for information). Select the desired Pin name.

Prompt - `OCB Pin - Select Point on Algorithm Symbol [Focus/Pan/Zoom]:`

Action - Click on the algorithm where you want to add the Pin.

Prompt - `OCB Pin - Select Pin End Points [Focus/Pan/Zoom]:`

Action - Click on the Pin's beginning end point and on the ending end point.

Prompt - `OCB Pin - Accept Current Points <Yes> [Yes/No]:`

Action: If **Yes** is selected, the Pin is added to the algorithm. If **No** is selected, then reselect the start point and end point.

Delete

Deletes an optional pin which is not connected.

Prompt - `OCB Pin [Delete]: Select Algorithm [Focus/Pan/Zoom(+/-)]:`

Action - Select the desired algorithm.

Prompt - `OCB Pin: Enter Pin Name`

Action - (~) displays a list of possible pins.

Move

Moves one or more pins on an existing algorithm which is not connected.

Prompt - `OCB Pin: [Move]: Select Algorithm [Focus/Pan/Snap/Zoom(+/-):`

Action - Select algorithm and a new prompt appears.

Prompt - `OCB Pin: Enter Pin Name: (left Column)[~]:(A` dialog box appears. If dialog box is suppressed, use the AutoCAD Text window for information.

Action - Select the desired Pin name. If necessary, enter (~) to display a list of possible pins.

Prompt - `OCB Pin: Select Point on ALgorithm Symbol [Focus/Pan/Zoom]:`

Action - Select point on algorithm where you want to attach pin.

Prompt - `OCB Pin: Select Pin End Point [Focus/Pan/Zoom]:`

Action - Click on the Pin's beginning end point and on the ending end point.

Prompt - `OCB Pin: Accept Current Points <Yes> [Yes/No]`

Action: If **Yes** is selected, the Pin is moved to the algorithm. If **No** is selected, then reselect the start point and end point.

4-10. QSAVE

This is a standard AutoCAD command. When a functional drawing is saved, the Control Builder performs the following steps:

- **Syntax Checking** - The algorithms are checked for any content errors (such as required pins that are not connected).

  If NO syntax errors are found, the drawing file will be written to disk, and the following functions will be performed.

  — **Update Oracle Database** - The control from the sheet is saved into the Oracle database. Load the Controller via the Studio to activate the control logic on the sheet.

  — **Create Monitor Graphic** - The monitor graphic is created and compiled. To use the graphics, the various NT Workstations must be downloaded via the Studio.

  If syntax errors are found, the drawing file will be written to the disk, but NONE of the above functions will be performed.

4-11. Sheet (SHT) Command

Manipulates more than one object on the sheet. If you enter **SHT** at the command prompt, SHT displays prompts on the command line and provides the options that can be selected.

4-11.1. SHT Options

OCB Sheet [Audit/Comments/Database/Locate/Print/Order/Title]

Audit

Verify and correct OCB specific data on the sheet. Displays dialog box of syntax errors in algorithms.

Comments

Prompt - `OCB Comment [Edit/File/Generate]`

Action - If **Edit** is selected, the Edit Comments window appears.

If **File** is selected, the Open window containing all files and directories appears.

If **Generate** is selected, the Save window to save the file appears.

Database

Prompt - `OCB Sheet Print Database Interface [Create/Security]`

Action - If **Create** is selected, a prompt appears. This command will create the user-defined points on the sheet that do not already exist.

Prompt - `Preview/Confirm Point Creations [Yes] (Yes/No)`
If **Yes** is selected, a dialog box appears. If **No** is selected, the points are created.

If **Security** is selected, the Enable Point Security dialog box appears.

Locate

Find an algorithm or point on the sheet.

Prompt - `OCB Locate [Algorithm/Point]:`

Action - Enter the name of the algorithm or point (wildcards acceptable).

Print

Prints information about sheet.

Prompt - `OCB Print [Connectors/Details/Functional/Ladders/Titles]:`

Action - If **Connectors** is selected, connector information from the sheet is printed.

If **Details** is selected, detailed information from the sheet is printed.

If **Functional** is selected, the functional drawing (WYSIWYG) for the sheet is printed.

If **Ladders** is selected, the content of the ladders on the sheet is printed.

If **Titles** is selected, all the sheet titles for the Controller are printed (similar to a Table of Contents).

Order

Sets sheet execution order in the task.

Action - Control Sheet Execution Order box appears. Make changes and select **OK** to save changes.

Title

Modify title box fields and Frame.

Prompt - `OCB TitleBox [Edit/Replace/Add]`

Action - If **Edit** is selected, the Sheet Parameters dialog box appears. Edit the fields.

If **Replace** is selected, the title box and disclosure statement will be replaced with data from **D:\OvPtSvr\System\template.dwg**

If **Add** is selected, dynamic text will be added to the drawing, and will be updated as the title box is modified.

4-12. Signal (SIG) Command

Manipulates signals on the sheet. If you enter **SIG** at the command prompt, SIG displays prompts on the command line and provides the options that can be selected.

Note

Use the **Escape** key to cancel a command.

4-12.1. SIG Options

OCB Signal [**Add/Bend/ClearTracking/Delete/Highlight/Move/Tracking**]

Add

Adds a signal segment to a pin or existing signal.

Prompt - `OCB Signal: Select Signal [Focus/Pan/Snap/Zoom(+/-)]`

Action - Define start of signal segment.

Prompt - `OCB Signal: Select Position [Focus/Pan/Zoom(+/-)]:`

Action - Select location for signal on drawing. This is repeated until an input pin is selected or the Escape key is pressed to cancel the process.

Bend

Adds a junction in the middle of an existing segment.

Prompt - `OCB Signal: Select Signal [Focus/Pan/Snap/Zoom(+/-)]:`

Action - Select segment that you want to bend.

Prompt - `OCB Signal: Select Position [Focus/Pan/Zoom(+/-)]:`

Action - Select new junction in segment.

Clear Tracking

Clears ALL tracking on the sheet.

Delete

Deletes selected segment and all downstream segments.

Prompt - `OCB Signal: Select Signal [Focus/Pan/Snap/Zoom(+/-)]:`

Action - Define first segment to delete.

Highlight

Highlights entire signal to show connections; to reset, verify the signal.

Prompt - `OCB Signal: Select Signal [Focus/Pan/Snap/Zoom(+/-)]:`

Action - Select a signal that you want to highlight.

Move

Moves a segment or junction; to reset, adjust connected segments.

Prompt - `OCB Signal: Select Signal [Focus/Pan/Snap/Zoom(+/-)]:`

Action - Select a segment or junction to move.

Prompt - `OCB Signal: Select Position [Focus/Pan/Zoom(+/-)]:`

Action - Defines the new position of the segment or junction.

Tracking

Modifies the tracking between two tracked pins.

Prompt - `OCB Signal: Select Signal [Focus/Pan/Snap/Zoom(+/-)]:`

Action - Select signal to modify tracking.

Prompt - `OCB Signal: Tracking [Clear/Set]`

Action - Define the operation.

If **Clear** is selected, any tracking relationship that exists is removed.

If **Set** is selected, tracking between possible tracking pins is rerouted, and the following prompt appears:

Prompt - `OCB Signal: Select Signal [Focus/Pan/Snap/Zoom(+/-)]:`

Action - Closest trackable pin is selected.

Verify - Verifies signal constancy; removes unattached segments.

4-13. Tag Command

A tag depicts dynamic database information and places dynamic text for a point field value. If you enter **Tag** at the command prompt, Tag displays prompts on the command line and provides the options that can be selected.

Note

Use the **Escape** key to cancel a command.

4-13.1. Tag Options

OCB Point Tag [Add, Delete]:

Add

Adds a tag for a point field (for example, point name, description, and so on)

Prompt - `OCB Point Tag: Select Signal or Algorithm [Focus/Pan/Snap/Zoom (+/-)]:`

Action - Select where you want to add a tag.

Prompt - `OCB Point Tag: Alignment <Default> [Left/Center/Right]: <Algorithm Selected>`

Action - Select the desired alignment for tag (Default is the last alignment, if any.)

Prompt - `OCB Point Tag: Algorithm Field (left Column)[~]: <Signal Selected or Input/Output of Algorithm>` (A dialog box appears. If dialog box is suppressed, use the AutoCAD Text window for information.

Action - Select tag location from a list of all inputs, parameters, and outputs.

Prompt - `OCB Point Tag: Point Field Name <Name>`

Action - Standard point fields, plus NAME, DESC, and VALUE.

Delete

Deletes a tag.

Prompt - `OCB Point Tag: Delete: Select Tag`

Action - Select tag and it will be deleted.

Existing - Converts existing TEXT or MTEXT into a Tag.

Note

OBCDelete will also delete a tag.

4-14. Script Files

You can create a script file in a text editor that can be used to create one control sheet quickly and efficiently. These script files are based on the format used in AutoCAD script files. Figure 4-3 provides an example of a portion of a script file. Note that along with the commands, coordinates are used to specify where the objects are to be placed on the drawing.

The script file should set "CMDDIA and FILEDIA" to zero (0) to suppress dialog box displays. All options offered in the dialog box will then be offered as options in the command line. This suppression will stay in effect until you set CMDDIA and FILEDIA to one (1). Then the dialog boxes will be displayed again.

To run a script file, select the **Run Script** option in the AutoCAD **Tools** menu. A dialog box appears where you can select the desired script file.

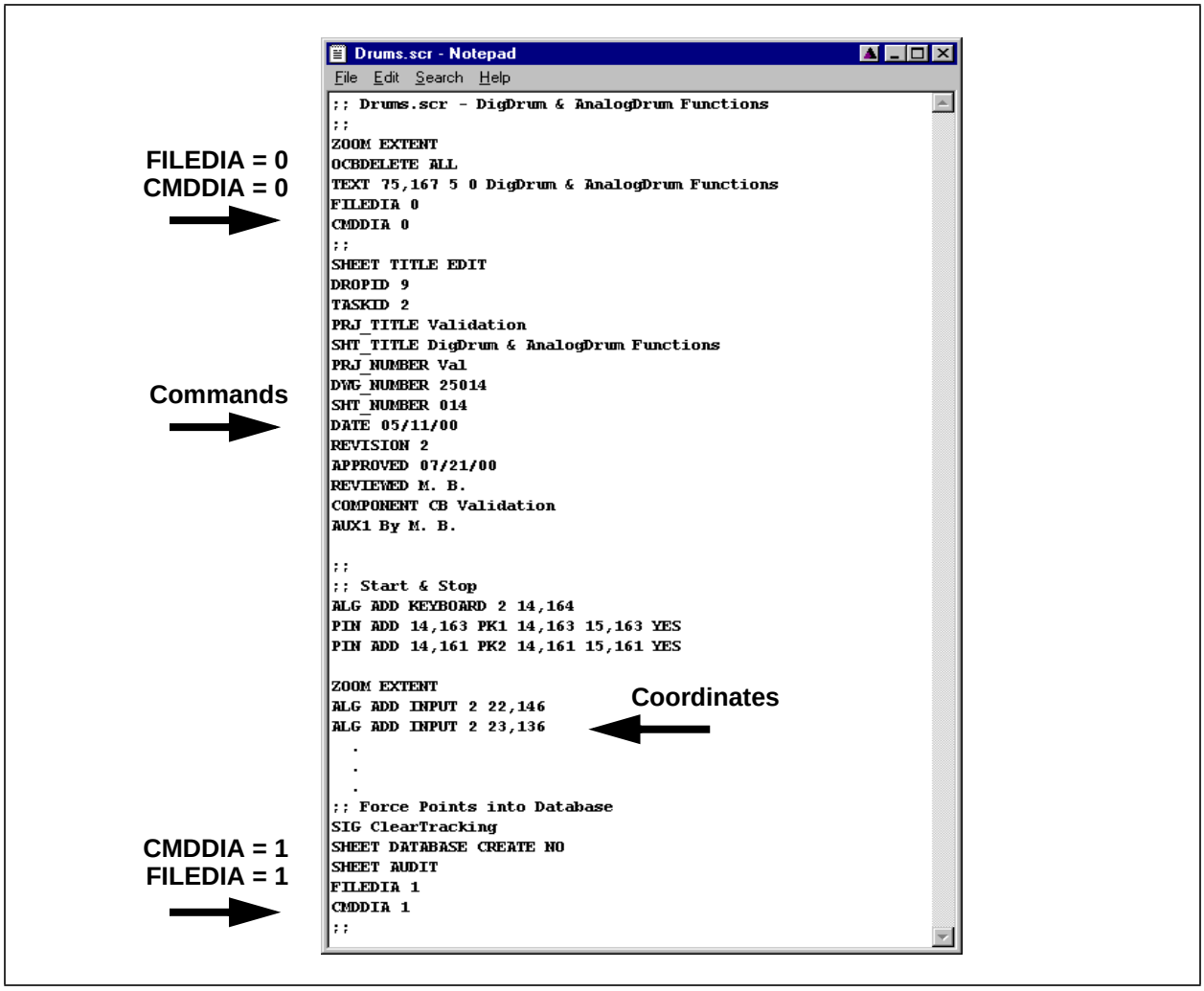


Figure 4-3. Example of a Script File

Section 5. OCB Configuration

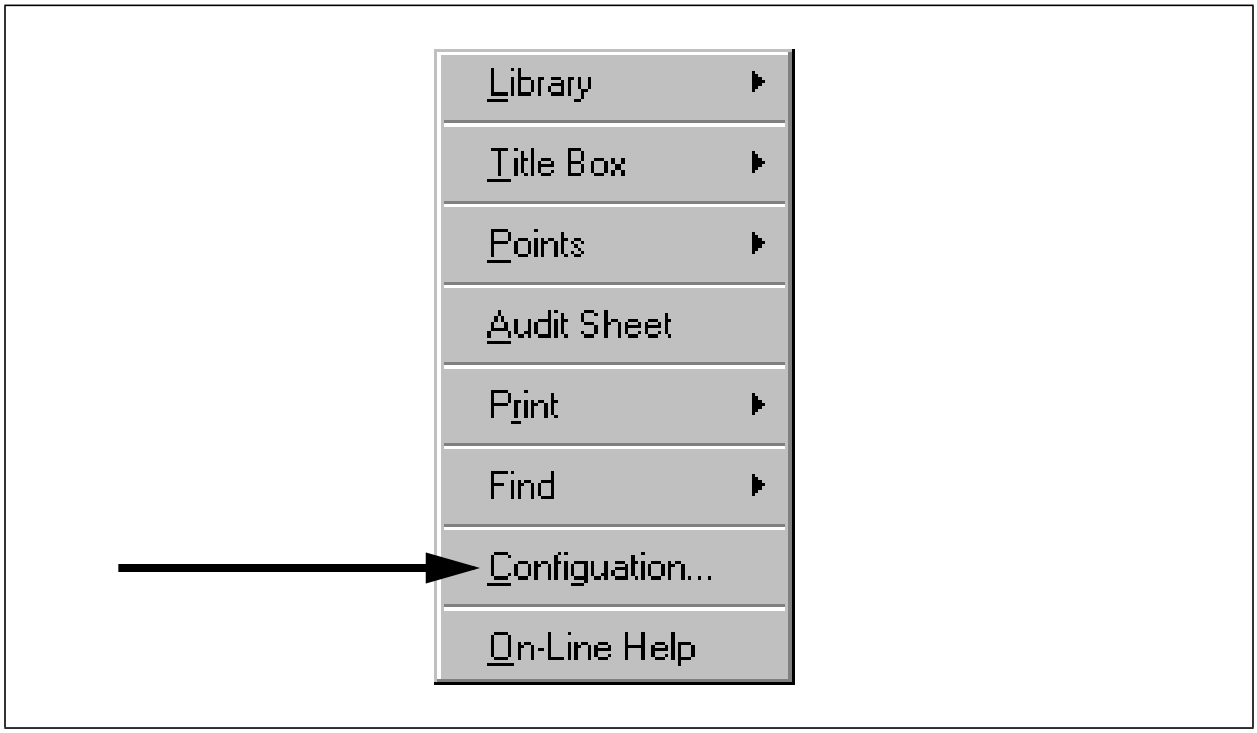
5-1. Section Overview

This section describes the use of the OCB Configuration dialog box to configure the Ovation NT Control Builder. The Configuration dialog box can be accessed through the Control Builder Control menu or through the Command lines (see Section 4 for information on using commands).

5-2. Configuration Dialog Box

Use the following procedure to access the OCB Configuration dialog box through a pull-down menu:

1. Select the OCB **Control** pull-down menu (as shown below).
2. Select the **Configuration** item.



3. The Configuration dialog box appears. The Configuration box contains six tabs that are used for configuring different functions of the Control Builder:
   - Database Connection Tab (Section 5-2.1).
   - Project Details Tab (Section 5-2.2).
   - Signal Display Tab (Section 5-2.3).
   - Plot Details Tab (Section 5-2.4).
   - Text Defaults Tab (Section 5-2.5).
   - Options Tab (Section 5-2.6).
4. Select the appropriate tab and perform the desired configurations. Select the **OK** button to save the changes.
5. You must end the Control Builder session in order for the changes to take place.

Note

Configuration is done at the Unit level and needs to be done at least once in order to configure Project Details.

5-2.1. Database Connection Tab

This tab is used to identify the database parameters that provide for communication between the Control Builder and the Oracle database. These parameters allow OCB to use an **Oracle Client** to communicate with the Oracle Database Server.

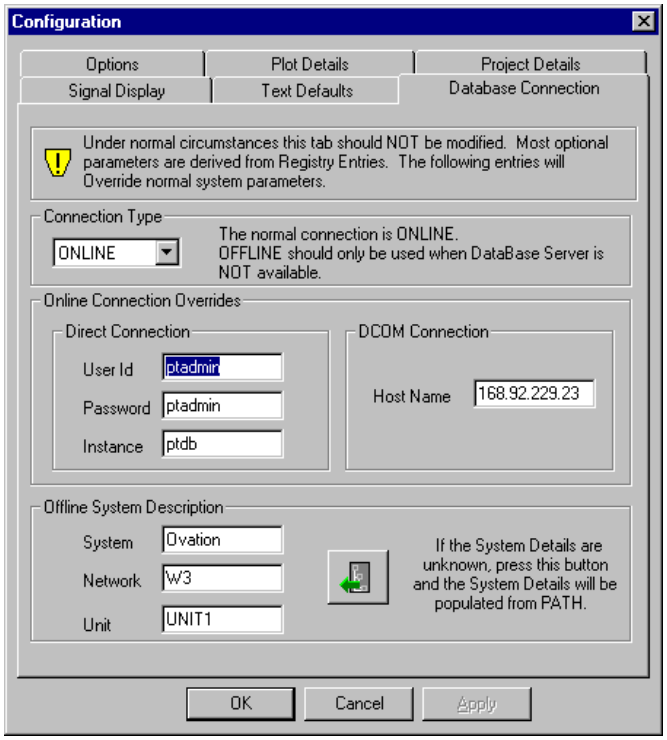


Figure 5-1. Database Connection Tab

Table 5-1. Database Connection Table

Field	Description
Connection Type	Defines type of connection to database. Typically, ONLINE is selected.
Online Connection Overrides	
Direct Connection User ID	Defined by system, do NOT change.
Direct Connection Password	Defined by system, do NOT change.
Direct Connection Instance	Defined by system, do NOT change.
DCOM Connection Host Name	IP address of NT Server.

Table 5-1. Database Connection Table (Cont'd)

Field	Description
Offline System Description	
System	Name of Ovation NT System.
Network	Name of Network in the Ovation NT System.
Unit	Name of Unit in Network.
System Details Button	If System details are not displayed, press this button to display the current System details in the entry fields.

5-2.2. Project Details Tab

This tab is used to configure the project information that appears in the drawing frame and title boxes (see Figure 5-3). The fields defined here cannot be changed at the sheet level.

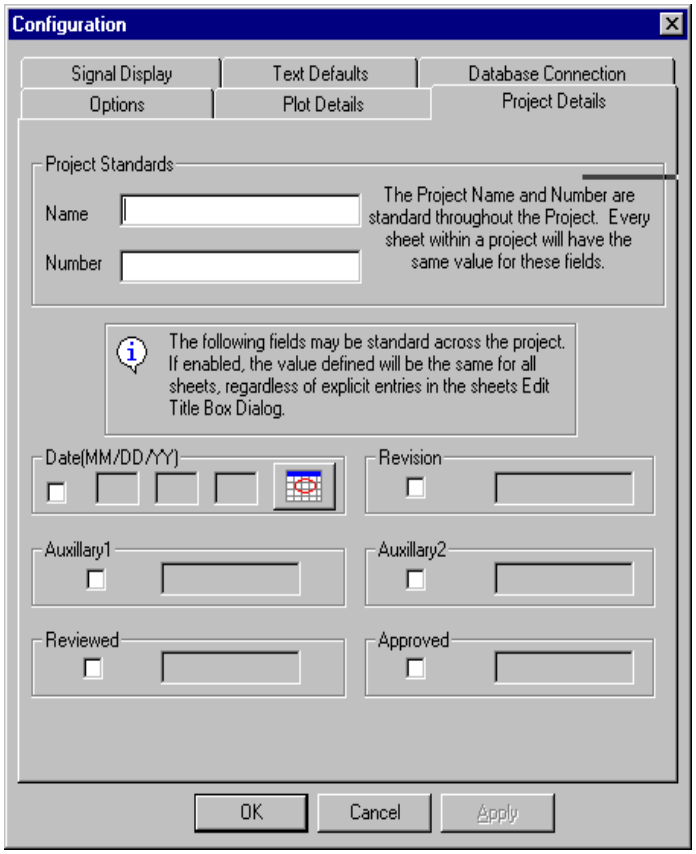


Figure 5-2. Project Details Tab

Table 5-2. Project Details Table

Field	Description
Project Standards Name	Name or Title of project.
Project Standards Number	Number assigned to project.
Date (MM/DD/YY)	Date of drawing. If date is not displayed, press button to display current date.
Revision	Revision of drawing.
Auxillary1	Extra information that might be useful to project personnel.

Table 5-2. Project Details Table (Cont'd)

Field	Description
Auxillary2	Extra information that might be useful to project personnel.
Reviewed	Engineer who reviewed drawing.
Approved	Engineer who approved drawing.

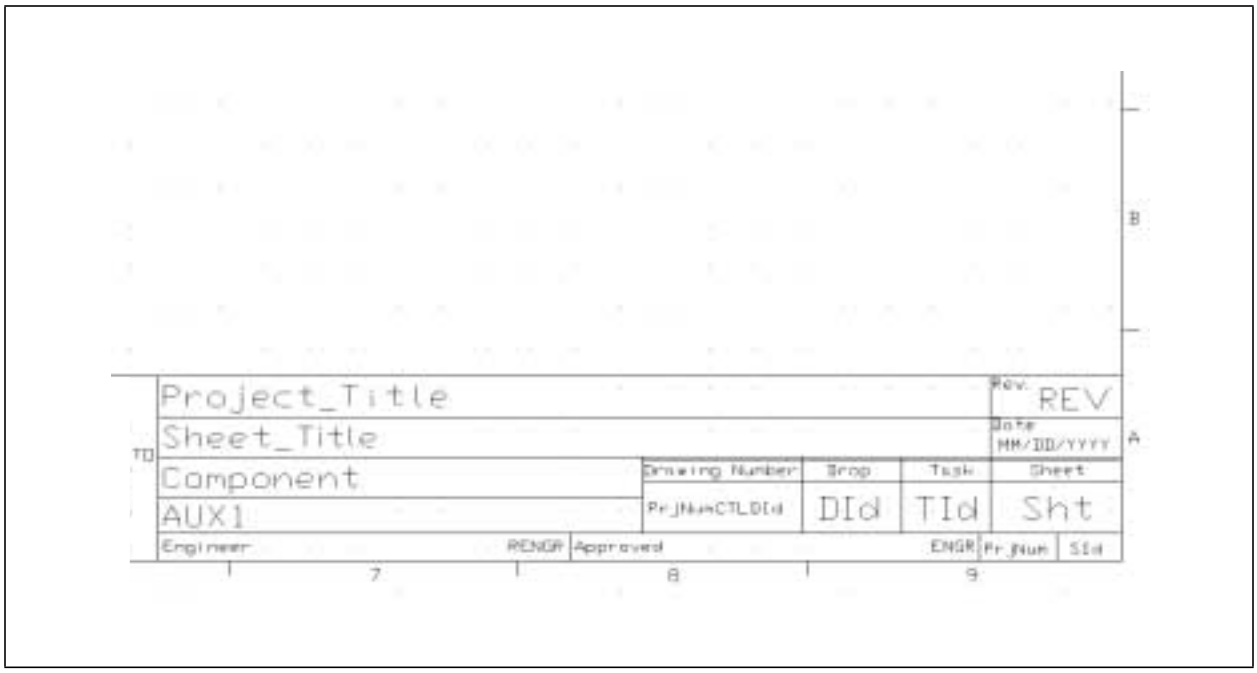


Figure 5-3. Title Boxes

5-2.3. Signal Display Tab

This tab is used to configure the signal lines between the algorithms. The Ovation Control Builder release is configured with the recommended default settings. If you change the signals settings, you must use the **Audit** function (through the Control menu or Sheet command line) to save the changes. **Changing these parameters is NOT recommended**.

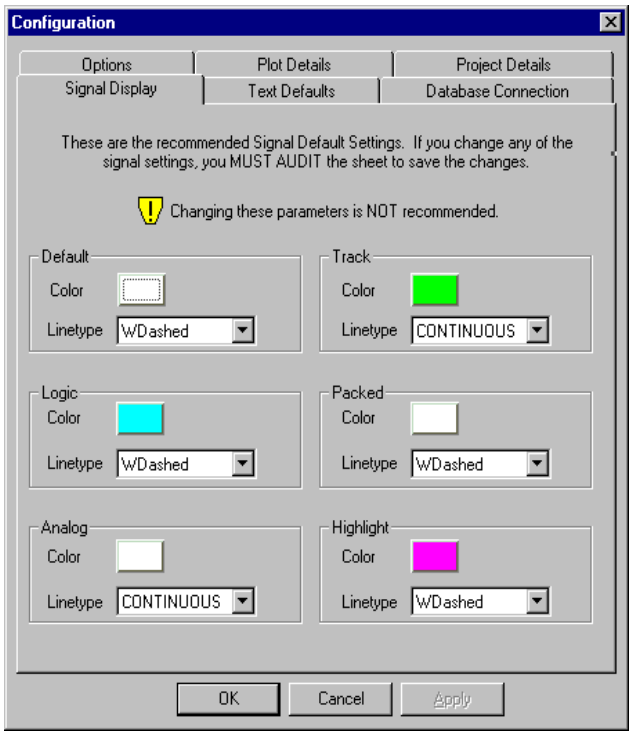


Figure 5-4. Signal Display Tab

Table 5-3. Signal Details Table

Field	Description
Default	Color and linetype of default signals (white and dashed).
Logic	Color and linetype of digital signals (cyan and dashed).
Analog	Color and linetype of analog signals (white and continuos).
Track	Color and linetype of tracking signals (green and dashed).
Packed	Color and linetype of packed point signals (white and dashed).
Highlight	Color and linetype of highlighted signals (purple and dashed).

5-2.4. Plot (Print) Details Tab

This tab is used to configure the printing device being used by the Control Builder.

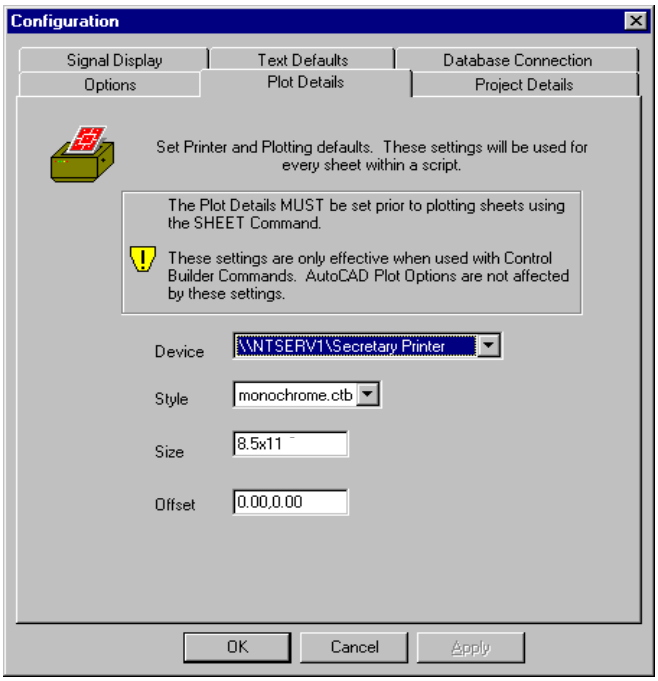


Figure 5-5. Plot Details Tab

Table 5-4. Plot Details Table

Field	Description
Device	Name of printer.
Style	Color or monochrome (black and white).
Size	Paper size.
Offset	Set at zero (0) to use complete sheet for drawing. Increasing the number will “offset” the drawing from the edge of the paper by the value of the entered number.

5-2.5. Text Defaults Tab

This tab is used to configure the text tags used to identify the points, values, descriptions and also to configure dynamic text that can be added to the title box.

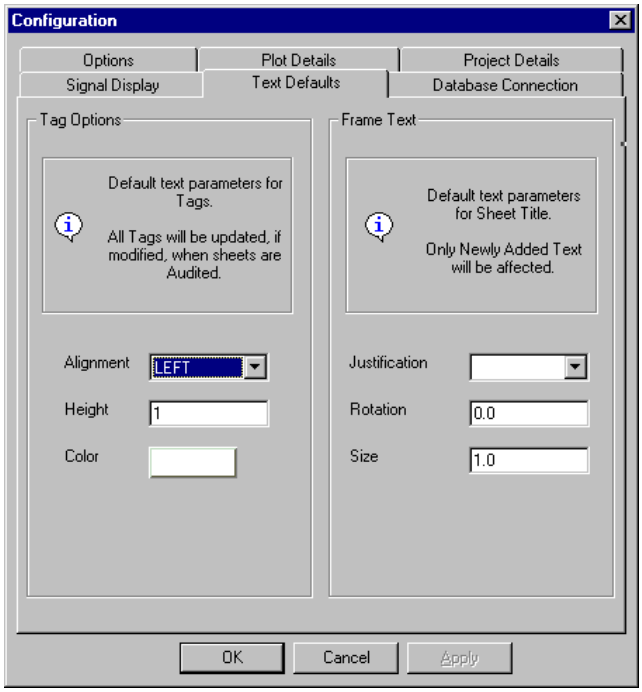


Figure 5-6. Text Defaults Tab

Table 5-5. Text Defaults Table

Field	Description
Tag Options (settings for tags)	
Alignment	Determines if tag will have Center, Left, or Right alignment.
Height	Sets size of font used in tags.
Color	Sets color of font used in tags.
Frame Text (settings for text in title boxes)	
Justification	Determines if text will be Center, Left, or Right justified.
Rotation	Determines position of text in title boxes.
Size	Sets size of font used in text.

5-2.6. Options Tab

This tab is used to configure various Control Builder functions.

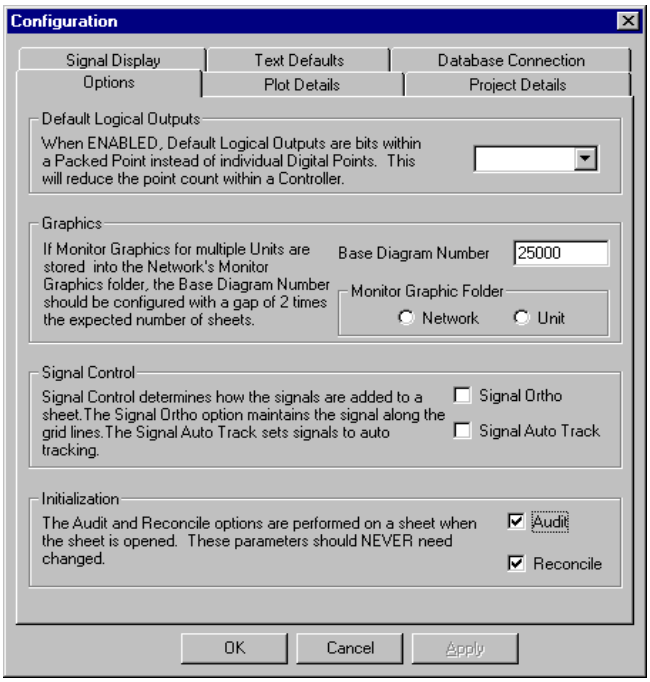


Figure 5-7. Options Tab

Table 5-6. Options Table

Field	Description
Default Logical Outputs	If ENABLED, Packed Point outputs will be bits instead of Digital Points.
Graphics	
Base Diagram Number	Defines the beginning number for the Monitor Graphic diagrams that will be created from the sheets.
Network	If selected, Monitor Graphics will be stored in the Network Monitor Graphic folder.
Unit	If selected, Monitor Graphics will be stored in the Unit Monitor Graphic folder.
Signal Control	
Signal Ortho	If selected, only horizontal or vertical signal lines can be drawn.

Table 5-6. Options Table (Cont'd)

Field	Description
Signal Auto Track	If selected, signals drawn between algorithms will track automatically.
Initialization	
Audit	If selected, a sheet will be audited when it is opened.
Reconcile	If selected, a sheet will be reconciled when it is opened.

Section 6. Monitor Graphics

6-1. Section Overview

The Control Builder creates functional drawings and when these drawings are saved, two types of files are created (see Figure 6-1):

- Drawing files (.**dwg**) - Actual OCB files that can be edited.
- Graphic files (.**diag**) - Read-only files that can be displayed on NT Operator Stations (MMIs) and can be used for monitoring and control. However, any changes made during a monitoring session will NOT be saved when the session is ended and the .diag file is closed.

  These graphics are numbered between 25000 and 32000 and are known as the **Monitor Graphics**.

