



# **Bartels AutoEngineer®**

## **Version 6.2**

### **Release Notes**

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This documentation contains information about the new features introduced with **Bartels AutoEngineer Version 6.2**. Forward compatibility from earlier versions to **Bartels AutoEngineer Version 6.2** is ensured, but not backward compatibility.

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**Bartels AutoEngineer Version 6.2 Release Notes**

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# 1 General

## 1.1 Installation

### Installation Guide

The [Bartels AutoEngineer Installation Guide](#) (file `inste.htm` from the `baedoc` directory of the BAE-CD-ROM) provides detailed Bartels AutoEngineer installation instructions for all supported hardware and software platforms.

### Automatic Parameter Configuration Update

Previously, new configuration parameters in the `bae.ini` configuration file had to be added manually after every BAE update installation. This is now done automatically when first starting BAE after installing a software update by appending a version-specific difference file to the existing `bae.ini` file.

## 1.2 User Interface and General Functions

### Module-specific Color Table Configurations

Module-specific color table configurations are supported through `bae<moduleid>.col` color table names. The RGB values for the BAE color palette are loaded from `bae.col` if no module-specific color table file is available. This allows for the definition of a white background color table configuration in `baescm.col` for the **Schematic Editor** whilst still using black background color table configurations in the layout modules. The **Schematic Editor** has been optimized for white background display configurations. Predefined BAE system color files for white background configurations, `bae256_i.col` for Windows and `baeunix_i.col` for Linux/Unix are provided with the software. Simply copy the file for your operating system to `baescm.col` in the BAE programs directory to configure a white display background for the **Schematic Editor**.

### Command History and Command Repetition

The last 50 menu selections are now available for re-selection with the right mouse button pressed. Cursor keys can be used to scroll through the menu selection list. Releasing the mouse button activates the currently selected/highlighted menu selection. Scrolling back automatically activates a command loop to the last menu item. The right mouse button repeats the command sequence until a different menu item is selected. The `S` key can be used to save the command sequence whilst the right mouse button is pressed, and the `I` button can be used to re-activate the save command sequence.

### Key Programming

The key programming functions available through key `S` have been extended to allow for the programming of special keys such as `Strg` key combinations, and `Tab`, `Esc`, `Enter` and `Del` keys. The menus include indicators for shortcut keys assigned to menu functions.

### Horizontal Scroll with Mouse Wheel

The mouse wheel is used to scroll the graphic display vertically. Turning the mouse wheel with the `Shift` key pressed causes the graphic screen to scroll horizontally.

### Windows and Motif Menu Shortcut Key Display

Shortcut key indicators have been added to the key-programmed menu entries of the Windows and Motif menus.

### Favourites Menu

The `F` button for activating a user-defined menu has been added to the toolbar. This menu provides the `Edit Favourites` function for configuring the favourites menu. BAE module-specific favourites menu configurations are stored to the `baeparam.dat` file in the BAE programs directory.

### Macro Command Definitions

The `M` button for activating a function for storing and activating command sequences has been added to the toolbar. Macro command sequences can be created by selecting functions from the menu and/or the command history (up to 50 previously called menu functions). Both the key programming facilities and the favourites menu support macro command calls. Module-specific macro command sequences are stored to the `baemacro.dat` in the BAE programs directory.

## Element History

The **H** button for quickly accessing the recently stored elements has been added to the toolbar. Special entries in the `bae.ini` file can be set to restrict the history to recently loaded elements and/or SCM sheets and/or layouts. The element history is stored to the `baehist.dat` file in the BAE programs directory.

## Mathematical Expressions in Numeric Input Dialog Elements

The Windows and Motif dialog elements for numerical value input have been changed to support mathematical expressions. Any mathematical expression in the input field is evaluated upon = input, when leaving the input field or when exiting (not aborting) the dialog box. The + (add), - (subtract), \* (multiply), / (divide) and ^ (power) operators, the constant `pi` and the `abs` (absolute value), `cos` (cosine), `exp` (exponent), `log` (natural logarithm), `sin` (sine), `sqrt` (square root) and `tan` (tangent) functions are supported. Parentheses can be used to redefine the evaluation sequence.

