Autodesk® DirectConnect 2013

User's Guide

Autodesk®

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What Is Autodesk DirectConnect

1

Autodesk® DirectConnect is a family of data translators. Each of these translators imports a specific CAD file format into one or more of the following Autodesk® software products:

- Autodesk® Alias®
- Autodesk® Maya®
- Autodesk® Showcase®
- Autodesk® Opticore® Studio
- 3ds Max®/3ds Max® Design

In addition, you can export some CAD file formats from some products with Autodesk DirectConnect.

Supported products and translators

Import to: Autodesk Alias, Autodesk Showcase, Autodesk Maya, Autodesk Opticore Studio, 3ds Max, 3ds Max Design

File Format	Microsoft®Windows® XP, Windows® 7, 32-bit and 64 bit	Apple® Mac OS® X® 10.6 or higher, 64 bit
Autodesk Inventor (page 10) Not available in 3ds Max/3ds Max Design	✔	Not available
CATIA V4 (page 12) All versions + V3RX	✔	Not available
CATIA V5 (page 14) R6-R21	✔	Not available
DWG DXF (page 19)™ Real DWG 2013 Not available in 3ds Max/3ds Max Design	✔	✔ Not available in Showcase, Opticore Studio
IGES (page 21) V5.3	✔	✔ Not available in Showcase, Opticore Studio
JT (page 26) Up to 9.5	✔	Not available
Pro/ENGINEER (page 35)® Up to Wildfire 6.0 and Creo Parametrics Not Available in Showcase	✔	Not available
NX (page 28)® UG V13.0 to NX 7.5	✔	Not available

Import to: Autodesk Alias, Autodesk Showcase, Autodesk Maya, Autodesk Opticore Studio, 3ds Max, 3ds Max Design

File Format	Microsoft®Windows® XP, Windows® 7, 32-bit and 64 bit	Apple® Mac OS® X® 10.6 or higher, 64 bit
Open Inventor™ and Cosmo™_ (page 33) All versions Not available in 3ds Max/3ds Max Design	✔	Not available
SolidWorks (page 37)®(1) 2003-2012 Must be licensed and running on the import machine.	✔	Not available
SPF (Alias Packet File) (.wire)	✔	✔ Not available in Showcase
STEP (page 39) AP214, AP203E2	✔	✔ Not available in Showcase, Opticore Studio.
STL (page 41) (Stereo-lithography) Not available in 3ds Max/3ds Max Design	✔	✔ Not available in Showcase, Opticore Studio.

Export from: Autodesk Alias, Autodesk Maya, 3ds Max, 3ds Max Design

File Format	Microsoft®Windows® XP, Windows® 7, 32-bit and 64 bit	Apple® Mac OS® X® 10.6 or higher, 64 bit
DWG DXF (page 19) Real Dwg 2013, Alias (.wire) only. Not available in 3ds Max/3ds Max Design.	✔	✔
IGES (page 21) V5.3 Not available in 3ds Max/3ds Max Design.	✔	✔

Export from: Autodesk Alias, Autodesk Maya, 3ds Max, 3ds Max Design

File Format	Microsoft®Windows® XP, Windows® 7, 32-bit and 64 bit	Apple® Mac OS® X® 10.6 or higher, 64 bit
NX (page 28) NX1.0, 3.0, 5.0, 7.0 Not available in 3ds Max/3ds Max Design.	✔	Not available
SPF (Alias Packet File) (.wire)	✔	✔
STL (Stereo-lithography) Not available in 3ds Max/3ds Max Design.	✔	✔
ZPR (page 43)™ (ZPrint CAD for Rapid Prototyping) V1.2 Not available in 3ds Max/3ds Max Design.	✔	Not available

What's New in This Release

2

This section lists the new features and improvements in Autodesk® DirectConnect 2013.

New Features

Support is added for:

- CATIA V5 (R21) for import (export in Alias).
- Alias to CATIA V5 translation supports export of Alias meshes.

- Granite version 7.0
- JT version 9.5
- Parasolid V24
- Solidworks 2012

Improvements

- JT
  - XBREP import quality is improved.
  - A new option is added to read mesh, but only if BREP is not available.
  - New options for meshes and tessellation detail are added, including the highest detail and lowest detail option.
- NX supports the import of all mesh data.

Installation and Licenses 3

Install Autodesk DirectConnect

Autodesk® DirectConnect® software installs automatically when the following Autodesk software is installed:

- Autodesk® Alias®
- Autodesk® Maya®
- Autodesk® Showcase®
- 3ds Max®/3ds Max® Design

Autodesk DirectConnect software is provided on the media with Autodesk® Opticore® Studio software, in the Autodesk DirectConnect 2013 folder. It requires manual installation.

For information about installing these software products, refer to their respective installation guides.

NOTE

- When installing DirectConnect, install the same version, such as 32-bit or 64-bit, as your Autodesk Opticore Studio.
- DirectConnect Help is supported only on Microsoft® Internet Explorer®. Performance on other browsers does not provide consistent results.

Support platforms

Autodesk DirectConnect runs on the same platform as the Autodesk product it installs with:

Autodesk Software	Microsoft® Windows® XP, Windows® 7, 32-bit and 64-bit	Apple® Mac OS® X® 10.6 or higher, 64-bit
Autodesk Alias	✔	✔
Autodesk Maya	✔	✔
Autodesk Showcase	✔	Not available
Autodesk Opticore Studio	✔	Not available
3ds Max/3ds Max Design	✔	Not available

System requirements

Autodesk DirectConnect requires the following amount of available disk space:

- Windows XP, Windows 7: 671 MB for 32-bit, and 838 MB for 64-bit.
- Mac OS X: 10.6 or greater. On Snow Leopard: 65 MB on an Apple Mac computer with 64-bit Intel processors.

DirectConnect installs with other products, so your system must also accommodate the host product requirements. (For the system requirements of the host product, consult the appropriate installation guide.)