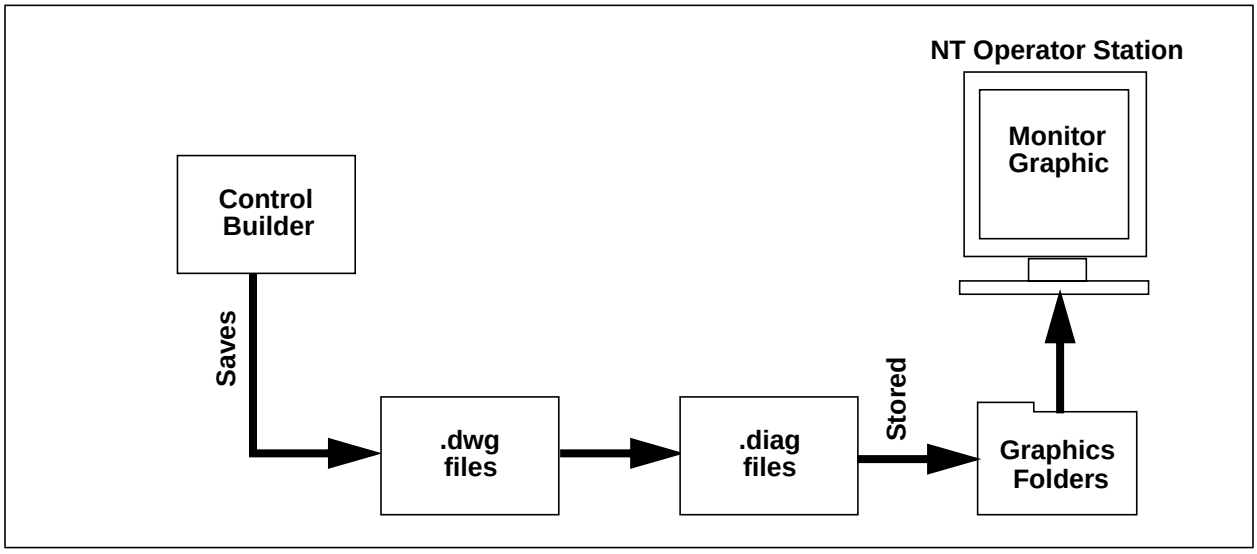


Figure 6-1. Monitor Graphics Overview

The following topics, discussing Monitor Graphics, are included in this section:

- Monitor Graphics Functions (Section 6-2).
- Downloading Monitor Graphics (Section 6-3).
- Displaying Monitor Graphics (Section 6-4).

6-2. Monitor Graphics Functions

The following functions are provided by the on-line Monitor Graphics:

- Monitoring Analog and Digital values.
- Monitoring algorithm mode, tracking and limit status.
- Tuning Algorithms Parameters.
- Manipulating Set Point and MA Station algorithms.
- Using points via page connectors.

6-3. Downloading Monitor Graphics

When a new Control Builder drawing is created or an existing drawing is edited, it must be downloaded to the MMIs, so it can be displayed as a graphic at the Operator Stations when needed.

Use the following procedure to download new or edited Monitor Graphics:

1. At the Control Builder, create or edit a functional drawing.
2. Save the drawing.
   - A **.dwg file** is saved to the system database.
   - A **.diag graphic file** is built.
3. At the NT Developer Studio, load the changes on the Controller:
   A. Access the **System Tree**.
   B. Select the appropriate **Controller**.
   C. Right-click on the Controller to display a **menu**.
   D. Select **Load** from the menu. The changes are loaded on the Controller.
4. At the NT Developer Studio, download the changes on the MMI(s).
   A. Select the appropriate **MMI drop(s)**.
   B. Right-click on the MMI to display a **menu**.
   C. Select **Download** from the menu.

      The Download Preview box appears displaying the files that were changed (see Figure 6-2).

   D. Select the desired files to download. Press **OK** and the files are downloaded to the MMI.

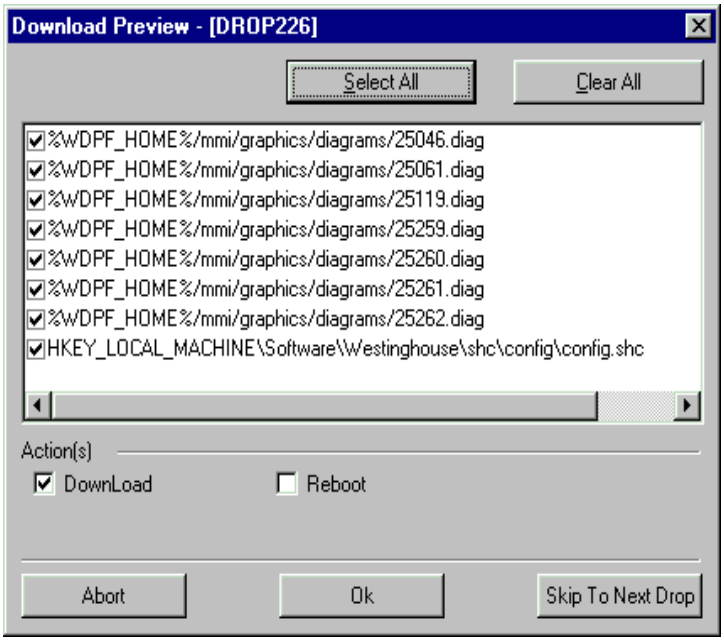
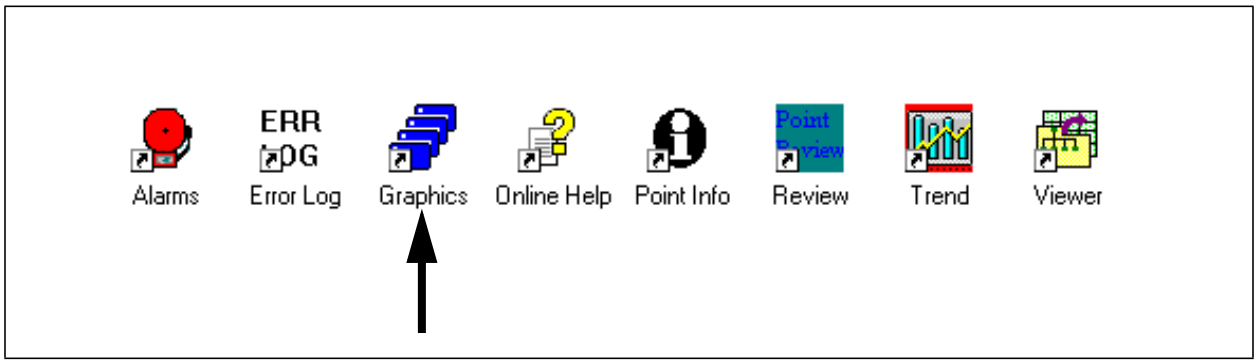


Figure 6-2. Download Preview Dialog Box

6-4. Displaying Monitor Graphics

Monitor Graphics are compiled and displayed through the NT Graphics Builder, GBNT. Use the following procedure to display a **.diag** graphic on the Operator Station.

1. Access the NT Operator Station functions.



2. Select the **Graphics** icon. A GBNT window opens.
3. Select the **Control** pull-down menu.
4. Select the **System Overview** or **Control Overview** item.
5. Select the **desired graphic** to display at the Operator Station (refer to "Ovation NT Operator Station User Guide" (NT-0020) for additional information about using the NT PDS system).

Section 7. Using the Ovation NT Control Builder Services

7-1. Section Overview

This section describes the services used to perform various Ovation NT Control Builder functions. These services are available through the Control Builder. These functions include:

- Library services (Section 7-2).
  - — Exporting control logic (Section 7-2.1).
  - — Importing control logic (Section 7-2.2).
- Comments service (Section 7-3).
- Print service (Section 7-4).
- Audit service (Section 7-5).
- Point edit service (Section 7-6).
- Create points service (Section 7-7).
- Security service (Section 7-8).
- Macros (Section 7-9).

7-2. Library Services

The Ovation NT Library services provide methods by which portions of control logic in a drawing can be exported to a library file, and then be imported into another drawing.

7-2.1. Exporting Control Logic to a Library File

If you want to be able to reuse existing portions of control logic in a functional drawing, you can export these portions to a library file. These files can then be accessed and reused in another drawing.

These library files are typically stored in the following path:

ovptsvr\<System_Name>\<Network_Name>\<Unit_Name>\library

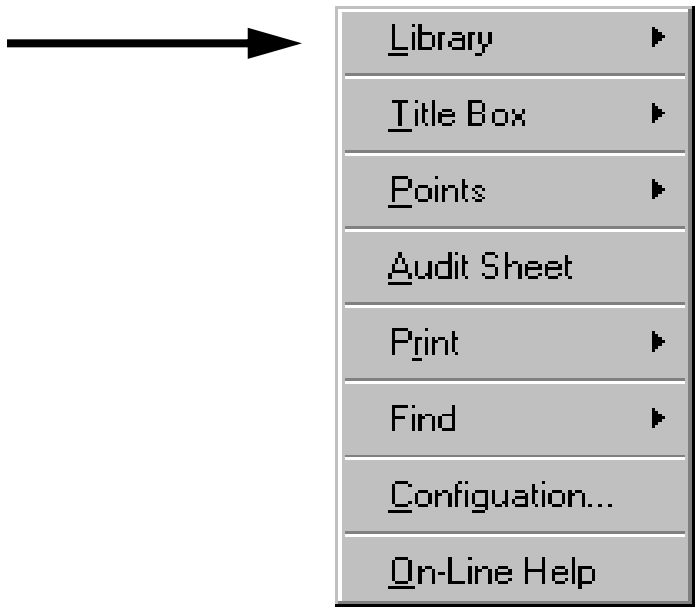
Use one of the following procedures to export control logic from a functional drawing:

- Use the Control pull-down menu.
- Use the OCB Main toolbar.
- Use the Command line (see Section 4 for information on using the Export command).

1. Use a pull-down **menu** to export control logic:

   A. Open a functional drawing that already exists or create a new drawing.

B. Select the **Control** pull-down menu (shown below).



C. Select the **Library** item (Section 2 provides details about the Control menu).

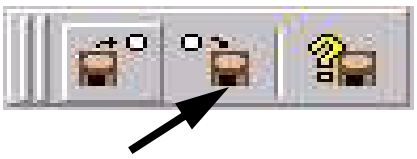
D. Select the **Export Control** option. The Export control dialog box appears (skip to Step 3).

OR

2. Use a **toolbar** to export control logic:

   A. Open a functional drawing that already exists or create a new drawing.

   B. Select the **Library** toolbar (shown below).



C. Select the **Export Control** icon. The Export control dialog box appears (proceed to Step 3).

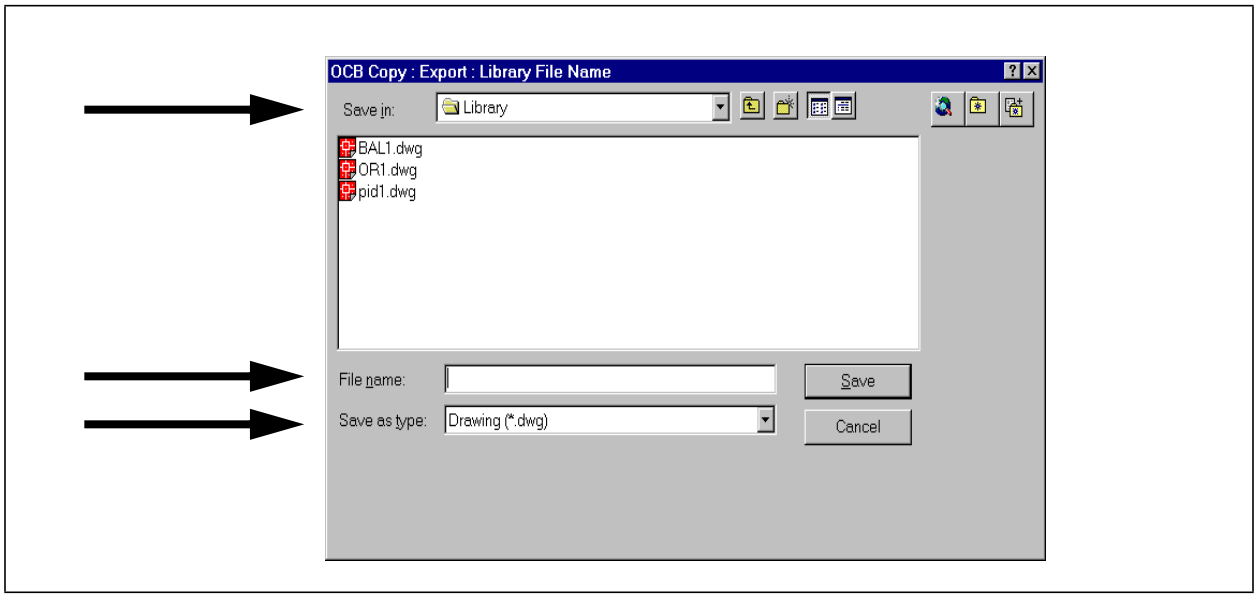


Figure 7-1. Export Control Dialog Box

3. Define the **path** where you want to store the file (Save in), enter a **name** for the file (File name), and define it as a **.dwg file type** (Save as type).

4. Select the **Save** button. The Command line prompts you to "Select Entities."

5. Use the cursor to select the portion of the drawing that you want to save, or type **All** in the Command line to save all the logic on the sheet.

6. Click the **Enter** button or use the right mouse button to save your selection to the library file you defined in Step 3.

7. The command ("Select base point") will appear in the Command line. Define the **base point** with the cursor (see Figure 7-2).

   A base point is a selected point on a graphic. The point is used to determine the placement of that graphic when it is inserted into a new drawing. The base point will be placed at the insert point (x, y intersection) that is selected when the graphic is imported from the library.

   The logic you selected and saved to a file can now be used in another drawing by using the Import function (described in Section 7-2.2).

.

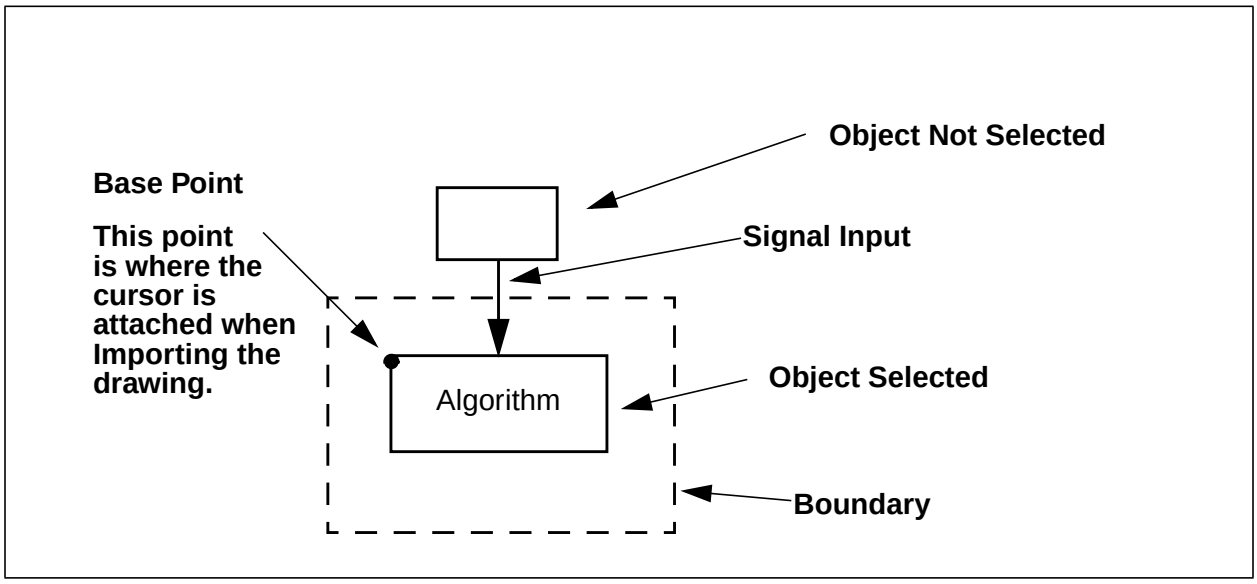


Figure 7-2. Example of Base Point

7-2.2. Importing Control Logic from a Library File

You can use the Import function to bring existing control logic, that is stored in a library file, into your current drawing sheet.

These library files are typically stored in the following path:

ovptsvr\<System_Name>\<Network_Name>\<Unit_Name>\library

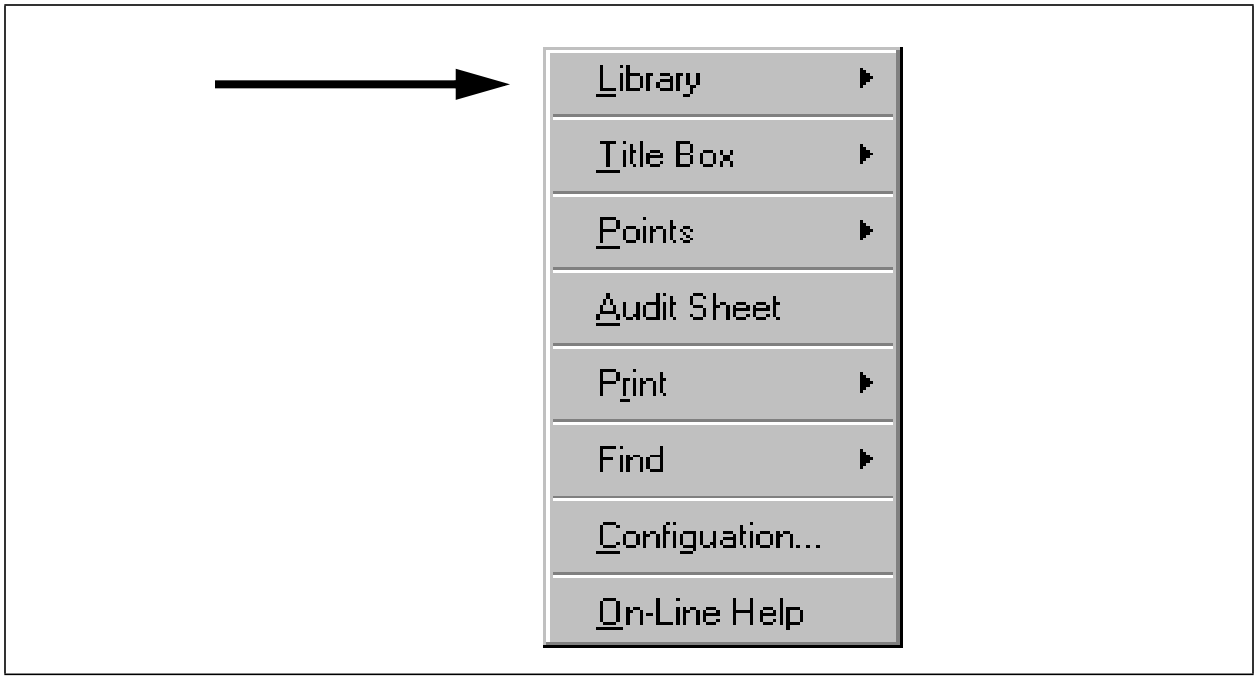
Use one of the following procedures to import control from a functional drawing:

- Use the Control pull-down menu.
- Use the OCB Main toolbar.
- Use the Command line (see Section 4 for information on using the Import command).

1. Use a pull-down menu to import control logic:

   A. Open a functional drawing that already exists or create a new drawing.

   B. Select the **Control** pull-down menu (shown below).



   C. Select the **Library** item (Section 2 provides details about the Control menu).

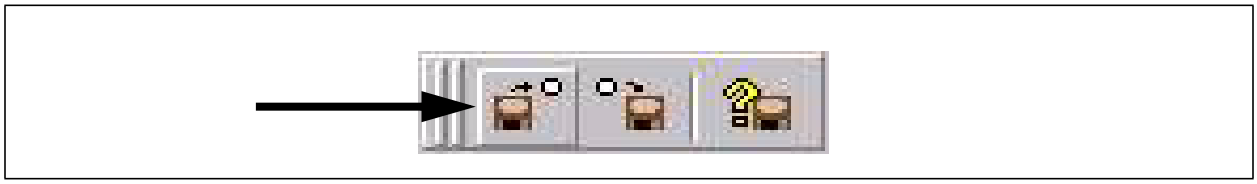
   D. Select the **Import Control** option. The Import control dialog box appears (skip to Step 3).

OR

2. Use a toolbar to import control logic:

   A. Open a functional drawing that already exists or create a new drawing.

   B. Select the **Library** toolbar (shown below).



   C. Select the **Import Control** icon. The Import control dialog box appears (proceed to Step 3).

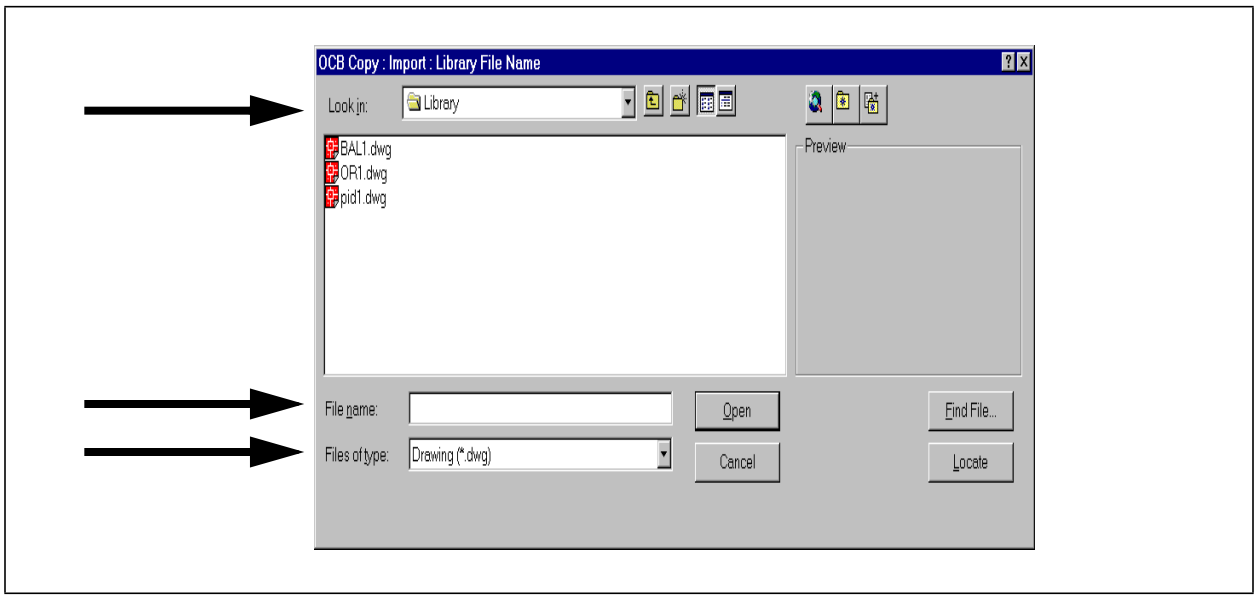


Figure 7-3. Import Control Dialog Box

3. Define the **path** where the desired file is stored (Look in), enter a **name** for the file (File name), and identify it as a **.dwg file type** (File of type). The selected file will be displayed in the Preview window.

4. If it is the appropriate file, select the **Open** button.

5. Use the cursor to position the control elements saved in the file onto the current drawing. The location for the segment is determined by the Base point (defined in Section 7-2.1).

6. Click the **left** mouse button. The control logic is placed on the sheet and the Point Edit dialog box appears. Make the necessary changes (see Section 7-6).

7-3. Comment Service

The Comment service uses the OCB Comment toolbar and the OCB Command line (described in Section 4) to add or edit comments in a drawing sheet.

1. Open a functional drawing where you want to add or edit comments.

2. Select the appropriate icon from the Comment toolbar:

A. Set Comment Rotation:

The Command line prompt will appear:

```
OCB Comment Rotation [0 90 180 270] <0>
```

when left justified
where **0** (default) = text is horizontal left to right
90 = text is vertical bottom to top
180 = text is horizontal right to left
270 = text is vertical top to bottom

Only new comments will be affected.

B. Set Comment Size

The Command line prompt will appear:

```
OCB Comment Size [1.0 2.5] <1.0>
```

where 1.0 = default
Sizes are limited to provide for standardization.
Only new comments will be affected.

C. Line

The line type and color are determined by OCB and are unique to avoid confusion with signal lines.

D. Comment Attributes

Current comment settings will be displayed in the Command line.

E. Comment Edit Dialog Box

The Edit Comments dialog box appears (Figure 7-4). Use this box to edit comments on a sheet, define the location for the comment, and access a Find and Replace dialog box (Figure 7-5).

— Double-click on text that is to be edited.

— Modified text will have a check mark in icon to the left of comment.

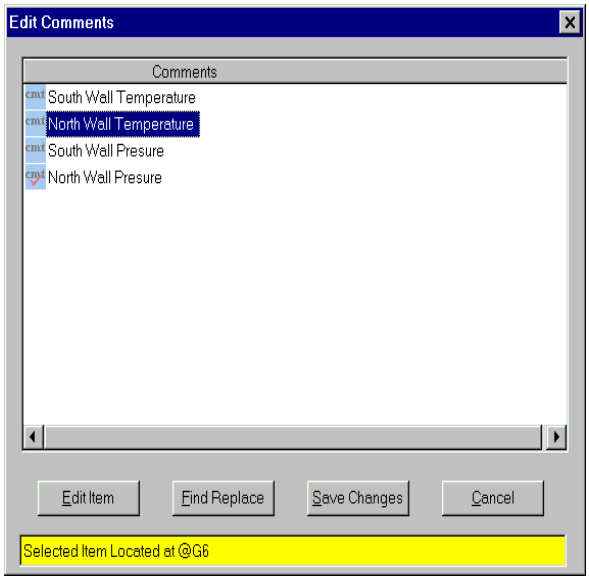


Figure 7-4. Edit Comments Dialog Box

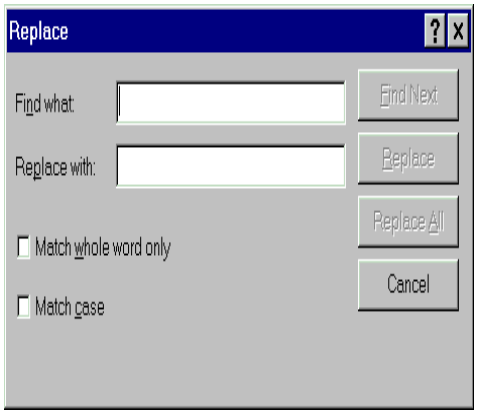


Figure 7-5. Replace Comment Dialog Box

F. Left Justify Comment

Selects a left-justified insertion point for text. Multiple lines can be entered, and the service exits on the first empty line.

G. Center Justify Comment

Selects a center-justified insertion point for text. Multiple lines can be entered, and the service exits on the first empty line.

H. Right Justify Comment

Selects a right-justified insertion point for text. Multiple lines can be entered, and the service exits on the first empty line.

7-4. Print Service

The Ovation Control Builder provides for printing different types of information about the control sheets, as well as the control sheets themselves. Printing can be done from the following:

- Print toolbar
- Print item from the Control menu
- OCB Sheet command line
- Plot item from the AutoCAD File menu (only prints the active sheet)

7-4.1. Required Configuration

Before using the Print service for OCB, be sure that it is configured for the specific Unit (use the **Project Details tab** as described in Section 5).

Also, confirm that the **Plot Details tab** (Figure 7-6) is configured correctly for your printer:

1. Select the **Control** pull-down menu.
2. Select the **Configuration** item.
3. Select the **Plot Detail**s tab.
4. Enter or select the appropriate information.
5. Select the **Ok** button.
6. If you have made changes, you must close the session for the changes to take place.

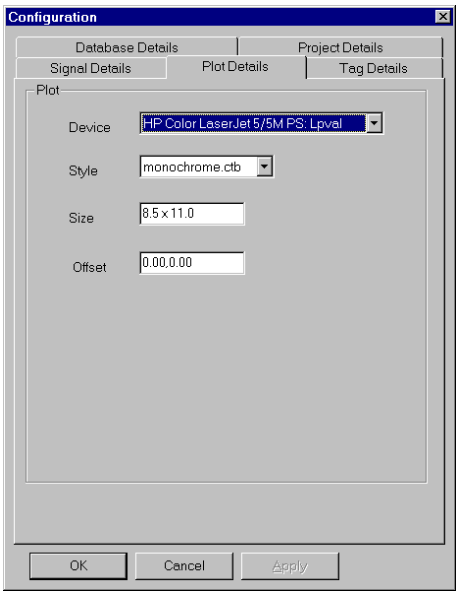
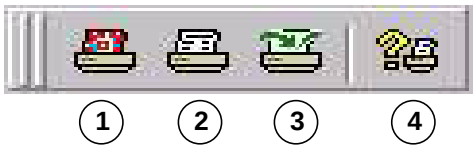


Figure 7-6. Plot Details Tab

7-4.2. Using a Toolbar

The Print toolbar can be used to perform the Print functions. Select the desired print function (see Table 7-1).

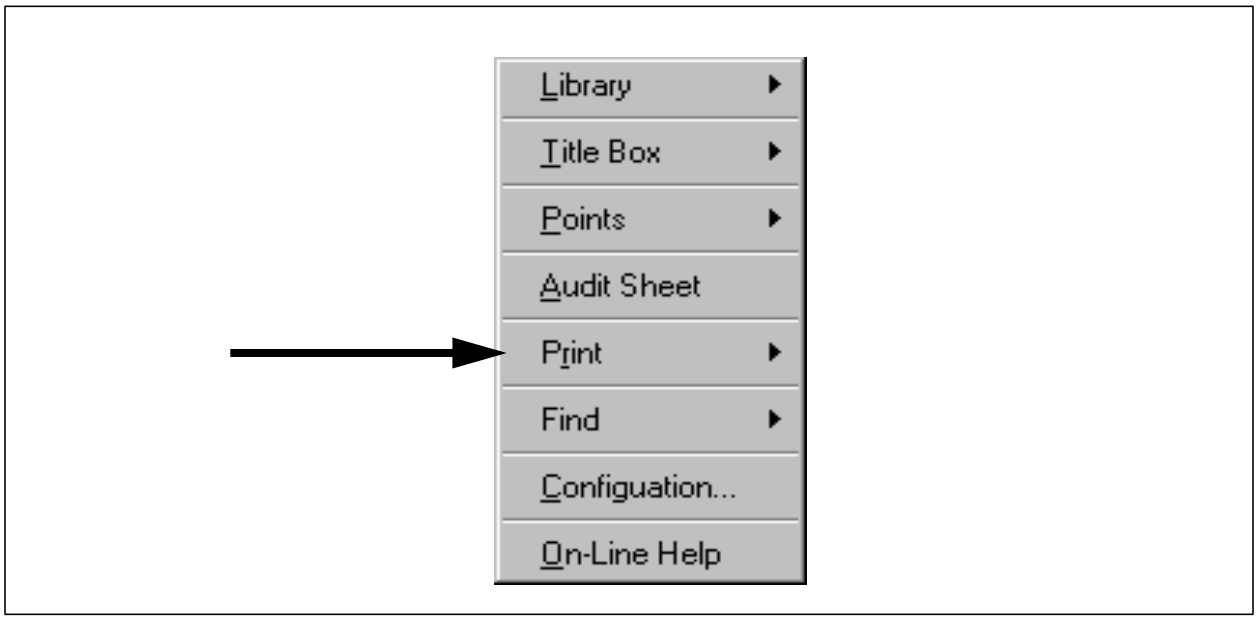
Table 7-1. Print Toolbar



Icon	Description
1	Prints the functional drawing just as it is displayed (WYSIWYG) on the Control Builder window.
2	Prints the details (such as parameters and algorithm names) about the current sheet.
3	Prints information about the sheet connectors.
4	Provides online Help for Print functions.

7-4.3. Using a Menu

The Control menu can be used to perform the Print functions. Select the **Print** item. .



The Print options will appear. Select the desired print function:

- **Functional** - Prints the current functional drawing or sheet just as it is displayed in the Control Builder window.
- **Connectors** - Prints all the information about the page connectors on the sheet.
- **Details** - Prints all the details about the sheet.
- **Titles** - Prints all the sheet titles for a Controller. This can be used as a Table of Contents for the project.

7-4.4. Using a Command Line

The OCB Sheet command line can be used to perform the Print functions.

```
OCB Sheet [Audit/Comments/Database/Locate/Print/Order/Title]
```

Select the Print option. The following prompt will appear:

```
OCB Print [Connectors/Details/Functional/Titles]
```

Select the desired Print function:

- **`Connectors`** will print connector information from the sheet.
- **`Details`** will print detailed information from the sheet.
- **`Functional`** will print the functional drawing (WYSIWYG) of the sheet.
- **`Titles`** will print all the sheet titles for the Controller (similar to a Table of Contents). This is done on a per Drop basis, and the produced list is typically attached to the front of the package of functional sheets for the Controller.

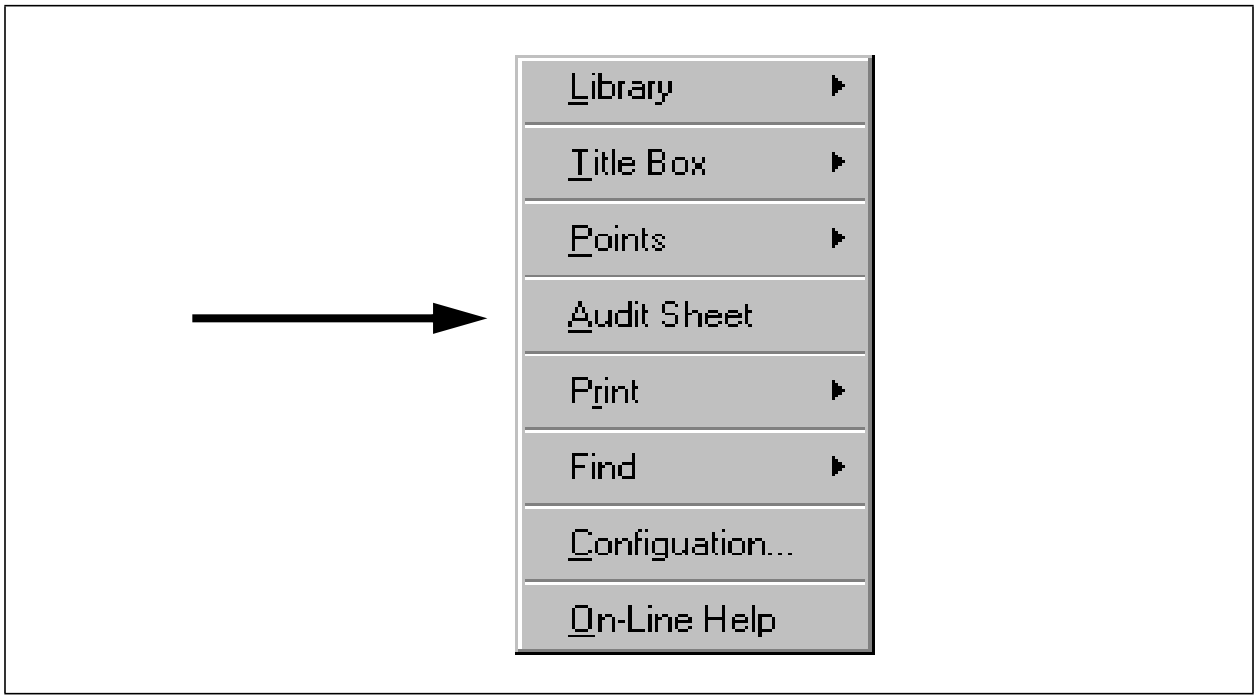
7-4.5. Using the AutoCAD File Menu

The **Plot** item from the AutoCAD File menu can be used to print a control sheet just as it appears (WYSIWYG) in the Control Builder window.

