MAC CGM Converter

Computer Graphics Metafile to PICT file conversion for the Apple Macintosh

Version 2.0
January 1992

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MAC CGM Converter contains programs to convert between Computer Graphic Metafiles (CGM) and Apple Macintosh PICT graphics files.

The CGM provides a file format suitable for the storage, retrieval and transfer of graphical information between computer systems of different architectures and graphic output devices of differing capabilities.

The CGM is a set of basic elements defined as an American National Standards Institute (ANSI) standard and also as an International Standards Organization (ISO) standard. The CGM draws extensively for its model of a Graphics System, on the Graphical Kernel System (GKS).

To use ***MAC CGM Converter*** you need a Macintosh computer with at least 1Mb of memory. Even if you use a black and white screen with a Macintosh computer, you can convert color CGM files to color PICT files.

MAC CGM Converter consists of two programs -

1. CGM to PICT

   CGM to PICT converts CGM files to PICT or PICT2 files.
   Once a CGM file is converted to the PICT file format, it is possible to read the picture into most Graphics Packages on Apple Macintosh computers.

   - expects the CGM to use the "Binary Encoding".
     The "Character" or "Clear Text" Encodings are not supported.

     Appendix A contains a list of CGM's from various packages tested with ***CGM to PICT***.

2. PICT to CGM

   PICT to CGM converts PICT and PICT2 graphics to CGM files.
   Once a PICT graphic is converted to a CGM file, you can read the picture into CGM compatible Graphics Packages on other computers.

Summary of capabilities

CGM to PICT

- On a Mac 512K, Mac Classic, Mac LapTop, Mac Plus, Mac SE or PowerBook 100 creates PICT files with up to 8 colors.
- On a Mac supporting color quickdraw (Mac II, IIci, IIcx, IIfx, IIsi, IIx, LC, SE/30, Classic II, PowerBook 140, PowerBook 170, Quadra), creates PICT2 files with an unlimited number of colors.
- No limit set on the number of points in a CGM polygon.
- Supports most CGM commands.
- Interprets binary CGM's from any computer system.
- Allows automatic exchange of Black and White colors.
- Option to disassemble CGM 's into a readable text format.
- Automatically creates a PICT file for each CGM picture, or overlays all CGM pictures into a single PICT file.
- Option to set the color palette to the Harvard Graphics default color palette.
- Allows the creation of pictures scaled from A4 to A0 in size and supports the CGM scaling command. A PICT file can automatically be sized to that of the original CGM, provided that scaling information is present in the CGM.
- Background color selection options available.
- Multi-finder compatible - the conversion may be run as a background process, while you continue work on another task.
- Option to preview the PICT file created.
- Runs under system 6.0x, System 7 (24-bit and 32-bit compatibility modes). Supports balloon help under System 7.

PICT to CGM

- Converts PICT and PICT2 files.
- No limit set on the number of points in a polygon.
- Allows automatic exchange of Black and White colors.
- Option to disassemble PICT and PICT2 files into a readable text format.
- Creates an easily interpretable CGM.
- Multi-finder compatible - the conversion may be run as a background process, while you continue work on another task.
- Supports the Macintosh character set, also the conversion of text to a set of characters supported by other computers. Also can provide a "font list", so that intelligent graphics applications on other computers can use fonts matching those used in your drawing.
- Allows a CGM to be created which contains scaling information, so that a CGM will be automatically scaled to the same size as the PICT drawing.
- Contains an option to allow Macintosh images to be converted to the CGM (to a cell array).Even if you are using a non-color quickdraw Macintosh (a Mac Classic for example), you may convert 8-bit color PICT2 pixel-map images to a CGM containing an 8-bit color cell array.
- Allows a background color to be selected.
- Allows the choice of a CGM supporting "Direct" or "Indexed" color modes.
- Runs under system 6.0x, System 7 (24-bit and 32-bit compatibility modes). Supports balloon help under System 7.

Known Problems

- Not all CGM commands are supported - a complete list of supported commands is shown in Appendix B.

  Unsupported CGM commands will be ignored by ***CGM to PICT***.

Conversion Incompatibilities

- Some CGM files do not contain a color palette. These files may need to be edited manually to obtain the correct color sequences.

  If a color palette does not exist, the colors used are the Technical and Office Protocols 3.0 (TOP 3.0) color defaults.

- Text fonts between the PICT and CGM files are mapped onto similar fonts, provided that the font is known to *CGM to PICT*.

  A font not known to *CGM to PICT* with an index number of 1 will be mapped onto the Macintosh Font number 1.

Installation

MAC CGM Converter is supplied on one disk. Before you start using the programs you should make a copy of the master disk and work with the copy.

Keep the master disk in a safe place.

The ***MAC CGM Converter*** master disk contains the ***CGM to PICT*** and ***PICT to CGM*** programs and sample files.

MAC CGM Converter is not copy protected, so you can easily install it on your hard drive by following these steps -

Turn on your Macintosh

Insert the ***MAC CGM Converter*** disk.

Drag the ***MAC CGM Converter*** disk icon onto your hard disk icon.

Chapter 1: Getting Started

Chapter 1: Getting Started

Before you can convert a CGM file to a PICT file, you must use a communications package to transfer the CGM file from the computer that it resides on, to your Macintosh computer.

The file transfer must be in a binary mode (ie. not a text transfer). Most communications packages allow the transfer of binary information.

The file transfer must not exchange any characters, such as Carriage Return to Line Feed; or Insert characters at any time, such as a Line Feed after every 80 characters.

If a CGM is not transferred exactly as it was on the host computer, then errors will occur when you proceed with the conversion.

Alternatively, Apple File Exchange may be used to transfer CGM files from MS-DOS format to Macintosh format.

The CGM file on the Macintosh must be of file type **BINA** (for binary), **CGMF** or **TEXT**. If you transfer the file to the Macintosh as another file type, then when you execute ***CGM to PICT***, you will not be able to proceed.