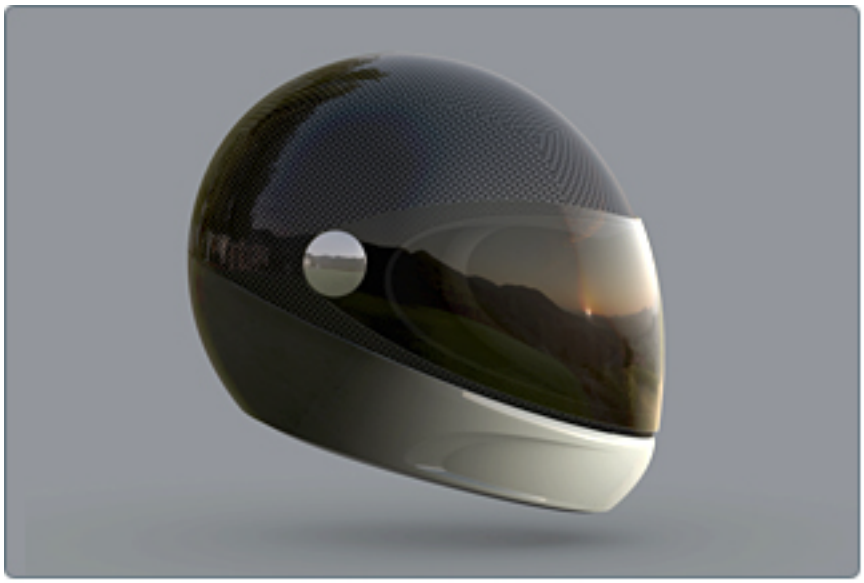
For the most up-to-date information about hardware qualifications, see Qualified Hardware.

For information about how to import specific file formats into each of these products, see chapter 4, Translator details. (page 9)

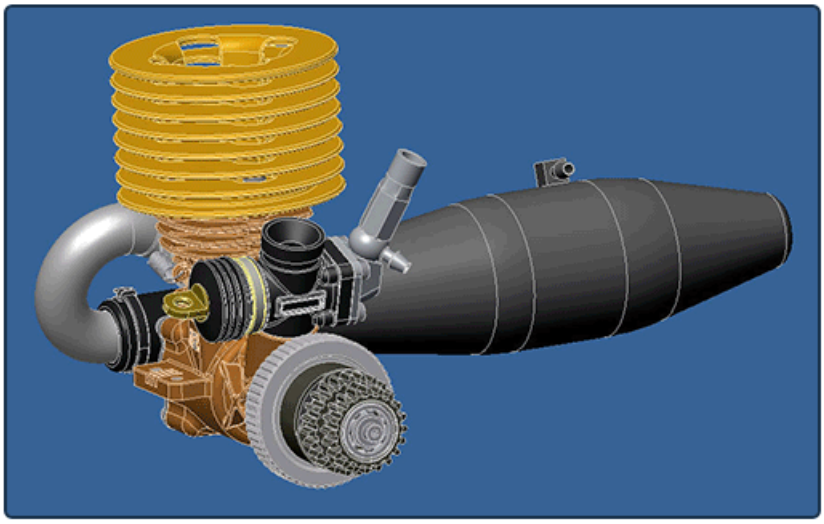
To locate imported data in your Autodesk software, see Locations of Imported Data. (page 45)

Translator Details

4



Autodesk Inventor



Autodesk® Inventor® is a 3D mechanical design, product simulation, tooling creation, and design communication software.

Autodesk DirectConnect supports the import of Autodesk Inventor part (**.ipt*) and assembly (**.iam*) files into the Autodesk Alias, Autodesk Maya, Autodesk Showcase, and Autodesk Opticore Studio software. See installation information in Install Autodesk DirectConnect. (page 7)

Import Autodesk Inventor files

1 Choose the menu path in your installed Autodesk software product:

Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya (Windows version)	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

2 In the browser, select an Autodesk Inventor **.ipt* or **.iam* file.

3 Click **OK**, or **Open** to launch the translator and import the file.

NOTE To maintain the original positioning and orientation of part files in your scene, import the assembly file. Importing part files before the assembly file positions all of them at the origin (0,0,0), and removes the original positioning.

Types of data imported

NURBS are imported, and the following additional information is maintained on import:

- Brep bodies
- Data organization
- Tolerances and units
- Material colors and simple transparency
- Weld maps (beads only)
- Thread maps
- Decals

NOTE For information about locating this data in your Autodesk software, see Locations of Imported Data (page 45).

Limitations

- Work sources, display meshes, and some 2D/3D sketches are automatically excluded when importing an Autodesk Inventor file.
- Some cylindrical surfaces (pipes) do not trim properly.

CATIA V4

CATIA is computer-aided design software from Dassault Systèmes.

Autodesk DirectConnect supports the import of CATIA V4 (V4.xx and earlier V3RX Levels) geometric sets, attributes, such as names, layers, RGB colors, and visibility, and the CATIA file types into the Autodesk Alias, Autodesk Showcase, Autodesk Opticore Studio, and 3ds Max/3ds Max Designsoftware. See installation information in Install Autodesk DirectConnect. (page 7)

DirectConnect supports CATIA model and export files produced with CATIA V4.xx and earlier V3RX Levels.

Import CATIA V4 files

1 Choose the menu path in your installed Autodesk software product:

Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya (Windows version)	**File** > **Open Scene** or **File** > **Import**

Autodesk Showcase	**File** > **Import** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**
3ds Max/3dsMax Design	**Application Menu** > **Import** > **Select File to Import dialog**

2. In the browser, select a CATIA V4 **.model, *.mdl, *.session, *.exp, *.dlv,*.dlv3,* or *.dlv4* file.
3. Click **OK**, or **Open**.

   The translator launches automatically, and the file imports into the scene.

Types of SPACE (SP) entities supported for import

- Point (Type 1)
- Line (Type 2)
- Parametric curve (Type 3)
- Plane (Type 4)
- Parametric surface (Type 5)
- Face (Type 6)
- Volume (Type 7)
- Transformation (Type 9)
- Edge (Type 12)
- Circle (Type 20)
- Ellipse (Type 21)
- Parabola (Type 22)
- Hyperbola (Type 23)
- Polyhedral surface (Type 16)
- Composite curve (Type 24)
- Solids - Mockup (Type 17, secondary type 1)
- Exact solid (Type 17, secondary type 2)
- Space ditto (Type 28)
- Parametric skin (Type 35)

- NURB curve (Type 46)
- NURB surface (Type 47)

NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 45).
- For information about options in Alias for data importation, see the Autodesk Alias Help.
- For definitions on these data types, consult your CATIA documentation.

CATIA V5

CATIA® is computer-aided design software from Dassault Systèmes.