7-5. Audit Service

Use the Audit service to validate a sheet. Use the following procedure:

1. Select **Audit Sheet** from the Control pull-down menu.



2. Control Builder performs the following:
   - Validates the sheet - The drawing is checked for internal consistency and syntax errors. Internal consistency is the verifying of graphical signals, tags, and algorithm connections.
   - Internal data is updated.
   - Checks for syntax errors - Syntax errors are mistakes in the content-based data within an algorithm, data such as point record types and value ranges. If syntax errors are found, the drawing file will be written to the disk, but OCB will not proceed with the save.
   - Tags are updated.
3. If errors are detected, an Algorithm Errors window will appear (see Figure 7-7) listing the errors. Refer to Section 1-5.3 for error message descriptions.

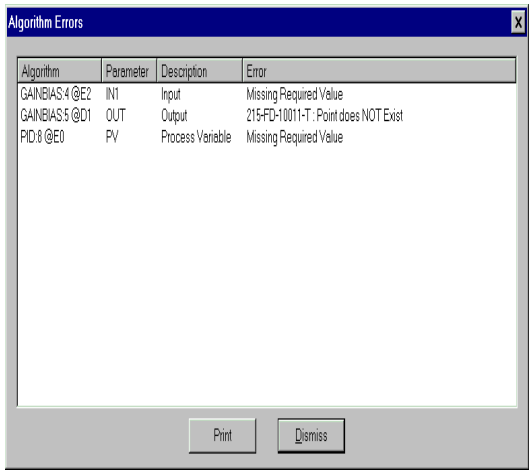


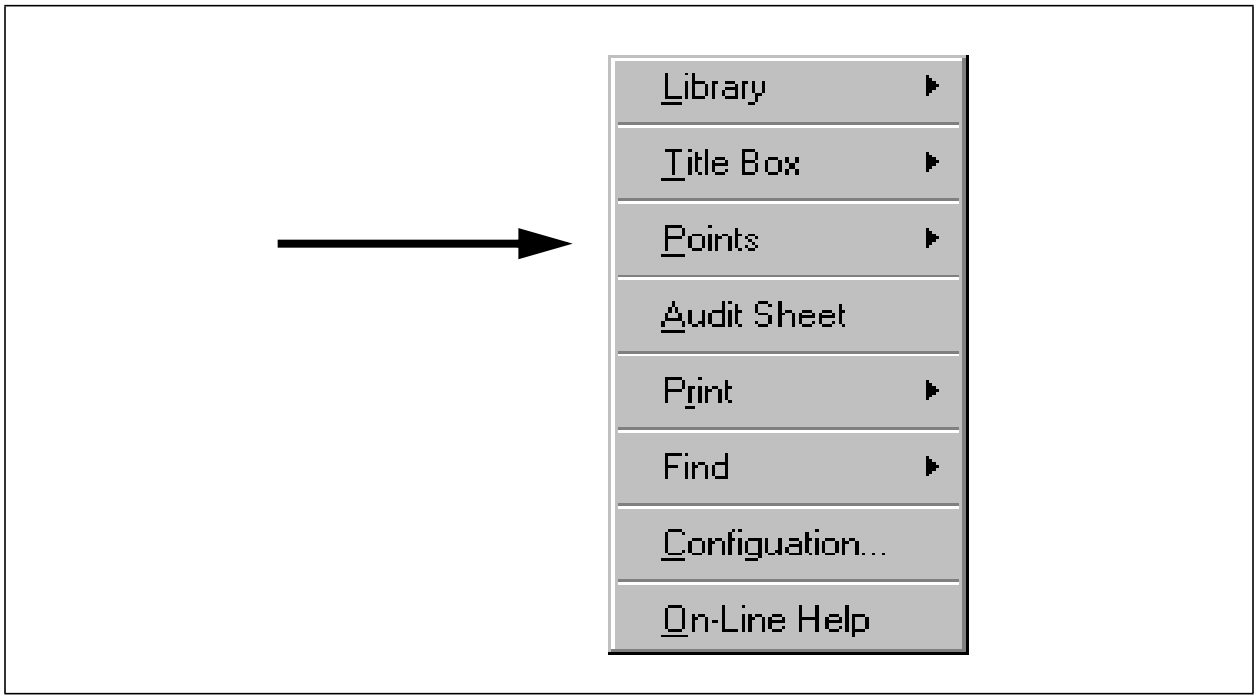
Figure 7-7. Algorithm Errors Window Displaying Syntax Errors

7-6. Point Edit Service

The Point Edit Service provides a dialog box that can be used to map point names after a sheet has been imported, locate points on a sheet, and edit points.

Use the following procedure to access the Point Edit Service:

1. Select **Points** from the Control pull-down menu.



2. Select **Edit Output Points**.

   The Point Edit dialog box appears (see (Figure 7-8). The Point Edit dialog box displays all the points contained on a drawing sheet, plus information about the algorithms on the sheet.

3. Select a point and make the desired edits. Table 7-2 describes the fields in the box.

4. Select **Ok** to save the changes.

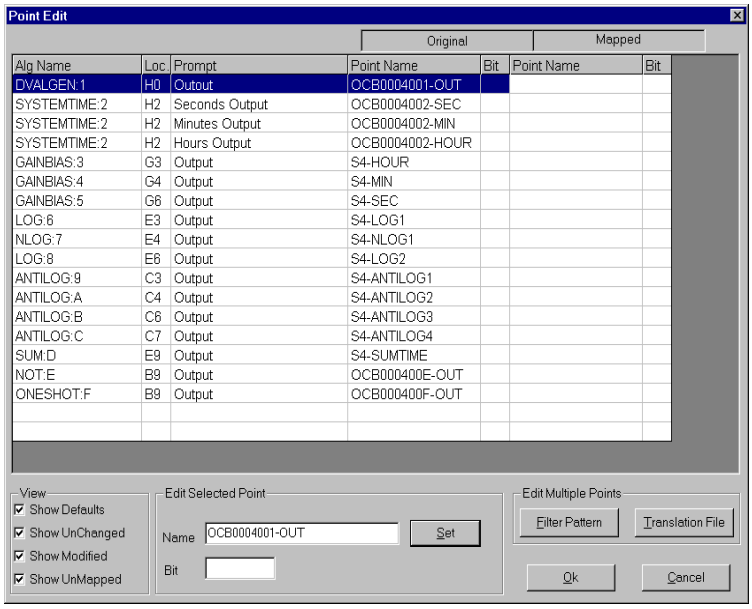


Figure 7-8. Point Edit Dialog Box

Table 7-2. Point Edit Dialog Box Fields

Field	Description
Alg Name	Name of algorithm on sheet
Loc	Location of algorithm on sheet based on coordinates (x = 0-9) (y = A-H)
Prompt	Algorithm parameters
Original Point Name	Original name of point on sheet
Bit	Packed point bit number (if used) for original point name
Mapped Point Name	New name of point on sheet
View	Defines what points will be shown in list
Show Defaults	Default point names will be shown
Show Unchanged	Original point names will be shown
Show Modified	Mapped point names will be shown
Show Unmapped	Unmapped point names will be shown

Table 7-2. Point Edit Dialog Box Fields (Cont'd)

Field	Description
Edit Selected Point (modify one point at a time) **Name** **Bit**	Displays the point name that will be edited Name of point Packed point bit number (if used) for mapped point name
Edit Multiple Points (modify multiple points) **Filter Pattern** **Translation File**	Selects method to be used to edit multiple points Displays the Filter Points dialog box (see Figure 7-9) Displays the Translation File browser dialog box
OK	Performs the mapping
Cancel	Cancels any entered data

Figure 7-9 illustrates the Filter Points dialog box and Table 7-3 describes the fields.

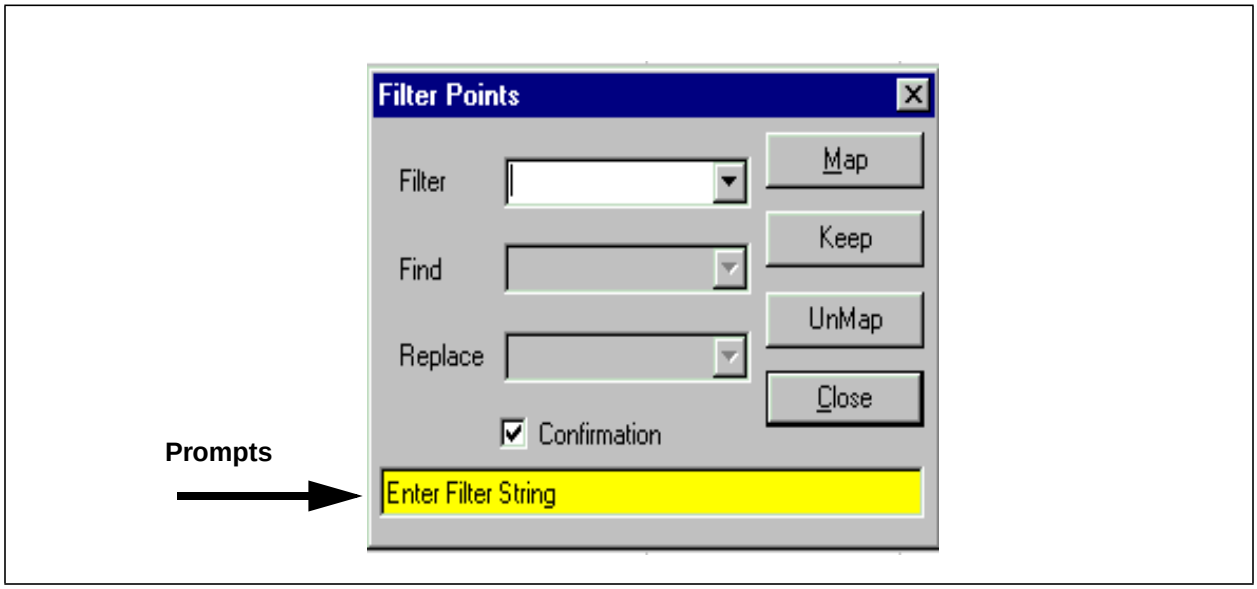


Figure 7-9. Filter Points Dialog Box

Table 7-3. Filter Points Dialog Box Fields

Field	Description
Filter	First level of filtering
Find	Defines what characters (in point names) to change
Replace	Defines the replacement characters for the characters entered in the “Find” entry field
Confirmation	Provides a preview of the action.
Prompt Display field	Prompts user to perform needed actions
Map	Replaces indicated points
Keep	Moves unchanged points to Mapped Point Name column in Point Edit dialog box (Figure 7-8)
Unmap	Removes mappings that match the fields entered in the Filter box.
Close	Closes window

7-7. Create Points Service

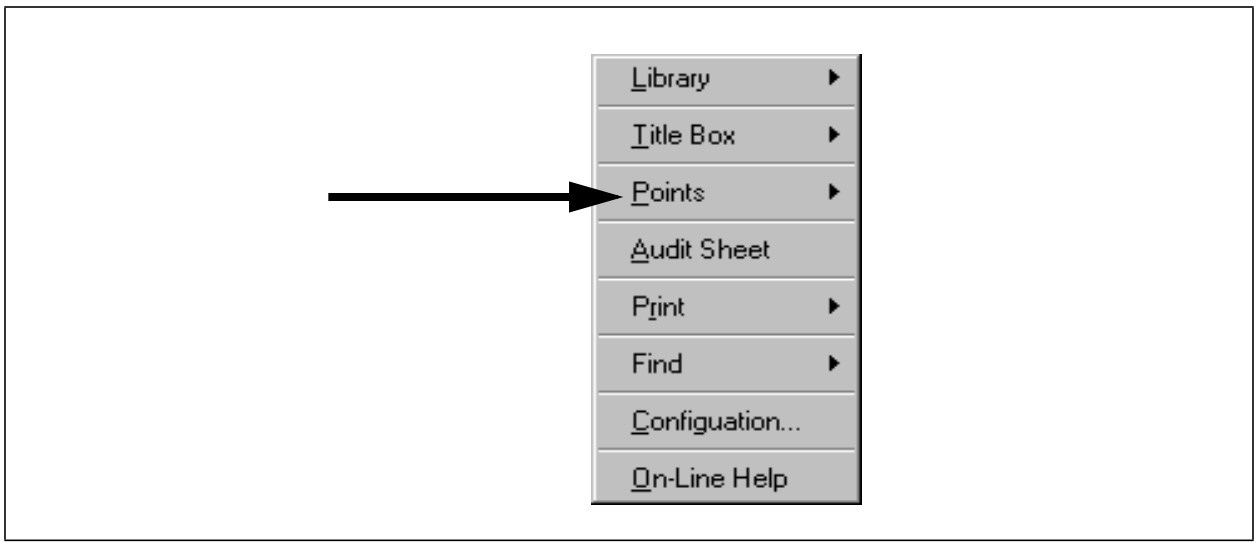
The Create Points Service is used to create user-defined points in the system database. These points are not based on the default points as defined in the Developer Studio, but contain only the minimum definition needed to be functional highway points.

This service is typically used during the initial programming of control to quickly create points for testing. Any points created with this service should be further defined by the user to contain meaningful descriptions, display limits, and so forth.

To create points in the database from points that are used on the sheet but do not currentlly exist in the database, use the following procedure:

1. Insert the desired point names in the appropriate algorithms using the Edit Algorithm dialog box (from the Algorithm toolbar or the Algorithm pull-down menu). A message stating whether or not a point currently exists in the database will appear in the bottom of the box.

2. Once the algorithms contain the desired points, select **Points** from the Control pull-down menu.



3. Select **Create User Points**.

4. The Create User-Defined Points dialog box will appear (Figure 7-10) containing the points on the sheet that are not in the database.

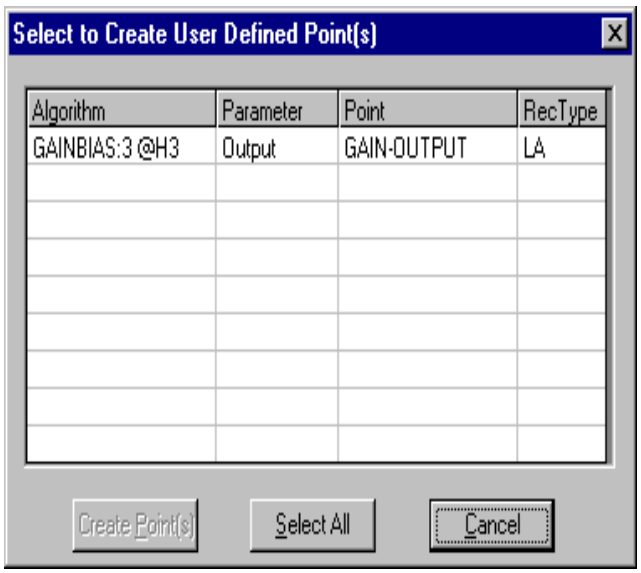


Figure 7-10. Select to Create User-Defined Points Dialog Box

5. Verify that the Record Types (Rec Type) for the points are correct.

6. Highlight the points and select the **Create Point(s)** button. This adds the points to the database and allows you to save the sheet.

7-8. Security Service

Point groups are created to join points together in a common function, such as a graphic display. Points can belong to more than one point group.

Security access is defined for each security group. If never defined, all security groups are enabled Once security is defined for a sheet, you must update the security for each sheet as groups are added or the security strategy for the system is modified.

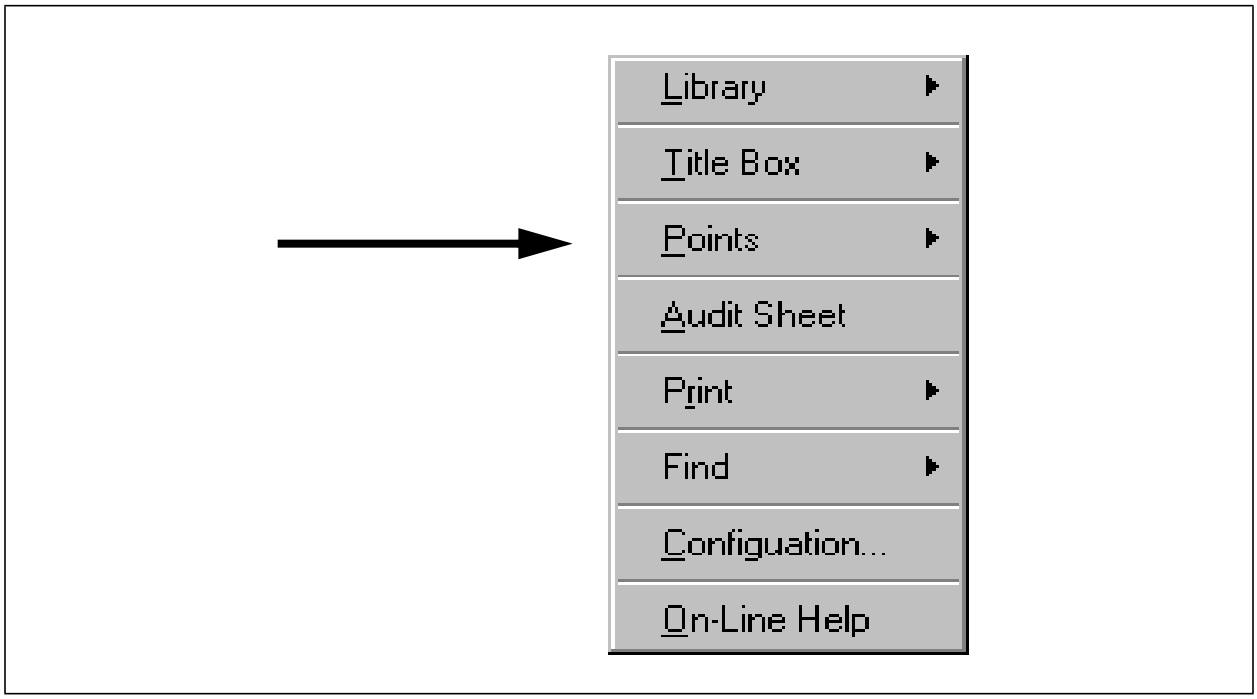
Note

Refer to "Ovation NT Developer Studio" (NT-0060) for detailed information about security for an NT system.

Security only effects the default points (including Algorithm Records) for the current sheet. Tuning permissions are sensitive to point security groups. If the security is incorrectly configured for a sheet, none of the algorithms on that sheet can be tuned.

Use the OCB Security service to enable or disable point security groups:

1. Select **Points** from the Control pull-down menu.



2. Select **Security**.

   The Enable Point Security dialog box appears (see Figure 7-11).

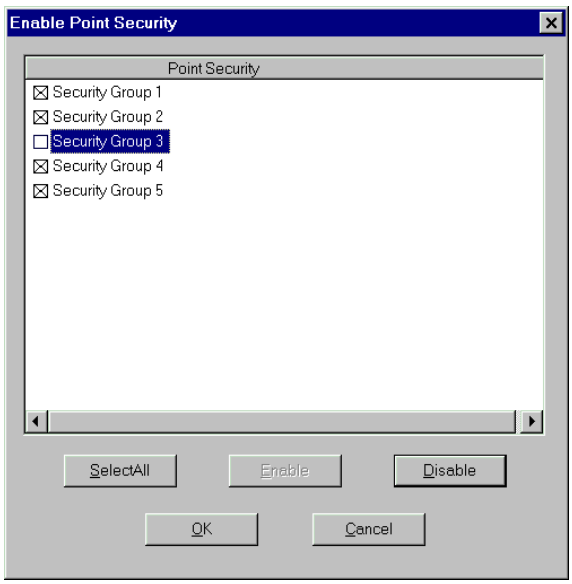


Figure 7-11. Enable/Disable Point Security

3. Use the appropriate buttons to enable or disable the security groups.

4. Select **Ok** to save the changes.

7-9. Macros

7-9.1. Overview

A Macro is a user-defined control strategy, with clearly defined inputs and outputs. Even though a macro typically consists of several algorithms, it is represented in a functional drawing as a **single** user-defined algorithm. Each macro can contain an entire sheet of control and multiple macros may be used on a given sheet. The defined macros are stored in the **Control Macros** directory.

To permit standard usage, the symbol of a macro is identical to the symbol of a standard algorithm, and is visible as one symbol with configurable values and points. A dialog box is provided in the Ovation Control Builder that supports easy macro definition.

The information used in the macro dialog box is the same information as provided for each algorithm in the Algorithm Definitions tables in the "Ovation Algorithms Reference Manual" (R3-1100) and in the online Help for the Ovation NT Control Builder.

Requirements

The following components are required in order for a macro to be defined and to work properly:

- Collection of algorithms on a control sheet that form a complete function.
- Points and desired tunable parameters.
- Macro name.
- Macro description.
- Macro symbol.

Limitations

In order to permit simple modifications, the implementation of a macro is transparent to the user. The number of ‘hidden’ algorithms in a macro may be significant. The Ovation Controller is limited to 144 Boolean stages for a given sheet. A Boolean stage represents one or more fast Boolean algorithms (such as AND, NOT, OR, FLIP-FLOP, or XOR). When a drawing is saved and the database is updated, the Control Builder ensures that this Boolean limit is not exceeded.

Since implementation algorithms are transparent to the user, do **NOT** use the following algorithms in macros:

- KEYBOARD
- MASTATION
- XMA2
- SETPOINT
- Other Macros

Creating a New Macro

The following steps should be used to create a new macro:

1. Create a new sheet or open an existing control sheet.
2. Build a valid control function using a group of algorithms.
3. Name the interface points (I/O points).
4. Compile, load, and test the control function.
5. Follow the procedure (Section 7-9.2) to define a macro.

Macro Functions

There are two main Macro functions:

- **Define** the macro - Use this function to define a new macro or edit an existing macro (see Section 7-9.2).
- **Explode** the macro - Use this function to display the original components (algorithms) of the macro (Section 7-9.3), and to make modifications to the components (see Section 7-9.4).

These functions can be selected from the Algorithm menu (Figure 7-12), Macro toolbar (Figure 7-13), or the Control Builder Command line.

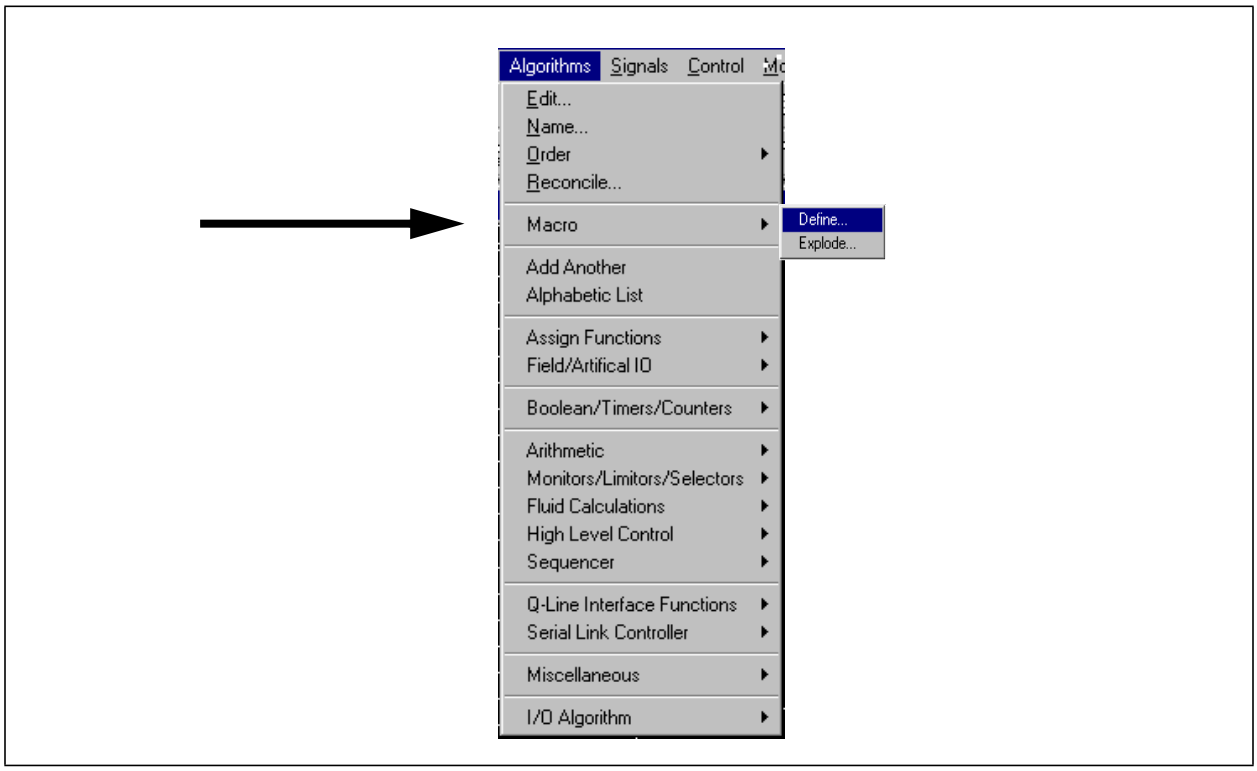


Figure 7-12. Algorithm Menu (Macro Item)

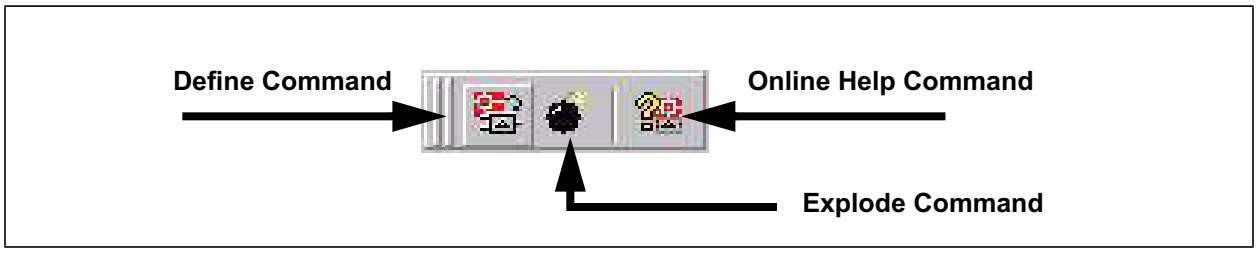


Figure 7-13. Macro Toolbar

7-9.2. Defining the Macro

When the **Define** option is selected from the Macro item (in the Algorithm menu, Macro toolbar, or Command line), the Macro: Define dialog box appears (see Figure 7-14). This dialog box has three tabs that are used to define a new macro or edit an existing macro:

- Macro tab
- Points tab
- Parameters tab

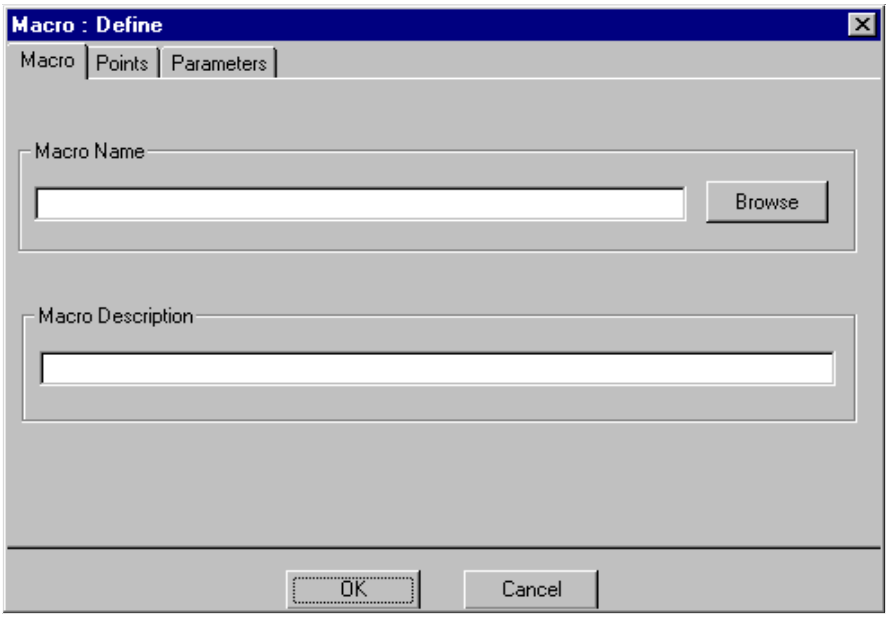


Figure 7-14. Macro Dialog Box (Macro Tab)

Macro Tab

The Macro tab is used to define the name and description configuration for the macro. The fields on this tab are illustrated in Figure 7-14 and described in Table 7-4:

Table 7-4. Macro Tab Fields

Entry Field	Description
Macro Name	Editable field where the user can enter the macro name. If the user is editing a pre-existing macro, a **Browse** button is provided. A Macro Name must be entered in order to define a macro.
Macro Description	Editable field where the user can enter the macro description.
Browse Button	Used to search through the Control Macros directory for existing macros. See Figure 7-15 for an example of the Open dialog box that appears when the Browse button is selected.

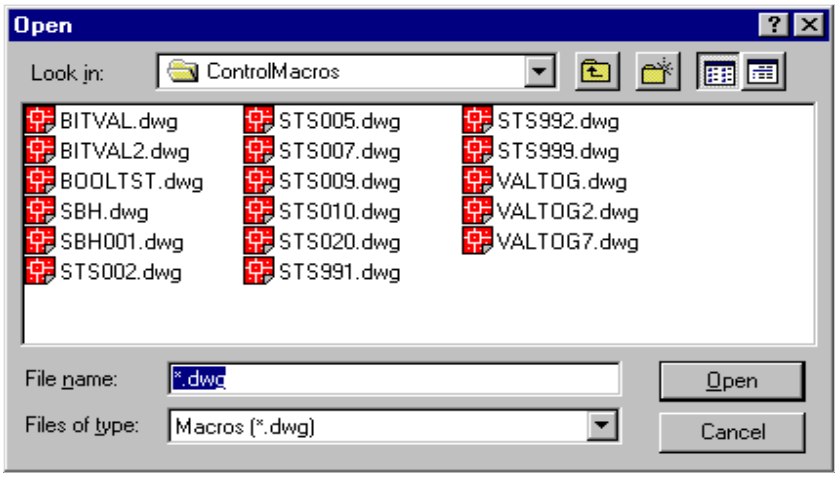


Figure 7-15. Open Dialog Box (Browse Button)

Points Tab

The Points tab contains a list of all interface points for the macro. These are the user-defined input and output points. When the Points tab is selected, it determines which points on the sheet are interface points and adds them to the list.

This is an automatic operation, and points **cannot** be manually added or deleted from this list. In order to add or delete a point from the list, you must add or delete an interface point to or from the function. Each row represents a possible pin on the macro symbol. The fields on this tab are illustrated in Figure 7-16 and described in Table 7-5:

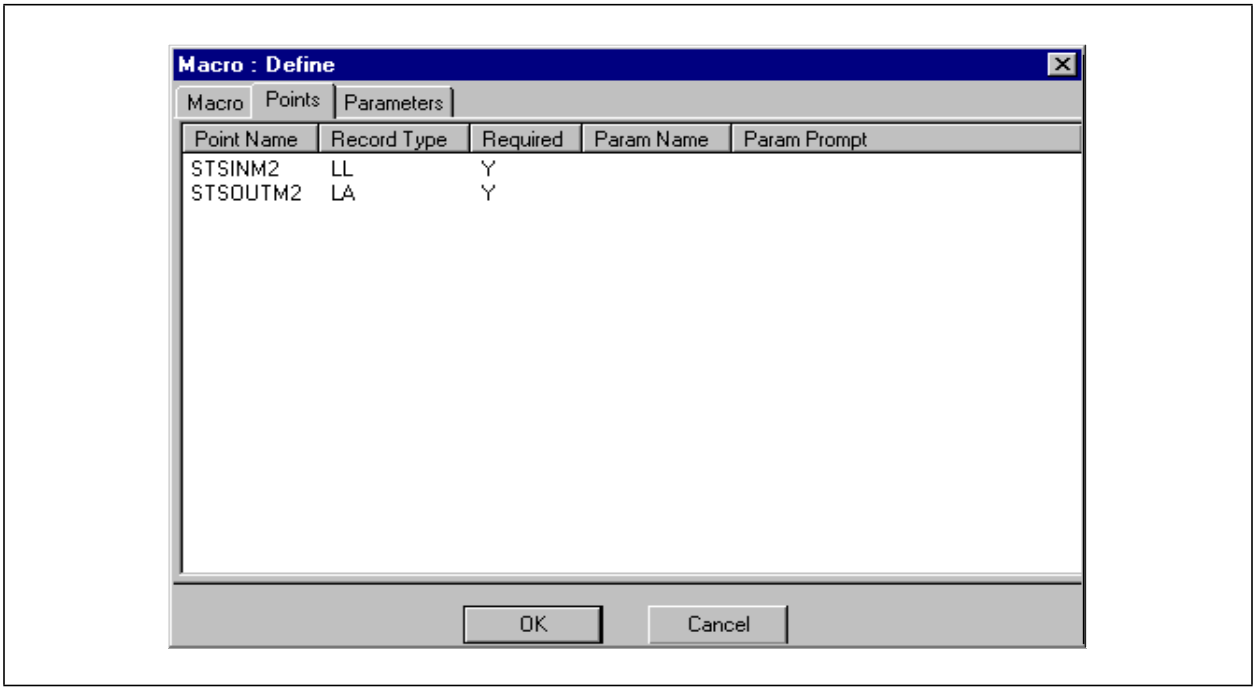


Figure 7-16. Macro Dialog Box (Points Tab)

Table 7-5. Points Tab Fields

Entry Field	Description
Point Name	Interface point name.
Record Type	Interface point record type.
Required [1]	Y = Interface point is required. N = Interface point is not required. The required field (Y) may be over-ridden if the point is initially not required (N).
Parameter Name [1]	Parameter and pin name that will be used when editing.
Parameter Prompt [1]	Descriptions that will be used when editing.