If the CGM file is not of type BINA, CGMF or TEXT, then you may use a file editor (such as Resedit or Mac Tools, etc) to change the file type.

Starting CGM to PICT

To begin a session:

1. Turn on your Macintosh.

   If you have copied the master disk onto a hard disk, locate the ***CGM to PICT*** application on the desktop, or open the folder that contains the application and proceed to step 5.

2. Put a working copy of your system disk into a disk drive.

3. Put a working copy of the ***CGM Converter*** disk in another disk drive.

4. Click the ***CGM Converter*** disk icon and choose "Open" from the "File" menu.

   The Macintosh desktop opens, displaying Icons for the application and sample files (Figure 1-1).

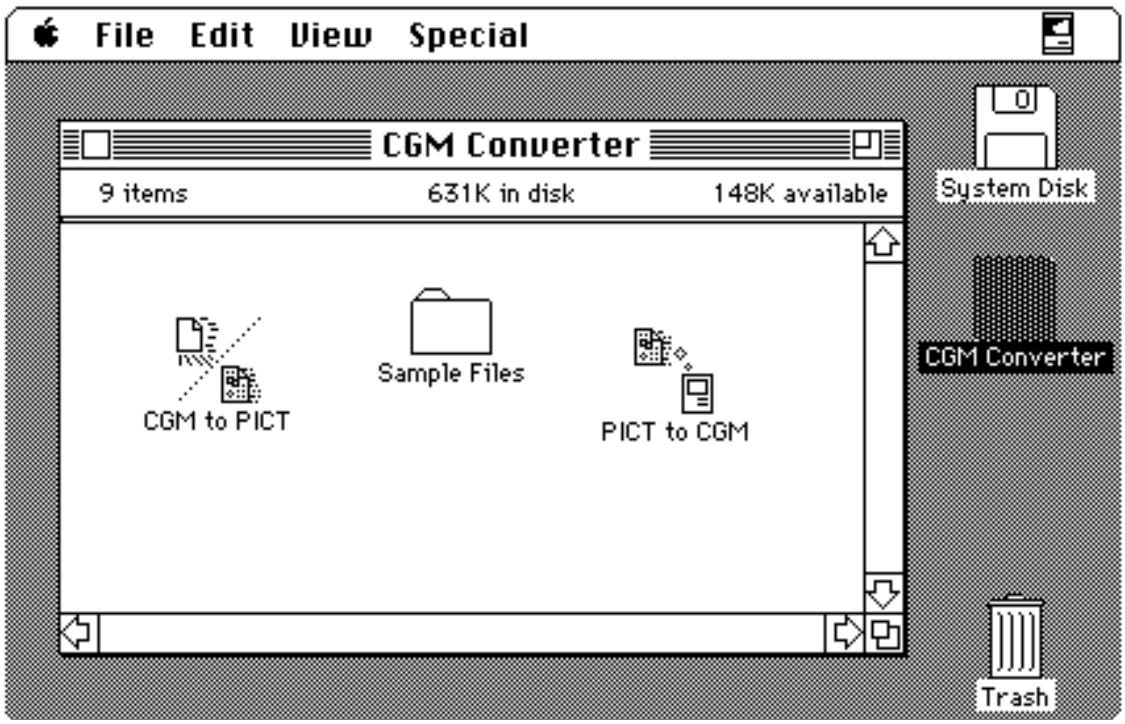

Figure 1-1

5. Click the ***CGM to PICT*** application icon and choose "Open" from the "File" menu (or double click the application icon).

Using CGM to PICT

Once the ***CGM to PICT*** program is started, the following desktop will appear -

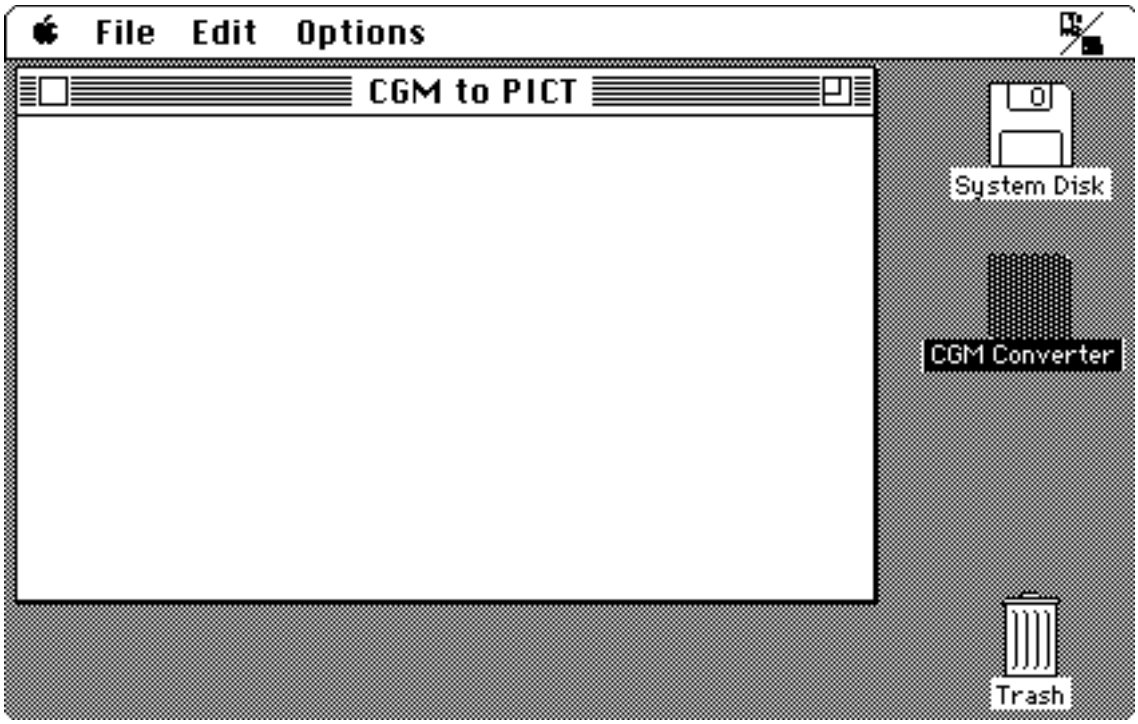

Figure 1-2

1. Choose **Open CGM file** from the File menu.

   A list of the names of the CGM documents contained on the disk will be displayed. Scroll through the list of the documents and click a CGM filename. If your CGM document is not listed, then it is not of type BINA, CGMF or TEXT and must be changed (ref: "Chapter 1: Getting Started").

