

N I N T E N D O
NITRO-System

g3dcvtr

G3D Binary Converter

Version 0.1.3

The contents of this document are strictly
confidential and should be handled accordingly.

Table of Contents

1	Introduction	4
2	How to Use g3dcvtr	5
2.1	Command Line Description	5
2.1.1	Specifying File Names of Multiple Intermediate Files	5
2.1.2	Options.....	6
3	Converting the Intermediate File	7
3.1	Converting Model Data	7
3.1.1	Selecting the Output of the Model Binary Data	7
3.1.2	Storing in the Matrix Stack	7
3.1.3	Sharing of Textures among Models	7
3.1.4	Outputting the Material Texture Matrix Field	8
3.2	Converting Character Animation Data	8
3.2.1	Suppressing the Output Content of the Character Animation Data	8
3.3	Converting Material Animation Data	8
3.3.1	Converting Material Color Animation Data.....	8
3.3.2	Converting Texture SRT Animation Data	9
3.3.3	Converting Texture Pattern Animation Data.....	9
3.3.4	Converting Visibility Animation Data	9
3.4	Limitation on the Name Length.....	9
3.5	Restrictions on the Number of Files that can be Packed	9
4	Utilities Feature.....	10

Tables

Table 2-1	Intermediate files that g3dcvtr can convert.....	5
Table 2-2	g3dcvtr Option Descriptions	6
Table 3-1	Output Option Descriptions	7
Table 3-2	Matrix Option Description	7
Table 3-3	Character Animation Data Output Option Description.....	8

Revision History

Version	Date	Description
0.1.3	05/11/2005	Added note on packing restrictions.
0.1.2	10/12/2004	Added a description of the <code>-texsrt</code> option.
0.1.1	9/02/2004	Added description regarding the file indexing specification.
0.1.0	8/12/2004	Initial version.

1 Introduction

G3D Library uses binary format for drawing data. The NITRO-System includes the g3dcvtr converter, which converts XML format NITRO intermediate files to binary files for use with the G3D Library.

2 How to Use g3dcvtr

`g3dcvtr` is a command line application that operates on Windows and is used for converting the NITRO intermediate file in the NITRO-System to the binary format file utilized by the G3D Library. With `g3dcvtr` it is possible to convert the six types of intermediate file shown in Table 2-1. The content to be converted is automatically determined from the extension of the intermediate file name specified by the `g3dcvtr` argument.

Table 2-1 Intermediate files that `g3dcvtr` can convert

Extension	Type of Intermediate File	File Description
imd	Model data	Model information including polygons, parent/child structure, materials, and textures.
ica	Character animation data	Animation data that operates the node matrix.
iva	Visibility animation data	Animation data that operates the node visibility.
ima	Material color animation data	Animation data that operates the material colors.
itp	Texture pattern animation data	Animation data that cycles through multiple textures.
ita	Texture SRT animation data	Animation data that operates the texture matrix.

2.1 Command Line Description

`g3dcvtr` is used in the following format.

```
g3dcvtr Intermediate_file_name ... [option] ...
```

2.1.1 Specifying File Names of Multiple Intermediate Files

Multiple intermediate files can be specified with `g3dcvtr` at once. If multiple intermediate file names are specified in the command line, `g3dcvtr` converts these intermediate files and outputs by packing them into a single binary file. If the intermediate files are not all the same type, an error is generated.

The output binary can be accessed by using the index that starts at 0, in the order that was specified by the argument. It can also be accessed by using a file name (by eliminating the file extension to limit the length of the file name to 16 characters or less). Additionally, to specify multiple intermediate file names, the `-o` option must be specified at the same time to specify the output file name.

2.1.2 Options

The `g3dcvtr` options are characters or character strings that begin with a hyphen (-). The option is described after the intermediate file name. The following options can be specified regardless of the content being converted.

Table 2-2 g3dcvtr Option Descriptions

Option	Description
<code>-h / --help</code>	Display help message and exit.
<code>-o <output></code>	Specify output file name. If the file extension was omitted, the proper one is automatically added.
<code>--version</code>	Display the <code>g3dcvtr</code> version information and exit.

Besides these common options, unique options for each conversion type exist for `g3dcvtr`. These unique options are introduced with their respective chapters.

3 Converting the Intermediate File

3.1 Converting Model Data

If the model data file (file extension: `.imd`) is specified in the `g3dcvtr` intermediate file name, it is converted to the model binary file (file extension: `.nsbmd`) used with the G3D Library.

3.1.1 Selecting the Output of the Model Binary Data

The output content can be selected by specifying any of the options below when converting the model data. If these options are omitted, they are converted as if `-eboth` was specified.

Table 3-1 Output Option Descriptions

Option	Description
<code>-etex</code>	Outputs only the texture data. The extension of the output file is <code>.nsbtex</code> .
<code>-emdl</code>	Outputs only the model structure to the file. The extension of the output file is <code>.nsbmd</code> .
<code>-eboth</code>	Outputs a file that includes both the model structure and texture data. The extension of the output file is <code>.nsbmd</code> (default conversion operation).

3.1.2 Storing in the Matrix Stack

Options for G3D Library drawing can be specified when converting the model.

Table 3-2 Matrix Option Description

Option	Description
<code>-s</code>	Stores all of the joint matrixes in the matrix stack.