## Windows File Associations

The DDB file selection dialog of the BAE Windows version has been changed to support associations. Adding associations for, e.g., library files in project directories simplifies file selections significantly.

## Arc/Circle Processing

Full circle definitions with redundant end points close to the circle start point caused sporadic problems. Arcs which obviously span a full circle are now automatically splitted into two arcs to avoid these problems. This transformation is also applied when loading older DDB files.

## 1.3 Symbol and Part Libraries

The Bartels AutoEngineer layout library has been updated and supplemented by new definitions.

## 2 Schematic Editor

### 2.1 General

#### File Element Selection

The **Newest Project Sheet**, **Newest Sheet**, **Newest Symbol**, **Newest Label** und **Newest Marker** options for loading the DDB file element with the latest modified date have been added to the **File / Load** menu and the corresponding toolbar button.

According to this function, the last saved project SCM sheet is automatically loaded when switching to the **Schematic Editor** module without preset SCM sheet name. **bae.ini** entries can be used to set a fixed SCM sheet name for automatic load.

#### Display Parameter Dialog

The **Settings** dialog from the **View** menu has been added to the middle mouse button display menu.

#### Grid Selection

The **2.5 mm** and **0.25 mm** grid options have been added to the menus for setting the input and display grid.

The **0.25 \* Display Grid**, **0.5 \* Display Grid**, **Display Grid** and **2.0 \* Display Grid** options for automatically adjusting the input grid to display grid settings have been added to the **Input Grid** menu of the display settings dialog. The **0.25 \* Input Grid**, **0.5 \* Input Grid**, **Input Grid** and **2.0 \* Input Grid** options for automatically adjusting the display grid to input grid settings have been added to the **Display Grid** menu of the display settings dialog.

#### Zoom Window Selection through Toolbar

Left mouse button interactions in the toolbar's element overview window have been changed to cause a **Center/Pan Window** to the selected position instead of activating the **Zoom Last** function.

#### Project Net Highlight

The **Highlight Net** has been changed to keep highlights for named nets when loading different schematic sheets from the same project file. **BAE HighEnd** supports this feature when selecting nets on the project layout.

Project net highlight is now also supported for nets connected to bustaps if the corresponding bus and bustap names provide unique net identification.

The **Reset Highlights** function can be used to clear all net highlights.

#### Highlight Focus

The **Highlight Focus On/Off** for activating and/or deactivating the exclusive display of highlighted elements has been added to the **Ansicht** menu. This simplifies the localisation of errors and/or highlighted nets, especially when using white display backgrounds. The **Reset Highlights** function automatically resets the highlight focus.

## 2.2 Symbols, Labels

### Repeated Symbol/Label Placement

Features for label placement support and the preservation of non-default name and attribute text positioning have been added to the toolbar windows for placing symbols with pre-defined attribute values.

The **Copy Symbol** function for copying selectable symbols and/or labels has been added to the **Other Functions** submenu of the **Symbols** menu.

### Label Macro Selection

The **Change Macro** function has been added to the context menu of the **Add Label** function to allow for non-default label macro selections when placing labels for nets without corresponding label macro.

### Label Check

Label and bustap coordinates have been added to the single label and bustap reference output listing of the **Check Labels** function from the **Other Functions** submenu of the **Symbols** menu. Any selection of a label and/or bustap name automatically loads the referring SCM sheet and zooms to the selected label and/or bustap.

### Next Pin Placement

The **Next Symbol/Label** function has been extended to allow for placing pins on symbol level. The new pin name is derived from the name of the last placed pin by incrementing the last number from the previous pin name; alternatively, the last letter is replaced by the next letter if the pin name doesn't contain a number. The rotation angle and mirror mode of the previously placed pin are used as defaults for placing the new pin. Any **Jump relative** placement operation is carried out relative to the position of the previously placed pin.