   If the CGM document you're looking for is on a different disk, click Eject and insert the correct disk.

   To see the names of documents on a disk in the other drive, click Drive.

2. Click Open.

3. Select the necessary options from the Options menu:

   For an option to be selected, it must be checked.

The options are -

Convert to PICT

Allows the conversion of the CGM to PICT graphics files.

The PICT file is compatible with most graphics packages on the Macintosh. You can edit or print your picture from a Macintosh graphics application.

Decode to TEXT

Allows the decoding of the CGM to a readable text file.

The TEXT file is editable from most text editors and word processors.
You can read the commands in the CGM file, or print the document. The text listing of the CGM file is not as compact as the binary CGM file and will amount to many pages if printed.

Reverse Black and White

Allows the reversal of all Black and White picture elements.

This option may be necessary if the CGM was created for a graphics display with a black background. The actual picture may look better, printed on a laser printer if the output has a White background.

Ignore VDC Extents

Some CGM files have incorrect values for the VDC Extent. If this is the case the picture will not be correctly sized (usually appearing in the top right-hand corner of a page).

To correctly size the picture, you should over-ride the VDC Extents in the CGM by ensuring that this option is checked.

If this option is checked, the minimum VDC Extents will be set to (0,0).

Recommended for- **GSS**, **Harvard Graphics**, **SAS**, **Super Chart**, **Super Image**.

Overlay Pictures

Some CGM files contain more than one picture.
When this option is checked, the created PICT file will contain all CGM pictures drawn over each other.

If this option is not checked, a separate PICT file will be created for each picture. The first file created is *filename-specified*, other pictures will be named, *filename-specified.picture-number* .

HG Color Palette

Harvard Graphics CGM files contain incorrect color table information, resulting in black and white converted pictures.

Selecting this option over-rides the incorrect color information contained in the CGM, setting them correctly to the default Harvard Graphics color palette.

The default Harvard Graphics color palette consists of the following colors-

Color Number	Red	Green	Blue	Name
1	1000	1000	1000	White
2	0	1000	1000	Cyan
3	1000	0	1000	Magenta
4	0	1000	0	Green
5	0	0	660	Blue
6	1000	0	330	Red
7	1000	1000	330	Yellow
8	1000	330	0	Orange
9	0	0	1000	Royal Blue
10	1000	660	0	Gold
11	660	0	660	Violet
12	1000	0	660	Pink
13	660	660	660	Grey
14	660	0	0	Crimson
15	0	330	0	Dark Green
16	0	0	0	Black

Set picture size

Select the size of the picture you wish to create. The size of the picture created will be scaled to the exact dimensions of the selected sheet size, except for the "**Within A4**" option.

The "**Within A4**" option scales the picture to fit with the A4 page using the correct aspect ratio of the CGM picture.

The dimensions of the various sheet sizes are -

A4	297 x 210 mm	A3	420 x 297 mm	A2	594 x 420 mm
A1	840 x 594 mm	A0	1187 x 840 mm		

The "**Use CGM Scaling**" option will use information contained in the CGM file to size the PICT file.
Note that some CGM generators DO NOT correctly store CGM Scaling.

The "**640 x 480**" option sizes the picture to a size corresponding to 640 pixels in the x dimension and 480 pixels in the y dimension.

BG color type

A CGM may contain a background color, this option allows the control of the background.

If "**None**" is selected, the created PICT file will contain no background color, even if a background exists in the CGM.

If "**From CGM**" is selected, the created PICT file will contain the background color as it exists in the CGM, either from the *background color command* or by the setting of *Color Index 0* in a color table, provided that either of these commands exist in the CGM.

A color table containing a defined color number 0 is usually found in CGMs produced from GKS packages.

If "**Set BG Color...**" is selected, select the preferred color of the background. This will over-ride any background color settings in the CGM, setting the background color to that selected.

On a Macintosh supporting color QuickDraw, a color wheel displaying the available colors will appear.

On a Macintosh not supporting color QuickDraw, a limited palette of colors is available in the pop-up menu. Click on the displayed color name and select the desired color from the menu.

Display PICTure

If selected, this option will cause the converter to display each picture that is created on the screen of your Macintosh.

Cell Array Output

In a CGM, the cell array contains image information in a raster format.
If "**None**" is selected, the cell array will be ignored and no Macintosh equivalent for this image information will be output.

Selecting "**As vectors**" converts the raster image to vector format (ie. moves and draws). Note that this is recommended for small images only, as a large amount of information is generated by this option.
This option is only available on a Macintosh supporting color quickdraw.

Selecting "**As a Pixel Map**" converts the raster image to a Macintosh image. This option is only available on a Macintosh supporting color quickdraw. This option is currently not available in this version of ***CGM to PICT***.

4. Select **Save as...** from the File menu.

   The **Save as...** option will be enabled, provided that either or both the **Convert to CGM** and **Decode to TEXT** options (under the Options menu) are checked, and that a CGM file has been selected (Step 1).

   Enter a name for the created PICT file, or use the default name suggested. Press the return key or click the Save button and the conversion will proceed.

   If both the **Convert to PICT** & **Decode to TEXT** options have been selected, you may only specify the PICT filename.
   In this case, the TEXT file that will be created will have the same name as the CGM file, with the extension, ".LST" .