[1] May be modified by double clicking on the interface point to be edited. A dialog box (see Figure 7-17) will appear with an edit field for the Parameter Name, Parameter Prompt and a check box to **force** the requirement of the point. Forcing the requirement of a point means that the point is initially not required and the user wants to make it required within the macro. By forcing the requirement field, the point may now be displayed as a pin on the macro.

Figure 7-17. Edit Parameter Dialog Box

Parameters Tab

When the user creates a function that will later be transformed into a macro, there may be some internal algorithm parameters that the user may want to expose (exposed parameters may be set to a unique value each time the macro is used). The Parameters tab provides the ability to add, delete, or edit parameters.

The following information is provided for each parameter:

- New Parameter Name - As displayed when the macro is used.
- Algorithm Name - Algorithm on the current sheet that “owns” the original parameters.
- Original Parameter Name - Name of the parameter on the current sheet.
- Parameter Prompt - Description displayed on the Edit box when editing the macro.

Initially, the Parameter tab is empty.

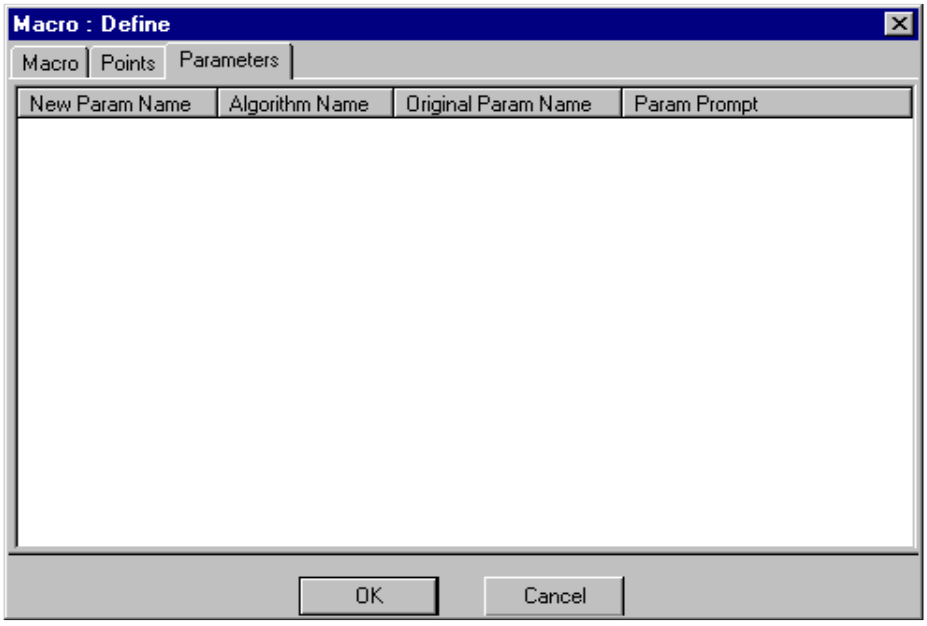


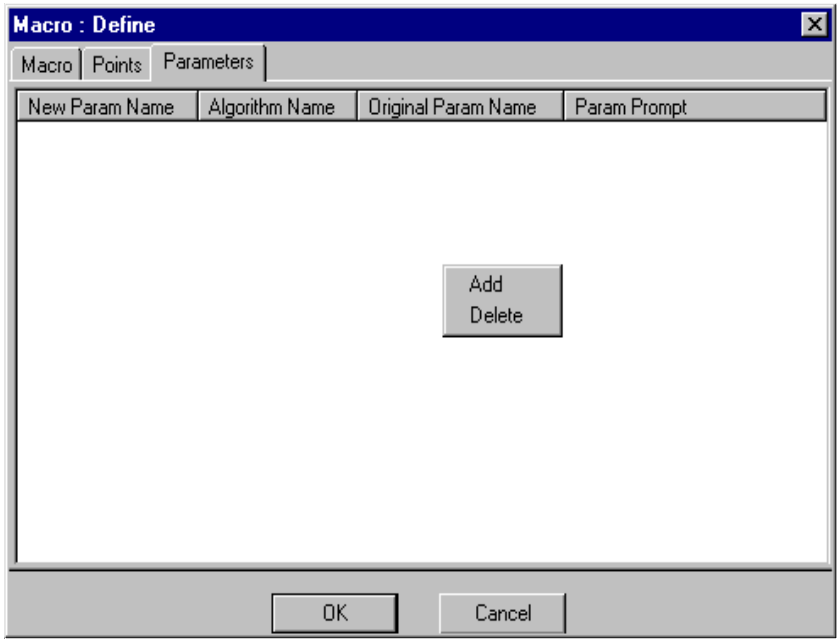
Figure 7-18. Macro Dialog Box (Parameters Tab)

There are three operations within the Parameters tab that are available to the user:

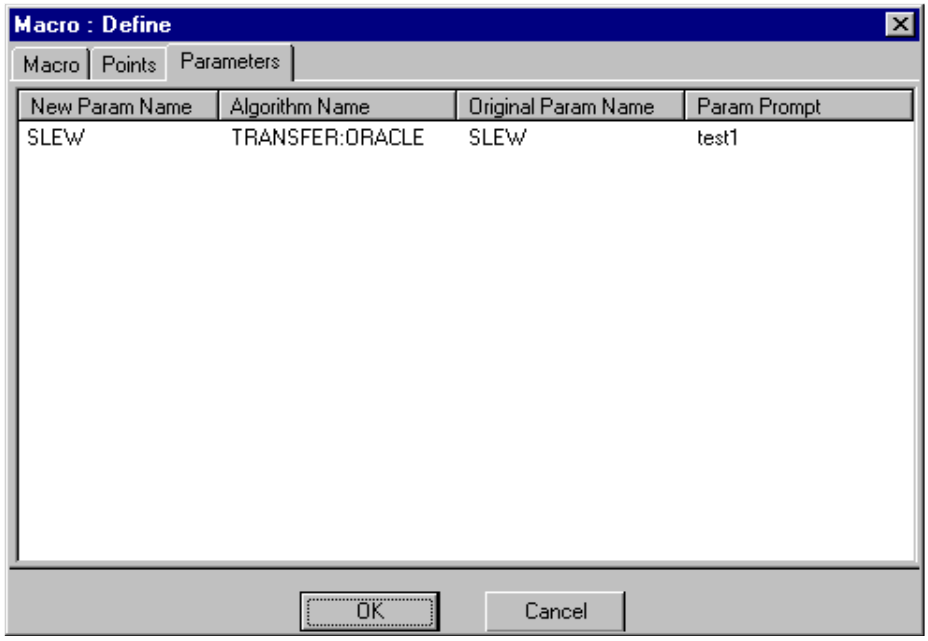
- Add - Right-click menu.
- Delete - Right-click menu.
- Edit - Double click on desired entry.

Perform the following to use the Parameters tab operations:

1. Right click to access the **Add/Delete menu** (or press the **Insert** or **Delete** key on the keyboard).



2. If you select **Add**, a dialog box will appear (see Figure 7-17). Define the new parameter name and prompt for the macro and it will be added to the Parameters tab (see figure below). If you do **not** define the new parameter name and prompt, the selected parameter will not be added to the list, and therefore will not be tunable within the macro.



3. If you select a **parameter**, and then select **Delete**, the selected parameter will be removed from the list and the parameter will not be tunable within the macro.

4. If you want to **edit** a parameter, double click on a **parameter** in the list to edit a parameter. A dialog box will appear (see Figure 7-17). Define the new parameter name and prompt for the macro.

Completing the Macro

When all of the tabs have been configured and the necessary pieces of the macro have been defined, select the **OK** button to complete the macro and send the entered data to the database. If you do not want to save the data, select the **Cancel** button to clear the entered data and cancel the operation.

If **OK** is selected, the system will perform the following checks and operations when defining the macro:

- Audits the sheet.
- Verifies the macro name.
- Verifies the macro description.
- Creates a temporary template file.
- Inserts the new macro into the macro template.
- Adds the new macro to the Control Macros directory.

If any of the first four operations fail, the macro will not be created and you will be required to correct any errors. If all the operations succeed, the macro will be created. Next, create a symbol for the macro by using the Symbol Builder (described in Section 8-8).

7-9.3. Exploding the Macro

The Explode option can be used for the following:

- Displaying the components of an existing macro (original control sheet containing all the algorithms used in the macro may no longer be available).
- Modifying an existing macro.
- Creating a new macro based on an existing macro.

Use the following procedure to explode a macro:

1. Select the **Explode** option from the Macro item (in the Algorithm menu, Macro toolbar, or Command line). The Explode Macro dialog box will appear (see Figure 7-19).

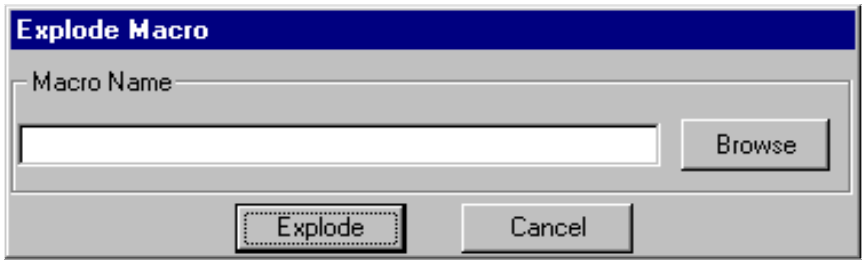


Figure 7-19. Explode Macro Dialog Box

2. Enter the **name** of the existing macro that you want to explode and select the **Explode** button. The macro will "explode" into its various algorithms and appear in its original implementation form on the current sheet.

Note

This option will delete **everything** on the current sheet before exploding the macro.

7-9.4. Modifying the Macro

Use the following procedure to modify a macro:

1. **Explode** the macro as described in Section 7-9.3.
2. Make the desired modification.
3. Define the macro (as described in Section 7-9.2) and use the previously defined name (do **not** change the macro name, or the sheets will not be updated).
4. If the interface has **not** changed, the sheets will recompile automatically and insert the macro changes into the applicable sheets. The following changes can be made and you will not have to manually edit the sheets:
   - Adding or removing a parameter.
   - Removing a user-defined point.
   - Adding a user-defined output point.
5. If the interface **has** changed or if a **required input point** is added, you will need to manually edit the sheets that use the macro.

7-9.5. Creating a New Macro from an Existing Macro

Use the following procedure to create a new macro from an existing macro:

1. **Explode** the macro as described in Section 7-9.3.
2. Make the desired modification.
3. Define the macro (as described in Section 7-9.2) and **rename** the macro.
4. If the interface has **not** changed, the sheets will recompile automatically and insert the macro changes into the applicable sheets. The following changes can be made and you will not have to manually edit the sheets:
   - Adding or removing a parameter.
   - Removing a user-defined point.
   - Adding a user-defined output point.
5. If the interface **has** changed or if a **required input point** is added, you will need to manually edit the sheets that use the macro.

7-9.6. Adding a Macro to a Control Sheet

Once a macro has been defined and the symbol for the macro has been created, you may add the macro to a control sheet.

1. Open a control sheet in the Control Builder.
2. Select the **Alphabetic List item** from the pull-down Algorithm menu**,** the Algorithm toolbar, or the Algorithm - Add command in the Control Builder Command Line (these choices are described in Section 3).
3. When the Select Function Name (Alphabetic list) dialog box appears, select the **Macros** View Type.

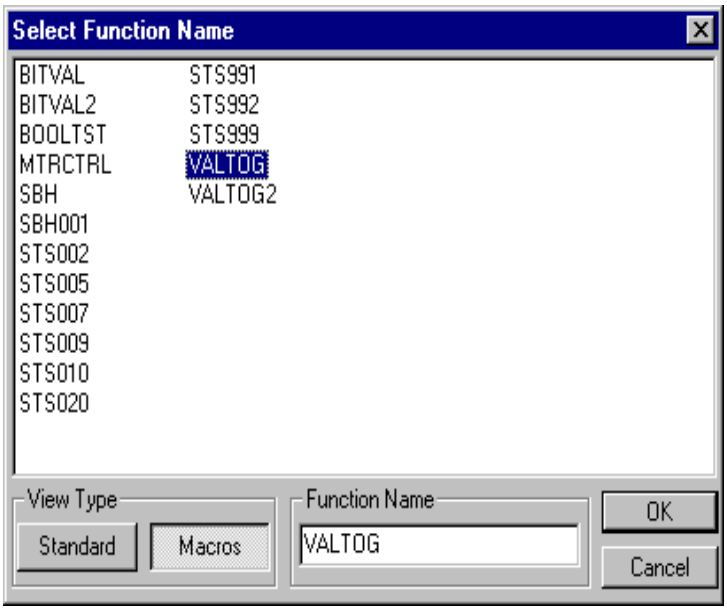


Figure 7-20. Select Function Name (Alphabetic List) Dialog Box

4. Select or enter the desired **macro name** in the Function Name entry field.
5. Select the **OK** button and the macro will be placed on the sheet.

Note

If there is **not** a symbol for the macro, a warning message will appear. Create a custom symbol using the Symbol Builder.

Section 8. Using the Ovation Control Builder Utilities

8-1. Section Overview

This section describes the utilities used to perform various Control Builder functions. These functions include:

- **Compile Control Sheets** processes multiple sheets at one time using the Control Builder (described in Section 8-3).
- **Copy Control Sheets** makes one or more copies of one or more sheets into a specified drop or task (described in Section 8-4).
- **Export Control Sheets** extract sheets, symbols, or macros out of the current database server so they can be imported into an unrelated server (described in Section 8-5).
- **Import Control Sheets** insert sheets, symbols or macros into the current database (described in Section 8-6).
- **Order Control Sheets** edits the execution order of control sheets within a control task (described in Section 8-7).
- **Symbol Builder** provides a simple direct means of creating custom symbols for algorithms and macros (described in Section 8-8).
- **OCB Batch** executes a list of commands on multiple sheets (described in Section 8-9).
- **Script Status Log** is an HTML page that contains information about the scripts executed, sheets compiled, and error status information. This information is provided for the Compile, Copy, and Import utilities (described in Section 8-10).

8-2. Accessing the Utilities

In order to select one of the Ovation Control Builde utilities, perform the following:

1. Access the Ovation Developer Studio **right-click menu**.

2. Select **Control Options**. The Ovation Utilities Main Control Graphical User Interface (GUI) will appear (Figure 8-1). This dialog box contains six utility options and a description box. The description box provides a brief description about each utility.

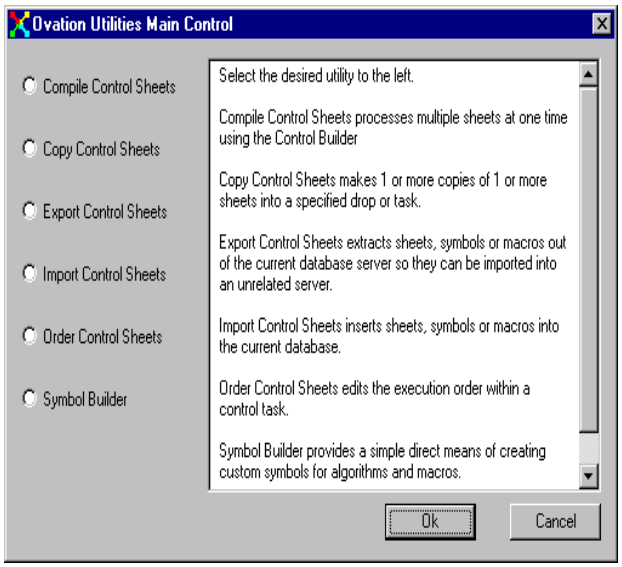


Figure 8-1. Ovation Utilities Main Control Menu

3. Select the **desired utility**. Only one utility may be selected at a time, but multiple utilities can be running at the same time. However, running multiple utilities may decrease system performance and cause licensing issues.

   When a utility button is selected, its graphical representation appears below the options.

4. Select the **Ok** button to start the application.

8-3. Compile Control Sheets

Ovation Compile Control provides a user-friendly interface for compiling multiple sheets at one time and performing multiple script commands. Compile Control is accessed from the Ovation Developer Studio (see Section 8-2). An AutoCAD license is required to run this utility. Once the Compile operation is complete, a summary of the compilation is displayed (see Section 8-10).

Some of the more common script commands, such as Print and Zoom Extents, have been added as options for the users to select. Other script commands may be added through the Custom Tab that provides a text editing area for writing Pre and Post scripts. Ovation Compile Control will not only compile sheets and generate new monitor graphics, but it will also perform script commands as provided by the user.

Note

This utility replaces the OCBBatch Utilities.

The GUI for the Ovation Compile Control utility consists of four tabs:

- Configuration tab (Section 8-3.1).
- Sheets tab (Section 8-3.2).
- Options tab (Section 8-3.3).
- Custom tab (Section 8-3.4).

These tabs are used to **define** the desired Control Compile action before starting the actual Compile procedure. After the tabs are configured and set, press the **Compile** button to start the Compile process (refer to Section 8-3.5).

8-3.1. Configuration Tab

The Configuration tab (Figure 8-2) contains two major fields. User input is required only in the Data Directory field. Ovation Control Compile will not work unless this field is set:

- Ovation Data Directory (input required)
- Compile Sheets (information only)

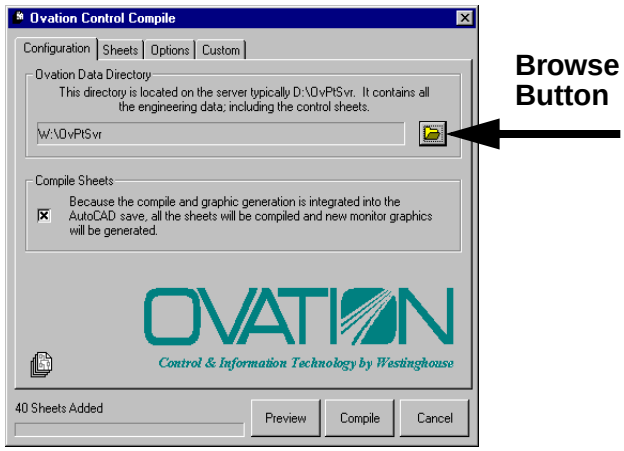


Figure 8-2. Compile Configuration Tab

Ovation Data Directory Field

The Ovation Data Directory field is the location of the sheets that are to be compiled. This is typically the **D:\OvPtSvr** directory on the server. However, Ovation Control Compile can be run from any location. In order for Control Compile to work, the server's Ovation data disk must be mounted on the machine, where Control Compile will be executed, or a Universal Naming Convention (UNC) path must be provided (for example **\\drop202\d$\OvPtSvr)**.

Perform the following to set the Ovation Data Directory field and mount the server's Ovation data disk:

1. Click on the **Browse button** within the Ovation Data Directory group box (as shown in Figure 8-2).
2. A Browse dialog box (as shown in Figure 8-3) will appear that lists all of the disks that are on the local machine (similar to looking at all of the disks in Windows Explorer). Note that the typical data directory of **D:\OvPtSvr** on the server may now be **<X>\OvPtSvr** on another machine.

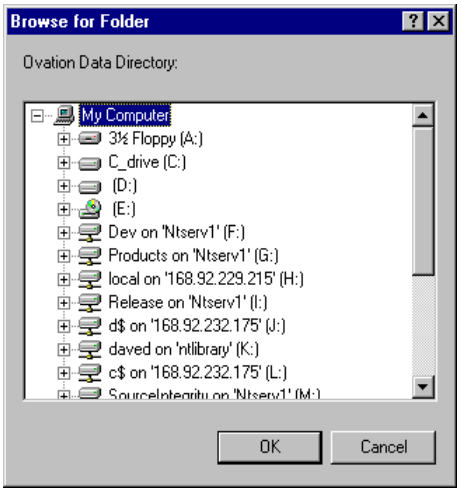


Figure 8-3. Browse Dialog Box

3. Select the server's **Ovation Data Directory**. Once the user selects the Ovation Data Directory, an entry is made in the registry that contains the directory. This will become the default directory when the user executes Ovation Control Compile from the same machine.

Compile Sheets Field

This field cannot be edited. The Compile Sheets field is provided to inform the user that all sheets are compiled by default during the AutoCAD **Save** operation. Therefore, all sheets will be compiled and new monitor graphics will be generated.

8-3.2. Sheets Tab

The Sheets tab (Figure 8-4) contains the list of the sheets that are to be compiled. The following information is provided for each sheet:

- Drop number
- Task number
- Sheet number
- Sheet title

The sheets are sorted based on drop number, then task number, then sheet number, and then sheet title. The order of the sheets cannot be changed. Initially, the sheet list is empty

There are only two operations available to the user:

- Insert - Insert sheets into the list for processing.
- Remove - Remove sheets from the processing list.

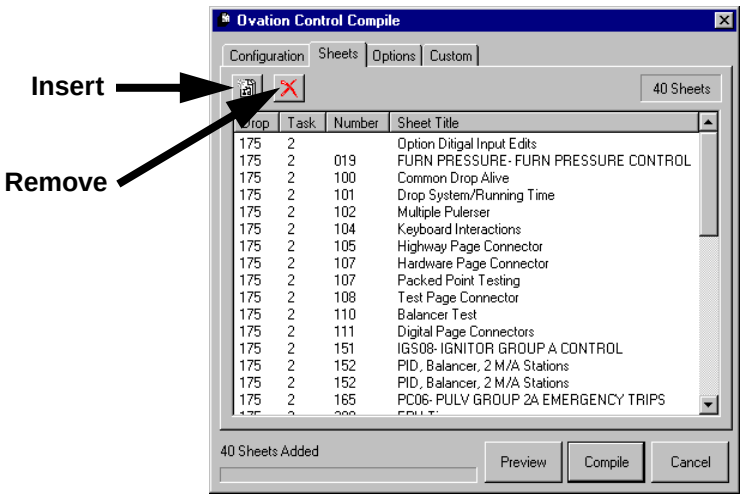


Figure 8-4. Compile Sheets Tab

Insert Operation

1. Select the **Insert** button and a dialog box will appear displaying the database hierarchy (Network, Unit, Drops, and Control Tasks).

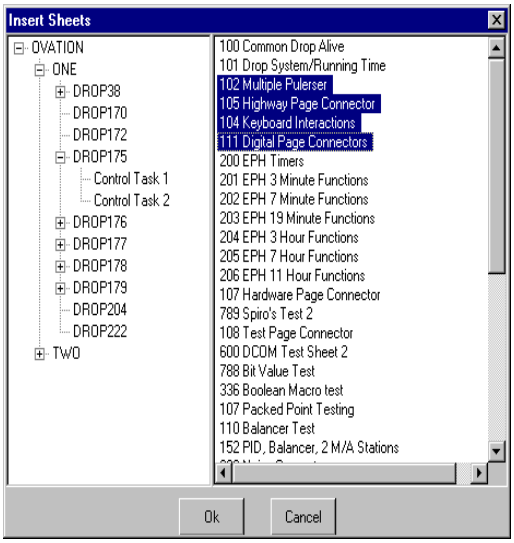


Figure 8-5. Insert Sheets Dialog Box

2. Double-click on a **control task** and the control sheets for that control task will appear on the right.
3. Select the sheet(s) to compile.
4. Click the **Ok** button to add the sheets to the list in the Compile Sheets tab, or click the **Cancel** button to abort the operation.

Remove Operation

1. Select the sheet(s) to be deleted from the Compile Sheets tab.
2. Select the **Remove** button. The sheet(s) will be removed from the list.

Note

This deletes sheets from the list, **NOT** from the system.

8-3.3. Options Tab

The Options tab provides an interface for adding frequently used **script commands** to the compile script. If none of the script command options are selected, then they will not be added to the compile script. The following types of options are provided:

- Printing options
- AutoCAD Command options
- User-Defined points
- Update Title Box options

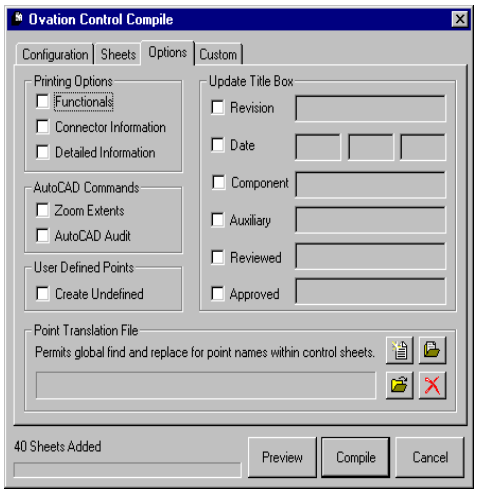


Figure 8-6. Compile Options Tab

Printing Options

These printing options can be selected to print the following:

- **Functional** prints the functional drawing (WYSIWYG) of the sheet(s).

  This is the drawing as it is displayed in the OCB drawing window.

- **Connector Information** prints information about connectors used in the sheet.
- **Detailed Information** prints detailed information (such as algorithms, point names, and tuning values) from the sheet.

Note

In order for these print options to work properly, a printer must first be configured through the Control Builder (as described in Section 5-2.4).

After the printer has been defined, select the desired Printing Options from the Options tab (as shown in the example in Figure 8-7).

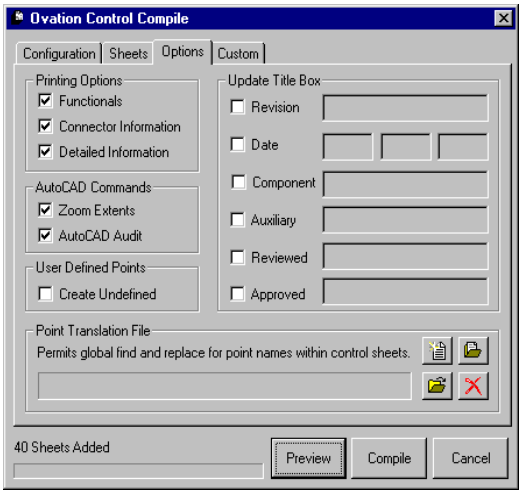


Figure 8-7. Options Selected

AutoCAD Command Options

These AutoCAD options (as shown in the example in Figure 8-7) can be selected to perform the following:

- **Zoom Extents** zooms the view to display all contents of the drawing.
- **AutoCAD Audit** examines the current drawing and corrects errors and/or reports errors.

User Defined Points Option

When this option, **Create Undefined**, is selected, all undefined user points that are found on the compiled sheets will be created.

Update Title Box Options

These options will update the title box on the compiled drawings to common values. If the option is checked, you can enter the desired values (this will NOT override the defaults set through the Configuration dialog box (Section 5-2.2)):

- **Revision** number of the drawing.
- **Date** the drawing was created. Format is Month/Day/Year (01/23/01).
- **Component** provides additional title information.
- **Auxiliary** provides additional title information.
- **Reviewed** is the name of the engineer who reviewed the drawing.
- **Approved** is the name of the engineer who approved the drawing.

Point Translation File Options

These options permit the global find and replace of point names within control sheets. There are four Point Translation File option buttons (see Figure 8-8):

- **Generate** creates a Point Translation file containing two lists that map the old point name to the new point name. These lists will be the same when the Point Translation file is generated.
- **Browse** searches through the directories for a Point Translation file. This file should have a **. map** extension.
- **Edit** selects the Point Translation file to edit. The Translation file is opened in a text editor for the user to modify.
- **Disable** clears the Point Translation File field.

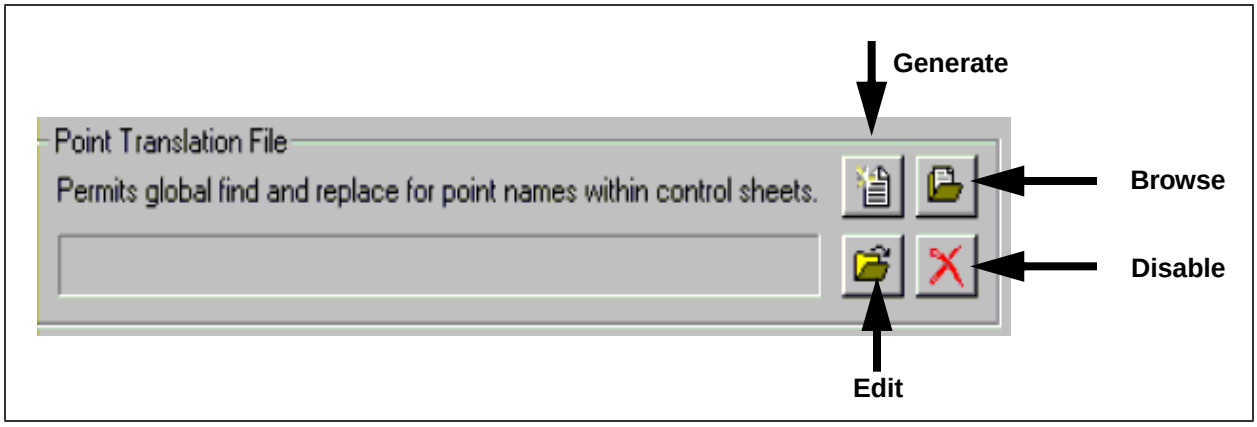


Figure 8-8. Point Translation File Options

8-3.4. Custom Tab

The Custom tab contains two text-editing fields where users can type additional script commands to be executed with the compile script. There are two text-editing fields:

- **Pre-Script Commands** will be executed **before** the compile script and Options Tab script commands are executed.
- **Post-Script Commands** will be executed **after** the compile script and Options Tab script commands are executed.

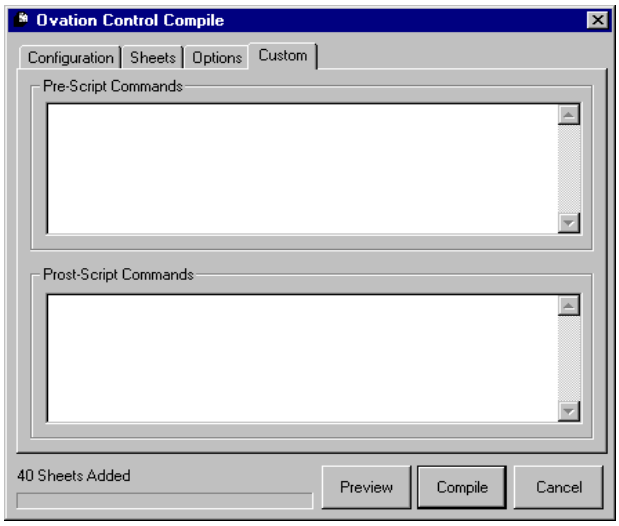


Figure 8-9. Custom Tab

8-3.5. Ovation Control Compile

The main dialog box contains four tabs (described in Section 8-3.1 through Section 8-3.4). After the tabs have been configured, the Compile operation is begun by using the buttons on the bottom of the dialog box:

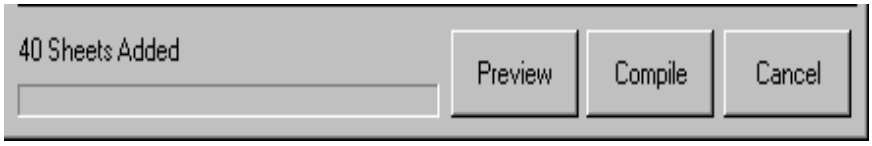


Figure 8-10. Compile Buttons

- **Preview** brings up a dialog box containing all of the script commands that are to be executed during the compile operation. Scripts are very sensitive to white spaces, because all of the white space characters have been highlighted in red. .

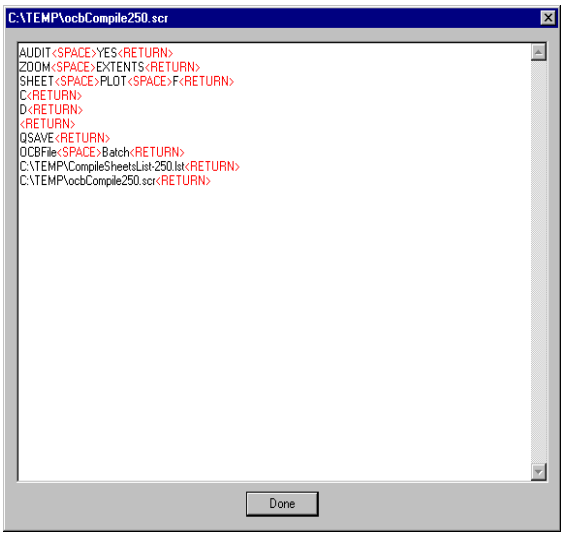


Figure 8-11. Compile Preview Dialog Box

- **Compile** opens AutoCAD and executes all of the custom and option scripts as defined by the user. This also activates the progress bar and an estimated completion time is displayed in the status. The **Compile** button also enables the Abort feature on the **Cancel** button which permits the user to abort the Compile operation once it has been executed.

- **Cancel** aborts the current session of Ovation Control Compile. All information within the current session will be lost.

8-4. Ovation Copy Control Utility

Ovation Copy Control is a stand-alone utility that is used to make multiple copies of existing control sheets. A flexible, user-friendly Graphical User Interface (GUI) is provided that can copy control sheets from multiple locations to one specific location per each session. Copy Control is accessed from the Ovation Developer Studio (see Section 8-2). An AutoCAD license is required to run this utility. For example, during one copy session, you can copy sheets **from** Control Task 1 in Drop 175, Control Task 2 in Drop180, and Control Task 2 in Drop 155 **to** Control Task 1 in Drop185. Once the Copy operation is complete, a summary of the compilation is displayed (see Section 8-10).

This GUI provides an interface for defining the point information that is needed in order to create numerous copies. The following table lists the information that is necessary for Ovation Copy Control to function properly. The following information provided by the user should be determined before configuring the Copy Control GUI:

Information	Provided by
Configuration information (source of control sheets, destination for copies, base sheet number for copies.)	User
Control sheets that are to be copied.	User
New point names for the points that are to be copied.	User
Point information.	Ovation Control Copy
Error checking on new point names.	Ovation Control Copy

The GUI for the Ovation Copy Control utility consists of four tabs:

- Configuration tab (Section 8-4.2).
- Sheets tab (Section 8-4.3).
- Points tab (Section 8-4.4).
- Map Points tab (Section 8-4.5).

These tabs are used to **define** the desired Copy Control action before starting the actual Copy procedure. After the tabs are configured and set, press the **Copy** button to start the Copy process.

8-4.1. Copy Control Icons

The Ovation Copy Control utility uses icons to identify point types and point statuses. These icons are displayed on the Points tab and the Map Points tab. The following table lists the icons and describes each one.