Autodesk® DirectConnect supports the import of CATIA V5 (R6-R21) files in the Autodesk Alias, Autodesk Maya, Autodesk Showcase, Autodesk Opticore Studio, and 3ds Max/3ds Max Design software. See installation information in Install Autodesk DirectConnect. (page 7)

Export of CATIA V5 Part files is available only in Alias (from release 10 to 21).

Import CATIA V5 files

1 Choose the menu path in your installed Autodesk software product:

Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya (Windows version)	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**
3ds Max/3dsMax Design	**Application Menu** > **Import** > **Select File to Import dialog**

2 In the browser, select a CATIA V5 (`*.CATProduct` ,`*.CATPart`, or `*.cgr`) file.

3 Click **OK**, or **Open** to launch the translator and import the file into the scene.

Types of data imported

We support the import of files from CATIA V5 releases R21 and earlier, and the following types of data:

- Point
- Line
- Arc
- Ellipse
- Parabola
- Hyperbola
- BSpline curve
- Polynomial curve
- Plane
- Cylindrical surface
- Conical surface
- Spherical surface

- Toroidal surface
- BSpline surface
- Revolve surface
- Ruled surface
- Open body
- Solid body
- Layer
- Geometric set
- Part (from CATIA V5 release 6 and higher)
- Product (from CATIA V5 release 6 and higher)
- Attributes (RGB color, layer, name, visibility, and materials)
- Per face color assignments
- Cloud mesh data
- Tessellated data
- Weld data

NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 45).
- For information about options in Alias for data importation, see the Autodesk Alias Help.
- For definitions about these data types, consult your CATIA documentation.

Export CATIA V5 files

NOTE Not available in 3ds Max/3ds Max Design software.

1. In your Autodesk software, choose **File > Save As**, or **File > Export > Active As** ❐ .
2. For details about the available options, see the Help in the Autodesk software.
3. Save to CATIA version R6-R21.

File formats referenced

The following are some of the file formats that can be referenced by CATIA V5 assembly files:

- .CATProduct
- .CATPart
- .model
- .cgr
- .stl

DWF

Design Web Format (DWF™) is a file format developed by Autodesk for web viewing and printing.

Autodesk DirectConnect supports the export of Autodesk Alias® tessellated model data to DWF format files (*.dwf) to view in Autodesk Design Review and Project Freewheel. See installation information in Install Autodesk DirectConnect. (page 7)

NOTE For information about additional software setup for Autodesk Alias, please see the Autodesk Alias Help.

Export DWF files

1. In Autodesk Alias, select a file to be exported as a DWF, and choose **File > Export > Active As** ❐ , or **File > Save As** ❐ .
2. On the **File Formats** menu, select **DWF** (`.dwf`).
3. Set export options, and then click **Save**.

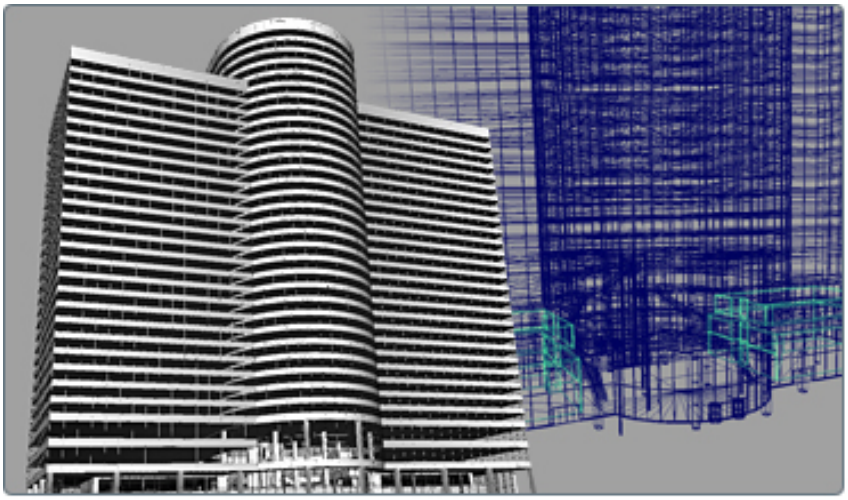
Option	Function
Export Curves	When turned **ON**, exports curves.
Export Symmetry	If an Alias layer has symmetry turned **ON**, this information and the geometric objects resulting from symmetry can be merged and converted, or left intact (unmerged) and converted. When turned **OFF**, layer symmetry is not exported.
Tessellator	**Fast**- Models triangulate quickly and less accurately. **Accurate** -Models triangulate slowly and more accurately. ■ **Tolerance** – The amount a polygonal surface can deviate from the original NURBS surface. The default value is 0.01. ■ **Limit Edge Length** – If checked, a Max edge length slider controls maximum size of the triangles. If unchecked, there is no limit to the size of the triangles. ■ **Max Edge Length** – The maximum length of any triangle edge (in current linear units).

Types of data exported

The DirectConnect translator for DWF exports only meshes. The Alias scene DAG hierarchy is preserved. Associated color information is also exported.

NOTE For information about options in Alias for data importation, see the Autodesk Alias Help.

DWG DXF



The DWG and DXF file types are drawing files and Drawing eXchange files in the AutoCAD ® software.

Autodesk DirectConnect supports the import of AutoCAD (DWG and DXF) files into the Autodesk Alias, Autodesk Maya, Autodesk Showcase, and Autodesk Opticore Studio software. See installation information in Install Autodesk DirectConnect. (page 7)

Import DWG/DXF files

1 Choose the menu path in your installed Autodesk software product:

Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

2 Browse to, and select a DWG (.dwg) or DXF (.dxf) file.

3 Click **OK**, or **Open** to launch the translator and import the file.

Types of DWG and DXF data imported

- Colors
- Materials
- Lines, arcs, and splines
- Extruded curves
- Extrusions
- Layers
- Meshes
- Surfaces
- Text
- 3D solids

IMPORTANT

- Showcase does not support the AutoCAD material attribute **Illumination**. Alias supports the AutoCAD material attribute **Illumination**; however, it is called **Incandescence**.
- Showcase supports only 3D hierarchical data. It does not support 2D drawings.

NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 45).
- For information about options in Alias for data importation, see the Autodesk Alias Help.
- With **want curves** set to ON, DWG and DXF both support curves and round trip data export. If they do not come in, set **want curves** to ON.