### Placement Status Display (BAE HighEnd)

In **BAE HighEnd**, the frames of SCM symbols/parts are displayed according to the placement status of the corresponding layout part if both the project's schematic sheet/plan and the project's layout are open. A dashed (----) symbol frame is displayed for unplaced layout parts, and a dashed/dotted (-.-) symbol frame is displayed for placed layout parts.

## 2.3 Connections

### Moving Connection Corners

The new **Move Corner** can be used to move connection corner points. This is useful for correcting bus segment lengths. The function performs a **Move Segment** operation on the connection segment closest to the pick point if more than one connection segment ends at the selected corner point.

### Bus Tap Signal Rerouting

Bus tap connections are now automatically re-routed when using the **Move Bus Tap**, **Move Segment** and **Move Group** functions.

### Bus Tap Function with Name List Display

The **List** button for displaying a list of existing bus tap names has been added to the bus tap name dialog of the **Tap Bus** function. Connected symbol bus pins are displayed at the beginning of this list, and the pin name is used as bus tap name when connecting a symbol bus pin. This simplifies the connection of symbol bus pins significantly if symbol bus pin names are defined according to valid bus tap range names such as **d(0-7)**.

### Bus Tap Cross Reference

A section for listing bus taps with bus names and bus tap counts for each SCM sheet has been added to the output of the **SCM Cross Reference** function from the **Other Functions** submenu of the **Symbols** menu.

### Automated Connection Pattern Generation

The **Draw Pattern** function for automated connection pattern (e.g., connection combs, multiple parallel connections) generation has been added to the **Other Functions** submenu of the **Connections** menu.



## 2.4 Graphics

### Graphic Line Widths

The **Set Polygon Line Width** submenu with the **Change**, **Set** and **Set Group** functions for changing and/or setting graphic line widths has been added to the **Other Functions** submenu of the **Graphic** menu.

### Graphic Line Dash Modes

The **Dash Mode** submenu with the **Change**, **Set** and **Set Group** functions for activating dash mode and line width dialogs has been added to the **Other Functions** submenu of the **Grafik** menu.

## 2.5 Text, Attributes

### Text Settings

The functions for adding and/or editing texts have been changed to memorize not only the text size but also text rotation, text mirror mode and text string for subsequent **Add Text** calls.

### Symbol Reference Display during Move Name and Move Attribute Operations

The **Move Name** and **Move Attribute** functions are displaying a line to the placement point of the corresponding symbol whilst selecting the new name and/or attribute text position. This helps to identify the currently processed symbol if other symbols are placed closely.

### Text Line Widths

The **Set Text Plot Width** submenu with the **Change**, **Set** and **Set Group** functions for changing and/or setting text line widths has been added to the **Other Functions** submenu of the **Text** menu.

### Text Class Assignments to group-selected Texts

The **Group Assignment** option for assigning text classes to all group-selected texts has been added to the **Text Class** function of the **Other Functions** submenu of the **Text** menu.

## 2.6 Group Functions

### Group Matrix Copy

The **Copy Matrix** function for creating matrix copies of the currently selected group has been added to the **Other Functions** submenu of the **Edit** menu.

## 2.7 Plot Output

### Standard Pen Width for Lines and Texts

The **HP Laser Output** and **Generic Output** functions of the BAE Windows versions have been changed to use the **Plotter Pen Width** setting for plotting lines and texts instead of drawing pixel lines depending on the output device raster resolution.

### EPS/PDF Output

The **EPS/PDF Output** dialog has been extended to allow for the selection of the output character font (either the BAE vector font or a PostScript font).

A button for deactivating comment text output has also been added to the dialog.

## 3 Packager

### 3.1 Log File Update

The update of the **Packager** log file (**bae.log**) was completed only after exiting the **Packager** module. This behaviour has been changed, the log file contents is now updated immediately after finishing the packaging process.