If the `-s` option is specified, `g3dcvtr` converts all of the joint matrixes used in the model drawing to be stored in the matrix stack. If there are 32 or more joint matrixes in the model, an error results. Storing the joint matrixes in the matrix stack simplifies obtaining the calculation result of the joint matrix from the application.

3.1.3 Sharing of Textures among Models

If multiple model intermediate files are specified in the command line and multiple model data is stored in one binary file. And if the same texture is used for all that model data, the texture is converted in a way that allows it to be shared.

By comparing the texture name and content, it is determined whether or not the same texture is used. If the texture name is the same but the content is different, an error occurs.

3.1.4 Outputting the Material Texture Matrix Field

When converting model data, you can specify an option that controls the output of the material's texture matrix field.

Option Name	Description
--texsrt	Always outputs the material's texture matrix field to the .nsbmd file.

Normally, `g3dcvtr` does not output the material's texture matrix field to the .nsbmd file when the texture has the Scale of 1 and there are no rotations or translations. When the `--texsrt` option is specified, `g3dcvtr` suppresses this process so that the material's texture matrix field is always output to the .nsbmd file.

Use this option to ensure that the material's texture matrix field is included in the .nsbmd file, so an application program can modify the material's texture matrix.

3.2 Converting Character Animation Data

If the character animation data file (file extension: .ica) is specified in the `g3dcvtr` intermediate file name, it is converted to the character animation binary file (file extension: .nsbca) used with the G3D Library. The number of unique rotation matrices in the character animation data that is converted must be 32,767 or less.

3.2.1 Suppressing the Output Content of the Character Animation Data

The content output when converting model data can be suppressed by specifying the following options. As for the omitted data, information from the model data is used during playback. If these options are not used, all of the data is output without any omissions.

Table 3-3 Character Animation Data Output Option Description

Option	Option Name	Description
-OT	--OmitTranslation	Omits translation data The translation data of the root node is never omitted.
-OS	--OmitScale	Omits scaling data
-OR	--OmitRotation	Omits rotation data

3.3 Converting Material Animation Data

NITRO-System has four types of material animation.

3.3.1 Converting Material Color Animation Data

If material color animation data (file extension: .ima) is specified in the `g3dcvtr` intermediate file name, it is converted to the material color animation binary file (file extension: .nsbma) used with the G3D Library.

3.3.2 Converting Texture SRT Animation Data

If texture SRT animation data (file extension: `.ita`) is specified in the `g3dcvtr` intermediate file name, it is converted to the texture SRT animation binary file (file extension: `.nsbta`) used with the G3D Library.

3.3.3 Converting Texture Pattern Animation Data

If texture pattern animation data (file extension: `.itp`) is specified in the `g3dcvtr` intermediate file name, it is converted to the texture pattern animation binary file (file extension: `.nsbtp`) used with the G3D Library.

3.3.4 Converting Visibility Animation Data

If visibility animation data (file extension: `.iva`) is specified in the `g3dcvtr` intermediate file name, it is converted to the visibility animation binary file (file extension: `.nsbva`) used with the G3D Library.

3.4 Limitation on the Name Length

To speed up processes with the G3D library, the length of the joint name, material name, texture name, palette name and polygon name are limited to 16 characters.

If the name length of each type used with `g3dcvtr` in the intermediate file exceeds sixteen, everything past the sixteenth character is truncated. A warning occurs whenever such truncation happens. If this truncation of the file name results in a duplication of names an error results.

3.5 Restrictions on the Number of Files that can be Packed

The maximum number of files that can be packed into a single binary file is 255.

4 Utilities Feature

By specifying the binary file used with the G3D Library in the `g3dcvtr` command line you can display (output to standard output) information about the content of the corresponding binary file.

This converter uses software developed by the Apache Software Foundation (<http://www.apache.org/>).

The Apache Software License, Version 1.1

Copyright (c) 1999 The Apache Software Foundation. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The end-user documentation included with the redistribution, if any, must include the following acknowledgment:
"This product includes software developed by the Apache Software Foundation (<http://www.apache.org/>)."
Alternately, this acknowledgment may appear in the software itself,
if and wherever such third-party acknowledgments normally appear.
4. The names "Xerces" and "Apache Software Foundation" must not be used to endorse or promote products derived from this software without prior written permission. For written permission, please contact apache@apache.org.
5. Products derived from this software may not be called "Apache", nor may "Apache" appear in their name, without prior written permission of the Apache Software Foundation.

THIS SOFTWARE IS PROVIDED ``AS IS" AND ANY EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE APACHE SOFTWARE FOUNDATION OR ITS CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

=====

This software consists of voluntary contributions made by many individuals on behalf of the Apache Software Foundation and was originally based on software copyright (c) 1999, International Business Machines, Inc., <http://www.ibm.com>.

For more, information on the Apache Software Foundation, please see [<http://www.apache.org/>](http://www.apache.org/).

Windows is a registered trademark or trademark of the Microsoft Corporation in the U.S. and in other countries.
Other company names, product names, etc. are the registered trademarks or trademarks of each company.

© 2004 Nintendo

The contents of this document cannot be duplicated, copied, reprinted, transferred, distributed or loaned in whole or in part without the prior approval of Nintendo Co. Ltd.