Export DWG/DXF files (Autodesk Alias)

1 In your Autodesk software, choose **File > Save As** ❐, or **File > Export > Active As** ❐.

2 On the **File Formats** menu, click **DWG** or **DXF**. For details about the available options, see the Help in the Autodesk software.

3 Select a **DWG/DXF** version, and click **Save**.

IGES

Initial Graphics Exchange Specification (IGES) is a file format for transferring graphics data between CAD/CAM systems.

Autodesk DirectConnect supports the import and export of the neutral IGES V5.3 (**.iges* or **.igs*) format files in the Autodesk Alias, Autodesk Maya (Wndows version), Autodesk Showcase, Autodesk Opticore Studio, and 3ds Max/3ds Max Design software. See installation information in Install Autodesk DirectConnect. (page 7)

NOTE For information about additional software setup for Autodesk Alias, please see the Autodesk Alias Help.

Import IGES files

1 Choose the menu path in your installed Autodesk software product:

Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya (Windows version)	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import** > **Import Models**

Autodesk Opticore Studio	**File > Import**
3ds Max/3dsMax Design	**Application Menu > Import > Select File to Import dialog**

2 In the browser, select a native IGES V5.3 (**.iges* or **.igs*) file.

3 Click **OK**, or **Open** to launch the translator and import the file into the scene.

Export IGES files

1 In your Autodesk software, choose **File > Save As**, or **File > Export > Active As** ❐ .

2 On the **File Formats** menu, click **DWG** or **DXF**. For details about the available options, see the Help in the Autodesk software.

3 Save to a native IGES V5.3(**.iges* or **.igs*) file.

Troubleshoot (Autodesk Alias)

If the files you import contain unsatisfactory data, change the following import options in Autodesk Alias:

Default Trim Curves Specifies the trim curves that the processor uses. You can select parameter space curves, model space curves, or use the flag that is present in the IGES file. By default, the preference flag in the IGES files is used.

Shrink Surface When turned ON, Alias detects trimmed surfaces with trim boundaries that are the same as, or isoparametric to, the natural boundaries of the untrimmed surface. It then converts these surfaces into Alias surfaces by shrinking the untrimmed surface to the trim boundaries.

When turned OFF, Alias converts all trimmed surfaces of this type to Alias trimmed surfaces.

Types of data imported

The DirectConnect for IGES translator imports ASCII format IGES files with or without linefeed characters at the end of each record. The software does not support Binary IGES files.

The software imports NURBS for this file format and maintains the following information on import:

- Surfaces and curves
- Data organization (groups, layers, visibility, and instances)
- Units
- Colors

NOTE

- For information about this data in your Autodesk software, see Locations of Imported Data (page 1).
- For information about options in Alias for data importation, see the Autodesk Alias Help.

Identify IGES supported entities in log files

The following table shows IGES entities supported on import by DirectConnect for IGES.

NOTE The input translator ignores any entities with an entity use flag value 02 (Definition), except for entity use flag value with IGES Subfigure Definition entity (Type 308).

Type	Form	IGES Entity
100	0	circular arc
102	0	composite curve
104	0-3	conic arc, ellipse, parabola, hyperbola
106	1	copious data
106	2	copious data
106	11	copious data
106	12	copious data

Type	Form	IGES Entity
106	63	closed area
108	0	plane
108	+/- 1	bounded plane
110	0	line
112	0	parametric curve
114	0	parametric surface
116	0	point
118	0 - 1	ruled surface
120	0	surface of revolution
122	0	tabulated cylinder
123	0	direction
124	0	transformation matrix
126	0-5	rational B-spline curve
128	0-9	rational B-spline surface
130	0	offset curve
140	0	offset surface
141	0	boundary entity

Type	Form	IGES Entity
142	0	curve on surface
143	0	boundary surface
144	0	trimmed surface
186	-1,0,1	Manifold Solid BRep Object (MSBO)
190	0,1	plane surface (1)
192	0,1	right circular cylindrical surface
194	0,1	right circular conical surface
196	0,1	spherical surface
198	0,1	toroidal surface
308	0	subfigure definition
402	7, 9	associativity instance
408	0	singular subfigure instance
502	1	vertex list
504	1	edge list
508	0,1	loop
510	1	face
514	1,2	shell

(1)For type 190, 0 means unparameterized surface and 1 parameterized. The plane surface type is unbounded unless it is subordinate to another entity, such as the Bounded Surface Entity (type 143) or the Trimmed parametric Surface Entity (type 144), that references its bounding geometry.

IGES levels

The system adds all supported geometric IGES entities that are associated with IGES level <n> to an Alias layer called LEVEL<n>.

For example, if a 126 B-spline entity directory entry indicates that it is on level 42, then it is added as Layer LEVEL42.

JT

The JT Open Program develops and supports the DirectModel format JT for the visualization of 3D models.

Autodesk DirectConnect supports the import of JT (up to V9.5) files into the Autodesk Alias, Autodesk Maya, Autodesk Showcase, Autodesk Opticore Studio, and 3ds Max/3ds Max Design software. See installation information in Install Autodesk DirectConnect. (page 7)

Import JT files

1 Choose the menu path in your installed Autodesk software product:

Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**

Autodesk Showcase	**File > Import > Import Models**
Autodesk Opticore Studio	**File > Import**
3ds Max/3dsMax Design	**Application Menu > Import > Select File to Import dialog**

2. In the browser, select a (**.jt*) file.
3. Click **OK**, or **Open** to launch the translator and import the file into the scene.

Type of data imported

The software maintains the following information when importing JT files:

- Precise geometric data conversion
- Data organization (parent and child hierarchal data, visibility, and instances)
- Units
- Levels of detail (degrees of tessellation)
- Materials (brightness (shininess), ambient color, specular color, diffuse color, and emission color)
- Textures (embedded image files)
- XT BRep and JT BRep topology

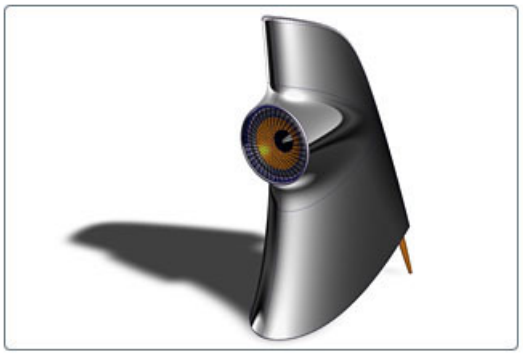
NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 1).
- For Information about Alias options for data importation, see the Autodesk Alias Help.