   The ***PICT to CGM*** desktop changes to include a window displaying the progress of the PICT conversion, as shown in figure 1-3.

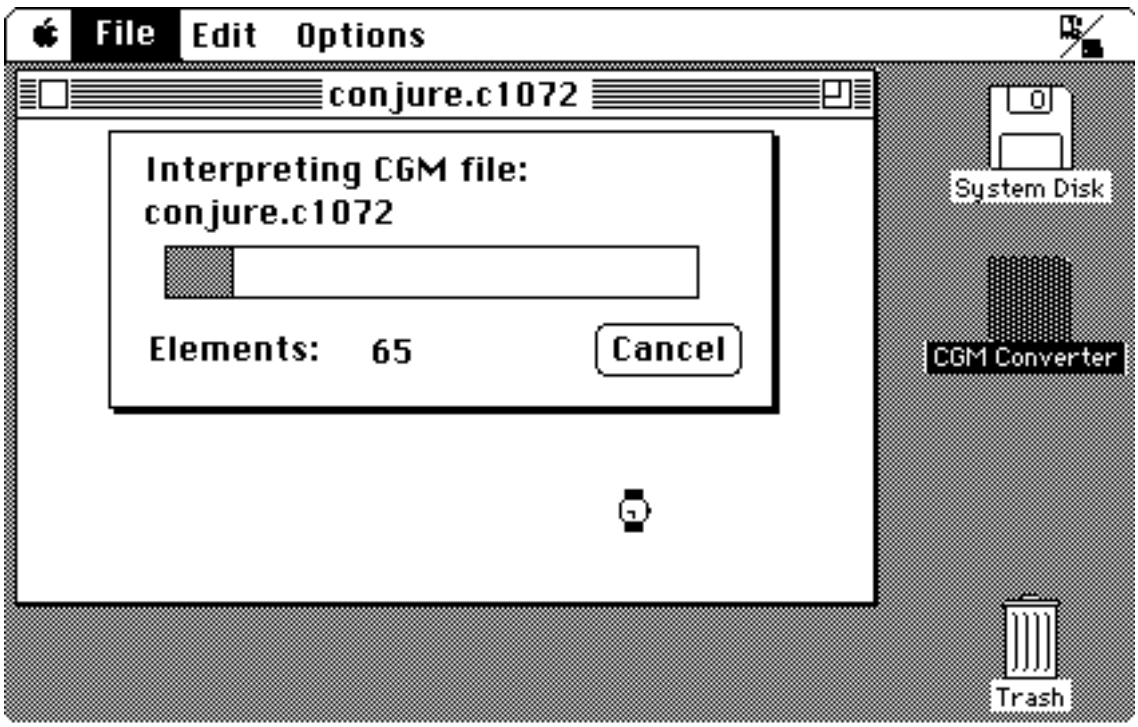

Figure 1-3

   At any time during the conversion process, click the mouse cursor within the cancel area to stop the CGM conversion.
   You can also quit the ***CGM to PICT*** program immediately by pressing the command key "⌘" and the period key "**.**" simultaneously.

   If an error occurs during the conversion process, an error alert will appear. The type of alert shown will depend on the severity of the error. A less severe error will allow the option of continuing or stopping the CGM conversion.
   A more severe type of error will require you to acknowledge the error and the conversion process will stop.

5. Choose the **Quit** option from the File menu.

Chapter 2: Starting PICT to CGM

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To begin a session:

1. Turn on your Macintosh.

   If you have copied the master disk onto a hard disk, locate the ***PICT to CGM*** application on the desktop, or open the folder that contains the application and proceed to step 5.

2. Put a working copy of your system disk into a disk drive.

3. Put a working copy of the ***CGM Converter*** disk in another disk drive.

4. Click the ***CGM Converter*** disk icon and choose "Open" from the "File" menu.

   The Macintosh desktop opens, displaying Icons for the application and sample files (Figure 2-1).

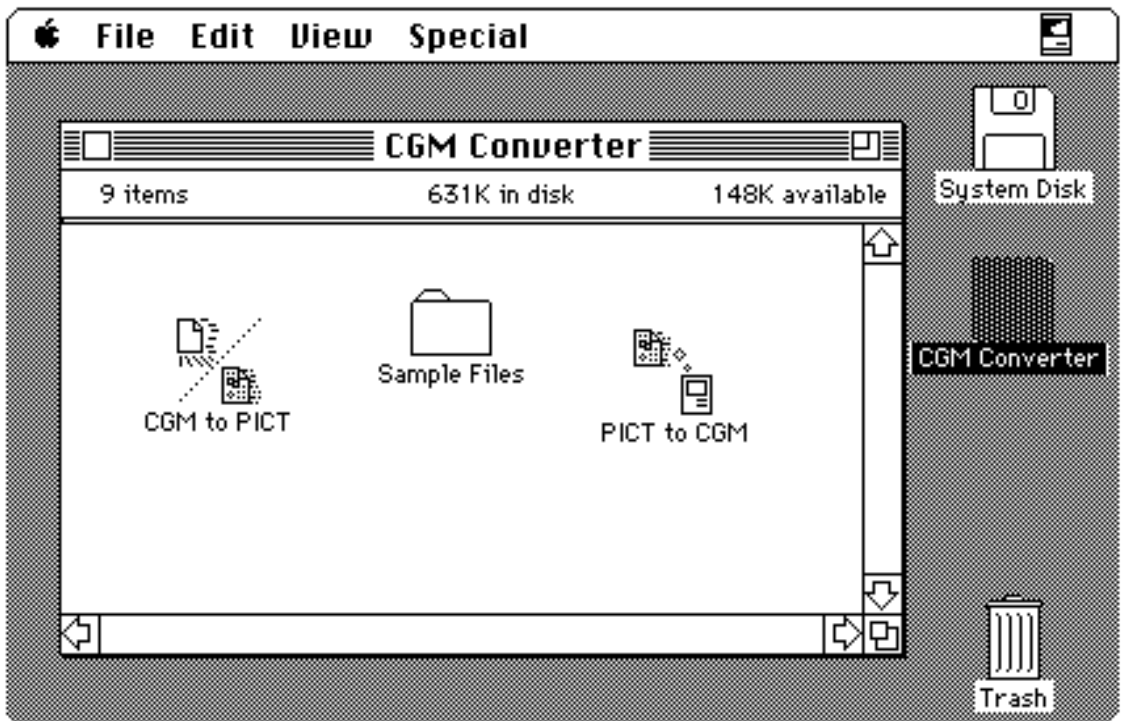

Figure 2-1

5. Click the ***PICT to CGM*** application icon and choose "Open" from the "File" menu (or double click the application icon).