Table 8-1. Control Copy Icons

Icon	Description
	Indicates the point is an **Originated** point. (Displayed on Points Tab)
	Indicates the point is a **Hardware** point. (Displayed on Points Tab)
	Indicates the point is an **Alarm** point. (Displayed on Points Tab)
	Original point is represented by a **yellow** box in the background. **Red** slash over a **white** box in the foreground indicates a new point will NOT be created. (Displayed on Map Points Tab)
	Original point is represented by a **yellow** box in the background. New point is represented by a **gray** box in the foreground indicating the new point contains minimum detail. (Displayed on Map Points Tab)
	Original point is represented by a **yellow** box in the background. New point is represented by a **yellow** box in the foreground indicating it is identical to the original point (cloned). (Displayed on Map Points Tab)
	Indicates there is an **Information** message about this point in the Error Status file (described in Section 8-10). (Displayed on Map Points Tab)
	Indicates there is an **Error** message about this point in the Error Status file (described in Section 8-10). (Displayed on Map Points Tab)
	Indicates there is a **Warning** message about this point in the Error Status file (described in Section 8-10). (Displayed on Map Points Tab)

8-4.2. Configuration Tab

The Configuration tab contains three major fields where user input is required. Ovation Control Copy will not work unless these three fields are set:

- Ovation Data Directory
- Destination Location
- Base Sheet Number.

Ovation Data Directory Field

The Ovation Data Directory field is the location of the sheets that are to be copied. This is typically the **`D:\OvPtSvr`** directory on the server. However, Ovation Control Copy can be run from any location. In order for Control Copy to work, the server's Ovation data disk must be mounted on the machine where Control Copy will be executed.

Perform the following to set the Ovation Data Directory field and mount the server's Ovation data disk:

1. Click on the **button** within the Ovation Data Directory group box. A Browse dialog box (as shown in Figure 8-3) will appear that lists all of the disks that are on the local machine (similar to looking at all of the disks in Windows Explorer). Note that the typical data directory of **`D:\OvPtSvr`** on the server may now be **`<X>\OvPtSvr`** on another machine.

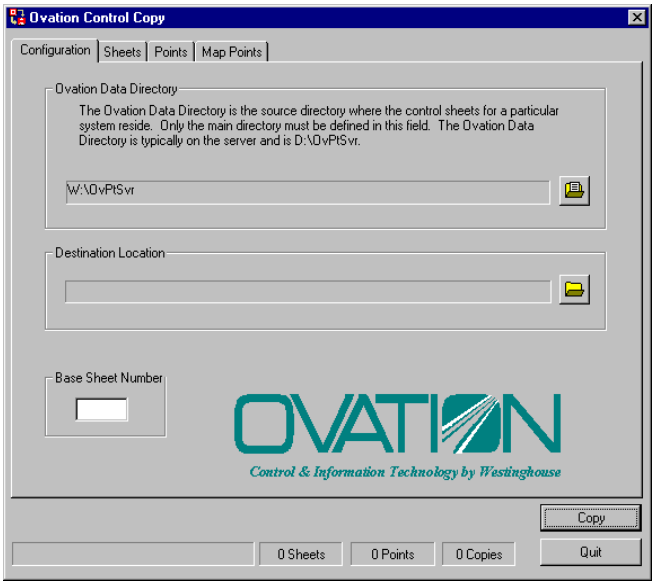


Figure 8-12. Ovation Control Copy Configuration Tab

2. Select the server's **Ovation Data Directory**. Once the user selects the Ovation Data Directory, an entry is made in the registry that contains the directory. This will become the default directory when the user executes Ovation Control Copy from the same machine.

Destination Location Field

The control sheets will be copied to the location specified in the Destination Location field. Perform the following to set the Destination Location field:

1. Click on the **button** within the Destination Location group box to set this field.

   A dialog box will appear displaying the database hierarchy (Network, Unit, Drops, and Control Tasks).

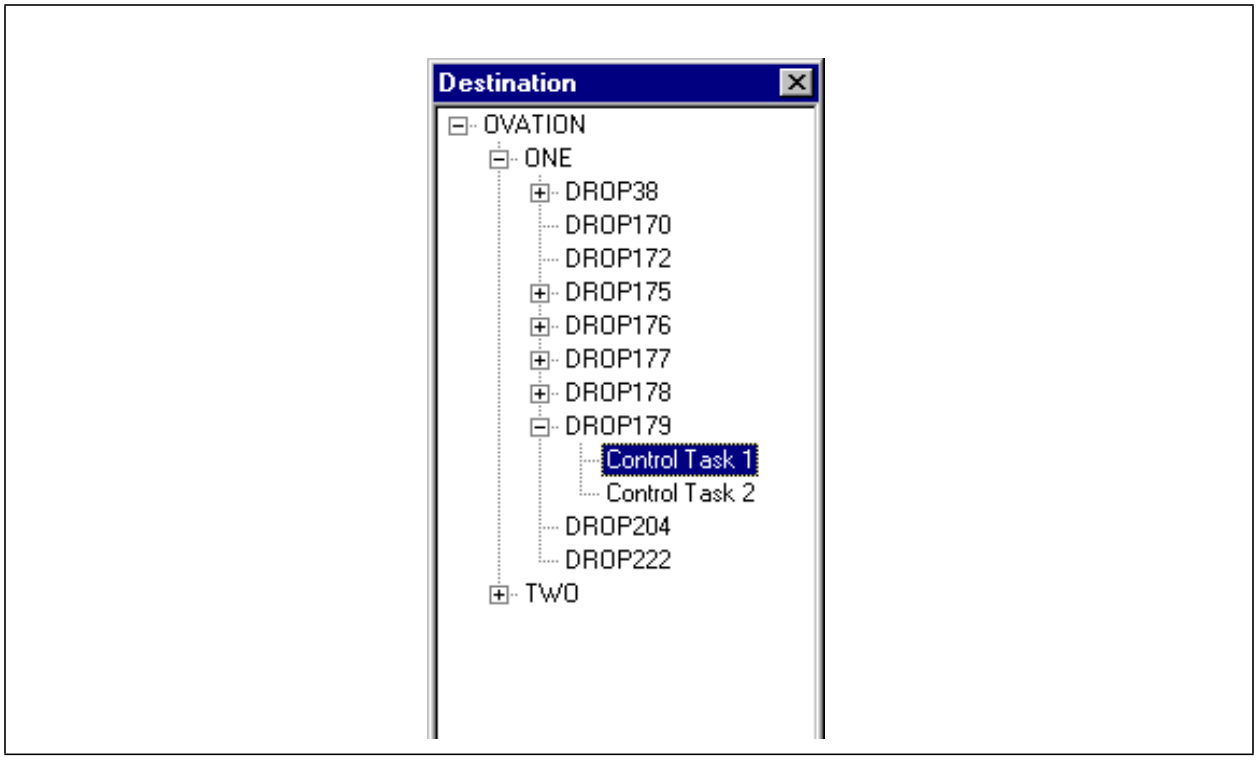
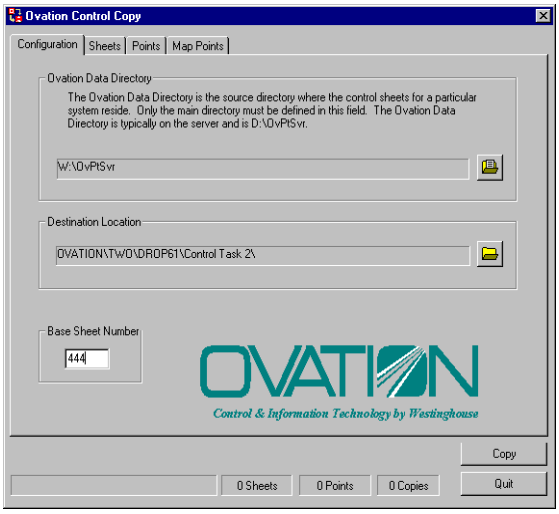


Figure 8-13. Database Hierarchy

2. Select either a **drop** or a **Control Task** within a drop. This field determines where the sheets will go. If a Control Task is not specified, the default is **Control Task 2**.



Base Sheet Number Field

The Base Sheet Number field determines the new sheet numbers for the copied control sheets. Perform the following to set the Base Sheet Number field:

1. Enter the **sheet number** that you want to assign to the first new sheet. The other new sheets will continue numbering from that Base number until you change the number.

2. Set this field by clicking outside of the Base Sheet Number field.

8-4.3. Sheets Tab

The Sheets tab contains the list of the sheets that are to be copied. The following information is provided for each sheet:

- Drop number
- Task number
- Sheet number
- Sheet title

The sheets are sorted based on drop number, then task number, then sheet number, and then sheet title. The order of the sheets cannot be changed. Initially, the sheet list is empty.

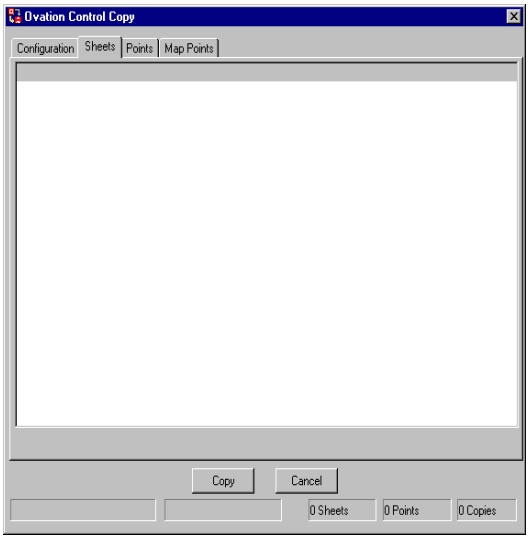


Figure 8-14. Ovation Control Copy Sheets Tab

There are two operations within the Sheets Tab that are available to the user:

- Insert
- Delete

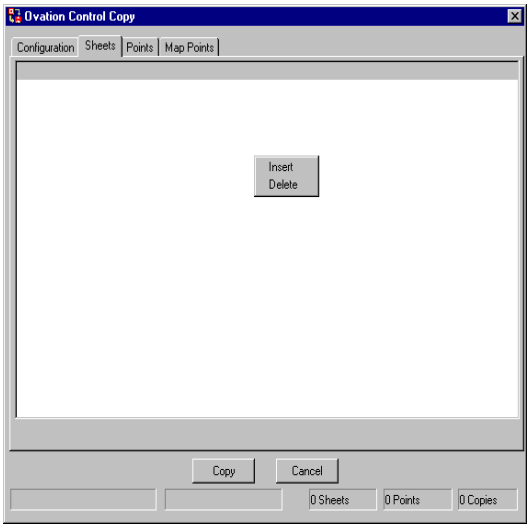


Figure 8-15. Sheets Tab with Right-click Menu Shown

Insert Operation

1. Right click to access the Insert/Delete menu (or press the **Insert** key on the keyboard, see Figure 8-15).

2. Select **Insert** and a dialog box will appear displaying the database hierarchy (Network, Unit, Drops, and Control Tasks).

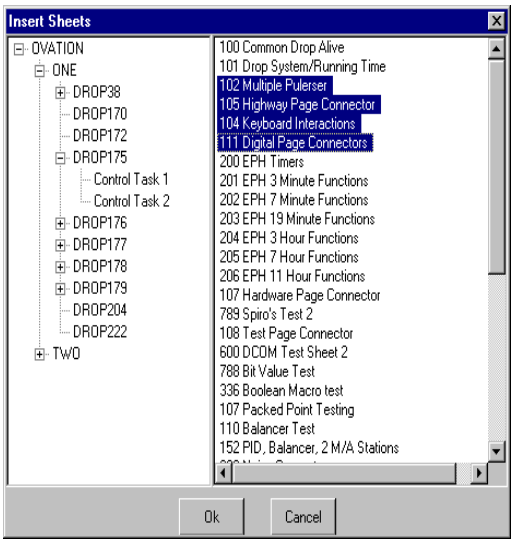
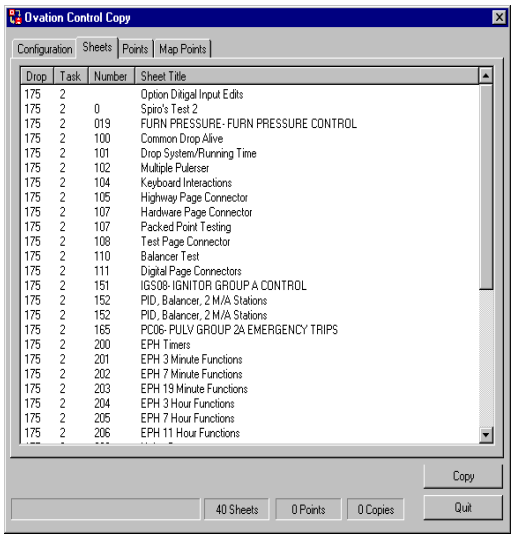


Figure 8-16. Insert Sheets Dialog Box

3. Double-click on a **control task** and the control sheets for that control task will appear on the right.

4. Select the **sheet(s)** to copy.

5. Click the **Ok** button to add the sheets to the list in the tab, or click the **Cancel** button to abort the operation. Adding the sheets also updates the points listed in the Points tab and Map Points tab.



Delete Operation

1. Select the **sheet** that is to be deleted.

   Only one sheet may be removed at a time and unnecessary points will also be removed.

2. Right click to access the **Insert/Delete menu** (or press the **Delete** key on the keyboard). The selected sheet will be removed from the list.

8-4.4. Points Tab

The Points tab displays the points associated with the sheets to be copied.

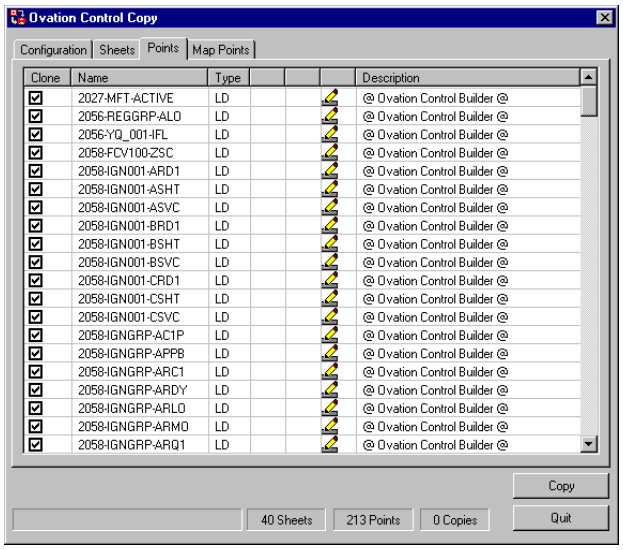


Figure 8-17. Ovation Control Copy Points Tab

The user cannot edit, insert, or delete points on this tab. It is automatically updated as the list of sheets is modified. Information is provided in the following columns for each point:

- **Name** – Original name of point
- **Type** – Point record type (LA, DA, LD, DD, LP, DP, LC, DU, RM, or RN)
- **Alarm** – Icon present indicates point is configured for alarms.
- **Hardware** - Icon present indicates point is configured for hardware. Hardware points CANNOT be cloned.
- **Originated** - Icon present indicates point is originated by the sheets that are to be copied.
- **Description** – English Description of point

8-4.5. Map Points Tab

Since no point can be originated from two different algorithms, each Control Copy operation must define point names for all points originated on the sheets that are to be copied. The Map Points tab manages this task (mapping means that when the sheets are copied, the original point names will be changed (or mapped) to new point names).

The data is displayed in spreadsheet format, where each row represents a point used in the sheets that are to be copied. The first column displays the original point name, and the subsequent columns represent the point name that will be substituted for the original in the copied sheets. Initially, the table contains an empty column (Map 1) for the first Copy operation. This is a default setting where one copy of all of the sheets in the Sheets tab will be made and the original point names will be mapped to their corresponding new names in the Map 1 column.

The first column, containing the original point name, also has an icon in front of the point name that indicates whether the new points will be cloned or created. The check boxes in the **Points tab** define the cloning status. The user can go back to the Points tab and check or uncheck a point at any time.

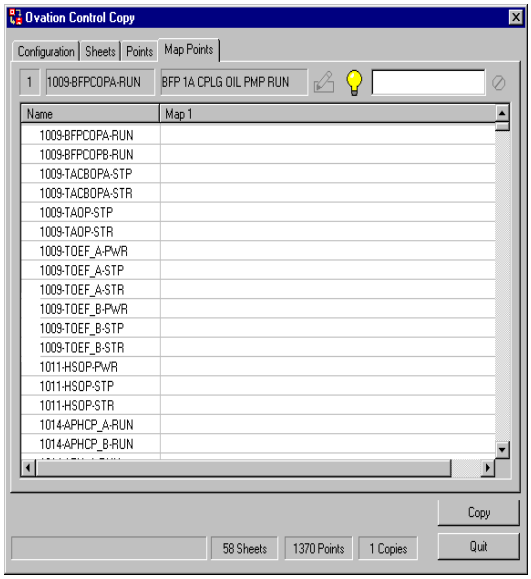


Figure 8-18. Ovation Control Copy Map Points Tab

Information Fields

Figure 8-19 provides an example of the Map Points tab with filled-in information fields. The various fields in the Error Log are identified by arrows and are described in Table 8-2. These fields are information fields that display information about a mapped point in the table. To define an individual map, left-click on the map cell to select it. The information fields are then set to match the selected cell.

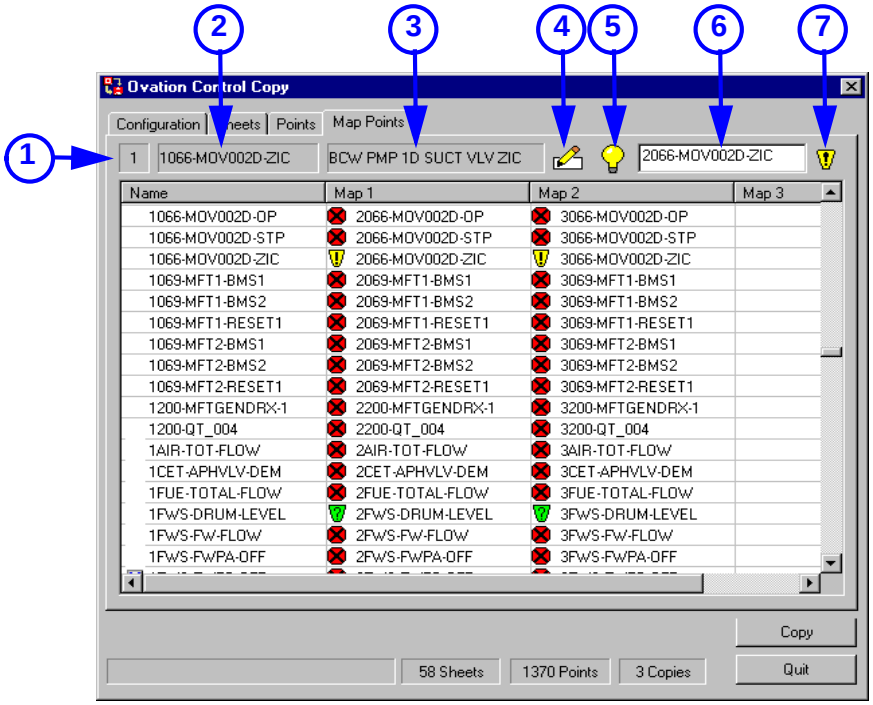


Figure 8-19. Information Fields in Map Points Tab

Initially, the fields are blank and are not filled until a cell is selected in the spreadsheet (any column except the first).

Table 8-2. Information Fields for Map Points Tab

Key	Field	Description
1	Mapping Number	Column or copy of the selected cell
2	Original Point Name	Original point name for the row of the selected cell
3	Original Point Description	English description of the original point
4	Identifies Originated Status (pencil icon, see Table 8-1)	If the original point is originated by the sheets that are to be copied, the pencil icon is visible. Otherwise, it is grayed out.
5	Identifies Hardware Status (light bulb icon, see Table 8-1)	If the original point has a hardware definition, the light bulb icon is visible (lit). Otherwise, it is grayed out.
6	New Point Name	Editable field where the user can define the new point name. Name is set when tab key is hit or field is exited.
7	New Point Error Status	If the mapped point name is not acceptable, the applicable icon will be visible. Otherwise, it will be grayed out. Refer to Table 8-1 for icon descriptions. The new point name undergoes error checking to determine if the point is acceptable. Refer to Section 8-10 for descriptions of errors.

Map Points Operations

A right-click menu (shown in Figure 8-20) provides the following various operations that can be performed within the Map Points tab. Table 8-3 describes these operations:

- Insert Column(s)
- Delete Column
- Clear Cell
- Find/Replace
- Audit Points
- Save
- Load

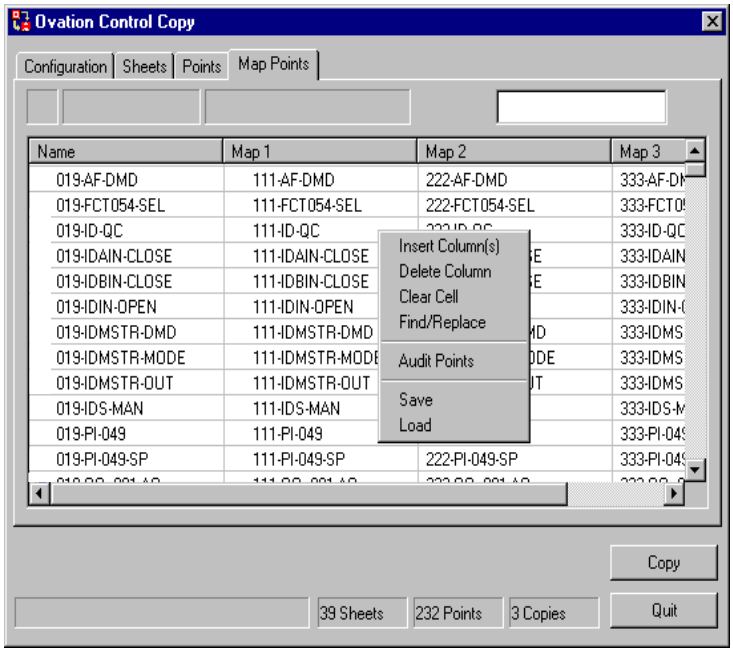


Figure 8-20. Right-Click Menu for Map Points Tab

Table 8-3. Right-Click Menu Operations

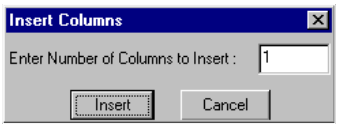
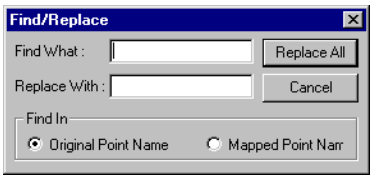
Operation	Description
Insert Column(s)	Use this operation to **add** new columns to the table. A dialog box prompts you to enter the desired number of columns. The number of columns is unlimited and determines the number of copies that are to be made. The new columns are inserted at the position where the mouse was when you right-clicked. For example, if you right-click between columns 2 and 3, and insert two columns, then column 3 becomes column 5 and the two new columns become 3 and 4. 
Delete Column	Use this operation to delete the column where you clicked the right mouse button. For example, if you want to delete column 2, place the mouse in column 2 and right-click, then select **Delete Column** from the menu. This will delete column 2 and all following columns are renumbered to compensate for the deleted column.
Find/Replace	Use this operation to find and replace text strings. A dialog box appears with fields for searching and editing a specific string within a column or from the original point name column. Use the **Find** string to find the desired string in the existing point names, and then use the **Replace With** string to replace the Find string with a new string. This will create new point names.  Select the **From Original Point Name** radio button to conduct the search on the original point names. Select the **Within Column** radio button to search on the new point names in the selected column. After all fields are set, click the **Replace All** button to conduct the search, or the **Cancel** button to cancel the operation. If you select the Replace All button and all of the fields are set, the new point **names** will be created within the column where you right-clicked. The actual points will **not** be created until you run the Copy function from the Copy button.
Clear Cell	Use this operation to clear a specific cell in the table. Place the mouse in the cell and right-click. Then select **Clear Cell** from the menu. Since Find/Replace only modifies empty cells, clearing a cell will allow the mass edit Find/Replace to edit the cleared cell.

Table 8-3. Right-Click Menu Operations (Cont'd)

Audit Points	Use this operation to perform error checking on every new point name in the table. If any errors are found, an **Error Status** dialog box appears indicating the error and the associated point. Click the **Ok** button to simply close the box. Click the **Print** button to print the errors out to the default printer. Error status icons are also displayed in the table next to the point with the error. This makes it easier for the user to view the points that have errors. Refer to Section 8-10 for error checking information.
Save	Use this operation to **stop** the Ovation Control Copy process and continue at a later time. A Save As dialog box will pop up prompting you to name the Save file. This file will contain all mapping information for the points (original name and new name).
Load	Use this operation to **load** the point data that was previously saved in an earlier session of Ovation Control Copy. An Open Dialog box will pop up prompting you to select the previously saved data file. This will load all of the point names and maps. No error checking is done in this procedure. If you wants to do error checking on the points after they have been loaded, execute the **Audit Points** option from the right click menu.

8-4.6. Ovation Control Copy

The main dialog box contains four tabs (described in Section 8-4.2 through Section 8-4.5). After the tabs have been configured, and the Copy button has been clicked, this dialog box provides Copy information for the user, as well as progress and operation information. The information fields at the bottom of the box are as follows:

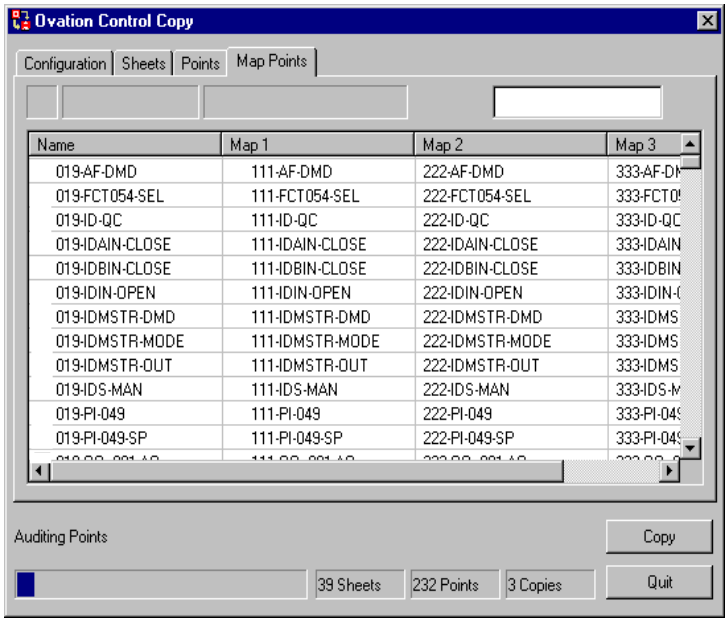
- **Operation** - Indicates when you are executing an operation. This is activated when the user is inserting sheets, and auditing points.
- **Progress** - A progress bar that reflects the percentage of the operation that is complete.
- **Sheet Count** - Indicates the number of sheets that are in the sheet list in the Sheets tab. You can change this field by inserting or deleting sheets from the Sheets tab.
- **Point Count** - Indicates the number of points that are in the point list in the Points tab. This field is updated when sheets are inserted or deleted in the Sheets tab.
- **Copies** - Indicates the number of copies of inserted sheets that are to be made. The number of mapping columns in the Map Points tab determines this. You can change this field by inserting or deleting columns in the Map Points tab.

The Ovation Control Copy dialog box has two buttons:

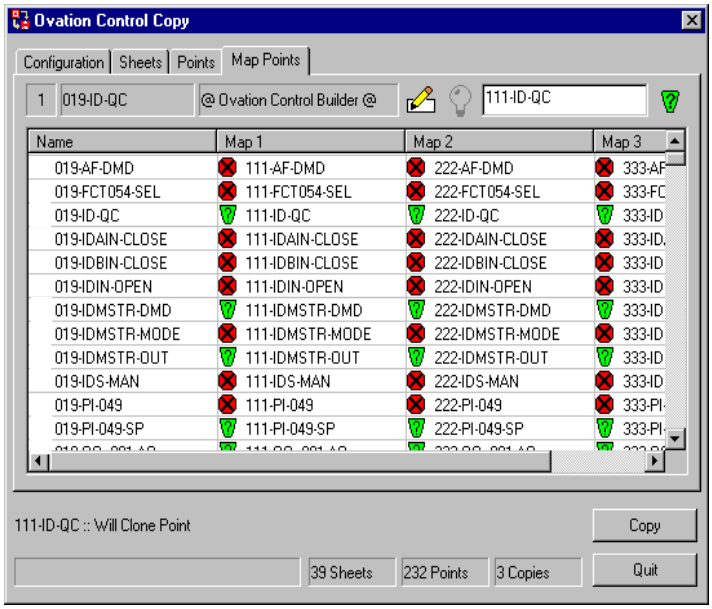
- Copy
- Cancel

If you click the **Copy** button, a series of operations will begin:

1. **Audit Points** - If this is successful, then the Copy operation continues, otherwise the Error Status dialog appears and the user is required to resolve any point errors. A message appears in the bottom of the dialog box indicating the progress of the Audit process.



After the Audit is complete, any errors are indicated for each point name.



2. **Create all necessary map files** - There is one map file per copy and it contains a map from the original point name to the new point name.

3. **Build a script file** – This file contains the sheets that are to be copied and the map files for the point information.

4. **Copy the sheets** - This executes Import Control on the sheets in the script and maps all of the necessary points.

5. **Generate Script File** - This is an HTML file indicating any errors in the sheets during the script.

If you click the **Cancel** button, the Copy operation is cancelled. If the point information was not saved in the Map Points tab, then all data will be lost. If the user wants to cancel the operation and work on it later, it is recommended that the user save the mapping information in the Map Points tab by selecting **Save** from the right-click menu.

8-4.7. Error Checking

Ovation Control Copy checks for errors during the copy process and displays them in the OCBCopy Error Status file. The following table shows the error messages that Control Copy reports, descriptions of the messages, and the status (or type) of those errors. Figure 8-21 displays a sample Copy Error Status file.

Message	Description	Status
Point Does Not Exist/ Can Clone	New Point does not exist. Original Point is a non-hardware point in the source control sheets.	Information (normal) 
Point Does Not Exist/ Will Create	New Point does not exist. Original Point is a hardware point. Original Point is originated in the source control sheets.	Warning (acceptable but not desired) 
Point Does Not Exist/Cannot Reference	New Point does not exist. Original Point is only referenced in the source control sheets.	Error 
Invalid Record Type	New Point's record type is incompatible with the Original Point's record type.	Error 
Invalid Originating Drop	New Point does not originate in the destination drop. Original Point is originated from within the source control sheets.	Error 
Already Originated	New Point is already used in control elsewhere.	Error 

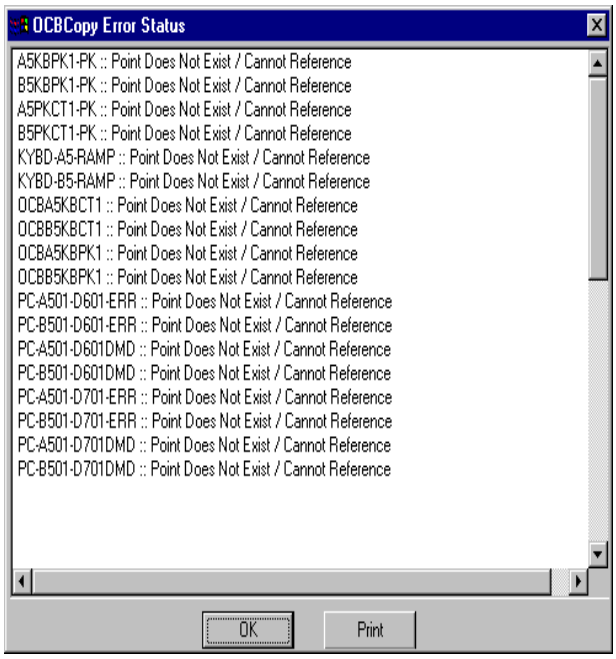


Figure 8-21. Sample Error Status File

8-5. Export Control Sheets

This utility extracts Control Sheets, Custom Symbols and Control Macros out of an Ovation system. Each object is stored as a file with easily recognizable names that may be transferred between systems.

This utility is the primary means for moving control between systems. Import Control Sheets (see Section 8-6) provides the other half of the operation by copying the objects into an Ovation database.

Export Control is accessed from the Ovation Developer Studio (see Section 8-2) and does **not** require the Control Builder or an AutoCAD license.

This tool allows the user to define the **two** key pieces of information required to import objects into the system:

1. **Source (What to Export)** Sheets may be selected in the Developer Studio before the application is initiated. Custom Symbols and Control Macros can only be selected after the application is running.

2. **Destination (Where to put It**) The destination is the directory where the exported objects will be stored. The tool will define the filename based on the object type and the directory's previous content.

The GUI for the Export Control utility consists of four tabs:

- Configuration tab (Section 8-5.4).
- Sheets tab (Section 8-5.5).
- Symbols tab (Section 8-5.6).
- Macros tab (Section 8-5.7).

These tabs are used to **define** the desired Export Control action before starting the actual Export procedure.

8-5.1. Guidelines for Exporting Control Sheets

1. Control sheets may be extracted by a unit, drop or control task if selected in the workspace from the Developer Studio right-click menu.

2. Individual sheets may be exported if selected in the WorkPad window. If started stand-alone, any combination of sheets may be exported.

3. Exported sheets will be exported into a single AutoCAD drawing file. The name is based on the sheet's title. It is possible to pre-fix the name with the sheet number, unit ID and drop ID. This is useful for sorting the sheets when importing.

4. In addition to the control sheet, a point translation file may be created for the selected sheets. This file can be used with the Import Control Sheets Utility or the Control Compile utility.

8-5.2. Guidelines for Exporting Custom Symbols

1. Custom symbols are exported into a directory, one symbol is stored in each file, and the file has a .**sym** extension.

2. The destination filename is based on the function.

3. The symbol filenames are numbered, guaranteeing unique file names.

4. Exported symbols will not overwrite another symbol. If the same symbol is exported three different times, three unique files will be produced.

Caution

These files are not readable by AutoCAD. Do not rename the files with external utilities, such as NT Explorer. Renaming a symbol may cause it to be improperly imported.