Limitations

- Import options are not available.
- The software automatically excludes curve geometry and animation when importing a JT file.

NX



NX is a solid modeling package based on the Parasolid kernel. The package contains many (mostly optional) modules, for example CAD, CAM, CAE, sheet metal applications, knowledge bases, quality control, and rapid prototyping. The file structure is binary.

Autodesk DirectConnect supports the import of NX files (UG V13.0 through NX 7.5) into the Autodesk Alias, Autodesk Maya, Autodesk Showcase, Autodesk Opticore Studio, and 3ds Max/3ds Max Design software.

See installation information in the *Install_DirectConnect.pdf* document on the installation CD.

Import NX files

1 Choose the menu path in your installed Autodesk software product:

Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya (Windows version)	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**
3ds Max/3dsMax Design	**Application Menu** > **Import** > **Select File to Import dialog**

2 In the browser, select an NX (version UG V13.0 to NX 7.5) part or assembly*.*prt* file.

   For information about import options in Alias, see the Autodesk Alias Help.

3 Click **OK**, or **Open** to launch the translator and import the file into the scene.

Export NX files - Autodesk Alias, Autodesk Maya

1 In your installed Autodesk software, choose the menu path:

Autodesk Alias	**File** > **Save As** ❐ or **File** > **Export** > **Active As** ❐
Autodesk Maya	**File** > **Export all** or **File** > **Export Selection**

2 In Alias, on the **File Formats** menu, click **NX**.

3 For options, see the Help in the Autodesk software.

4 Click **Save**.

See the Alias documentation for details about building a model for maximum compatibility between NX and Alias.

Supported Alias geometry types for export to NX

The translator does not support non-geometry entities, such as lights, cameras, textures, windows, and animations. The numbers in the table entries refer to *Notes for NX entities* following the table.

Alias Entity	NX Entity
Conic (ellipse/hyperbola/parabola)	Bcurve
Conic	Curve
Circle	Circle
Line	Line
Curve	BCurve

Alias Entity	NX Entity
Surface	BSurface (1), (2)
Trimmed Surface	Face (1), (2)
Plane	Bsurface (1), (2)
Shader	Colour Attribute (3)
Shell (Open)	Sheet Body
Shell (Closed)	Solid Body
Layer	Layer (4)
Category	Category

Notes for NX entities

(1) NX cannot have free-standing surfaces, so it maps all surfaces to faces which must be attached to a sheet body.

(2) Splits appear in surfaces that have internal discontinuities at the discontinuities.

(3) Mapped as a Display Attribute of the mapped surface or shell.

(4) Layer name is not mapped.

Supported Alias NX entities for Alias import

NX Entity Objects	Alias Entity
BSurface	Surface
Bounded Plane	Surface
Cylindrical Surface	Surface

NX Entity Objects	Alias Entity
Conical Surface	Surface
Tabulated Cylinder	Surface
Rules Surface	Surface
Blended Face Surface	Surface
Surface of Revolution	Surface
Offset Surface	Surface
Sculptured Surface	Surface
BCurve	Curve
Line	Line (Curve)
Bcurve	Curve
Point	Point (Curve) (1)
Sheet Body	Shell (Open) (2)
Assembly	Groups/Instance (3)
Layer	Layer
Category	Category

Notes for Alias NX (object) entities

(1) An NX point converts to a degree 1 curve composed of two coincident points. On export to NX, this construction converts back to an NX point.

(2) If the sheet body only points to one face, then Alias converts the face to a trimmed surface.

(3) This is a one-way mapping. Assemblies cannot be exported.

(4) Added as blind data. Can be re-exported.

Types of data imported

We support the import of the following types of NX geometry, and attributes such as name, color, layer, and visibility.

- Point
- Line
- BCurve
- Circle
- Ellipse
- Parabola
- Hyperbola
- Surface Parameter Curve
- Trimmed Curve
- Intersection Curve
- BSurface
- Planar Surface
- Spherical Surface
- Cylindrical Surface
- Conical Surface
- Surface of Revolution
- Spun Surface
- Offset Surface
- Ruled Surface
- Swept Surface
- Toroidal Surface
- Blended Edge Surface
- Blended Bound Surface
- Facet

- Sheet Body
- Solid Body
- Part
- Instance
- Assembly
- Category

Open Inventor and Cosmo

Open Inventor™ is a 3D file format from Silicon Graphics Inc., with no relation to Autodesk Inventor software.

Autodesk DirectConnect supports the import of Open Inventor ASCII or binary (**.iv*) files, or Cosmo 3D™scene binary (**.csb*) files into the Autodesk Alias, Autodesk Maya, Autodesk Showcase, and Autodesk Opticore Studio software. See installation information in Install Autodesk DirectConnect. (page 7).

Import Open Inventor or Cosmo files

1 Choose the menu path in your installed Autodesk software product:

Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya (Windows version)	**File** > **Open Scene** or **File** > **Import**

Autodesk Showcase	**File** > **Import** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

2 Browse to and select an Open Inventor (**.iv*) or Cosmo (**.csb*) file.

3 Click **OK**, or **Open**.
The translator launches and imports the file.

Type of data imported

The software imports polygons and NURBS for these file formats, and maintains the following information on import:

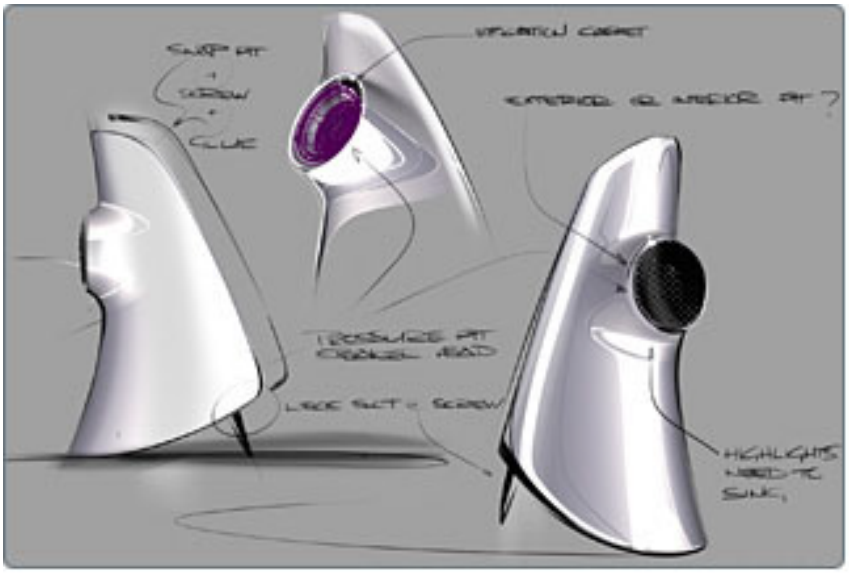
- Data organization (parent, child, and groups)
- Units
- Materials
- Textures
- Polygonal Shapes
- Transformation nodes

NOTE To locate this data in your Autodesk software, see Locations of Imported Data (page 45).

