

IRIS Inventor™
Nodes Quick Reference

Release 1.0

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Table of Contents

Section 1 Node Classes by Category	1
Table 1-1 Shape Node Classes.....	1
Table 1-2 Property Node Classes.....	2
Table 1-3 Group Node Classes	3
Table 1-4 Light Node Classes.....	3
Table 1-5 Camera Node Classes	3
Section 2 Inventor Nodes/ File Format Quick Reference.....	4
Table 2-1 Inventor Nodes/ File Format Quick Reference.....	4

This document provides reference information on Inventor nodes. It is especially useful as a quick reference for the Inventor file format. The following sections are included:

- A set of tables grouping node classes according to general usage
- A quick reference table for nodes

1 Node Classes by Category

The tables in this section group Inventor node classes according to usage. The categories are

- Shapes
- Properties
- Groups
- Lights
- Cameras

`SoCallback` and `SoEventCallback`, general-purpose nodes, do not fall into any of these categories and are therefore not included in any table. **Boldface type** in the tables indicates an abstract base class.

<code>SoCone</code>	<code>SoNonIndexedShape</code>
<code>SoCube</code>	<code>SoNurbsCurve</code>
<code>SoCylinder</code>	<code>SoNurbsSurface</code>
<code>SoFaceSet</code>	<code>SoPointSet</code>
<code>SoIndexedFaceSet</code>	<code>SoQuadMesh</code>
<code>SoIndexedLineSet</code>	<code>SoShape</code>
<code>SoIndexedNurbsCurve</code>	<code>SoSphere</code>
<code>SoIndexedNurbsSurface</code>	<code>SoText2</code>
<code>SoIndexedShape</code>	<code>SoText3</code>
<code>SoIndexedTriangleMesh</code>	<code>SoTriangleStripSet</code>
<code>SoLineSet</code>	<code>SoVertexShape</code>

Table 1-1 Shape Node Classes

SoBaseColor	SoProfileCoordinate2
SoComplexity	SoProfileCoordinate3
SoCoordinate3	SoResetTransform
SoCoordinate4	SoRotation
SoDrawStyle	SoRotationXYZ
SoEnvironment	SoScale
SoFont	SoShapeHints
SoInfo	SoTexture2
SoLabel	SoTexture2Transform
SoLightModel	SoTextureCoordinate2
SoLinearProfile	SoTextureCoordinate- Binding
SoMaterial	SoTextureCoordinateCube
SoMaterialBinding	SoTextureCoordinate- Cylinder
SoMatrixTransform	SoTextureCoordinate- Environment
SoNormal	SoTextureCoordinate- Function
SoNormalBinding	SoTextureCoordinatePlane
SoNurbsProfile	SoTextureCoordinate- Sphere
SoPackedColor	SoTransform
SoPickStyle	SoTranslation
SoProfile	SoUnits

Table 1-2 Property Node Classes

SoArray
SoCustomNode
SoFile
SoGroup
SoLayerGroup
SoMultipleCopy
SoPathSwitch
SoSelection
SoSeparator
SoSwitch