### 3.2 Controlling Logical Part Definition Assignments

The **\$rlext** (Requested Logical Library Name Extension) attribute is provided in addition to the **\$rlname** (Requested Logical Library Name) attribute for logical part definition assignments. **\$rlname** allows for direct logical part definition specifications, whereas **\$rlext** assigns a logical definition with a name consisting of the predefined logical library definition identifier, an underscore (**\_**) and an extension as specified with the **\$rlext** value. **\$rlext** assignments can be used to, e.g., include footprint names with part/symbol names. **\$rlext** also causes the **Browse** function of the SCM attribute assignment dialog to restrict the logical definitions listing to valid selections, whereas **\$rlname** lists all logical definitions.

### 3.3 Swap Restrictions

Logical library swap definitions for parts with fixed layout part name assignments through **\$rpname** (Requested Part Name) and **\$vgrp** (Variant Group) attributes are now automatically set to **internal** to prevent the **Layout Editor** from swapping affected gates. Previously, such swaps were possible but would have been reset by the **Packager**.

## 4 Layout Editor

### 4.1 General

#### File Element Selection

The **Newest Project Layout**, **Newest Layout**, **Newest Part**, **Newest Padstack** and **Newest Pad** options for loading the DDB file element with the latest modified date have been added to the **File / Load** menu and the corresponding toolbar button.

#### Loading the Default Layout at Module Startup

The project layout with the default layout element name defined in the setup is automatically loaded when switching to the **Layout Editor** module without preset layout name. `bae.ini` entries can be used to set a fixed layout name and/or select the last saved project layout for automatic load.

#### Cross and Center Point Snap Functions

During part placement and trace and/or polygon editing, the **Cross Point** and **Interpolated Center** functions for selecting polygon crossing point or interpolated arc center point coordinates are now available through the **X** key. The arc center point snap routines are tolerant enough to allow even for rectangle center point calculations.

### 4.2 Display, Design Rule Check

#### Grid Selection

The **2.5 mm** and **0.25 mm** grid options have been added to the menus for setting the input and display grid.

The **0.25 \* Display Grid**, **0.5 \* Display Grid**, **Display Grid** and **2.0 \* Display Grid** options for automatically adjusting the input grid to display grid settings have been added to the **Input Grid** menu of the display settings dialog. The **0.25 \* Input Grid**, **0.5 \* Input Grid**, **Input Grid** and **2.0 \* Input Grid** options for automatically adjusting the display grid to input grid settings have been added to the **Display Grid** menu of the display settings dialog.

The **Octagon mode** can now be applied specifically to **Traces**, **Areas** or **Traces+Areas**. The **Traces** octagon mode is selected when loading layout elements with octagon mode settings from previous BAE versions.

#### Zoom Window Selection through Toolbar

Left mouse button interactions in the toolbar's element overview window have been changed to cause a **Center/Pan Window** to the selected position instead of activating the **Zoom Last** function.

#### Signal Layer Settings through Toolbar

Buttons for quick color selection for the first 8 signal layers have been added to the toolbar of the layout system. Left mouse button clicks on the color button allow for color selections according to the **Change Colors**, while right mouse button clicks toggle the visibility of the signal layer. Left mouse button clicks on the signal layer name/label set the default input layer. The layer label/name display of the currently selected default input layer is inverted. Subsequent left mouse button clicks on the signal layer name of the currently selected preference layer toggle the screen visibility of all other layers.

#### Layer Selection

The **<** and **>** buttons for scrolling layer selection lists have been added to the **Change Colors** function from the **View** menu and to the documentary layer selection menus.

#### Distance Query

The **Distance Query** function has been changed to display not only the current X and Y coordinates but also the current distance to the selected start point whilst selecting the distance query end point.

#### Design Rule Check Error Listing

Part type errors and short-circuit net names have been added to the design rule check error listing displayed with the **DRC Error List** function from the **Utilities** menu. A mouse click on any of these error list entries triggers a **Zoom Window** operation to the erroneous part and/or the rectangle surrounding the pins of the short-circuit net.

## Airline Display Net Selection

The **Part Nets Visible**, **Part Nets Invisible**, **Pin Net Visible** and **Pin Net Invisible** net airline display options for selecting part or pin specific nets have been added to the **Settings** dialog from the **Settings** menu.