Using PICT to CGM

Once the ***PICT to CGM*** program is started, the following desktop will appear -

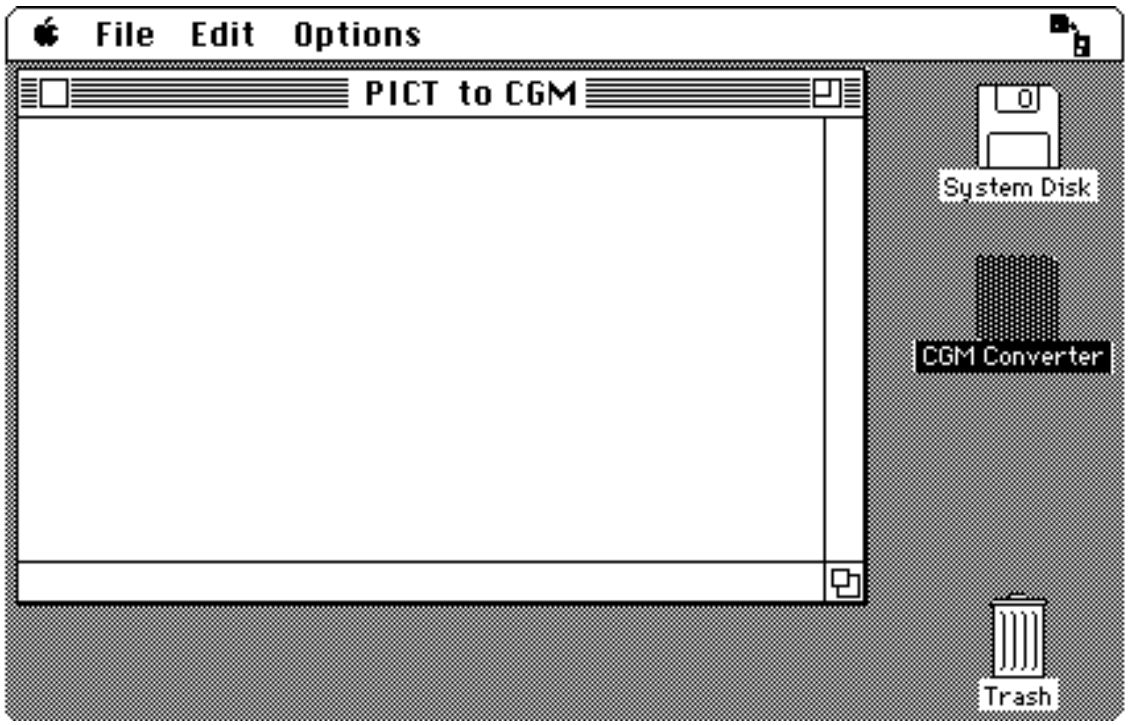

Figure 2-2

1. Choose **Open PICT file** from the File menu.

   A list of the names of the documents contained on the disk will be displayed. Scroll through the list of the documents and click a PICT filename.

   If the PICT document you're looking for is on a different disk, click Eject and insert the correct disk.

   To see the names of documents on a disk in the other drive, click Drive.

2. Click Open.

3. Select the necessary options from the Options menu:

   For an option to be selected, it must be checked.

The options are -

Convert to CGM

Allows the conversion of PICT files to binary CGM files.
The CGM is compatible with graphics packages on other computers which read binary CGM's.

Decode to TEXT

Allows the decoding of the PICT file to a readable text file.

The TEXT file is editable from most text editors and word processors.
You can read the commands in the PICT file, or print the document. The text listing of the PICT file is not as compact as a PICT file and will amount to many pages if printed.

Reverse Black and White

Allows the reversal of all Black and White picture elements.
This option may be necessary if the PICT was created for a graphics display with a white background.
Graphics screens on other computers usually have a black background.

Character Set

The "**Macintosh**" option stores the text characters exactly as they are stored on the Macintosh. Graphics systems on other computers may not recognize special characters such as •. If the CGM is converted back to PICT, the characters will be correctly displayed on the Macintosh.

If "**ASCII**" is selected, the characters are set to the normal alphabetic characters (ie. Å to A, • to *), so that a graphics system on another computer can correctly display them.

Scaling Mode

The "**Abstract**" option will specify that an arbitrary picture size will be selected by the graphics application. This is the default as all graphics applications support abstract scaling.

The "**Metric**" option will specify that the picture will be mapped to a particular size, the actual dimensions of the picture in your Macintosh application. Not all graphics applications on other computer systems will accept metric scaling.

Text Font Info

If "**None**" is selected, no font information will be passed to the CGM.
This may be necessary as some graphics applications are unable to interpret the "Font List" command that is created in the CGM.

The "**In CGM**" option stores text font information in the CGM, with the "Font List" command. Intelligent graphics applications will be able to use similar text fonts to those used in the creation of your picture on the Macintosh.

Pixel Map Output

"**None**" will specify that no Macintosh bit-map or pixel-map image will be converted to the CGM.

If "**Cell Array**" is selected, Macintosh images will be converted to the CGM Cell Array data type.