Table 1-3 Group Node Classes

SoDirectionalLight
SoLight
SoPointLight
SoSpotLight

Table 1-4 Light Node Classes

SoCamera
SoOrthographicCamera
SoPerspectiveCamera

Table 1-5 Camera Node Classes

2 Inventor Nodes/ File Format Quick Reference

Node	Field	Default Value	Value Type	Value Range	Description
Array					
	numElements1	1	SoSFShort	> 0	Group node that creates a regular <i>IxJxK</i> array of copies of children, separated in space by arbitrary 3D vectors
	numElements2	1	SoSFShort	> 0	
	numElements3	1	SoSFShort	> 0	
	separation1	1 0 0	SoSFVec3f	any	
	separation2	0 1 0	SoSFVec3f	any	
	separation3	0 0 1	SoSFVec3f	any	
	origin	FIRST	SoSFEnum	FIRST CENTER LAST	
BaseColor					
	rgb	[0.8 0.8 0.8]	SoMFColor	0 – 1	Defines an object's base/diffuse color
Callback					
	none	none	none	none	Provides custom behavior during action traversal
Complexity					
	type	OBJECT_SPACE	SoSFEnum	OBJECT_SPACE SCREEN_SPACE BOUNDING_BOX	Controls shape complexity
	value	0.5	SoSFFloat	0 – 1	
Cone					
	parts	ALL	SoSFBitMask	SIDES BOTTOM ALL	Represents a cone shape
	bottomRadius	1	SoSFFloat	> 0	
	height	2	SoSFFloat	> 0	
Coordinate3					
	point	[0 0 0]	SoMFVec3f	any	Defines coordinates, vertices, or control points for shapes

Table 2-1 Inventor Nodes/ File Format Quick Reference

Node	Field	Default Value	Value Type	Value Range	Description
Coordinate4	point	[0 0 0 1]	SoMFVec4f	any	Defines rational coordinates, vertices, or control points for shapes
Cube	width	2	SoSFFloat	> 0	Represents a cube shape
	height	2	SoSFFloat	> 0	
	depth	2	SoSFFloat	> 0	
CustomNode	className	[""]	SoMFName	any	A user-defined node with custom data
	fields	[""]	SoMFString	any	
	customData	[""]	SoMFString	any	
Cylinder	parts	ALL	SoSFBitMask	SIDES TOP BOTTOM ALL	Represents a cylinder shape
	radius	1	SoSFFloat	> 0	
	height	2	SoSFFloat	> 0	
DirectionalLight	intensity	1	SoSFFloat	0 – 1	Represents a directional light source
	color	1 1 1	SoSFColor	0 – 1	
	direction	0 0 -1	SoSFVec3f	any unit vector	
DrawStyle	style	FILLED	SoSFEnum	FILLED LINES POINTS INVISIBLE	Defines a drawing style
	lineWidth	1	SoSFShort	> 0	
	linePattern	0xffff	SoSFUShort	any	

Table 2-1 Inventor Nodes/ File Format Quick Reference (continued)

Node	Field	Default Value	Value Type	Value Range	Description
Environment					
	ambient-Intensity	0.2	SoSFFloat	0 – 1	Defines the global environment, including attributes for fog and ambient lighting
	ambientColor	1 1 1	SoSFColor	0 – 1	
	attenuation	0 0 1	SoSFVec3f	≥ 0	
	fogType	NONE	SoSFEnum	NONE LINEAR EXPONENTIAL EXPONENTIAL_SQUARED	
	fogComputed	PER_VERTEX	SoSFEnum	PER_VERTEX PER_PIXEL	
	fogColor	1 1 1	SoSFColor	0 – 1	
	fogDensity	0	SoSFFloat	0 – 1	
	fogNear-Distance	1	SoSFFloat	≥ 0	
	fogFarDistance	10	SoSFFloat	> fogNearDistance	
FaceSet					
	startIndex	0	SoSFLong	≥ 0	Shape node that constructs faces from the current coordinates
	numVertices	[-1]	SoMFLong	-1 (SO_FACE_SET_USE_REST_OF_VERTICES) or ≥ 0	
File					
	name	""	SoSFName	any	Group node that reads children from a named file
Font					
	name	"defaultFont"	SoSFName	any	Defines the font type and size for all subsequent text shapes
	size	10	SoSFFloat	> 0	
Group					
					Group node base class
IndexedFaceSet					
	coordIndex	[0]	SoMFLong	-1 (SO_END_FACE_INDEX) or ≥ 0	Constructs a 3D shape by drawing its faces from an indexed list of vertices
	materialIndex	[-1]	SoMFLong	(see above)	
	normalIndex	[-1]	SoMFLong	(see above)	
	textureCoord-Index	[-1]	SoMFLong	(see above)	