## Airline Density Display Dialog

The **Airlines Density** function from the **Utilities** menu has been changed to use a dialog box for displaying the airline density diagram.

## 4.3 Parts, Placement

### Part Swap with Name and Attribute Text Position Memory

The **Swap Parts** function from the **Other Functions** submenu of the **Parts** menu has been changed to preserve the name and attribute text positions of the swapped parts as defined with **Move Name** and **Move Attribute**.

### Next Pin Placement

The **Place Next Part** function has been extended to allow for placing pins on part level. The new pin name is derived from the name of the last placed pin by incrementing the last number from the previous pin name; alternatively, the last letter is replaced by the next letter if the pin name doesn't contain a number. The rotation angle and mirror mode of the previously placed pin are used as defaults for placing the new pin. Any **Jump relative** placement operation is carried out relative to the position of the previously placed pin.

### Part Placement with Dynamic Distance and Airline Length Display

The current distance to the previous part placement position has been added to the X/Y position placement status display of the **Move Part** function.

The current H+V airline length of the currently placed part is now displayed in the status field when placing parts with **Add Part** and/or **Place Next Part** and dynamic airline display activated.

### Logical Pin Name Query

A column named **LOGICAL NAME** for displaying logical/SCM pin names has been added part pin data table to the output of the **Place Data Query** function.

### Find SCM Symbol (BAE HighEnd)

The **Find SCM Symbol** function in **BAE HighEnd** has been changed to display the SCM symbol list when applied on layout parts consisting of different SCM symbols. After selecting a certain symbol position, the **→** and **←** keys can be used to switch to the next and/or previous symbol position.

## 4.4 Traces, Routing

### Trace Length Display

During interactive routing, the length of the currently processed trace is now displayed in the status field together with the current X and Y coordinates.

### Highlight Focus

The **Highlight Focus On/Off** for activating and/or deactivating the exclusive display of highlighted and/or net-colored elements has been added to the **Highlight Net** submenu. This feature works on net highlights, short-circuit highlights and group highlights. I.e., highlight focus can be used to emphasize net highlights, check group selections and localise short-circuits. The **Reset All** function automatically resets the highlight focus.

### Via Optimization

The **Vias: optimize** and **Vias: preserve** options have been added to the **Settings** dialog of the **Settings** menu. **Vias: optimize** (default setting) causes the system to replace and/or optimize vias during manual routing. **Vias: preserve** forces the system to keep vias and padstack macro types even if these vias are not in the currently configured via list or if these (blind and buried) vias are occupying more than the least required and/or possible set of layers.

### Teardrop Generation

The submenus of the **Create Teardrops** function have been replaced by a teardrop parameter dialog with a new **with Drill** button for quickly selecting all padstack macros with drill holes.

### Trace Impedance and Layer Stackup (BAE HighEnd)

The **Impedance** submenu with the **Impedance Query** and **Set Impedance** functions for querying and/or setting trace impedance characteristics has been added to the **Other Functions** submenu of the **BAE HighEnd Traces** menu.

The **Layer Stackup** function from the **Rule Attachment** submenu of the **Settings** menu can be used to enter the necessary layer stackup information for trace impedance calculations.

## 4.5 Graphic, Copper Areas

### Drawing Utilities

The **Drawing Utilities** function from the **Other Functions** submenu of the **Areas** menu have been changed to support the creation of keepout areas when generating rectangular and/or circular polygons. An **Undo** function and options for selecting the layer and polygon type have been added to the context menu to be activated with the right mouse button when placing the first polygon point. This allows for the generation of rectangular and/or circular polygons with different types on different layers through a single menu function call with the option to correct erroneous inputs.

### Polygon Line Widths

The **Set Polygon Line Width** submenu with the **Change**, **Set** and **Set Group** functions for changing and/or setting documentary line widths and power layer isolation widths has been added to the **Other Functions** submenu of the **Areas** menu.