Some graphics applications are not capable of interpreting CGM's containing the cell array.

BG color

A CGM may contain a background color, this option allows the control of the background.

If "**None**" is selected, the created CGM file will contain no background color.

If "**Set BG Color...**" is selected, select the preferred color of the background.

On a Macintosh supporting color QuickDraw, a color wheel displaying the available colors will appear.

On a Macintosh not supporting color QuickDraw, a limited palette of colors is available in the pop-up menu. Click on the displayed color name and select the desired color from the menu.

Color Mode

"**Direct**" color mode results in the created CGM having colors specified in R-G-B format. "**Indexed**" color mode will specify all colors as an index to a color table. The color table contains the R-G-B information required to describe this color.

Some graphics packages may not be capable of displaying colors in direct color mode, supporting indexed colors instead.

4. Select **Save as...** from the File menu.

   The "**Save as...**" option will be enabled, provided that either or both the "**Convert to CGM**" and "**Decode to TEXT**" options (in the Options menu) are checked, and that a PICT file has been selected (Step 1).

   Enter a name for the created CGM file, or use the default name suggested. Press the return key or click the Save button and the conversion will proceed.

   If both the "**Convert to CGM**" and "**Decode to TEXT**" options have been selected, you may only specify the CGM filename.
   In this case, the TEXT file that will be created will have the same name as the PICT file, with the extension, ".LST" .

   To stop the conversion at any time, click on the Cancel button.
   The ***PICT to CGM*** desktop changes to include a window displaying the progress of the PICT conversion, as shown in figure 2-3.

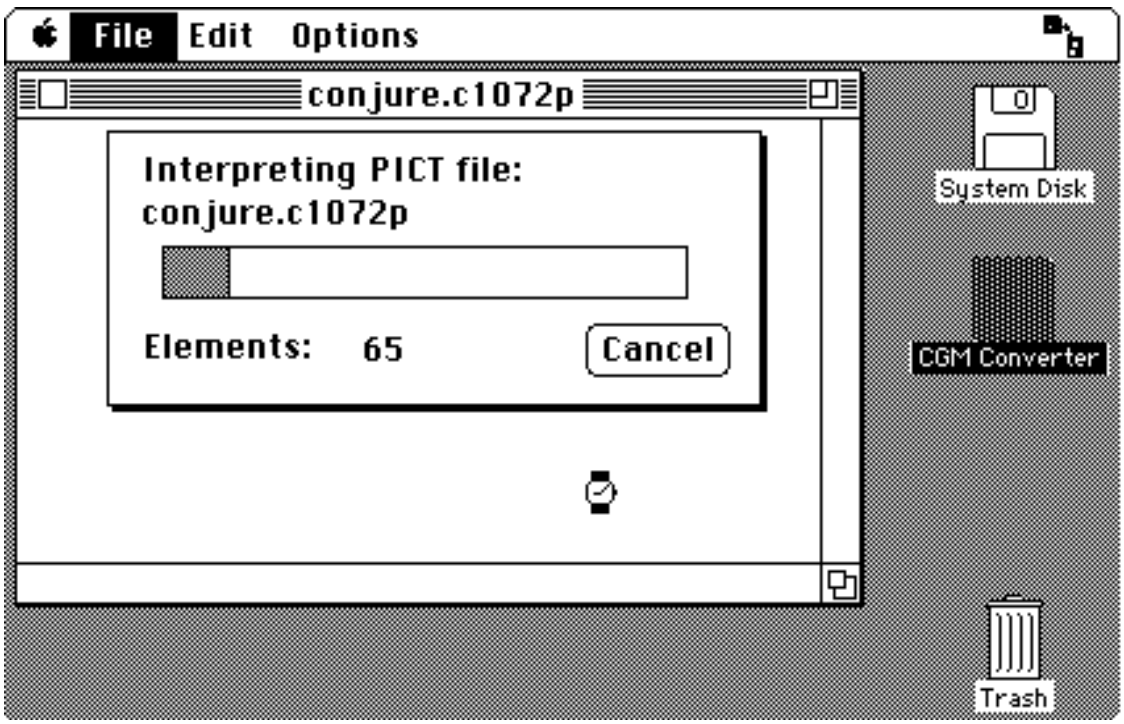

Figure 2-3

   At any time during the conversion process, click the mouse cursor within the cancel area to stop the CGM conversion.
   You can also quit the ***PICT to CGM*** program immediately by pressing the command key "⌘" and the period key "**.**" simultaneously.

   If an error occurs during the conversion process, an error alert will appear. The type of alert shown will depend on the severity of the error. A less severe error will allow the option of continuing or stopping the PICT conversion. A more severe type of error will require you to acknowledge the error and the conversion process will stop.

5. Choose the **Quit** option from the File menu.

Chapter 3: Error Messages

Chapter 3: Error Messages

If an error occurs during the conversion process, an error alert will appear. The type of alert shown will depend on the severity of the error.

If a System Error, such as "Disk is Full" occurs, you cannot proceed with the conversion. Figure 3-1 shows an example of this type of error.