Limitations

When importing Open Inventor files, the system automatically excludes lines, cameras, lights, manipulators, tolerances, and animation.

Pro/ENGINEER



Pro/ENGINEER® is a computer-aided design software application.

Autodesk DirectConnect supports the import of Pro/ENGINEER (Wildfire™ Release 6 or lower and Creo Parametrics) part, assembly, or PTC® Granite® (Release 7 or lower) files (**.prt, *.asm, *.g*) into the Autodesk Alias, Autodesk Maya, Autodesk Opticore Studio, and 3ds Max/3ds Max Design software. See installation information in Install Autodesk DirectConnect. (page 7)

NOTE For information about additional software setup for Autodesk Alias, see the Autodesk Alias Help.

Import Pro/ENGINEER files

1 Choose the menu path in your installed Autodesk software product:

Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya (Windows version)	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import** > **Import Models**

Autodesk Opticore Studio	**File** > **Import**
3ds Max/3dsMax Design	**Application Menu** > **Import** > **Select File to Import dialog**

2 Select a Pro/ENGINEER part(**.prt*), assembly (**.asm*), or Granite (**.g*)) file.

3 Click **OK**, or **Open** to launch the translator and import the file.

NOTE To maintain the original positioning and orientation of part files in your scene, import the assembly file. Importing part files before the assembly file positions all of them at the origin (0,0,0) and removes the original positioning.

Type of data imported

The software imports NURBS for this file format and maintains the following data on import:

- Precise geometric surface and topology information
- Data organization
- Tolerances and units.

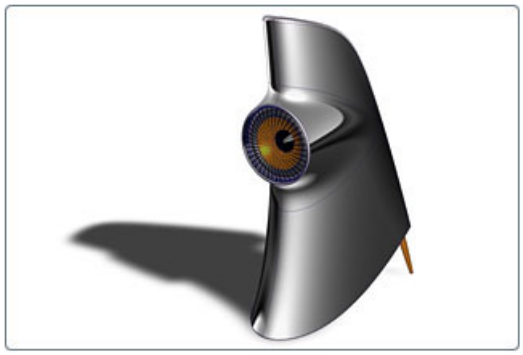
NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 45).
- For information about options in Alias for data importation, see the Autodesk Alias Help.

Limitations

- The software changes node names based on geometry, assembly, or part names.
- When importing a Pro/ENGINEER file, the software automatically excludes construction history, lines, and animation.
- Granite does not support layers or curves.

SolidWorks



SolidWorks® is a computer-aided design software application.

Autodesk DirectConnect supports the import of SolidWorks part **.sldprt* and assembly **.sldasm* files into the Autodesk Alias, Autodesk Maya, Autodesk Showcase, Autodesk Opticore Studio, and 3ds Max/3ds Max Design software. It is required that you install and license SolidWorks 2003-2012 on your machine, and have it running. See installation information in Install Autodesk DirectConnect. (page 7)

NOTE For information about additional software setup for Autodesk Alias, please see the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help.

Import SolidWorks files

NOTE

Before you can import SolidWorks files, purchase, install, and license SolidWorks 2005, 2006, 2007, 2008, 2009, 2010, or 2011 on the same machine, and have it running.

1 Choose the menu path in your installed Autodesk software product:

Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya (Windows version)	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import** > **Import Models**

Autodesk Opticore Studio	**File** > **Import**
3ds Max/3dsMax Design	**Application Menu** > **Import** > **Select File to Import dialog**

2 Select a SolidWorks part (**.sldprt*) or assembly **.sldasm* file. If you cannot see the files, start the SolidWorks software, minimize its window, and then try again to open the files.

3 Click **OK**, or **Open** to launch the translator and import the file into the scene.

NOTE To maintain the original positioning and orientation of part files in your scene, import the assembly file. Importing part files before the assembly file positions all of them at the origin (0,0,0) and removes the original positioning.

Type of data imported

The software imports NURBS for this file format and maintains the following information on import:

- Precise geometric surface and topology information
- Data organization
- Tolerances and unit
- Colors

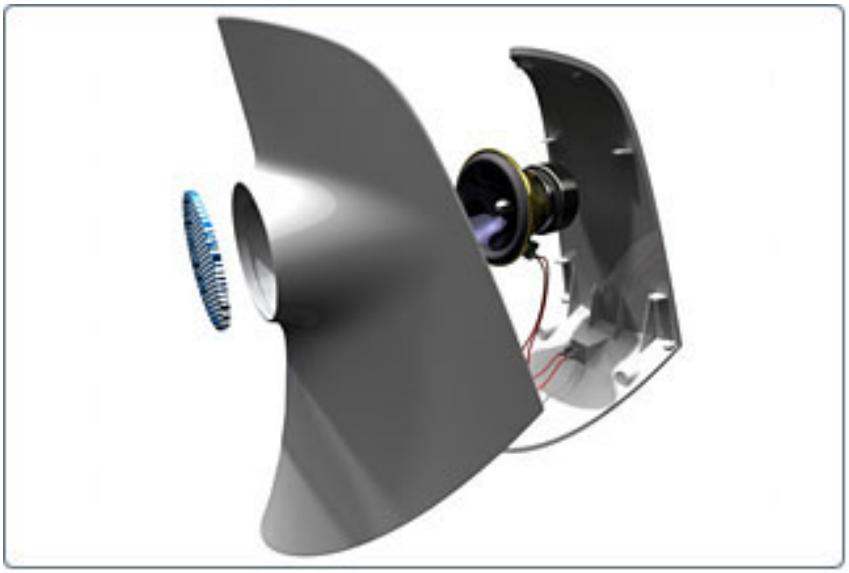
NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 45).
- For information about Alias options for data importation, see the Autodesk Alias Help.