### Polygon Line Dash Modes

The **Dash Mode** submenu options from the **Other Functions** submenu of the **Areas** menu have been replaced by the **Change**, **Set** and **Set Group** functions for activating dash mode and line width dialogs.

### Split Polygons

The **Doc.lines Split** from the **Other Functions** submenu of the **Areas** menu has been renamed to **Split Polygons** and supports now also the splitting of areas along the line between two selectable polygon corner points.

### Polygon Outline Keepout Area Processing

The **Create** and **Delete** options have been implemented for the **Border Keep Outs** function from the **Other Functions** submenu of the **Areas** menu. **Create** is used to create polygon outline keepout areas for selectable documentary lines and/or the board outline. **Delete** can be used to delete outline keepout areas of selectable polygons previously created with the **Create** option.

#### *Warning*

Polygon outline keepout areas created with previous BAE versions cannot be deleted automatically.

## 4.6 Text, Drill

### Text Settings

The functions for adding and/or editing texts have been changed to memorize not only the text size but also text rotation, text mirror mode and text string for subsequent **Add Text** calls.

### Centered Text

The **Centered** option for centering texts on **LOGICAL** documentary layers has been added to the context menu available through the right mouse button during text placement. The text placement reference point for centered text is the text base line. The **Align Left** context menu option is provided for restoring text left-alignment.

### Part Reference Display during Move Name and Move Attribute Operations

The **Move Name** and **Move Attribute** functions are displaying a line to the placement point of the corresponding parts whilst selecting the new name and/or attribute text position. This helps to the identify the currently processed part if other parts are placed closely.

### Text Line Widths

The **Set Text Plot Width** submenu with the **Change**, **Set** and **Set Group** functions for changing and/or setting text line widths has been added to the **Other Functions** submenu of the **Text, Drill** menu.

## 4.7 Group Functions

### Part Area Selection

The **Part Area** function has been added to the group placement reference point selection context menu of the **Move Group** function. **Part Area** restricts group movements to the element boundaries of the selected part. This feature can be used together with **Other Functions / Select / All** to move a part with all connected trace end points.

### Group Polygon

The **Select Polygon** function for selecting and/or deselecting elements within an already placed polygon has been added to the context menus of the **Group Polygon** functions. This allows for the quick selection and/or deselection of elements inside the board outline or a fill area or any other area and/or polygon outline.

## 4.8 Automatic Copper Fill

### Automatic Cutout Area Polygon Correction

The copper fill functions have been changed to create rectangular cutout areas in place of problematic cutout polygons to safely avoid the generation of short-circuits. Such problems are usually caused by concave cutout polygon segments with a size smaller than the sum of the minimum distance and the minimum structure size. The copper fill functions issue warning messages about any cutout polygon area fixes and group-select the polygons and/or parts which caused these problems.

## 5 Autorouter

### 5.1 General

#### Default Autorouter Control and Strategy Parameter Settings

New entries for automatically setting default **Autorouter** control and strategy parameters have been added to the `bae.ini` file.

#### Airline Display Net Selection

The `Part Nets Visible`, `Part Nets Invisible`, `Pin Net Visible` and `Pin Net Invisible` net airline display options for selecting part or pin specific nets have been added to the `Settings` dialog from the `Settings` menu.

### 5.2 Autorouter Algorithms

#### Task Priority

An entry for setting the **Autorouter** task priority has been added to the `bae.ini` configuration file.



## 6 CAM Processor

### 6.1 General

#### CAM Batch Configuration Database

The **CAM Batch Output** function for managing a CAM batch configuration database has been added to the **Import/Export** submenu of BAE Windows and Motif **File** menus.

The CAM batch configurations are stored to the `combatdb.dat` file in the BAE programs directory. The `combatdb.dat` file installed with the BAE software contains a few predefined CAM batch configurations such as **Sieb & Meyer, Gerber 2.4** (batch output with standard Gerber parameter settings according to the **CAMBATCH** User Language program) and **Sieb & Meyer, Ext. Gerber 2.4** (batch output with Gerber parameter settings for minimized output data file size). Please note that the **Sieb & Meyer, Ext. Gerber 2.4** batch configuration might not be supported by older Gerber plotter models.