8-5.3. Guidelines for Exporting Control Macros

1. Each Control Macro is exported into a file with a **.cmr** extension.
2. The destination filename is based on the function.
3. If a macro file already exists in the destination directory, it will be overwritten.
4. On import, unlike custom symbols, the macro name is not derived from the file name. Renaming the file has no effect on the macro name during import.
5. Macro files contain the necessary information to recreate the macro in a new system, and any symbols that were defined when the macro was exported. Therefore, it will not be necessary to import symbols for the macro, unless the desired symbol was created **after** the macro was exported.

Caution

These files are not readable by AutoCAD. Do not rename the files with external utilities, such as NT Explorer. Renaming a macro may cause it to be improperly imported, even inadvertently overwriting an existing algorithm.

8-5.4. Configuration Tab

The Configuration tab (see Figure 8-22) defines the general parameters, and the detailed information necessary to export control sheets.

Ovation Data Directory Field

The Ovation Data Directory field is the network location on the database server. Because of performance issues with AutoCAD, consider mounting the **D:** disk of the server when importing sheets or control macros. By default, the Developer Studio will define the drive by the IP address of the server.

Perform the following to set the Ovation Data Directory field and mount the server's Ovation data disk.

1. Click on the Browse **button** within the Ovation Data Directory group box. A Browse dialog box (as shown in Figure 8-3) will appear that lists all of the disks that are on the local machine (similar to looking at all of the disks in Windows Explorer). Note that the typical data directory of **`D:\OvPtSvr`** on the server may now be **`<X>\OvPtSvr`** on another machine.

2. Select the server's **Ovation Data Directory**. Once the user selects the Ovation Data Directory, an entry is made in the registry that contains the directory. This will become the default directory when the user executes Ovation Export Control from the same machine.

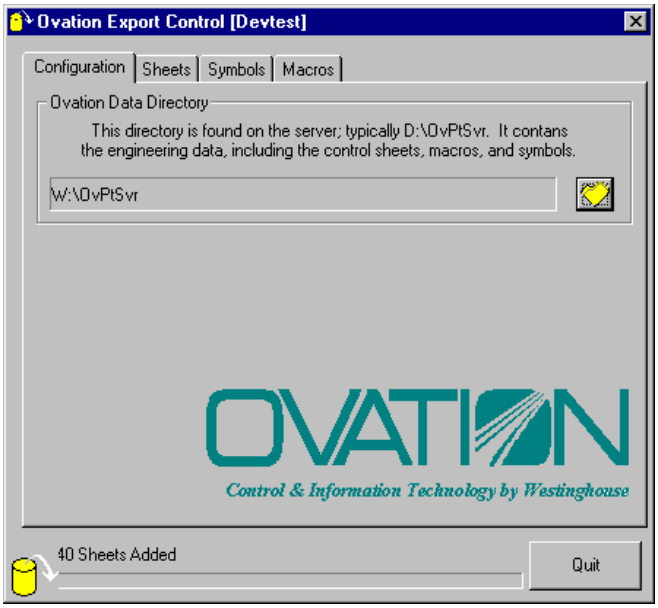


Figure 8-22. Export Configuration Tab

8-5.5. Sheets Tab

This tab (see Figure 8-23) allows the user to define what sheet objects are to be exported from the system. The Sheets tab contains the following information for each sheet:

- Drop number
- Task number
- Sheet number
- Sheet title

The sheets are sorted based on drop number, then task number, the sheet number, and then sheet title. The order of the sheets cannot be changed. Initially the sheet list is empty.

There are five operations available to the user:

- Insert
- Remove
- Browse
- Map File
- Export.

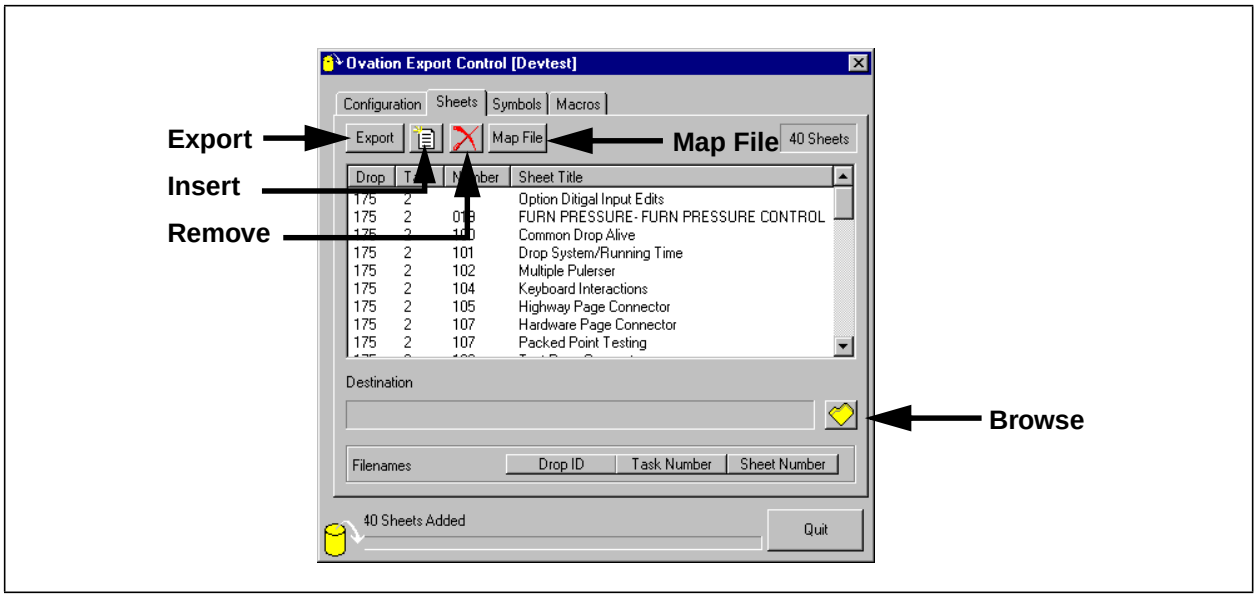


Figure 8-23. Export Sheets Tab

Insert Operation

1. Select the **Insert** button and a dialog will appear displaying the database hierarchy (Network, Unit, Drop, and Control Tasks).
2. Double-click on a **control task** and the control sheets for that control task will appear on the right.
3. Select the **sheets** to export.
4. Click the **Ok** button to add the sheets to the list in the Sheets tab, or click **Cancel** to abort the operation.

Note

Multiple sheets may be selected from the right-hand list. It is possible to extract files from different task or drops, by performing the **Insert** function multiple times.

Remove Operation

1. Select the **sheet(s)** to be deleted from the Sheets tab.
2. Select the **Remove** button. The sheet(s) will be removed from the list.

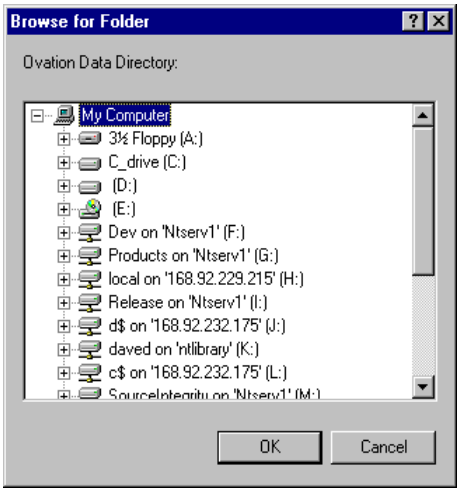
Note

This deletes sheets from the list of items to export, **NOT** from the system.

Browse Operation

1. Select the **Browse** icon in the Sheets tab. This action allows the user to select a destination directory.

2. A Browse dialog will appear (as shown below). Select a destination directory and click **Ok**.



Map File Operation

1. Select the **Map File** button from the Sheets tab. This action produces a map file for the selected sheets. The standard NT File Open dialog will appear.

2. Define the point map filename and click **Ok**. (see Figure 8-24).

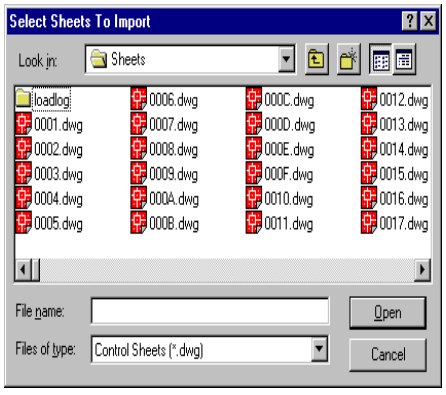


Figure 8-24. Insert Sheets Dialog

Export Operation

1. Select the **Export** icon in the Sheets tab to begin the Export.

Note

This may overwrite files that have already been placed in the directory. The file timestamp reflects the last time edited, not the time they are placed in the destination directory.

The exported filenames may be pre-fixed with the drop ID, task ID, and/or sheet number. This is useful when sorting during an export to simplify sheet numbering and execution order.

8-5.6. Symbols Tab

The Symbols tab allows the user to define what custom symbols are to be exported from the system. Symbols are exported from a system, not a specific network, unit, drop, or task. The order of the symbols is not critical, however, it will affect the unique number assigned to the exported symbol files. Initially the symbols tab is empty.

There are four operations available to the user:

- Insert
- Remove
- Browse
- Export

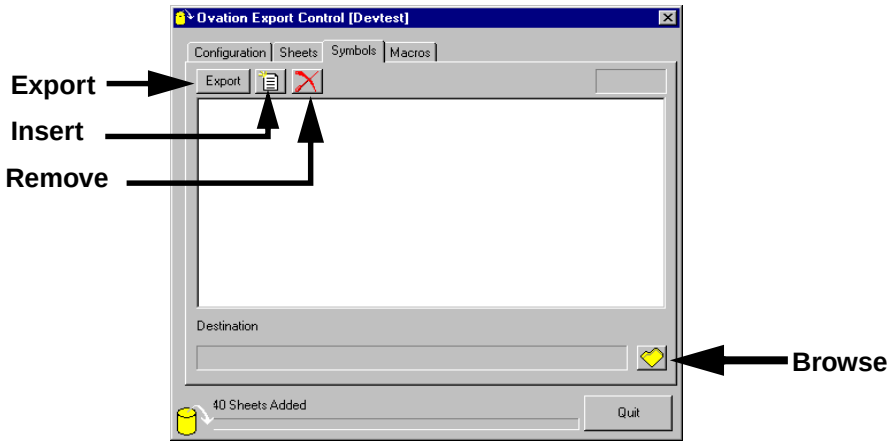


Figure 8-25. Symbols Tab

Insert Operation

1. Select the **Insert** button and a dialog will appear displaying the database hierarchy (Network, Unit, Drop, and Control Tasks).

2. Double-click on a **control task** and the custom symbols for that control task will appear on the right.

3. Select the **custom symbols** to export.

4. Click the **Ok** button to add the symbols to the list in the symbols tab, or click **Cancel** to abort the operation. This button opens the standard NT open file dialog box.

Note

Select one or more files from a directory. Do **not** select files from other directories. Custom Symbols are stored in only one directory for the entire system, regardless of which object was selected in the Developer Studio. The files must have a **.dwg** extension.

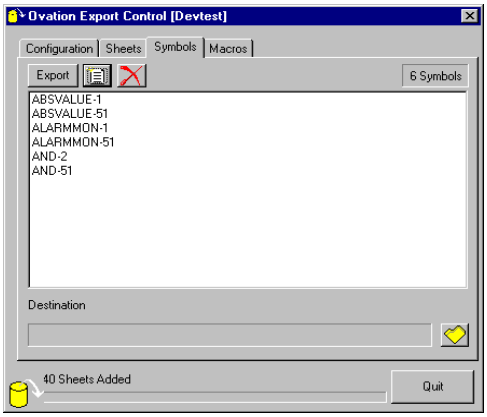


Figure 8-26. Symbols Tab with Symbols List

Remove Operation

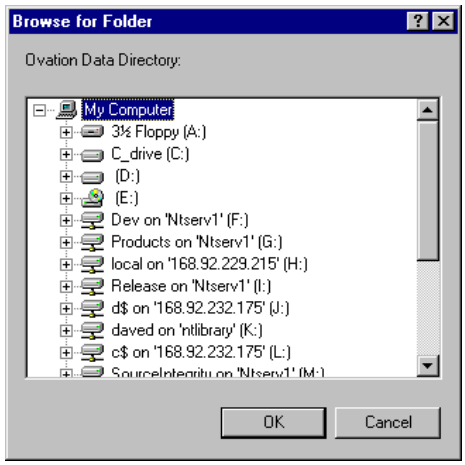
1. Select the custom symbol(s) to be deleted from the Symbols tab (Figure 8-26).
2. Select the **Remove** button. The custom symbol(s) will be removed from the list.

Note

This deletes custom symbols from the list, **NOT** from the system.

Browse Operation

1. Select the **Browse** icon in the Symbols tab. This action allows the user to select a destination directory.
2. A Browse dialog will appear (as shown below). Select a destination directory and click **Ok**.



Export Operation

Select the **Export** icon in the Symbols tab to begin the Export.

Note

This operation will **not** overwrite files that have already been placed in the directory.

8-5.7. Macros Tab

This tab allows the user to define what files are to be imported into the system as Control Macros. Control Macros are imported into a system, not a specific network, unit, drop, or task. The order of the Control Macros is not critical. The file list defines the name of the Control Macros, and the number of symbols. Initially the Macros tab is empty.

There are four operations available to the user:

- Insert
- Remove
- Browse
- Export

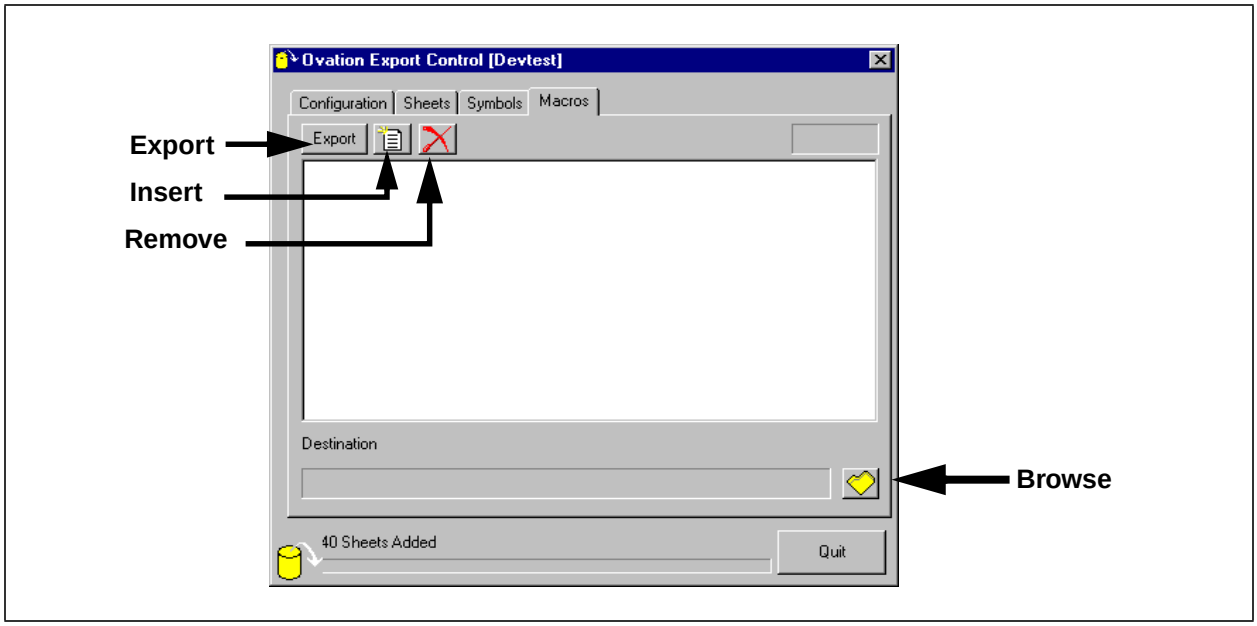


Figure 8-27. Macros Tab

Insert Operation

1. Select the **Insert** button (see Figure 8-27) and a dialog will appear displaying the database hierarchy (Network, Unit, Drop, and Control Tasks).
2. Double-click on a **control task** and the Control Macros for that control task will appear on the right.
3. Select the **Control Macros** to export.
4. Click the **Ok** button to add the Control Macros to the list in the Macros tab, or click **Cancel** to abort the operation.

Note

Select one or more files from a directory. Do **not** select files from other directories. Control Macros for the entire system are stored in only one directory, regardless of which object was selected in the Developer Studio. The files must have a **.dwg** extension.

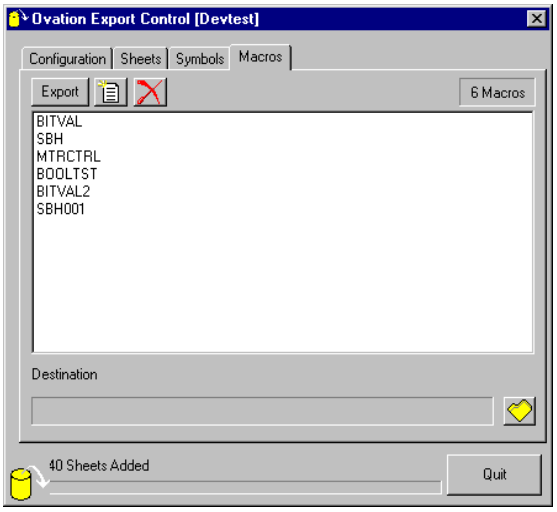


Figure 8-28. Macros Tab with Macros List

Remove Operation

1. Select the **Control Macro(s)** to be deleted from the Macros tab (see Figure 8-28).

2. Select the **Remove** button. The Control Macro(s) will be removed from the list.

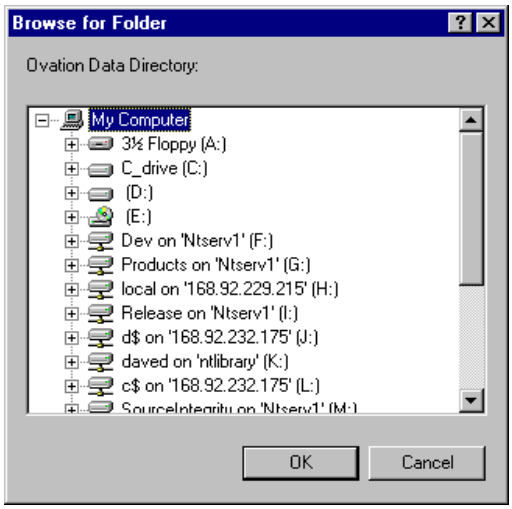
Note

This deletes Control Macros from the list, **NOT** from the system.

Browse Operation

1. Select the **Browse** icon in the Macros tab. This action allows the user to select a destination directory.

2. A Browse dialog will appear (as shown below). Select a destination directory and click **Ok**.



Export Operation

Select the **Export** icon in the Macros tab to begin the Export.

Note

This operation **will** overwrite files that have already been placed in the directory.

8-5.8. Command Line Options

The Export Control Sheets utility can be run from the Command Prompt. The user may also use the command prompt option to create a desktop shortcut for this utility.

The Command Prompt is accessed through the following path: **Start -> Programs -> Command Prompt**

/SYS:<systemName> This is a required option.

/SID:<user/password@schema> This optional parameter defaults to **ptadmin/ptadmin@ptdb.**

/DIR<ovationDataDir> This parameter is optional and defines the default for the ovation data directory on the configuration tab.

/FILE:<filename> This optional parameter defines the file containing a list of keys to extract. This is provided to support the studio interface.

/SILENT This optional parameter forces OCBExport to run automatically to support command line batch processor. The file option is necessary to run silently. The dialog box appears and the progress is supplied. The box will automatically shut down.

/KEY:<key> This parameter defines the source object or parent of the source objects.

8-6. Import Control Sheets

This utility copies Control Sheets, Custom Symbols and Control Macros into an Ovation database system. It will not replace existing objects. Internal object names may be slightly different than the original object. Import Control is accessed from the Ovation Developer Studio (see Section 8-2) and an AutoCAD license is required.

This utility is the primary means for moving control between systems. Export Control (see Section 8-5) provides the other half of the operation. It copies the objects out of the database into transportable files with easily recognizable names. When the import completes, a log depicting the results for each sheet will be presented. See Section 8-10 for information on the Script Status Log.

In order to customize objects for a new system, this utilty supports a simple method for defining new sheet numbers, and user defined points.

This tool allows the user to define the two key pieces of information required to import objects into the system.

1. **Source (What to import)** - No matter what type of object is to be imported, each object is stored as a discrete file on the disk. For the most part, Export Control creates these files. In the case of UNIX sheets, they are the actual .dwg files from the UNIX software server.

2. **Destination (Where to put It**) - The destination is the place in the hierarchy where the imported object will be stored. This is the selected object when the control options dialog box is opened from the Developer Studio. Because Import Control is designed to run stand-alone, the destination can be defined or redefined any time before the import is begun.

The GUI for the Import Control utility consists of four tabs:

- Configuration tab (Section 8-6.4).
- Sheets tab (Section 8-6.5).
- Symbols tab (Section 8-6.6).
- Macros tab (Section 8-6.7).

These tabs are used to **define** the desired Import Control action before starting the actual Import procedure.

8-6.1. Guidelines for Importing Control Sheets

1. Before importing control sheets, be sure the system database has already been imported and that it contains the Destination Drop and the Destination Task. Refer to "Ovation NT Developer Studio" (NT-0060) or "Ovation NT System Database" (NT-0015) for additional information about using and importing databases.

2. Since any user-defined points that are missing from the database can be created automatically, they do not have to be defined in the database before importing the sheets. However, the sheets will be imported with errors. After the import is complete, remove the errors by either editing the sheet, or by creating the point (Section 7-7), and then recompiling the sheets.

3. Control sheets may be extracted by a unit, drop or control task if selected in the workspace from the Developer Studio right-click menu or defined with the configuration tab (see Section 8-6.4).

4. If a **unit** is defined as the destination, the drop and control task are assumed to be the same as the originally exported sheets.

5. If a **drop** is defined as the destination, the control task is assumed to be the same as the originally exported sheets.

6. Importing sheets will reassign the unique sheet ID. This ID is used to define the algorithm names. To seamlessly move sheets between systems, all algorithms used in graphics MUST have user-defined names.

7. Importing sheets from a UNIX/Solaris Ovation system will convert the sheet into NT format. The algorithm names will be transformed into the new format. A point translation file, named **Ovation/Ovationbase/OCBPointNameXref.map**, is created to modify the custom graphics during import.

8-6.2. Guidelines for Importing Custom Symbols

1. Custom Symbols are imported into a system, one symbol is stored in each file, and the file has a .**sym** extension.

2. Do **not** rename the file before importing. The utility will determine the appropriate name and location for the destination system.

3. The filename is based on the function.

4. The destination object may be defined as any object under the system, but all control sheets under the system will be able to use the new symbol.

5. The imported symbols will be assigned new ID numbers, which are only needed if custom toolbars have been created.

6. These files are not readable by AutoCAD.

8-6.3. Guidelines for Importing Control Macros

1. Control Macros are imported into a system and each Control Macro file has a **.cmr** extension.

2. The destination object may be defined as any object under the system, but all control sheets under the system will be able to use the new macro.

3. Unlike symbols, the macro name is not derived from the filename. Renaming the file has no effect on the macro name during import.

4. Imported Control Macros are assigned the same name as the original. If a macro with the same name already exists in the system, it will be redefined. Replacing an existing macro can have drastic and far-reaching effects, depending on the usage of the existing macro and the differences between the two macro interfaces.

5. These files contain the necessary information to recreate the macro in the new system, and any symbols that were defined when the macro was exported. Therefore, it will not be necessary to import symbols for the macro, unless the desired symbol was created **after** the macro was exported.

8-6.4. Configuration Tab

The Configuration tab defines the general parameters, and the detailed information necessary to import control sheets (see Figure 8-29).

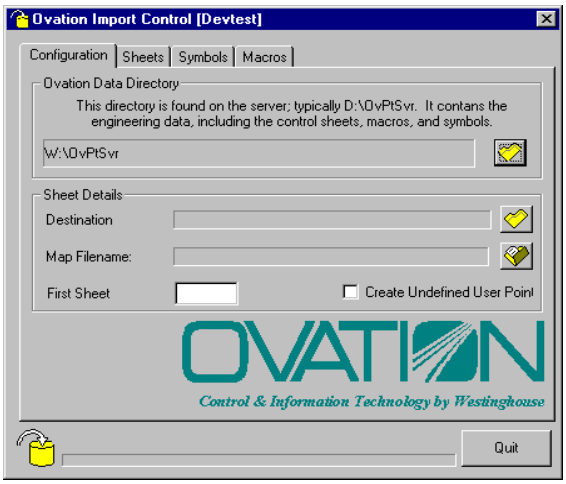


Figure 8-29. Import Configuration Tab

Ovation Data Directory Field

The Ovation Data Directory field is the network location on the database server. Because of performance issues with AutoCAD, consider mounting the D disk of the server when importing sheets or control macros. By default, the Developer Studio will define the drive by the IP address of the server.

Perform the following to set the Ovation Data Directory field and mount the server's Ovation data disk.

1. Click on the **button** within the Ovation Data Directory group box. A Browse dialog box (as shown in Figure 8-3) will appear that lists all of the disks that are on the local machine (similar to looking at all of the disks in Windows Explorer). Note that the typical data directory of **`D:\OvPtSvr`** on the server may become **`<X>\OvPtSvr`** on another machine.

2. Select the server's **Ovation Data Directory**. Once the user selects the Ovation Data Directory, an entry is made in the registry that contains the directory. This will become the default directory when the user executes Ovation Import Control from the same machine.

Sheet Import Details

The following items are only necessary when importing sheets.

1. **Initial Sheet Number:** The first sheet in the list will be given this number. All remaining sheets will be numbered sequentially.

2. **Destination:** If started from the Developer Studio, this field is defined as the selected object in the hierarchy, when the import was initiated. If running apart from the Developer Studio, this field must be defined.

8-6.5. Sheets Tab

This tab (see Figure 8-30) allows the user to define what files (sheets) are to be imported into the system. The Sheets tab contains the following information for each sheet:

- Filename (standard AutoCAD Drawing Files with a **.dwg** extension)
- Directory where files are stored

There are five operations available to the user:

- Insert
- Remove
- Sort
- Move
- Import

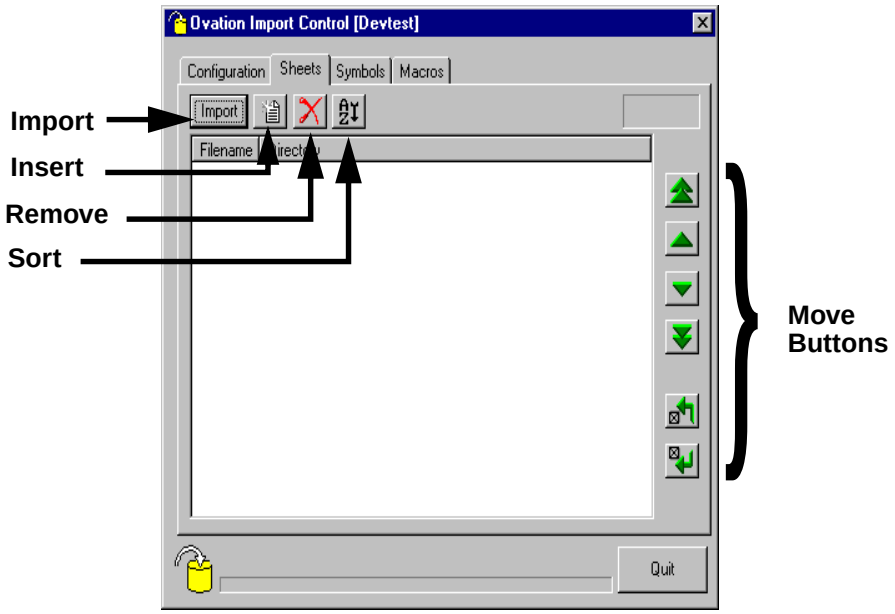


Figure 8-30. Import Sheets Tab

Insert Operation

1. Select the **Insert** button (see Figure 8-30) and a dialog will appear displaying the database hierarchy (Network, Unit, Drop, and Control Tasks).
2. Double-click on a **control task** and the sheets for that control task will appear on the right.
3. Select the **sheets** to import.
4. Click the **Ok** button to add the sheets to the list in the Sheets tab, or click **Cancel** to abort the operation.

Note

Select one or more files from a directory. Do **not** select files from other directories. It is possible to insert files from different directories, by performing the **Insert** function multiple times.

Remove Operation

1. Select the **sheet(s)** to be removed from the sheets tab (see Figure 8-30).
2. Select the **Remove** button. The sheet(s) will be removed from the list.

Note

This deletes sheets from the list of items to import, **NOT** from the system.

Sort Operation

Click the **Sort** icon in the sheets tab to alphabetically sort the sheets based on filename. Filenames are sorted to maintain execution order.

Move Operation

1. Use the **top four Move** buttons (see Figure 8-30) to move the selected sheet(s) up, down, or to the top or bottom of the list.

2. Use the **bottom two Move** buttons to move non-contiguous sheets:

   A. Select (highlight) a **sheet**.

   B. Click the **check boxes** for the sheet(s) that are to be moved.

   C. Select the **appropriate arrow** to move all the checked sheets ABOVE or BELOW the highlighted sheet. The checked sheets will be moved, made contiguous, and will maintain the same relative order to each other.

Import Operation

1. Click the **Import** icon to begin the import (see Figure 8-30).

Caution

Be aware that some of the fields significantly impact the import of control sheets.

2. Once the import is begun, the Control Builder will begin processing the files. The **Quit** button is changed to a **Cancel** button. If necessary, press the **Cancel** button to stop the import. The import will not stop until the processing on the current sheet is completed. The sheets previously processed will be in the database, and must be deleted via the Developer Studio, if they are not needed.

3. When the import completes, refer to the log depicting the results for each sheet. See Section 8-10 for information on the Script Status Log.

If UNIX sheets were imported, a second log is displayed denoting the unique details of the import, specifically default points used between sheets, and sheets containing balancers. Because of differences between UNIX and NT, these items require user intervention. Press the **BACK** button on the Internet Explorer to see the standard status log depicting the completion status of each sheets.

8-6.6. Symbols Tab

This tab allows the user to define what files are to be imported into the system as custom symbols. The files must have a **.sym** extension as created by the Export Control utility (described in Section 8-5).

Symbols are imported into a system, not a specific network, unit, drop, or task. The order of the symbols is not critical, however, it will affect the number assigned to the symbol (see Figure 8-31).

There are three operations available to the user:

- Insert
- Remove
- Import

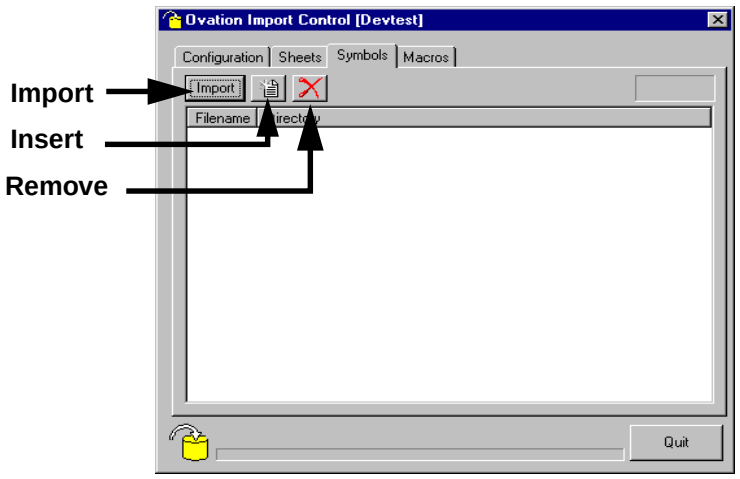


Figure 8-31. Import Symbols Tab

Insert Operation

1. Select the **Insert** button (see Figure 8-31) and a dialog will appear displaying the database hierarchy (Network, Unit, Drop, and Control Tasks).
2. Double-click on a **control task** and the symbols for that control task will appear on the right.
3. Select the **symbols** to import.

4. Click the **Ok** button to add the symbols to the list in the symbols tab, or click **Cancel** to abort the operation.

Note

It is possible to insert files from different directories, by performing the **Insert** function multiple times.

Remove Operation

1. Select the **symbol(s)** to be deleted from the symbols tab.
2. Select the **Remove** button. The symbol(s) will be removed from the list.

Note

This deletes sheets from the list of items to import, **NOT** from the system.

Import Operation

Click the **Import** button to begin the import. The Control Builder is **not** necessary for this operation. The symbols will be extracted into the system.

8-6.7. Macros Tab

This tab allows the user to define what files are to be imported into the system as Control Macros. The files must have a **.crm** extension, as created by the Export Control utility (described in Section 8-5).

Control Macros are imported into a system, not a specific network, unit, drop, or task. The order of the Control Macros is not critical. The file list defines the name of the Control Macros, and the number of Symbols (see Figure 8-32).

There are four operations available to the user:

- Insert
- Remove
- Create/Delete worksheet
- Import

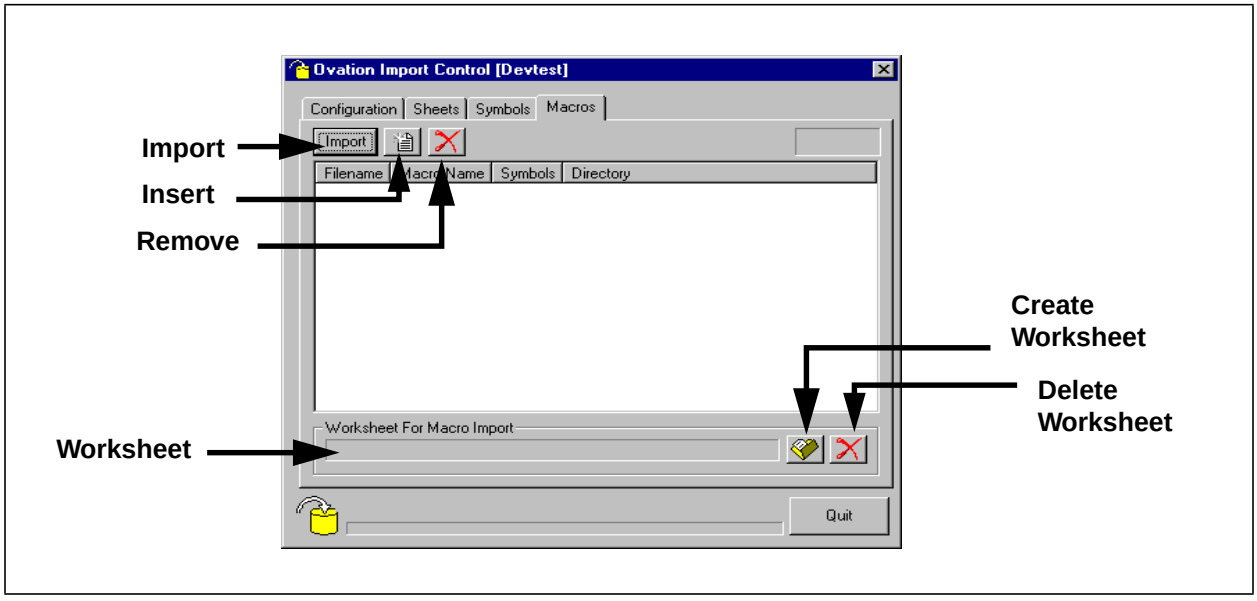


Figure 8-32. Import Macros Tab

Insert Operation

1. Select the **Insert** button (see Figure 8-32) and a dialog will appear displaying the database hierarchy (Network, Unit, Drop, and Control Tasks).
2. Double-click on a **control task** and the Control Macros for that control task will appear on the right.