Table 2-1 Inventor Nodes/ File Format Quick Reference (continued)

Node	Field	Default Value	Value Type	Value Range	Description
IndexedLineSet					
	coordIndex	[0]	SoMFLong	-1 (SO_END_LINE_INDEX) or ≥ 0	Constructs a 3D polyline shape from an indexed list of vertices
	materialIndex	[-1]	SoMFLong	(see above)	
	normalIndex	[-1]	SoMFLong	(see above)	
	textureCoord-Index	[-1]	SoMFLong	(see above)	
IndexedNurbsCurve					
	coordIndex	[0]	SoMFLong	0 ≥ 0	NURBS curve shape node whose control points are indexed coordinates
	knotVector	[0]	SoMFFloat	Refer to <i>Inventor Programming Guide</i> , Vol. I, Ch. 8, for information on restrictions to knot vectors.	
IndexedNurbsSurface					
	numUControl-Points	0	SoSFLong	≥ 0	NURBS surface shape node whose control points are indexed coordinates
	numVControl-Points	0	SoSFLong	≥ 0	
	numSControl-Points	0	SoSFLong	≥ 0	
	numTControl-Points	0	SoSFLong	≥ 0	
	coordIndex	[0]	SoMFLong	≥ 0	
	uKnotVector	[0]	SoMFFloat	Refer to <i>Inventor Programming Guide</i> , Vol. I, Ch. 8, for information on restrictions to knot vectors.	
	vKnotVector	[0]	SoMFFloat		
	sKnotVector	[0]	SoMFFloat		
	tKnotVector	[0]	SoMFFloat		
	textureCoord-Index	[-1]	SoMFLong	$\geq 0, -1$	
IndexedTriangleMesh					
	coordIndex	[0]	SoMFLong	-1 (SO_END_MESH_INDEX) -2 (SO_SWAP_MESH_INDEX) or ≥ 0	Constructs a triangle mesh from an indexed list of vertices
	materialIndex	[-1]	SoMFLong	(see above)	
	normalIndex	[-1]	SoMFLong	(see above)	
	textureCoord-Index	[-1]	SoMFLong	(see above)	

Table 2-1 Inventor Nodes/ File Format Quick Reference (continued)

Node	Field	Default Value	Value Type	Value Range	Description
Info	string	""	SoSFString	any	Contains an information text string
Label	label	""	SoSFName	any	Contains a label text string
LayerGroup					Defines a layered group
LightModel	model	PHONG	SoSFEnum	BASE_COLOR PHONG DEPTH	Defines the lighting model to use when rendering
	nearColor	1 1 1	SoSFColor	0 – 1	
	farColor	0 0 0	SoSFColor	0 – 1	
LinearProfile	index	[0]	SoMFLong	≥ 0	Piecewise-linear profile curve
	linkage	START_FIRST	SoSFEnum	START_FIRST START_NEW ADD_TO_CURRENT	
LineSet	startIndex	0	SoSFLong	≥ 0	Shape node that constructs polylines from the current coordinates
	numVertices	[-1]	SoMFLong	-1 (SO_LINE_SET_- USE_REST_OF_- VERTICES) or ≥ 0	
Material	ambientColor	[0.2 0.2 0.2]	SoMFColor	0 – 1	Surface material node
	diffuseColor	[0.8 0.8 0.8]	SoMFColor	0 – 1	
	specularColor	[0 0 0]	SoMFColor	0 – 1	
	emissiveColor	[0 0 0]	SoMFColor	0 – 1	
	shininess	[0]	SoMFFloat	0 – 1	
	transparency	[0]	SoMFFloat	0 – 1	

Table 2-1 Inventor Nodes/ File Format Quick Reference (continued)