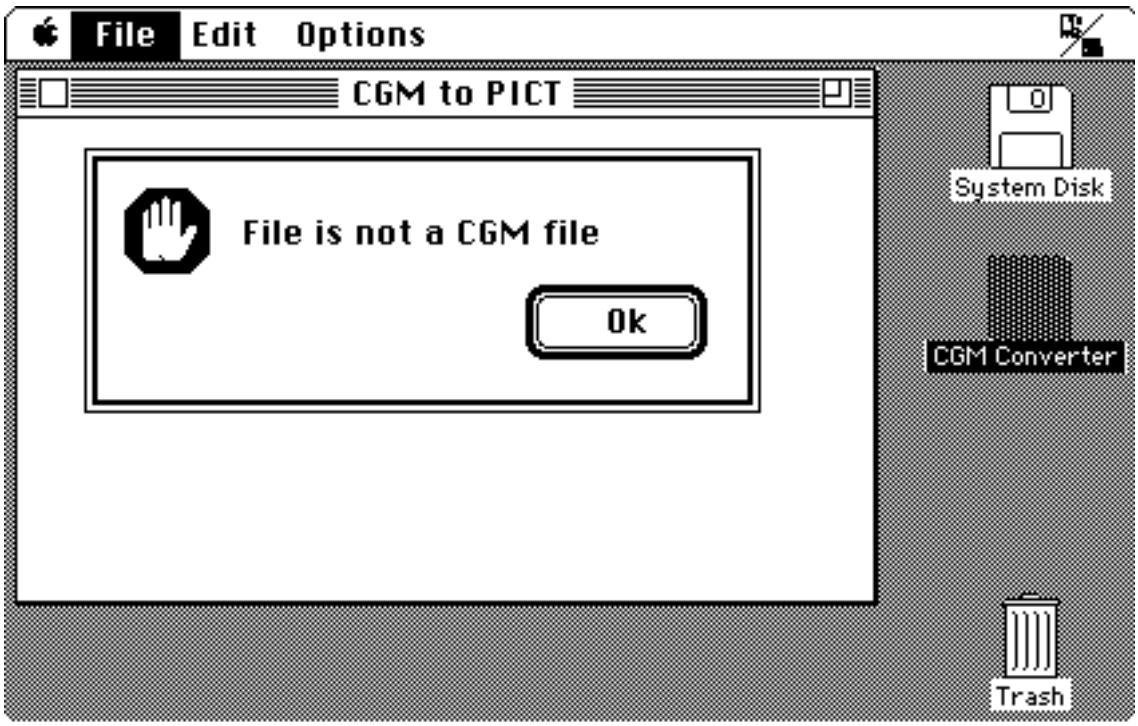

Figure 3-1

A less severe error alert will allow the option of continuing or stopping the conversion.

If such an error does occur, you can press the Continue button and the converter will try its best to continue processing.

It is quite possible that the converter will be unable to continue reliably due to incorrect data contained in the file.

It is important that the CGM file transferred to the Macintosh is exactly as it was on the host computer.

CGM to PICT Questions

When attempting the "Open CGM file" command, the CGM does not appear in the list of files.

The CGM will only appear in the list of files if it is BINA or TEXT file type.
Use a file editor such as Fedit (Mac Master Systems), Mac Tools (Central Point Software Inc.), ResEdit (Apple Computer Inc.), Symantec Utilities (Symantec Corp.), etc to change the file type of the CGM to either **BINA**, **CGMF** or **TEXT**.

For example, in ResEdit, click once on the CGM filename to select it, then do a **Get Info** (under the File menu), change the **Type** to BINA, CGMF or TEXT. Close the file, save your change and Quit from ResEdit.

Conversion errors continually appear.

Ensure that the CGM was transferred to the Macintosh using a binary transfer without the exchange of characters (such as carriage return, line feed).
For example, using Kermit to transfer files, specify, **Binary** or **Set type image**.
The CGM on the Macintosh must contain exactly the same information as the original CGM on the other computer.

The CGM is processed, but only a blank picture is produced.

It is possible that the CGM contains a blank pictures. If the Overlay Pictures option in CGM to PICT is not selected, a blank PICT file will be created for each blank CGM picture.

The created picture only fills the top right-hand quarter of a page.

Select the **Ignore VDC Extents** option in ***CGM to PICT*** as the CGM may contain inaccurate VDC limits. The picture should approximately fill an A4 page.

Part of the created picture is missing.

A missing object in the created PICTure may actually be there but isn't visible if-

- the color of the object is the same as the background color.
  In a graphics application, select the object and change the color or try the **Reverse Black and White** option in ***CGM to PICT***.

- A CGM object may be missing because ***CGM to PICT*** ignores unsupported CGM commands.

On a non-color quickdraw Macintosh, the PICT file displayed on the screen (with the "Display PICTure" option selected), is a completely black area.

The CGM probably contains a background color specified. On Macintosh computers not supporting color quickdraw, the picture is displayed with all colors appearing as black only. In order to see the picture on the screen, turn off the background by selecting "None" in the BG color option.

The created PICT file contains up to 8 colors. Some graphics applications (such as Mac Draw) display these colors as shades of grey on a non-color quickdraw Macintosh. Other applications (such as Canvas) display the picture as black, it is possible to detect the color of elements by selecting the element and then checking the color palette tool.

PICT to CGM Questions

When attempting to read a CGM created from *PICT to CGM* into a graphics application on another computer, errors occur.

Check that the graphics application is capable of reading binary CGM files.

Ensure that the CGM was transferred from the Macintosh using a binary transfer without the exchange of characters (such as carriage return, line feed).

For example, using Kermit to transfer files, specify, **Binary** or **Set type image**.

The CGM on the Macintosh must be transferred to other computer types, creating a CGM with exactly the same information.

A picture appears as monochrome in a graphics application on another computer.

The graphics application does not support the CGM **Direct Color Mode**.
Colors exist in the CGM but will be ignored. Select the "Indexed" option for the "Color Mode".

Chapter 4: Example Files

Chapter 4: Example Files

The *Example Files* folder contains demonstration CGM files which may be converted to APPLE Macintosh PICT format files using ***CGM to PICT***.

The PICT files produced may be viewed by any graphics application supporting PICT or PICT2 files. For optimum results use a Macintosh supporting Color QuickDraw with a color monitor supporting 256 or more colors.

For the best display of PICT graphic files, use a graphics application which allows the display of 256 or more colors.

CONJURE.REV

Conjure is a registered trademark of Vision Control International Pty. Ltd.

Select the following Options - **Convert to PICT**

FLPLUS.CHART

Freelance Plus is a registered trademark of Lotus Corporation.

Select the following Options - **Convert to PICT**

GENI.CGM

The origin of this demonstration CGM is unknown.