**CAM Batch Output** provides a series of features such as programmable multilayer plot configurations, HPGL outputs and EPS/PDF batch outputs which are not available through the **CAMBATCH User Language** program.

#### Gencad 1.4 Export

The **Gencad 1.4 Output** function for exporting the currently loaded layout data to GENCAD 1.4 format has been added to the **Import/Export** submenu of the **File** menu.

#### HyperLynx Output

The **HyperLynx Output** function for exporting the currently loaded layout data to HyperLynx format has been added to the **Import/Export** submenu of the **File** menu.

### 6.2 Control Plot

#### Standard Pen Width for Lines and Texts

The **HP Laser Output** and **Generic Output** functions of the BAE Windows versions have been changed to use the **Plotter Pen Width** setting for plotting lines and texts without line width assignment instead of drawing pixel lines depending on the output device raster resolution.

#### EPS/PDF Output

The **EPS/PDF Output** dialog has been extended to allow for the selection of the output character font (either the BAE vector font or a PostScript font).

The **Visible B/W** option for monochrome (black on white) output of the the currently visible layers has been added to the output layer selection menu.

A button for activating EPS/PDF batch output database management functions has been added. The EPS/PDF batch parameter are stored to the `epsbatdb.dat` file in the BAE programs directory. Any EPS/PDF batch output can consist of different EPS/PDF output files with different combinations of output pages and/or BAE output layer sets.

### 6.3 Drilling Data Output

#### Drill Class Selection

A drill class selection dialog listing all layout drill classes with drill counts has been added to the **Drill Output** and **Excellon Drill Out** functions.

## 7 Neural Rule System

### Rule Definitions

The `brules.vdb` file installed to the BAE programs directory contains precompiled rule definitions. The source files for these rule definitions are also provided (**User Language** directory; file extension `.rul`), i.e., the rule definitions can be modified and recompiled with the **RULECOMP** Rule System Compiler.

## 8 Utilities

### 8.1 LOGLIB

The **LOGLIB** utility program has been changed to support net attribute definitions through `netattr` commands for symbols which are not declared `virtual`.

## 9 Bartels User Language

### 9.1 General

This section describes general changes to the **User Language** specification. See the [Bartels User Language Programmer's Guide](#) for a detailed description of the **User Language** specification.

#### Internal User Language Version

The internal version of **BAE Version 6.2 User Language** has been changed. **User Language** programs compiled under earlier BAE versions won't execute in the **BAE Version 6.2 User Language Interpreter** environment (error message `User Language program version incompatible!`). This means that each **User Language** program compiled under earlier BAE Versions must be recompiled under **BAE Version 6.2** to regain compatibility.

### 9.2 Index Variable Types

This section lists the new and changed **User Language** index variable type. See the [Bartels User Language Programmer's Guide](#) for a detailed description of all index variable types.

#### Changed Index Variable Types

The `int` attribute **VIS** for net visibility queries has been added to the **L\_CNET** index variable type.

The **WIDTH** (data type `double`), **DASHLEN** (`double`), **DASHSPC** (`double`) and **DASH** (`int`) attributes for querying polygon line widths and dashed polygon parameters have been added to the **C\_POLY** index variable type.

The **WIDTH** (data type `double`) attribute for querying text line widths has been added to the **C\_TEXT** index variable type.

The **WIDTH** (data type `double`), **DASHLEN** (`double`) and **DASHSPC** (`double`) attributes for querying polygon line widths and dashed polygon parameters have been added to the **L\_POLY** index variable type.

The **WIDTH** (data type `double`) attribute for querying text line widths has been added to the **L\_TEXT** index variable type.

## 9.3 System Functions

This section lists the new and changed **User Language** system functions. See the [Bartels User Language Programmer's Guide](#) for a detailed description of all system functions.