Node	Field	Default Value	Value Type	Value Range	Description
MaterialBinding					
	value	DEFAULT	SoSFEnum	DEFAULT NONE OVERALL PER_PART PER_FACE PER_FACE_- INDEXED PER_VERTEX PER_VERTEX_- INDEXED	Specifies how materials are bound to shapes
MatrixTransform					
	matrix	[1 0 0 0 1 0 0 0 1 0 0 0 1]	SoSFMatrix	any	Specifies a 3D geometric transformation as a matrix
MultipleCopy					
	matrix	[1 0 0 0 1 0 0 0 1 0 0 0 1]	SoMFMatrix	any	Group node that traverses its children multiple times, applying a different transformation matrix each time
Normal					
	vector	[0 0 1]	SoMFVec3f	any unit vector	Defines surface normals for shapes
NormalBinding					
	value	DEFAULT	SoSFEnum	DEFAULT NONE OVERALL PER_PART PER_FACE PER_FACE_- INDEXED PER_VERTEX PER_VERTEX_- INDEXED	Specifies how surface normals are bound to shapes

Table 2-1 Inventor Nodes/ File Format Quick Reference (continued)

Node	Field	Default Value	Value Type	Value Range	Description
NurbsCurve	numControl-Points	0	SoSFLong	≥ 0	NURBS curve shape node
	knotVector	[0]	SoMFFloat	Refer to <i>Inventor Programming Guide</i> , Vol. I, Ch. 8, for information on restrictions to knot vectors.	
NurbsProfile	knotVector	[0]	SoMFFloat	Refer to <i>Inventor Programming Guide</i> , Vol. I, Ch. 8, for information on restrictions to knot vectors.	NURBS profile curve
	index	[0]	SoMFLong	≥ 0	
	linkage	START_FIRST	SoSFEnum	START_FIRST START_NEW ADD_TO_CURRENT	
NurbsSurface	numUControl-Points	0	SoSFLong	≥ 0	NURBS surface shape node
	numVControl-Points	0	SoSFLong	≥ 0	
	numSControl-Points	0	SoSFLong	≥ 0	
	numTControl-Points	0	SoSFLong	≥ 0	
	uKnotVector	[0]	SoMFFloat	Refer to <i>Inventor Programming Guide</i> , Vol. I, Ch. 8, for information on restrictions to knot vectors.	
	vKnotVector	[0]	SoMFFloat		
	sKnotVector	[0]	SoMFFloat		
	tKnotVector	[0]	SoMFFloat		

Table 2-1 Inventor Nodes/ File Format Quick Reference (continued)

Node	Field	Default Value	Value Type	Value Range	Description
OrthographicCamera					
					Defines an orthographic camera
	viewport-Mapping	ADJUST_CAMERA	SoSFEnum	ADJUST_CAMERA CROP_VIEWPORT_FILL_FRAME CROP_VIEWPORT_LINE_FRAME CROP_VIEWPORT_NO_FRAME LEAVE_ALONE	
	position	0 0 1	SoSFVec3f	any	
	orientation	0 0 1 0	SoSFRotation	any	
	aspectRatio	1	SoSFFloat	> 0	
	nearDistance	1	SoSFFloat	any	
	farDistance	10	SoSFFloat	> nearDistance	
	focalDistance	5	SoSFFloat	any	
	height	2	SoSFFloat	> 0	
PackedColor					
	rgba	[0xffccccc]	SoMFULong	any	Defines an object's base color using packed colors
PathSwitch					
	path		SoSFPath	any	Group node that traverses only the child that matches a path field
PerspectiveCamera					
					Defines a perspective camera node
	viewport-Mapping	ADJUST_CAMERA	SoSFEnum	ADJUST_CAMERA CROP_VIEWPORT_FILL_FRAME CROP_VIEWPORT_LINE_FRAME CROP_VIEWPORT_NO_FRAME LEAVE_ALONE	
	position	0 0 1	SoSFVec3f	any	
	orientation	0 0 1 0	SoSFRotation	any	
	aspectRatio	1	SoSFFloat	> 0	
	nearDistance	1	SoSFFloat	any	
	farDistance	10	SoSFFloat	> nearDistance	
	focalDistance	5	SoSFFloat	any	
	heightAngle	0.785398 ($\pi/4$)	SoSFFloat	> 0 , < π	