3. Select the **Control Macros** to import.

4. Click the **Ok** button to add the Control Macros to the list in the Macros tab, or click **Cancel** to abort the operation.

Note

Select one or more files from a directory. It is possible to insert files from different directories, by performing the **Insert** function multiple times.

Remove Operation

1. Select the **Control Macro(s)** to be deleted from the Macros tab.

2. Select the **Remove** button. The symbol(s) will be removed from the list.

Note

This will remove the selected files from the list. It does **not** delete files in the directories.

Creating a Worksheet Operation

1. Select the **Create Worksheet** button from the Macros tab.

   A temporary sheet will be created for processing macros during the import procedure.

2. Due to the nature of the macro import, any control information on the sheet will be destroyed. Therefore, once the import procedure is complete, select the **Delete Worksheet** button to delete the worksheet.

Import Operation

1. Click the **Import** button to begin the import. The Control Builder is necessary for this operation. The macro will be extracted into the system.

   During the import process, the temporary worksheet will be opened and the macros will be processed.

2. Use the **Algorithms pull-down menu** from the Ovation Control Builder to use the new control macros.

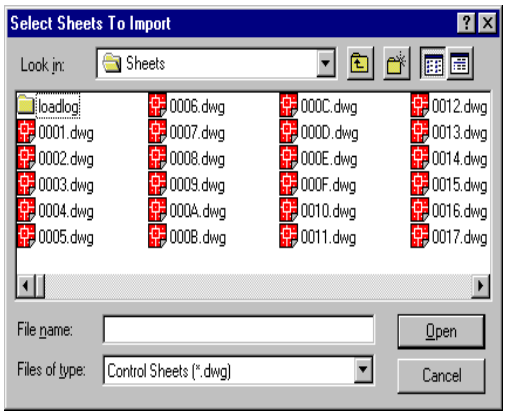


Figure 8-33. Import Sheet Browse Dialog

8-6.8. Command Line Options

The Import Control Sheets utility can be run from the Command Prompt. The user may also use the command prompt option to create a desktop shortcut for this utility.

The Command Prompt is accessed through the following path: **Start -> Programs -> Command Prompt**

/SYS:<systemName> This is a required option.

/SID: <user/password@schema>This optional parameter defaults to **ptadmin/ptadmin@ptdb.**

/DIR<ovationDataDir> This parameter is optional and defines the default for the ovation data directory on the configuration tab.

/FILE:<filename> This optional parameter defines the file containing a list of files to import. This is provided to support a command-line batch processor.

/SILENT This optional parameter forces OCBImport to run automatically to support command line batch processor. The file option is necessary to run silently. The dialog box appears and the progress is supplied. The box will automatically shut down.

/KEY:<key> This parameter defines the destination object.

8-7. Order Control Sheets

This application provides a user-friendly interface for defining the execution order for all the sheets within a task. Since tasks execute asynchronously in the Controller, it is not possible to order the execution of sheets outside of one task.

When the control sheets folder is selected from the Ovation Developer Studio hierarchy, the WorkPad window of the Studio displays the sheets in execution order.

The interface provides a simple means to sort the sheets by sheet number, thereby resetting execution order. If the sheet number sequence does not represent the desired execution order, the interface provides different methods to rearrange the execution order.

Note

You cannot use this utility to add or remove sheets.

You can order the sheets in the desired execution order by using the following buttons (identified by arrows in Figure 8-34):

- **1 =** Sorts the sheets alphabetically based on filenames.
- **2** = Undoes changes made.
- **3** = Moves selected sheet(s) to top of list.
- **4** = Moves selected sheet(s) one position higher.
- **5** = Moves selected sheet(s) one position lower.
- **6** = Moves selected sheet(s) to bottom of list.
- **7** = Select (highlight) a sheet. Check the sheet(s) to be moved. Press this button to move all the checked sheets ABOVE the highlighted sheet. The checked sheets will maintain the same relative order to each other.
- **8** = Select (highlight) a sheet. Check the sheet(s) to be moved. Press this button to move all the checked sheets BELOW the highlighted sheet. The checked sheets will maintain the same relative order to each other.
- **9**= Saves changes.
- **10** = Cancels changes made after last save.

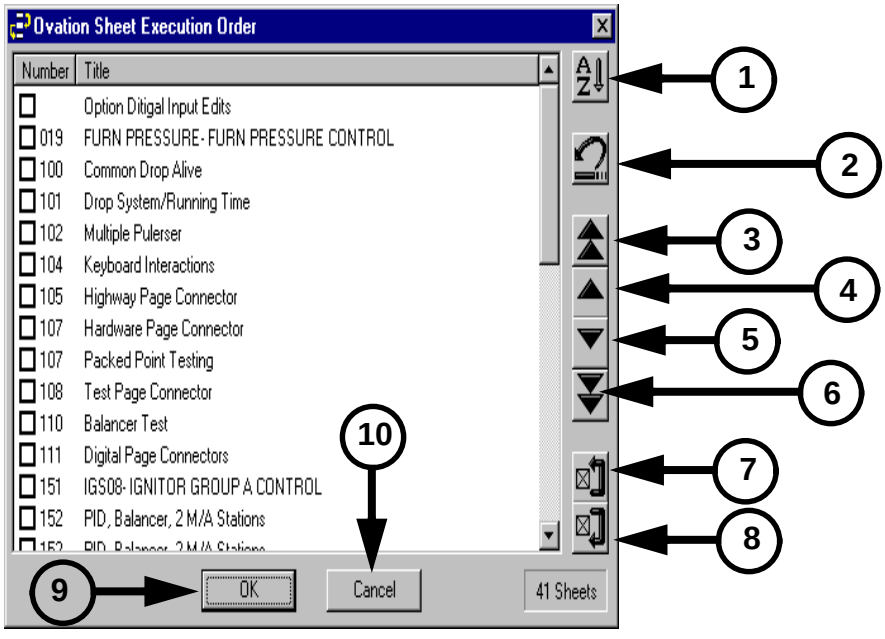


Figure 8-34. Order Control Sheets

8-8. Symbol Builder Utility

This section describes how custom symbols are built with the Symbol Builder Utility. Typically, symbols for macros (described in Section 7) are created by using the Symbol Builder. An AutoCAD license is required to run this utility.

This utility provides a user-friendly interface for creating custom symbols for algorithms and macros. Custom symbols for standard Ovation algorithms allow users to define symbol blocks consistent with standard drawings. Because control strategies take many forms, commonly used pin configuration can be created as a custom symbol, using the standard symbol block.

Symbols for control macros are created based on the information from the “Algorithm Macro Define” process. Each user-defined point is represented as a pin on the macro's symbol.

Symbol drawings are composed of an algorithm body and input and output connectors (or pins). The symbol is created on a grid displayed at increments of 1.0 drawing unit and a snap size of 0.5 units. This is to allow symmetrically drawn symbols. The following is a list of possible parts:

- Algorithm Body
- Algorithm Function Name
- Algorithm Name **OCBSSSSNNN** (assigned by the Control Builder)

  where:

  — **OCB** is understood and typically not displayed,

  — **SSSS** is the sheet name

  — **NNN** is the order that the algorithm was placed on the sheet. This may also be entered by the user.

- Input and Output Pins

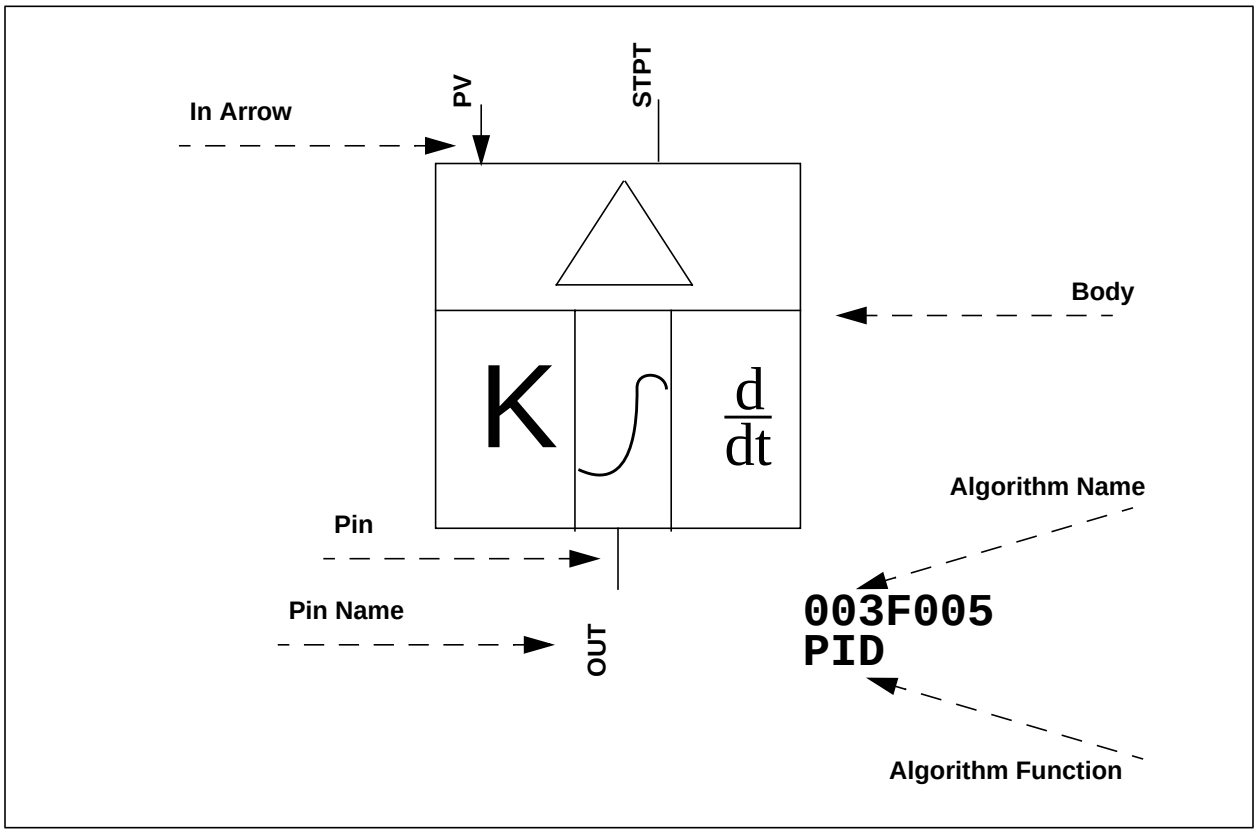


Figure 8-35. Example of an Algorithm View

8-8.1. Symbol Building Guidelines

Observe the following guidelines when creating symbols:

1. Symbols should be constructed using ONLY lines, arcs, circles and text.
2. Use only the default selected monotext font for text, with the default justification and horizontal text.
3. Use a text height of 1.0 drawing units or greater.
4. Build any mathematical characters such as delta, sigma or the integral sign from line segments. If the symbols from other fonts are used, they will not translate to NT graphics.
5. Instructions for all operations will appear in the command window at the bottom of the AutoCAD window.
6. Be sure that some part of the symbol body falls on a grid dot. This will facilitate selection of the algorithm in the Control Builder.
7. Creating custom symbols does not replace any previous existing symbols.

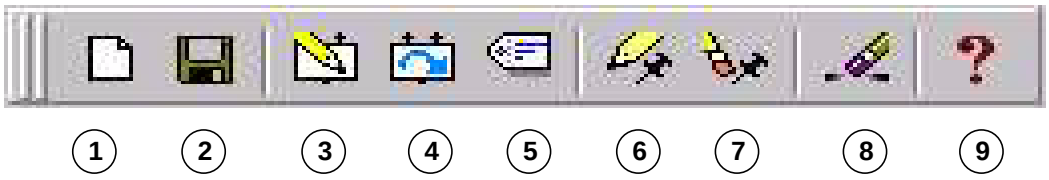
Caution

Do NOT add, modify, or delete the Standard symbols supplied with the Control Builder.

8-8.2. Symbol Builder Toolbar

The Symbol Builder utility provides a toolbar that is used to create, save, or delete custom symbols. A custom symbol is based on an existing algorithm function (as described in "Ovation Algorithms Reference Manual" (R3-1100)). Table 8-4 provides an example of the Symbol Builder toolbar and describes each of the toolbar functions.

Table 8-4. Symbol Builder Toolbar



Icon	Description
1	**New Symbol** - Clears the current sheet so you can create a new symbol.
2	**Save Symbol** - Saves the currently defined symbol to the custom symbol path on the server's data disk. There it can be used by the Control Builder.
3	**Algorithm Function** - Displays a list of algorithm functions (for example, SUM). These functions are defined in "Ovation Algorithms Reference Manual" (R3-1150) and in the Control Builder online Help.
4	**Algorithm Name** - Placeholder for the unique algorithm identifier (SSSSNNN) that will be assigned by the Control Builder when the symbol is placed on a sheet.
5	**Add Tag** - Adds a pre-defined tag to the symbol.
6	**Add Pin** - Displays a list of available pins that can be added to the symbol.
7	**Erase Pin** - Displays a list of pins that can be removed from the symbol.
8	**Delete Symbol** - Deletes an existing symbol.
9	**Help** - Displays a Help dialog box.

8-8.3. Creating a Custom Symbol

Use the following procedure to create a custom symbol:

1. Select the **New Symbol icon** from the Symbol Builder toolbar. This will clear the drawing so you can build a new symbol.

2. Select the **Algorithm Function** for the new symbol:

   A. Select the Algorithm Function icon from the Symbol Builder toolbar. The Algorithm Function Name list appears.

   B. Select the algorithm function you want to use to create a custom symbol.

   C. Place the function name, which is attached to the cross-hair cursor, anywhere in the drawing.

   Note

   A symbol can only be created for an existing Algorithm Function.

3. Place the **algorithm name** on the drawing:

   A. Select the Algorithm Name icon from the Symbol Builder toolbar. A placeholder for the future algorithm name will appear, attached to the cross-hair cursor.

   B. Add the name placeholder (SSSSNNN) to the drawing.

4. Use the AutoCAD Draw toolbar to draw a **frame** for the new symbol.

5. Add the **desired pins** to the symbol:

   A. Select the Add Pin icon from the Symbol Builder toolbar. The Add Pin list appears.

   B. Select the desired pin(s) from the provided list.

   C. Select the point where you want to attach the pin(s) to the symbol.

   D. Select the end point of the pin(s) where the signals will be attached.

   E. Refer to Section 3 for additional information about adding pins.

6. Add the **desired tags** to the symbol:

   A. Select the Add Tag icon. The parameter list appears.

B. Select a parameter from the provided list.

C. Go to the Symbol Builder command line.

D. Select the point definition from the prompt: **`Name/Desc/Value`**

E. Select the tag justification from the prompt: **`Left/Central/Right`**

F. Place the text, which is attached to the cross-hair cursor, in the drawing.

G. Refer to Section 3 for additional information about adding tags.

7. Select the **Save Symbol icon** from the Symbol Builder toolbar.

   This saves the symbol to the custom symbol path where it can be used by the Control Builder. The custom symbol will now be displayed in the Algorithm Choice Display screen for the appropriate algorithm function, and can be placed on a control sheet.

8-8.4. Editing a Custom Symbol

Use the following procedure to edit an existing Custom Symbol:

1. Access **Windows NT Explorer**.
2. Navigate to the following path on the Server:

   D:\OVPTSVR\<SYSTEM NAME>\CUSTOM SYMBOLS

3. Select the desired **drawing file** (containing the symbol).

   Filename format = **`<function name>_x.dwg`**
   For example, **`sum_55.dwg`**

Note

Custom symbol numbering starts at **50**.

4. Double-click on the **file**.
5. Use the **Symbol Builder toolbar** to make the desired changes.
6. Use the **Save Symbol** on the Symbol Builder toolbar to save the modified symbol.

8-8.5. Using a Custom Symbol

After a custom symbol has been built (as discussed in Section 8-8.3), it can be used by the Control Builder. Use the following procedure to use a custom symbol:

1. Access the Control Builder:

2. Select the desired algorithm function from the Algorithm pull-down menu, algorithm Alphabetic list, or on-screen menu (these choices are described in Section 3).

3. If the algorithm has more than one view, the Algorithm Choice Display screen will appear. Select the desired custom symbol and place it on the control sheet.

   The custom symbol's pins can be modified within the drawing, just as they can be modified for standard symbols (as described in Section 3).

8-9. OCB Batch Utility

OCB Batch is a utility used to perform specified functions on multiple sheets. OCB Batch is used in a command line that is entered at the DOS prompt. You can create a batch file that contains and executes a list of commands to processes multiple control sheets. This utility is used for the initialing loading of a system.

OCB Batch performs these functions by reading basic commands listed in generic script files that are provided with the Control Builder package.

The provided script files are:

- **compile.scr** - Used to compile multiple sheets. Graphics that are modified are automatically compiled.
- **print.scr** - Used to print multiple sheets.
- **translate.scr** - Used to map existing point names to new point names using a translation file (.map).

When a generic script file is used in an OCB Batch command line (see Section 8-9.1), a specific script file is created and executed. This file contains detailed commands for each individual sheet that is to be processed. This file (which does the actual processing) is based on the format of the generic file and on the commands and options used in the command line.

Any errors encountered during the process are listed in the HTML Script Status Log (described in Section 8-10).

Note

Additional information on OCB Batch is provided in the OCB man pages. Refer to Section 8-9.2 for a copy of the OCB Batch man page.

8-9.1. OCB Batch Command Line

OCB Batch is used in a command line that is entered at the DOS prompt. The command line format is as follows:

OCBBatch <CommandScriptFile> <DrawingDirectory> <option> <flag>

where:

CommandScriptFile = File containing list of commands to execute on sheets. The default location for the script files is:

```
C:\Ovation\OCB\Support\<script file>.scr
```

Drawing Directory = Directory where the AutoCAD drawings are located. This may contain UNC prefix. The typical location for this directory is:

```
D:\OvPtSvr\<SystemName>\<NetworkName>\<UnitName>\sheets
```

Options (options and flags must be preceded by a dash (-) in the command line):

- Unit = Processes sheets already in the database.

- Drop <key> = Processes sheets within a drop (**key** = Either drop key or drop number preceded by a “#” sign).

Note

The **key** value is from the database and is assigned by the system. A key file must be generated to obtain this value.

- Sheets <keyFileName> = Processes sheet keys listed in keyFileName (**keyFileName** = File that contains list of sheet keys with .key extension).

- Task <key> = Processes task designated by <key> (**key** = Specific task).

- Help = Displays Option menu.

Flags:

- NOEXEC = Specific script will be created, but will NOT be executed and Graphics will NOT be compiled.

- NOGRPH = Graphics will NOT be compiled.

Example 1

The following procedure is an **example** of running OCB Batch to compile sheets:

1. Access the DOS prompt.
2. Enter at the DOS prompt (all one line):

   ```
   OCBBatch C:\Ovation\OCB\Support\compile.scr
   D:\OvPtSvr\Ovation\Net10\Unit1\sheets -drop #211
   ```

   This will run the commands in the script file **compile.scr** on Drop 211 sheets. All the sheets for Drop 211 will be opened, compiled, and closed.

Example 2

The following procedure is an **example** of running OCB Batch to print sheets:

1. Access the DOS prompt.
2. Enter at the DOS prompt (all one line):

   ```
   OCBBatch C:\Ovation\OCB\Support\print.scr
   D:\OvPtSvr\Ovation\Net10\Unit1\sheets -drop #211
   ```

   This will run the commands in the script file **print.scr** on Drop 211 sheets. All the sheets for Drop 211 will be opened, printed, and closed.

Example 3

The following procedure is an **example** of running OCB Batch to reconcile sheets:

1. Access the DOS prompt.
2. Enter at the DOS prompt (all one line):

   ```
   OCBBatch C:\Ovation\OCB\Support\reconcile.scr
   D:\OvPtSvr\Ovation\Net10\Unit1\sheets -drop #211
   ```

   This will run the commands in the script file **reconcile.scr** on Drop 211 sheets. All the sheets for Drop 211 will be reconciled with the database.

Example 4

The following procedure is an **example** of running OCB Batch to translate sheets:

1. Access the DOS prompt.
2. Enter at the DOS prompt (use all one line and absolute pathnames):

   ```
   OCBBatch C:\Ovation\OCB\Support\translate.scr
   D:\OvPtSvr\Ovation\Net10\Unit1\sheets -drop #211
   ```

   This will run the commands in the script file **translate.scr** on Drop 211 sheets. All the points in Drop 211 will be changed from the old original point names to the new mapped point names if the points are listed in the translation file.

8-9.2. OCB Batch Man Pages

Usage: Initial System Loading (sheets not visible in studio)

OCBBatch *<CommandScript> <DrawingDirectory>*

Usage: Periodic Maintenance Processing on a Unit (Sheets already visible in Studio)

OCBBatch *<CommandScript> <DrawingDirectory>* /UNIT

Usage: Periodic Maintenance Processing on a Drop (Sheets already visible in Studio)

OCBBatch *<CommandScript> <DrawingDirectory>* /DROP *<Key | #Number/>*

Usage: Periodic Maintenance Processing on a Control Task (Sheets already visible in Studio)

OCBBatch *<CommandScript> <DrawingDirectory>* /TASK *<Key>*

Usage: Processing on Multiple Sheets (Sheets already visible in Studio)

OCBBatch *<CommandScript> <DrawingDirectory>* /SHEETS *<KeyFileName>*

General

OCBBatch executes as a list of commands on multiple sheets. This is necessary for periodic maintenance processing and initialing loading of the system. In general, OCBBatch must be told; (a) the sheets to process; (b) the commands to execute on each sheet. Once the sheets are processed; the necessary monitor graphics are compiled.

When the /UNIT, /DROP, /SHEETS flags are provided, only the sheets visible in the studio will be processed. By providing only the directory and script file, all the files in the directory are processed.

Once all the sheets are processed, the necessary monitor graphics are compiled. These graphics must be downloaded to the MMIs via the studio.
If the sheets are compiled, see below, the Controllers must be loaded.

Parameters:

CommandScript This is the filename containing the list of commands to be executed on the sheet. The following command scripts are provided with Ovation.

Script	Description
Compile	Uploads tuning changes into the sheets Updates Sheet Tags and Connectors Resynchronizes OvPt Database Generates Graphic Monitor Source
Translate	Changes point names via a Translation File Resynchronizes OvPt Database Generates Graphic Monitor Source
Print	Prints Functional Drawing

The default files are found in C:\Ovation\OCB\Support and have an SCR extension. This SCR extension is not necessary.

DrawingDirectory DrawingDirectory is the directory where the AutoCAD DWG files may be found. This may contain UNC prefix.

/UNIT /UNIT flag designates that only the sheets already in the database will be processed. Notice that the system load parameters do not include this flag. When only the script and directory are provided, the program assumes all DWG files in the directory must be processed. During a system load, the process of compiling the sheets will install them in the database.

/DROP The DROP flag forces only the sheets within that drop to be processed. A required parameter that describes a controller within the unit defined by *DrawingDirectory* follows this flag. It has two forms; either (a) the key of drop or (b) the drop number prefixed with a # (e.g. #1 for drop1). The key, which may change as the system is edited, is provided as an interface to the studio and should not be used by the user.

/TASK The TASK flag designates the task to process. Following this flag is a mandatory parameter, the task's key. The key, which may change as the system is edited, is provided as an interface to the studio and should not be used by the user.

/SHEETS The SHEETS flag designates a subset of a unit's sheets to process. A required parameter follows this flag. This file contains the keys of the sheet to process.

/NOGPH The NOGPH flag overrides the graphic compile. The graphics will NOT be compiled. This flag is available for any calling sequence.

/NOEXEC The NOEXEC flag stops the script from being executed. The graphics will NOT be compiled. The temporary script file is produced and not deleted. This flag is available for any calling sequence.

Files:

%TEMP%\OCB????.scr	The file containing the script commands. This file is deleted once the script completes. If the script hangs, correct any errors in the sheet, then edit this file to continue where the processing was halted. A corrupted, but recoverable, AutoCAD drawing is the typical reason for a script to halt. The prompt “Do you wish to recover” will be visible on the command line. Recover the file; edit the script; then restart the script with the SCRIPT command.
%TEMP%\OCBGraphic.key	This file contains the list of Monitor Graphic keys that are associated with the processed drawing files. The file is created when the process starts and deleted after being copied to the network area. The file is copied because the graphic compiler assumes the key file is relative to the sharedUNCPath.

8-10. Script Status Log

Once the Copy, Compile, and Import operations are complete, a summary of the compilation is displayed. The sheets with errors are highlighted in RED. To quickly resolve the errors, links are provided at the bottom of the summary sheets to open the sheets in the Ovation Control Builder. Once all the errors have been resolved, the effected Controllers should be loaded, and the Ovation Stations should be downloaded.

Once the Copy, Compile, and Import operations are complete, a script status report is generated and displayed. This is an HTML page that contains all information about the scripts executed, sheets compiled, and error status information.

Figure 8-36 provides an example of a Status Log. The various fields in the Status Log are identified by arrows and are described in Table 8-5.

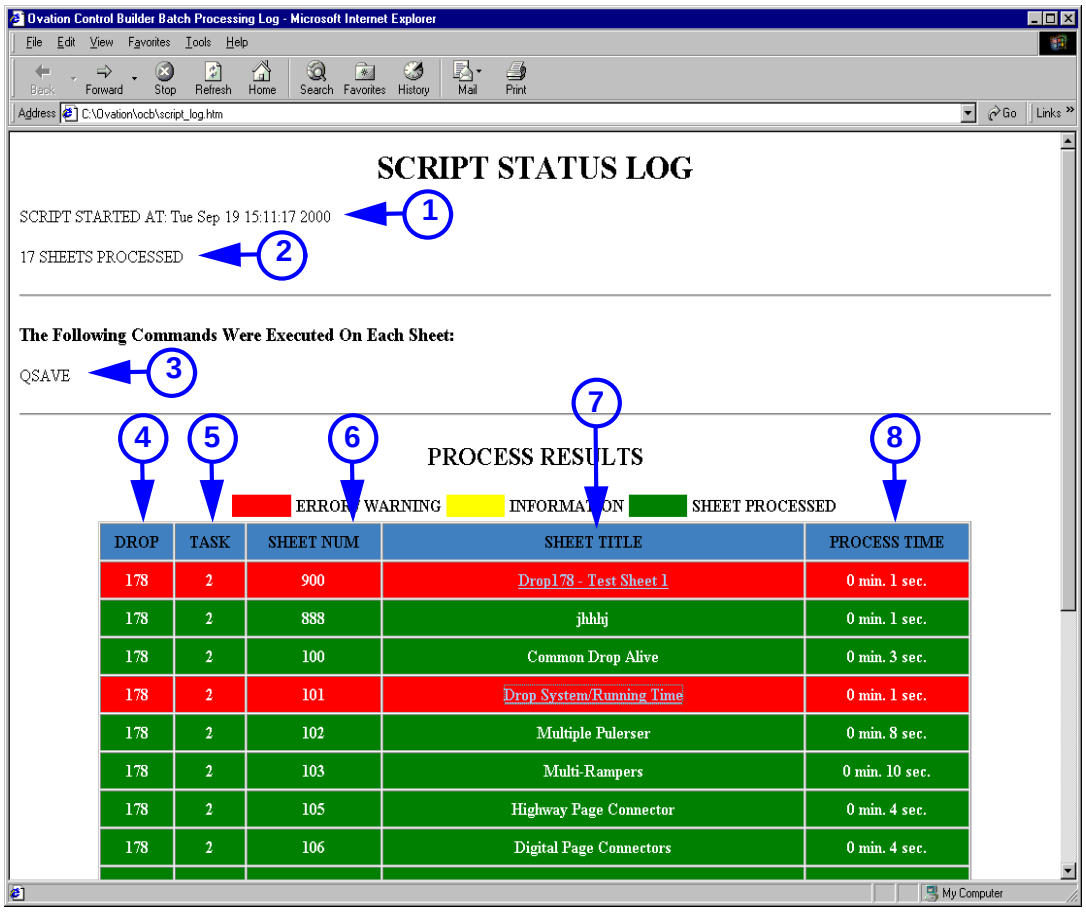


Figure 8-36. Script Status Log Window

Table 8-5. Script Status Log Fields

Key	Field	Description
1	Log timestamp	Time and date when log was started.
2	Sheets Processed	Amount of sheets that were processed.
3	Command	Name of command that was used on each sheet.
4	Drop	Number of drop where sheet was processed
5	Task	Number of task in Controller where sheet was processed.
6	Sheet Num	Number of sheet (this is number in title box assigned by user).
7	Sheet Title	Title of sheet (name in title box assigned by user).
8	Process Time	Amount of time used to process sheet.
Red	Error Warning Color	Color **red** is used to indicate an error occurred during sheet processing. An HTML link is provided to the sheet where the error occurred (see Figure 8-37). This link is accessed by selecting the underlined sheet title.
Yellow	Information Color	Color **yellow** is used to indicate information is being provided.
Green	Sheet Processed Color	Color **green** is used to indicate that the sheet was processed successfully.

Figure 8-37 provides an example of an Error Log. The various fields in the Error Log are identified by arrows and are described in Table 8-6. An HTML link is provided from this page to the actual drawing, so you can locate the algorithm where the error occurred.

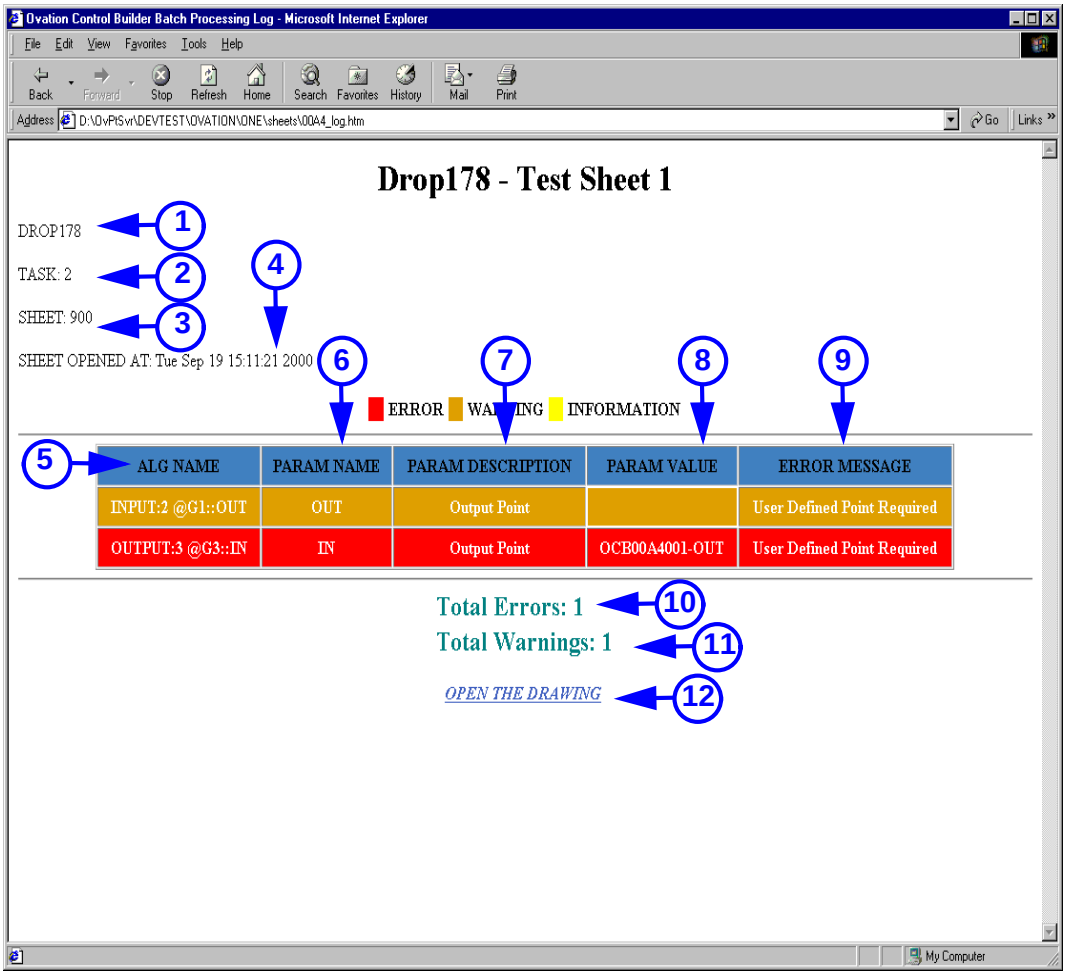


Figure 8-37. Error Log

Table 8-6. Error Log Fields

Key	Field	Description
1	Drop	Number of drop where sheet was processed
2	Task	Number of task in Controller where sheet was processed.
3	Sheet	Number of sheet where error occurred (this is number in title box assigned by user).
4	Log timestamp	Time and date when sheet was opened.
5	Algorithm	Name and location of algorithm where error occurred.
6	Param Name	Parameter of algorithm where error occurred.
7	Param Description	Description of algorithm parameter. Refer to "Ovation Algorithms Reference Manual" (R3-1100) for additional information about algorithm parameters.
8	Param Value	Name of point or value assigned to parameter.
9	Error Message	Description of error (Refer to Section 1-5.3 for error message descriptions.).
10	Total Errors	Total number of errors for this sheet.
11	Total Warnings	Total number of warnings for this sheet.
12	Open the Drawing	HTML link that will open drawing where error occurred.
Red	Error	Color **red** is used to indicate an error occurred for this algorithm.
Orange	Warning	Color **orange** is used to indicate a warning is being provided.
Yellow	Information	Color **yellow** is used to indicate that information is being provided.