Limitations

When importing SolidWorks files, the software automatically excludes construction history, lines, and animation.

STEP



Standard for the Exchange of Product Data (STEP) is an ISO standard exchange format that multiple programs can recognize. It is used for transferring graphics data between CAD/CAM systems.

Autodesk DirectConnect supports the import of STEP (**.stp* or **.step*) files into the Autodesk Alias, Autodesk Maya, Autodesk Showcase, Autodesk Opticore Studio, and 3ds Max/3ds Max Design software. See installation information in Install Autodesk DirectConnect (page 7).

Import STEP files

1 Choose the menu path in your installed Autodesk software product:

Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya (Windows version)	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

3ds Max/3dsMax Design	**Application Menu > Import > Select File to Import dialog**

2. In the browser, select a native STEP (**.stp* or **.step*) file.
3. Click **OK**, or **Open** to launch the translator and import the file into the scene.

Types of data imported

The software imports NURBS for this file format and maintains the following information on import:

- Precise geometric surface and topology information (ISO 10303:42)
- Data organization (layers)
- Tolerances and units
- Colors

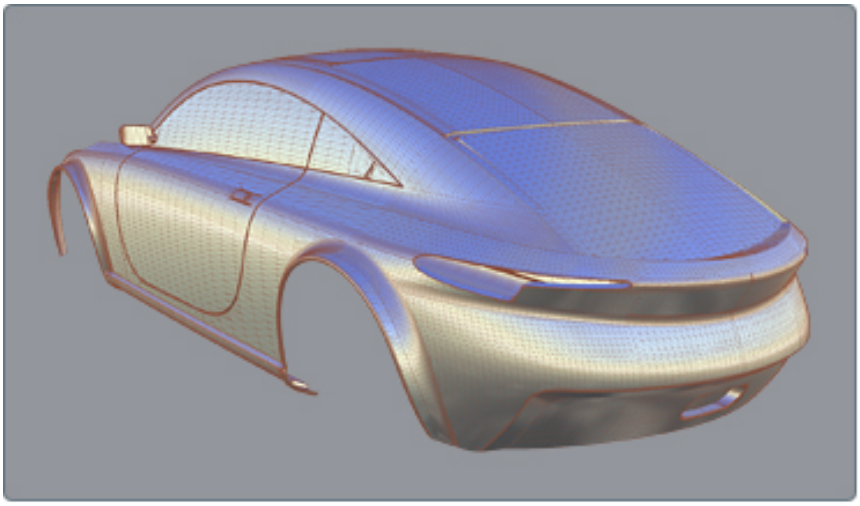
NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 45).
- For information about Alias options for data importation, see the Autodesk Alias Help.

Export STEP files

To export STEP files from the CAD software, use AP203 or AP214 specifications.

STL



STL is a file format native to the stereolithography CAD software created by 3D Systems. Multiple software packages support the STL file format.

Autodesk DirectConnect supports the import of STL files into the Autodesk Alias, Autodesk Maya, Autodesk Showcase, and Autodesk Opticore Studio software, and the export of STL files from the Autodesk Alias and Autodesk Maya software. See installation information in Install Autodesk DirectConnect. (page 7).

Import STL files

1 Choose the menu path in your installed Autodesk software product:

Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya (Windows version)	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

2 In the browser, select a native .stl (Stereolithography) file.

3 Click **OK**, or **Open** to launch the translator and import the file into the scene.

Type of files imported

We support ASCII and binary STL (color STL) files.

NOTE To locate this data in your Autodesk software, see Locations of Imported Data (page 45).

Export STL files

1 In your Autodesk software, choose the appropriate menu item:

Autodesk Alias	**File** > **Export** > **Rapid Prototype**
Autodesk Maya (Windows version)	**File** > **Export All** or **File** > **Export Selection**

2 In Maya, you can specify the file type as either ASCII or binary.

Click **OK**.

In Alias, on the **File Format** menu, click **STL**. You can also specify tolerance levels used in the export of the file.

3 Pick the meshes or shell to export, then click **Accept**.

4 Adjust settings, if necessary, and click **Update**.

5 Click **Accept**.

6 In the **Object name** box (Windows), or **Save As** box (Mac), enter a name for the file, and click **Save**.

ZPR

ZPrint CAD format (ZPR™) is a proprietary file format developed by Z Corporation® and used with ZPrint and ZEdit for printing on high definition color 3D printers.

Autodesk DirectConnect supports the export of ZPR (*.*zpr*) files to use in the Autodesk rapid prototyping solution in the Autodesk Alias, Autodesk Maya, Autodesk Showcase, and Autodesk Opticore Studio software. See installation information in Install Autodesk DirectConnect. (page 7)

Export ZPR files using the output command

1. Select a file to export as a ZPR file.
2. Choose **File > Export > Rapid Prototype.**
3. On the **File Format** menu, click **ZPR** (*.zpr*).

Depending on the entity selected for export, such as a shell, additional setup can be required. For information about additional setup options, see the Autodesk Alias Help.

4. Pick the meshes or shell to export, then click **Accept**.
5. Adjust settings, if necessary, and click **Update**.
6. Click **Accept**.

Types of data exported for ZPR

- Triangle meshes with simple colors.
- Textures for use with ZEdit and Zprint software for rapid prototyping.

Locations of Imported Data

5

Autodesk Alias Data

Data Organization	Tolerances and Units	Colors (Shaders)
Parts and assembly information displays in the **Windows** > **Information** > **Layer Categories** window.	View unit settings at **Preferences** > **Construction Options**.	Colors are visible in the **Render** > **Multi-lister** > **Shaders** window.

For information about these settings, menu items, and options, see the Autodesk® Alias® Help.

Autodesk Maya Data

Data Organization	Tolerances and Units	Colors (Shaders)
To view layer information, display the Layer Editor: click **Display** > **UI Elements** > **Channel Box/Layer Editor** or display the Relationship Editor: click **Window** > **Relationship Editors** > **Display Layers.** To View part and assembly information, click **Window** > **Outliner** or **Window** > **Hypergraph.**	View unit settings at **Window** > **Settings/Preferences** > **Preferences** > **Settings.** Change the **Working Units** and **Tolerance settings**.	Colors are imported as shaders and are visible at **Window** > **Rendering Editors** > **Hypershade.**

For more information about these settings and menu items, see the Autodesk® Maya® Help.