Table 2-1 Inventor Nodes/ File Format Quick Reference (continued)

Node	Field	Default Value	Value Type	Value Range	Description
PickStyle	style	PICKABLE	SoSFEnum	PICKABLE UNPICKABLE	Defines a picking style
PointLight	intensity	1	SoSFFloat	0 – 1	Represents a point light source
	color	1 1 1	SoSFColor	0 – 1	
	location	0 0 1	SoSFVec3f	any	
PointSet	startIndex	0	SoSFLong	≥ 0	Shape node that creates points at the current coordinates
	numPoints	-1	SoSFLong	-1 (SO_POINT_SET_USE_REST_OF_VERTICES) or ≥ 0	
ProfileCoordinate2	point	[0 0]	SoMFVec2f	any	Nonrational profile coordinate node
ProfileCoordinate3	point	[0 0 1]	SoMFVec3f	any	Rational profile coordinate node
QuadMesh	startIndex	0	SoSFLong	≥ 0	Quadrilateral mesh shape node
	verticesPer-Column	1	SoSFLong	≥ 1	
	verticesPerRow	1	SoSFLong	≥ 1	
ResetTransform	whatToReset	TRANSFORM	SoSFBitMask	TRANSFORM BBOX	Resets the current transformation to identity; resets the current bounding box to empty
Rotation	rotation	0 0 1 0	SoSFRotation	any	Represents a 3D rotation about an arbitrary axis

Table 2-1 Inventor Nodes/ File Format Quick Reference (continued)

Node	Field	Default Value	Value Type	Value Range	Description
RotationXYZ					
	axis	X	SoSFEnum	X Y Z	Represents a 3D rotation about the x axis, y axis, or z axis
	angle	0	SoSFFloat	any	
Scale					
	scaleFactor	1 1 1	SoSFVec3f	> 0	Represents a 3D geometric scale
ShapeHints					
	hints	SURFACE	SoSFBitMask	SOLID ORDERED CONVEX SURFACE UNORDERED CONCAVE	Provides hints about subsequent shapes
	creaseAngle	0.5	SoSFFloat	any	
Sphere					
	radius	1	SoSFFloat	> 0	Represents a sphere shape
SpotLight					
	intensity	1	SoSFFloat	0 – 1	Represents a spotlight source
	color	1 1 1	SoSFColor	0 – 1	
	location	0 0 1	SoSFVec3f	any	
	direction	0 0 -1	SoSFVec3f	any unit vector	
	dropOffRate	0	SoSFFloat	0 – 1	
	cutOffAngle	0.785398 ($\pi/4$)	SoSFFloat	0 – π	
Switch					
	whichChild	-1	SoSFLong	-1 (SO_SWITCH_-NONE) -2 (SO_SWITCH_-INHERIT) -3 (SO_SWITCH_-ALL) or ≥ 0	Group node that traverses one chosen child
Text2					
	string	[""]	SoMFString	any	Screen-aligned 2D text node
	spacing	1	SoSFFloat	any	
	justification	LEFT	SoSFEnum	LEFT RIGHT CENTER	

Table 2-1 Inventor Nodes/ File Format Quick Reference (continued)