### New System Functions

The following new **User Language** system functions have been implemented for **BAE Version 6.2**:

IP	System Function	Short Description
STD	<a href="#">askcoord</a>	Interactive X/Y coordinate value query
	<a href="#">bae_dashpolyline</a>	Vectorize dashed BAE polygon
	<a href="#">bae_dialbmpalloc</a>	Create BAE dialog bitmap
	<a href="#">bae_dialgettextlen</a>	Get BAE dialog text length
	<a href="#">bae_getcmdbuf</a>	BAE command history query
	<a href="#">bae_getgridmode</a>	Get BAE grid dependency mode
	<a href="#">bae_getinvcolor</a>	Get BAE color inversion mode
	<a href="#">bae_inpointmenu</a>	Input BAE point/coordinates with mouse and right mouse button callback function
	<a href="#">bae_plansename</a>	Get BAE destination element name
	<a href="#">bae_plansfname</a>	Get BAE destination element file name
	<a href="#">bae_popmouse</a>	Get BAE popup/toolbar mouse position
	<a href="#">bae_setgridmode</a>	Set BAE grid dependency mode
	<a href="#">mkdir</a>	Create directory
	<a href="#">setprio</a>	Set BAE process priority
<a href="#">getextprog</a>	Get file type specific application	
LAY	<a href="#">lay_rulelaysatt</a>	Attach rule(s) to layout layer stackup
	<a href="#">lay_rulelaysdet</a>	Detach rules from layout layer stackup
GED	<a href="#">ged_getsegmovmode</a>	Get GED trace segment move mode
	<a href="#">ged_getviaoptmode</a>	Get GED trace via optimization mode
	<a href="#">ged_setpickelem</a>	Set GED default pick element
	<a href="#">ged_setsegmovmode</a>	Set GED trace segment move mode
	<a href="#">ged_setviaoptmode</a>	Set GED trace via optimization mode

### Changed System Functions

The [bae\\_charsize](#), [bae\\_tbsize](#) and [bae\\_settbsize](#) function parameter data types have been changed from `int` to `double`.

The parameter value range of the [bae\\_popsetarea](#) function has been extended to support dialog bitmaps.

A parameter for controlling the relative dash line distance has been added to the [bae\\_setpopdash](#) function.

A new class for querying operating system specific directory name delimiters has been added to the [bae\\_swversion](#) system function.

A new layer query type for documentary, signal and power layer selection has been added to the [ged\\_asklayer](#) function.

The return value and parameter value ranges of the [ged\\_getautocornins](#) and [ged\\_setautocornins](#) functions have been extended to support element type specific options.

## 9.4 BAE User Language Programs

BAE installs some 200 pre-compiled **User Language** programs to the `ulcprog.vdb` file of the BAE programs directory. Additionally, the **User Language source** files (more than 4 Mbytes; some 150,000 lines) are installed to a special directory (`baeu1c`). See the [Bartels User Language Programmer's Guide](#) for a complete listing and short descriptions of the BAE **User Language** programs.

### Include Files

The **User Language** include files have been revised and extended by a series of new definitions and functions.

### New User Language Programs

The following new **User Language** programs are provided with **BAE Version 6.2**:

IP	Program Name	Short Description
STD	<b>FAVORITE</b>	Favorites Menu Management
	<b>HISTORY</b>	Element History Call
	<b>MACRO</b>	Macro Command Management
SCM	<b>SYMATTDB</b>	Create SQL Attribute Database for SCM Symbol Selection
	<b>SYMSEL</b>	SCM Symbol Placement with Attribute Selection
LAY	<b>GENCAD</b>	GENCAD 1.4 Layout Data Export
	<b>HYPLYNX</b>	HyperLynx Layout Simulation Data Output
GED	<b>GEDPICK</b>	Layout Polygon Cross/Center Pick Functions
CAM	<b>CAMBATDB</b>	CAM Batch Database

### Changed User Language Programs

The **User Language** programs already delivered with the previous BAE Version have been completely revised and extended by many new features and functions. A series of significant improvements and enhancements have already been mentioned in the previous sections of these Release Notes.