Autodesk Showcase Data

Data Organization	Tolerances and Units	Colors (Shaders)
View Layers, parts, and assembly hierarchies in the Organizer window (**Scene** > **Organizer**). This window shows the original file hierarchy. You can create your own arrangements of objects. You can view and change the state of objects to visible, hidden, or deleted.	Change unit settings in the **Import Status** window (**File** > **Show Status**). See the Showcase documentation for more information. Change tessellation quality in the **Import Status** window. See the Showcase documentation for more information. To adjust the Level of Detail (LOD) for models imported into Showcase, select **Options** > **Performance and Quality**. Then click the **Lock display quality to** button, and adjust the slider to see the different LODs.	Colors are imported as materials and are visible from **Material** > **Material Properties**.

For more information about these settings and menu items, see the Autodesk® Showcase® Help.

Autodesk Opticore Studio Data

Data Organization	Tolerances and Units	Colors (Shaders)
View the node structure in the **Scene Graph Editor**, in the **Window** > **Scene Graph Editor** menu. It opens by default.	There are no units in Studio. All imported data is considered the same unit. Set tolerances for tessellation in the **File** > **Preferences** dialog box, **GeomX** tab. **NOTE** GeomX is not available until you load the GeomX module in the **Modules** tab (in the same dialog box) and restart Studio. Set tessellation tolerances on the **GeomX** tab, **Import tessellation** section. To retessellate, use the **Window** > **GeomX** > **Tessellate** dialog box, and enter new settings.	Colors can be shaders or appearances. In the **Scene Graph Editor,** in **scenegraph**, all colors are visible in the **appearance** field of a **shape node**. Appearances are visible only in the Scene Graph Editor. Shaders are visible in both the Scene Graph Editor and through the **Windows** > **Shader List** dialog box.

For information about these settings, menu items, and options, see the Autodesk® Opticore® Studio Help.

Glossary

ASM (.asm)

A file format used by Pro/ENGINEER to represent an assembly.

assembly

An organizational file that fits together a collection of manufactured parts into a complete model.

BSD license

The Berkeley Software Distribution license for redistribution and use of source code.

CATIA® V4

CATIA V4 is computer-aided design software from Dassault Systèmes. Autodesk DirectConnect allows the exchange of 3D model data from CATIA V4, using `.model`, `.session`, `.exp`, `.dlv`, and `.dlv3` files.

CATIA® V5

CATIA V5 is computer-aided design software from Dassault Systèmes. Autodesk DirectConnect allows the exchange of 3D model data from CATIA V5, using the native CATIA part (`.CATPart`), product (`.CATProduct`), and (.cgr) files.

CGR ® (.cgr)

CATIA Graphical Representation (.cgr) is the triangulated format used by CATIA V5.

Cosmo™

A legacy 3D file format from Silicon Graphics Inc. using efficient binary compression and `*.csb` (Cosmo scene binary) files.

CSB (.csb)

Cosmo 3D™scene binary (*.csb) files.

DLV (.dlv)

A file format used by CATIA V4 computer-aided design software from Dassault Systèmes.

DRAW (DR)

A two-dimensional entity defined in the drafting and detailing world.

DWF™

Design Web Format, a file format developed by Autodesk for web viewing and printing.

DWG™

AutoCAD drawing file) A file format used by Autodesk AutoCAD software that contains lines, curves, and 3D data.

DXF™

(Drawing eXchange File) A file exchange format containing ASCII code and binary representations of the objects in a DWG file.

G (.g)

A file format used by Pro/ENGINEER PTC Granite for import into the Autodesk products that DirectConnect supports.

Granite®

A CAD technology platform for design collaboration using solid models.

IAM (.iam)

A file format in the Autodesk Inventor software represent an assembly.

IGES

(Initial Graphics Exchange Specification) A file format for transferring graphics data between CAD/CAM systems. A neutral file format that can be imported into any number of CAD or modeling packages.

IPT (.ipt)

A file format in the Autodesk Inventor software to represent a part.

IV (.iv)

A file format in the Open Inventor software.

JT

JT is a DirectModel file format that is developed and supported by the JT Open Program for the visualization of 3D models.

NX®

NX is a solid modeling package based on the Parasolid kernel. The package contains many (mostly optional) modules: for example, CAD, CAM, CAE, sheet metal applications, knowledge bases, quality control, and rapid prototyping. The files structure is binary.

Open Inventor™

Open Inventor is a legacy 3D file format from Silicon Graphics, Inc. Open Inventor is not related to Autodesk Inventor software. Open Inventor is an object-oriented 3D toolkit that describes complete 3D scenes, which can be made interactive and that are optimized for OpenGL. It is an ASCII or binary file format.

PCRE

The Perl-compatible regular expressions is a library of functions to support regular expressions, with syntax and semantics as close as possible to the syntax and semantics in the Perl 5 language.

Pro/ENGINEER®

A solid modeling CAD/CAM/CAE software product from Parametric Technology Corporation that requires positional construction tolerances.

PRT (.prt)

A file format used by NX to represent a part or assembly file.

SLDASM (.sldasm)

A file format used by SolidWorks to represent an assembly file.

.sldprt

A file format used by SolidWorks to represent a part file.

SolidWorks®

A solid modeling CAD/CAM/CAE software product from SolidWorks Corporation that requires positional construction tolerances.

SPACE (SP)

A three-dimensional entity defined in the 3D modeling world.

SPF

Alias SPF (Studio Packet File) is a native file format used by Autodesk Alias software, with the extension .wire.

STEP (.step)

An international standard for the exchange of geometric product definitions. STEP formats that are relevant to Autodesk products are AP203 (general mechanical CAD) and AP214 (automotive CAD).

STL

An STL (StereoLithography) file is a triangular representation of 3D surface geometry. The surface is tessellated, or broken down logically into a series of small triangles (facets). A perpendicular direction and three points representing the vertices (corners) of the triangle describe each facet.

STP (.stp)

A file format used in STEP (Standard for the Exchange of Product Data) for transferring graphics data between CAD/CAM systems.

V3Rx

A file format generated by a version of CATIA that is older than V4.

ZPR

ZPrint CAD format (ZPR) is a proprietary file format developed by Z Corporation. It is used with ZPrint and ZEdit for printing on high definition color 3D printers. Autodesk Direct lets you export files in ZPR (*.zpr) format to use in the Autodesk Rapid Prototyping solution.

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