Section 9. Using Ladder Control Logic

9-1. Section Overview

Typically, ladders are used only by Migration projects. Migration refers to the process of upgrading a system from WDPF to Ovation, while still using the original Q-Line I/O cards. This method of upgrade can save a company time and money since the existing field wiring does not have to be replaced.

After a system has been migrated, any ladder logic that was used in the original system will be preserved in the new Ovation system, and may need to be edited.

Ladder control can be edited or built with a special user interface provided in the Control Builder. The ladder control application contains a set of functions which duplicates relay-type circuits, devices, and the operation sequence of a conventional, electrical relay system.

A ladder is edited or built in a dialog box that consists of a 7 by 9 cell array. Each cell can be edited to display a shape (such as a coil, contact, or special function) and to store information about that shape.

These shapes or functions form a relay diagram that depicts the types of inputs, controls, and outputs. The diagram shows how these user-selected inputs are configured to cause an assigned device to operate in a desired manner.

The following topics, discussing ladders, are included in this section:

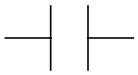
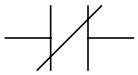
- Ladder Conventions (Section 9-2).
- Using the Ladder Function (Section 9-3).

9-2. Ladder Conventions

9-2.1. Items Used in Ladders

Figure 9-1 describes input contacts, contact colors, and output coils typically used in ladder logic.

Input Contacts

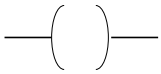
Contact Type	Description	Current Flow
	Normally open contact	When digital = 1
	Normally closed contact	When digital = 0

Contact Colors

When contact is:

Red - Power may flow
White - Power does not flow
Cyan - Point is a local record type or point is timed out

Output Coils



Energized, Power flows when red.
De-energized, current does not flow when white.

Figure 9-1. Ladder Items

Figure 9-2 describes some basic logic notation used by Scientific Apparatus Makers Association (SAMA) and Ovation.

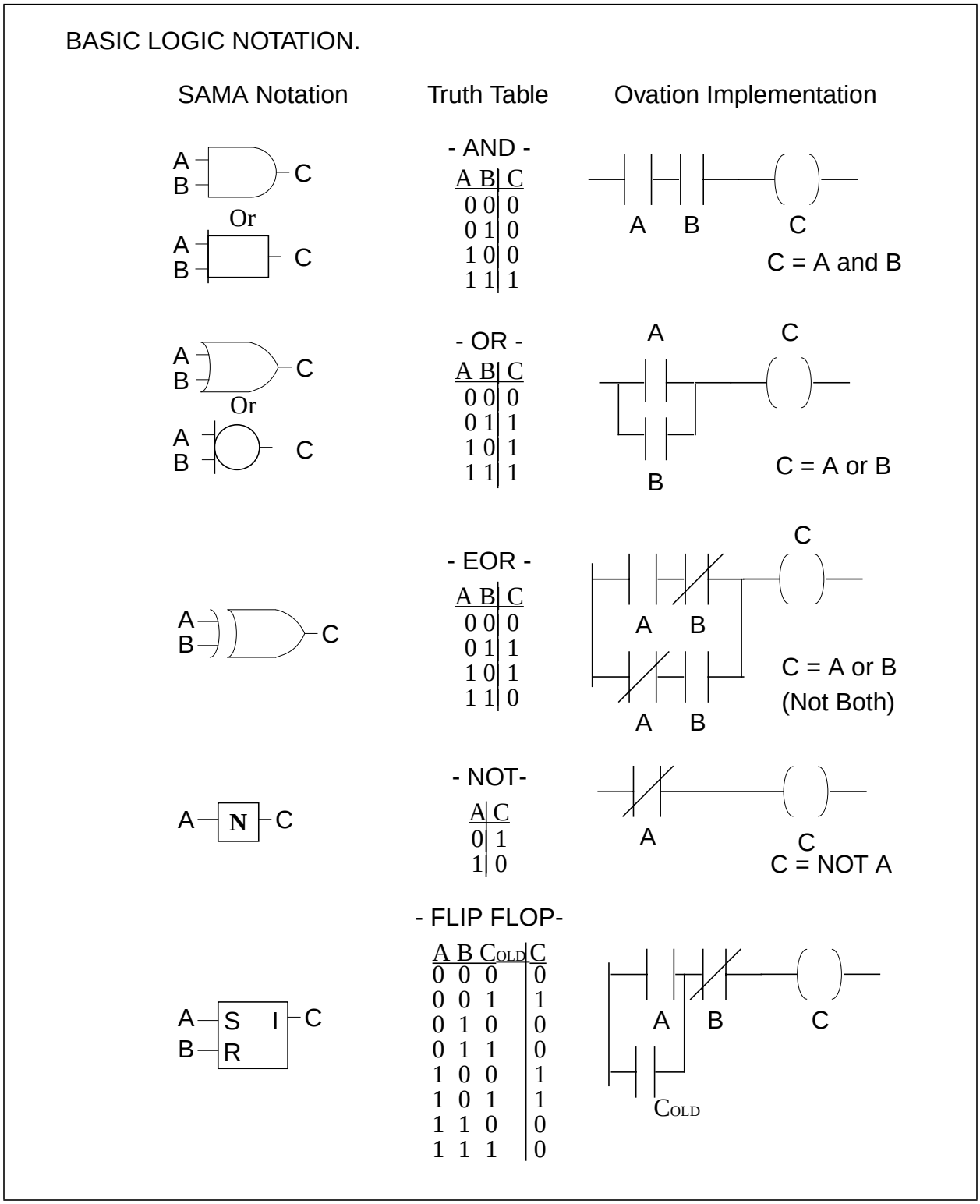


Figure 9-2. Basic Logic Notation

9-2.2. Executing the Ladder

Contacts, special functions, and coils are connected together by power flow paths to form rungs within the ladder dialog box. The ladder is divided into 63 areas, known as cells. Each cell can contain one piece of ladder logic: a contact, a coil, or a special function. There are seven rows and nine columns.

To process the ladder, the functional processor starts with the ladder's first cell. If logic appears in the cell, the cell is conducting or not conducting power depending on the states of any associated inputs. The ladder solves from **top to bottom**, one column at a time, starting with column one moving right to column nine (see the illustration of ladder execution in Figure 9-3).

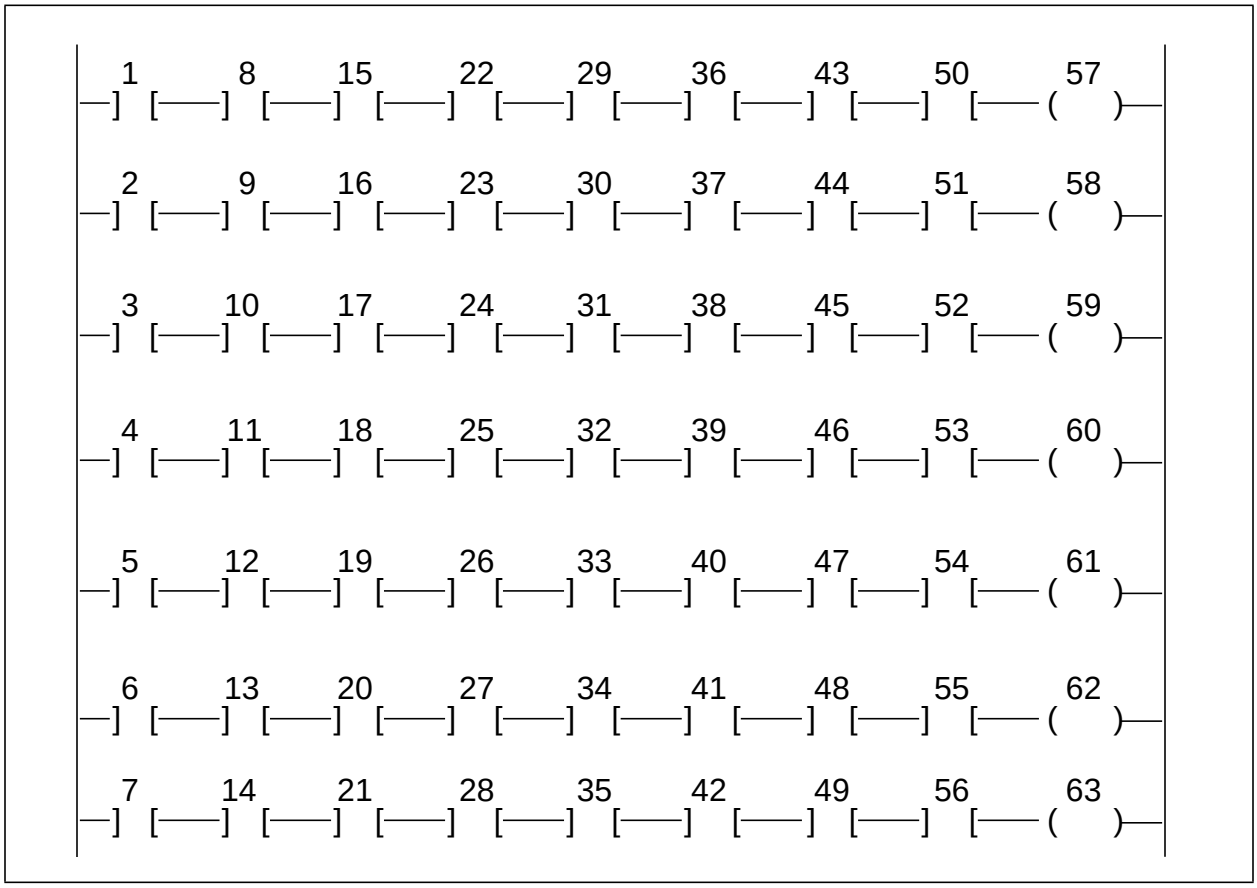


Figure 9-3. Ladder Execution

9-2.3. Ladder Compression

When downloaded into the Controller memory, the ladder is compressed automatically (whenever possible) to reduce execution time and increase storage capacity. This compression affects the way the ladder is executed. Contacts and special functions do not shift position when the ladder is compressed. However, coils may shift their effective cell position.

When a ladder is created, a coil can only be entered in the ninth column. However, when the ladder is downloaded into the Controller memory, the coil may be effectively shifted to the left. The number of cells it shifts depends on the individual ladder. As a general rule, the coil shifts to the left until it encounters another ladder logic element or a blank cell.

An example that illustrates this execution strategy is shown in Figure 9-4. The top ladder represents a ladder as it was designed. The bottom ladder represents the same ladder as it will be executed by the Controller.

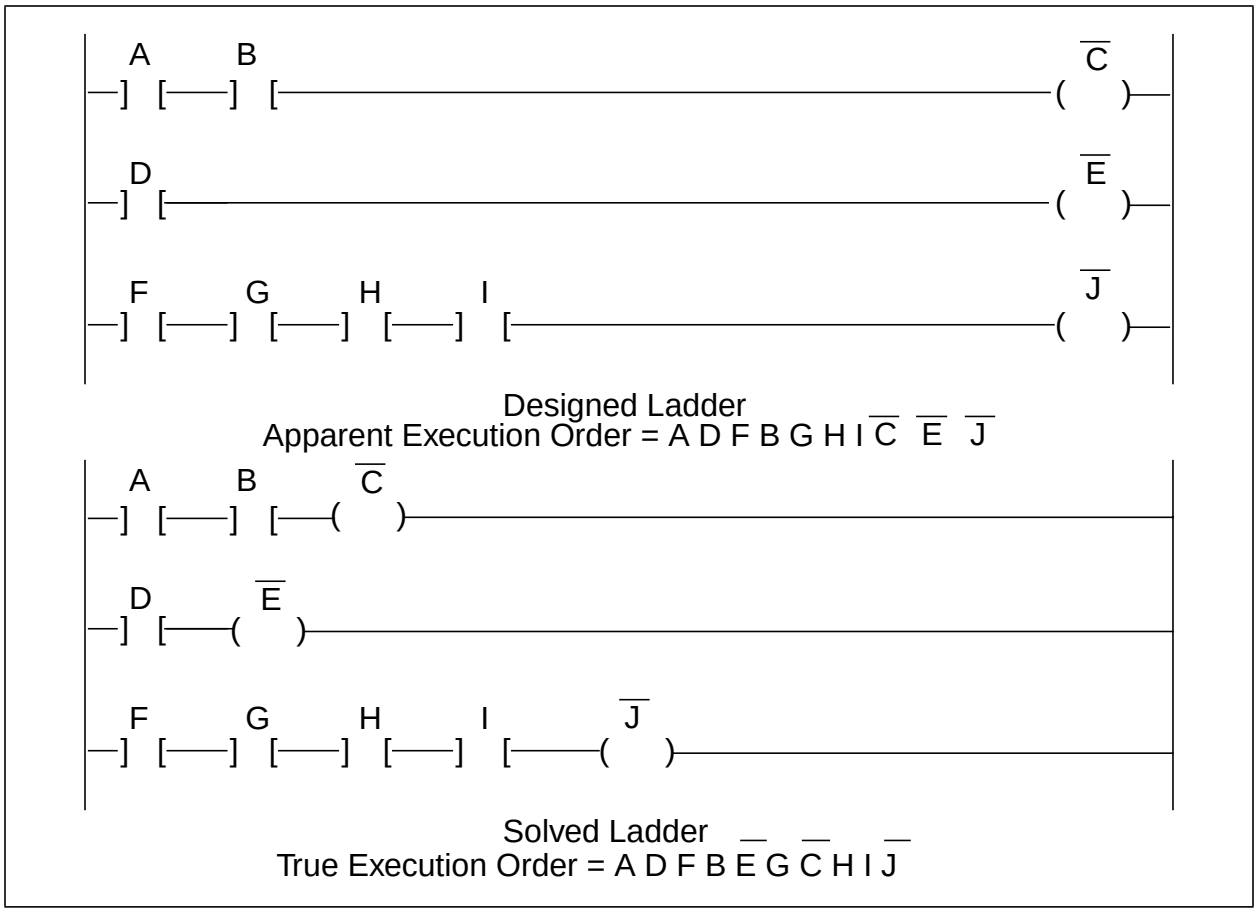


Figure 9-4. Simple Ladder Solved

Notice that coils $\overline{C}$, $\overline{E}$, and $\overline{J}$ shifted to the left, moving into the cell to the right of the last contact in each ladder rung. Ladders solve down each column, one at a time. Notice that the apparent execution order of the ladder and the true execution order are much different. This difference sometimes become very important when coils are acting as contacts in the same ladder.

Observe the rules listed in Section 9-2.4 for designing ladders.

Note

A PB record is automatically initialized for any ladder which contains one or more special functions. The name format is **OCBSSSSNNN-PB** (where **OCB** is automatic, **SSSS** is the sheet name, **NNN** is the order that the algorithm was placed on the sheet).

9-2.4. Rules for Designing Ladders

Observe the following five rules when designing circuits for a ladder:

1. Contacts must be placed along horizontal power path branches. They cannot be part of vertical branches. The Ladder function will not allow entry of vertical contacts.

2. One ladder can normally accommodate a maximum of eight contacts per row, and up to seven rows (for a maximum of 56 contacts).

3. Power flows from left to right. It **never** flows right to left.

4. Every row of a ladder **must** contain at least one coil in column 9. The Ladder function will not download a ladder if a coil is not placed in column 9.

5. Special function blocks reduce the number of contacts that can fit in a ladder. Special functions can only be placed in **even-numbered** columns (columns 2, 4, 6, and 8). The Ladder function will not allow entry of special functions in odd-numbered columns.

9-3. Using the Ladder Function

A ladder is treated as an algorithm in the Control Builder. Use the following procedure to edit an existing ladder or create a new one:

1. Open an existing or new **sheet** in the Control Builder.
2. Access the **Alphabetic List** (from the Algorithm pull-down menu or the Algorithm toolbar).
3. Select the **LADDER** item. The symbol for the LADDER appears on the sheet. The symbol contains seven outputs and no inputs.
4. Select the **Edit Algorithm** function (from the Algorithm menu or the Algorithm toolbar). The Ladder Editor box appears (Figure 9-5). This box can be used to edit or create a ladder.
5. Select a **cell** in the Ladder Editor box, and then select the appropriate **button** from the bottom of the dialog box. Each button will place a specific entity in the selected cell. Refer to Figure 9-6 for illustrations of cells and their contents.

   Table 9-1 defines the ladder-editing buttons and their functions.

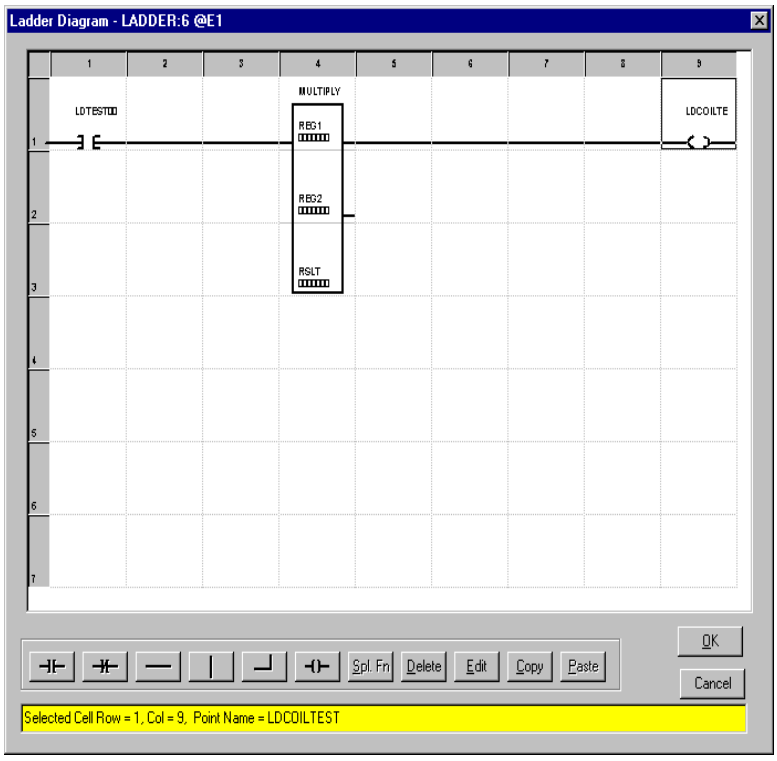


Figure 9-5. Ladder Editor Box

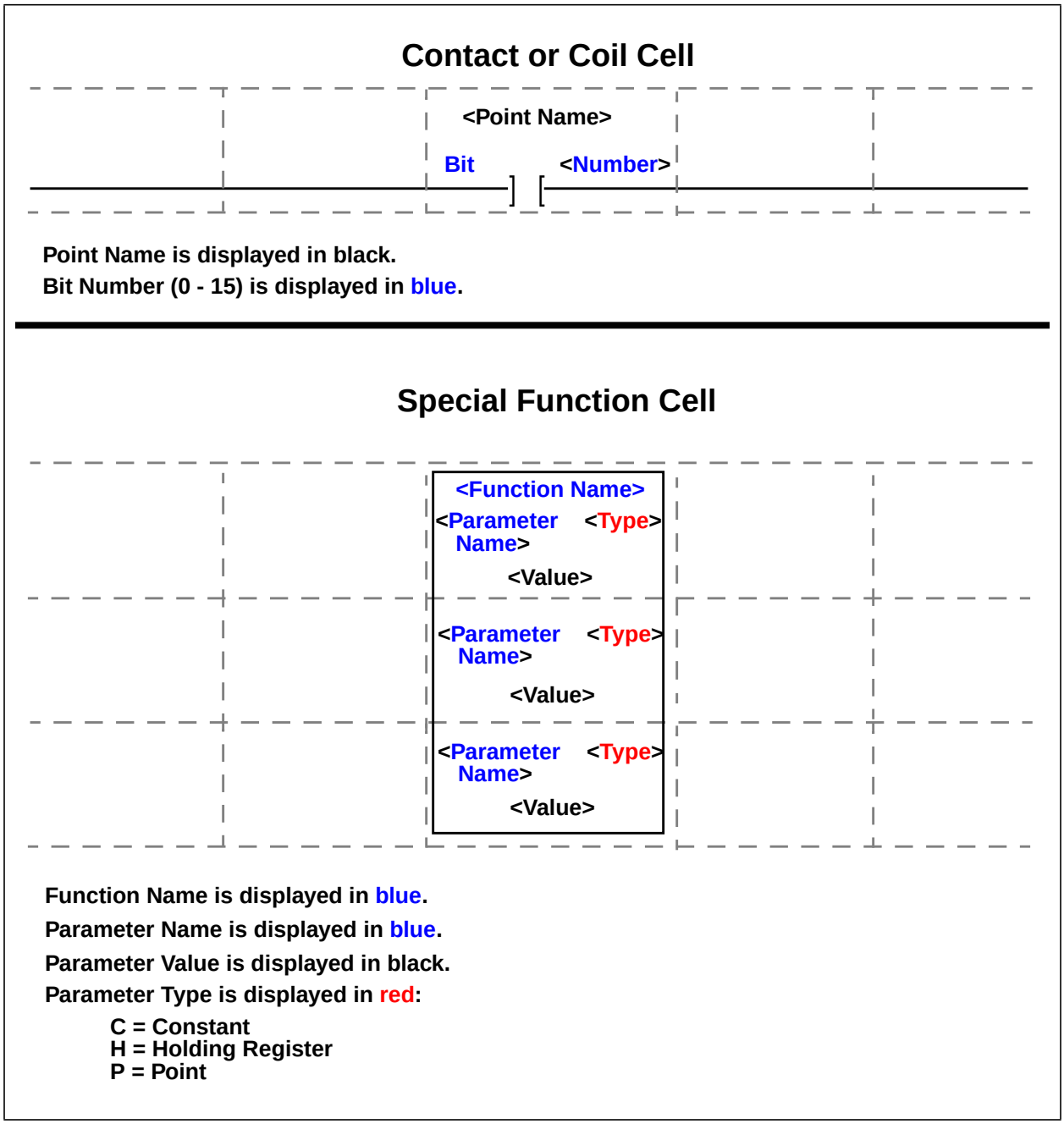


Figure 9-6. Cell Contents

Table 9-1. Ladder Editor Functions

Button	Description
	**Normally Open Contact** (NOC). Places an NOC in the cell and displays a Contact Parameter box (see Figure 9-7) where the desired point name for the NOC can be entered.
	**Normally Closed Contact** (NCC). Places an NCC in the cell and displays a Contact Parameter box (see Figure 9-7) where the desired point name for the NCC can be entered.
	**AND Line**. Places a horizontal line in the selected cell. Toggles on/off to add or remove the horizontal line.
	**OR Line**. Places a vertical line in the selected cell. Toggles on/off to add or remove the vertical line.
	**AND/OR Line** Places a vertical line and a horizontal line.
	**Coil**. Places a coil in the selected cell.
	**Special Function**. Displays the Select Special Functions box (Figure 9-8). Select the desired Special Function and the Special Function Parameter dialog box (Figure 9-9) appears containing the parameters appropriate for the selected Special Function. Refer to the WDPF manual "Special Functions' (U0-0133) for details about Special Functions.
	**Delete**. Removes the selected item from the cell.
	**Edit**. Edits Special Function parameters. Displays the Special Function Parameter dialog box (Figure 9-9) that contains the parameters appropriate for the selected Special Function. Refer to the WDPF manual "Special Functions' (U0-0133) for details about Special Functions.
	**Copy.** Copies the special function in a selected cell (some functions utilize more than one cell).
	**Paste**. Pastes the contents of a "copied cell" or the contents of several cells into the selected cell(s).

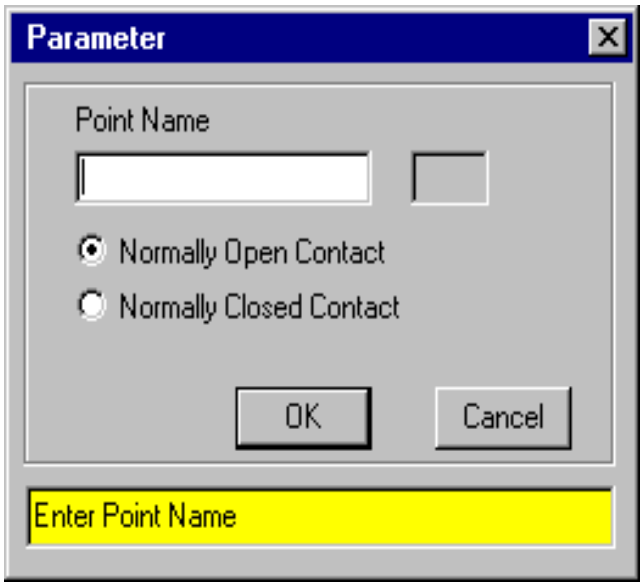


Figure 9-7. Contact Parameter Dialog Box

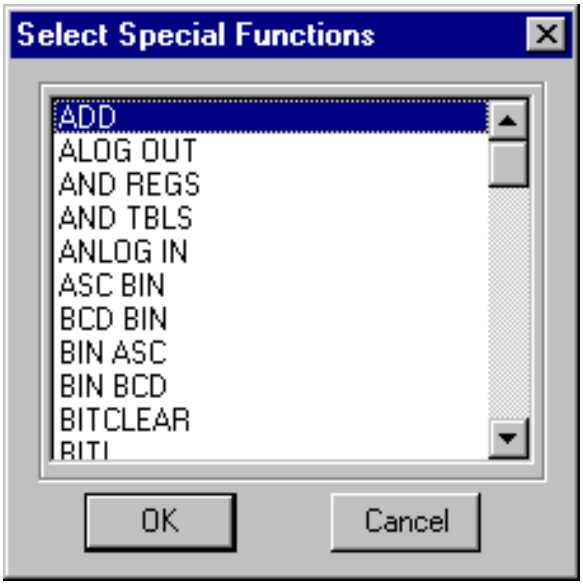


Figure 9-8. Select Special Function Box

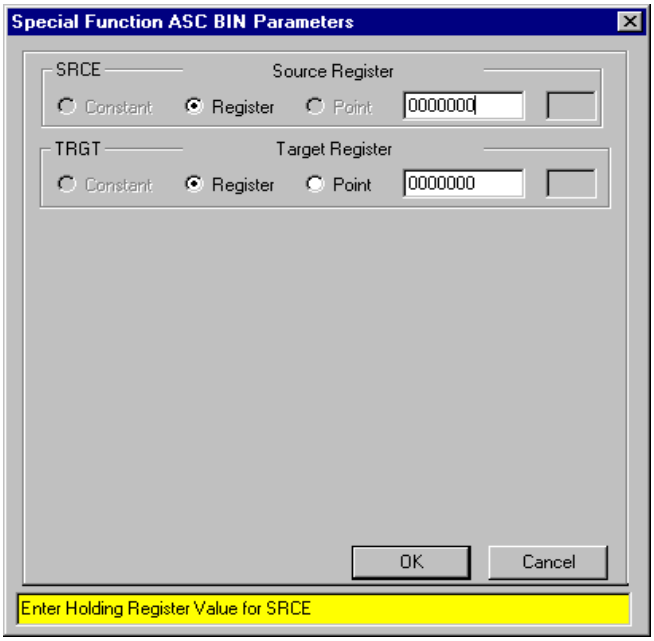


Figure 9-9. Special Function Parameter Dialog Box

Appendix A. AutoCAD Features

A-1. Section Overview

AutoCAD is a full-featured program used for computer-aided design (CAD). The Ovation NT Control Builder (OCB) runs on top of the AutoCAD package and provides functions that are used to build the control sheets used by the Ovation Controller.

The following topics are included in this section:

- AutoCAD Features Used by OCB (Section A-2).
- AutoCAD Commands Used by OCB (Section A-3).
- AutoCAD Variables Used by OCB (Section A-4).

A-2. AutoCAD Features Used by OCB

A-2.1. Zoom

The Zoom feature provides different methods that can be used to magnify parts of a functional drawing or the entire drawing.

OCB uses all the AutoCAD Zoom features which can be accessed from the Standard Toolbar, the AutoCAD View menu, or the command line.

Refer to the AutoCAD documentation or on-line Help for information about the different Zoom features.

A-2.2. Pan

The Pan feature is used to move the view of a drawing, but does not change the scale of the drawing.

OCB uses the AutoCAD Pan feature which can be accessed from the Standard toolbar, the AutoCAD View menu, or the command line.

A-2.3. Aerial View

The Aerial View feature provides a separate window to display a magnified view of a drawing section. The view can be changed to display any section by moving the cursor over the drawing.

OCB uses the AutoCAD Aerial View feature which can be accessed from the Standard toolbar, the AutoCAD View menu, or the command line.

A-3. AutoCAD Commands Used by OCB

Note the following guidelines when using AutoCAD/OCB commands:

1. The AutoCAD command "**undo**" can be used, but NOT the "oops" command.
2. Use the tilde (~) character in the AutoCAD/OCB command line to display the applicable dialog box.
3. The AutoCAD **Move**, **Copy**, and **Erase** commands will not work properly from the OCB command line because OCB entities are on locked layers. These layers are locked by OCB with each command.
4. Any **.Command** is regarded by OCB as the same as commands without the dot (.).
5. A **Transparent** command is a command you can use on a command line while using another command. It will not interrupt the currently active command. You enter a transparent command by placing an apostrophe (') in front of the transparent command. After the transparent command executes, the original command will resume.
6. The **Cut** command from the AutoCAD Edit menu cannot be used by OCB.
7. The editor for the Command line programs is AutoCAD based. The following programs can be run from the OCB command line prompt:
   - OCBBatch - Processes multiple sheets.
   - OCBImport - Places .dwg files into the desired system, unit, drop, or task.
   - OCBExport - Copies drawings out of the system.
   - OCBOrder - Orders sheets within a control task.

A-4. AutoCAD Variables Used by OCB

AutoCAD Variables that OCB can use

- CMDDIA - Controls the display of dialog boxes used to read and write to the database. When set to **1**, dialog boxes are displayed. When set to **0**, the command line must be used.
- FILEDIA - Controls the display of dialog boxes used to read and write files. When set to **1**, dialog boxes are displayed. When set to **0**, the command line must be used. If FILEDIA is set to 0, you can still request a dialog box by typing a tilde (~) at the prompt.
- USER15 - Enables debug function for various commands. When set to **1**, the debug function is enabled. When set to **0**, the debug function is disabled.

Appendix B. Trouble-Shooting

B-1. Section Overview

This sections provides suggestions for solving problems associated with the operation of the Ovation NT Control Builder.

B-2. Problem: Cannot Access Control Builder

Suggestion 1

If you cannot access Control Builder from the Desk Top, check to see if you have an AutoCAD licensing error (ACADSERVER).

Suggestion 2

If you cannot access Control Builder from the Developer Studio, check for the following possible errors:

- Registry configuration error (ACAD_HOME).
- PATH system variable truncated.

B-3. Problem: Need to Check Control Builder Status

Suggestion 1

Select the computer function key **F2** while you are in the Control Builder. A text file that describes all the commands and actions for this session will appear in the AutoCAD Text Window.

B-4. Problem: Control Builder Does Not Respond

Suggestion 1

Confirm that there is not an Ovation licensing error and that there are available licenses for Ovation Control Builder.

Suggestion 2

Confirm that the File Support Path is correct, **`C:\Ovation\OCB\support`** (as shown in Section 1).

Suggestion 3

Check the OCB extensions (ARX). Verify that OCBCORE.ARX is loaded. If it is loaded, then check for a licensing error.

B-5. Problem: Loss of Functionality

Suggestion 1

A variety of errors can occur if AutoCAD does not have the disk space to operate. Check the disk usage of the C: drive to determine if the disk is full.

B-6. Problem: No License Available

Suggestion 1

Go to the Ovation NT Station where AutoCAD is loaded and verify that the **ACADSERVER** variable is defined:

A. Select the **Start** button.
B. Select the **Settings** button.
C. Select the **Control Panel**.
D. Double click on the **System** icon. The **System Properties** window appears.
E. Select the **Environment** tab.
F. If ACADSERVER is **not** there, add it to the System Variable list. Enter **ACADSERVER** in the Variable entry field.
Enter the <**IP address**> or the <**host name**> of the AutoCAD drop in the Value entry field. Then select **OK**.
For example,

`177.9.20.200` (see your System Administrator for IP Address)
or **`drop200`**

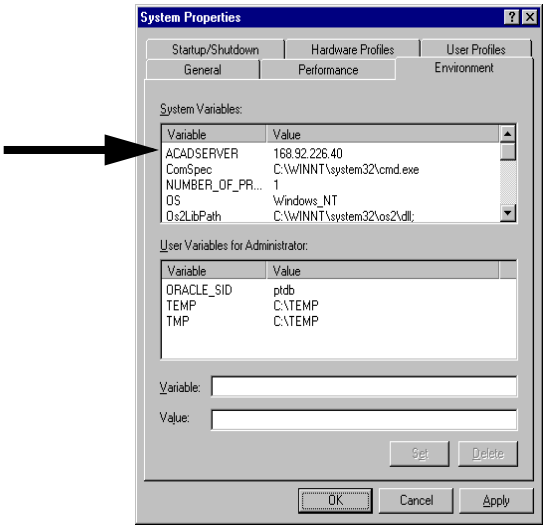


Figure B-1. System Environment Variable

B-7. Problem: Cannot Edit Drawing

Occasionally, when you try to open a Control Builder drawing for editing, a message will appear that you cannot edit the drawing, you can only view it.

Suggestion 1

Make sure that the drawing is not being edited by another Control Builder.

Suggestion 2

Make sure that the drawing was not just recently closed, and GBNT is not still processing the drawing.

Suggestion 3

Check the Task Manager function to determine if GBNT is still running long after it should have finished processing the drawing. If it is running, select it and click the End Task button.

This will free the drawing for editing.

B-8. Problem: Dialog Box Does Not Appear as Expected

Suggestion 1

The FILEDIA and CMDDIA flags are used to enable and disable dialog boxes. If a command line prompt appears instead of an expected dialog box, then set FILEDIA and CMDDIA to one (1) in a command line.

Suggestion 2

If you do not want to change the entire file, but only want one dialog box to appear, enter a tilde sign (~) in the command line.

Numerics

A

B

C

D

E

F

O

P

Q

R

S

T

U

V

W

X

Z