Node	Field	Default Value	Value Type	Value Range	Description
Text3					
	string	[""]	SoMFString	any	3D text node
	spacing	1	SoSFFloat	any	
	justification	LEFT	SoSFEnum	LEFT RIGHT CENTER	
	parts	ALL	SoSFBitMask	SIDES FRONT BACK ALL	
Texture2					
	component	INTENSITY	SoSFBitMask	INTENSITY TRANSPARENCY	Texture map node
	filename	""	SoSFName	any	
	minFilter	BILINEAR	SoSFEnum	POINT BILINEAR MIPMAP_POINT MIPMAP_LINEAR MIPMAP_BILINEAR MIPMAP_TRILINEAR	
	magFilter	BILINEAR	SoSFEnum	POINT BILINEAR	
	wrapS	REPEAT	SoSFEnum	REPEAT CLAMP	
	wrapT	REPEAT	SoSFEnum	REPEAT CLAMP	
	model	MODULATE	SoSFEnum	MODULATE DECAL BLEND	
	blendColor	1 1 1	SoSFColor	0 – 1	
	translation	0 0	SoSFVec2f	any	
	scaleFactor	1 1	SoSFVec2f	> 0	
	rotation	0	SoSFFloat	any	
	center	0 0	SoSFVec2f	any	
Texture2Transform					
	translation	0 0	SoSFVec2f	any	2D texture transformation node
	rotation	0	SoSFFloat	any	
	scaleFactor	1 1	SoSFVec2f	> 0	
	center	0 0	SoSFVec2f	any	
TextureCoordinate2					
	point	[0 0]	SoMFVec2f	any	Defines 2D texture coordinates

Table 2-1 Inventor Nodes/ File Format Quick Reference (continued)

Node	Field	Default Value	Value Type	Value Range	Description
TextureCoordinateBinding					
	value	DEFAULT	SoSFEnum	DEFAULT PER_VERTEX PER_VERTEX_INDEXED	Specifies how texture coordinates are bound to shapes
TextureCoordinateCube					
	coord	ALL	SoSFEnum	S T ALL	Specifies texture coordinates by projection from a cube
	center	0 0 0	SoSFVec3f	any	
	rotation	0 0 1 0	SoSFRotation	any	
TextureCoordinateCylinder					
	coord	ALL	SoSFEnum	S T ALL	Specifies texture coordinates by projection from a cylinder
	center	0 0 0	SoSFVec3f	any	
	rotation	0 0 1 0	SoSFRotation	any	
	height	1	SoSFFloat	> 0	
TextureCoordinateEnvironment					
	coord	ALL	SoSFEnum	S T ALL	Specifies texture coordinates by reflecting an eye vector around the normal vector at each vertex
TextureCoordinatePlane					
	coord	ALL	SoSFEnum	S T ALL	Specifies texture coordinates by projection from a plane
	normal	1 0 0	SoSFVec3f	any unit vector	
	distanceFrom- Origin	0	SoSFFloat	any	
	repeatInterval	1	SoSFFloat	any	
TextureCoordinateSphere					
	coord	ALL	SoSFEnum	S T ALL	Specifies texture coordinates by projection from a sphere
	center	0 0 0	SoSFVec3f	any	
	rotation	0 0 1 0	SoSFRotation	any	

Table 2-1 Inventor Nodes/ File Format Quick Reference (continued)

Node	Field	Default Value	Value Type	Value Range	Description
Transform	translation	0 0 0	SoSFVec3f	any	Represents a 3D geometric transformation
	rotation	0 0 1 0	SoSFRotation	any	
	scaleFactor	1 1 1	SoSFVec3f	> 0	
	scaleOrientation	0 0 1 0	SoSFRotation	any	
	center	0 0 0	SoSFVec3f	any	
Translation	translation	0 0 0	SoSFVec3f	any	Represents a 3D geometric translation
TriangleStripSet	startIndex	0	SoSFLong	≥ 0	Shape node that constructs strips of triangular faces from the current coordinates
	numVertices	[-1]	SoMFLong	-1 (SO_TRI_STRIP_SET_USE_REST_OF_VERTICES) or ≥ 0	
Units	units	METERS	SoSFEnum	METERS CENTIMETERS MILLIMETERS MICROMETERS MICRONS NANOMETERS ANGSTROMS KILOMETERS FEET INCHES POINTS YARDS MILES NAUTICAL_MILES	Scales to convert units of length

Table 2-1 Inventor Nodes/ File Format Quick Reference (continued)