Select the following Options - **Convert to PICT**

This CGM contains two pictures. Two PICT files will be created.

HARVARD.CGM

Harvard Graphics is a registered trademark of Software Publishing Corporation.

Select the following Options - **Convert to PICT**
Ignore VDC Extents
HG Color Palette

SAS.COWBOYHAT

SAS is a registered trademark of SAS Institute Inc.

Select the following Options - **Convert to PICT**
Ignore VDC Extents
Overlay Pictures

Appendix A: CGM Packages Tested

Appendix A: CGM Packages Tested

MAC CGM Converter has been successfully tested on a large number of CGM's from the packages listed below.

If you are using a package that is not listed, your package most probably creates CGM files which are compatible with ***CGM to PICT***.

COMPUTER	PACKAGE TESTED
Apple Macintosh	CadMover, Canvas 3.0, GraphPorter, NCAR Graphics.
Data General Corporation MV series Trendview.	CEO Drawing Board, DG/GKS 3.0, SAS version 6,
Digital Equipment Corp VAX series	CA-SuperImage VAX, CA-Tellagraf, CA-Graphics Connection, GRAFkit, Genigraphics, Lotus 123, PVI-products (DI-3000, DRAW, GK-2000, GrafMaker, PicSure, PicSure Gold) through the Extended Metafile System; PLOTIT, PV-WAVE, SAS version 6, Vivid, Zycor Hardcopy System. DEC GKS via Henderson Software CGM converter.
IBM PC, PS/2	Autumn, Conjure, CoPlot, Corel Draw, Designer, Draw Applause, Draw Perfect, Freelance Plus, Graphwriter II, GSS*CGI, Harvard Graphics, Lotus 123, Mirage, Nova*GKS, Pixie, SAS, Super Chart, Super Image.
Intergraph workstations	Intergraph converter between CGM and DGN formats.
Silicon Graphics IRIS	Visual GKS.
Sun workstations	Landmark, PRIOR GKS, Sun PHIGS, Zycor Hardcopy System.

Note:

SAS version 6 requires that the GACCESS field in the PROC GDEVICE procedure be set to 'SASGASTD>GRAPH.GSF' .

Digital Equipment VAX series requires that the CGM be of the file type - FIXED (ie. Fixed record length type), STREAM, STREAM_LF, STREAM_CR or UNKNOWN.

The VARIABLE file type contains characters known only in the VAX environment. If CGM files of this type are transferred to other computer systems the CGM will be uninterpretable.
Use the CONVERT/FDL command to convert VARIABLE file types to the STREAM/UNKNOWN formats before these files are transferred to other computer systems.

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Appendix B: Supported CGM Elements

Appendix B: Supported CGM Elements

Listed below are the CGM Elements that ***CGM to PICT*** supports in the PICT conversion. This is a technical reference for those familiar with CGM or for those curious about the details of the CGM.

Appendix D contains technical references which explain the CGM in detail.

fully supported
P partially supported
\- ignored

Element Code	Element Name	***CGM to PICT*** support
Delimiter Elements: Class 0		
1	Begin Metafile	
2	End Metafile	
3	Begin Picture	
4	Begin Picture Body	
5	End Picture	
Metafile Descriptor Elements: Class 1		
1	Metafile Version	-
2	Metafile Description	-
3	VDC type *Integer* *Real*	
4	Integer Precision *8, 16, 24, 32*	
5	Real Precision *32-bit floating point* *64-bit floating point* *32-bit fixed point* *64-bit fixed point*	
6	Index Precision *8, 16, 24, 32*	
7	Color Precision *8, 16, 24, 32*	
8	Color Index Precision *8, 16, 24, 32*	
9	Maximum Color Index	
10	Color Value Extent	
11	Metafile Element List	-
12	Metafile Defaults Replacement	
13	Font List	
14	Character Set List	-
15	Character Coding Announcer	-

Picture Descriptor Elements: Class 2

1	Scaling Mode	
	Abstract	
	Metric	
2	Color Selection Mode	
	Indexed	
	Direct	
3	Line Width Specification Mode	
	Absolute	
	Scaled	
4	Marker Size Specification Mode	
	Absolute	
	Scaled	
5	Edge Width Specification Mode	
	Absolute	
	Scaled	
6	VDC Extent	
7	Background Color	

Control Elements: Class 3

1	VDC Integer Precision	
	8, 16, 24, 32	
2	VDC Real Precision	
	Floating Point	
	Fixed Point	
3	Auxiliary Color	P
4	Transparency	P
5	Clip Rectangle	
6	Clip Indicator	

Graphical Primitive Elements: Class 4

1	Polyline	
2	Disjoint Polyline	
3	Polymarker	
4	Text	
5	Restricted Text	
6	Append Text	
7	Polygon	
8	Polygon Set	-
9	Cell Array	
	cell representation mode	
	0 run length list mode	-
	1 packed list mode	P
		(supported only if color selection mode is indexed)
10	Generalized Drawing Primitive	-
11	Rectangle	
12	Circle	

13	Circular Arc 3 Point		
14	Circular Arc 3 Point Close		
15	Circular Arc Centre		
16	Circular Arc Centre Close		
17	Ellipse		
18	Elliptical Arc	-	
19	Elliptical Arc Close		-

Attribute Elements: Class 5

1	Line Bundle Index		
2	Line Type		
3	Line Width		
4	Line Color		
5	Marker Bundle Index		
6	Marker Type		
7	Marker Size		
8	Marker Color		
9	Text Bundle Index		
10	Text Font Index		
11	Text Precision	-	
12	Character Expansion Factor	-	
13	Character Spacing		-
14	Text Color		
15	Character Height		
16	Character Orientation		
17	Text Path	-	
18	Text Alignment		
19	Character Set Index		-
20	Alternate Character Set Index	-	
21	Fill Bundle Index		
22	Interior Style		
23	Fill Color		
24	Hatch Index		
25	Pattern Index		
26	Edge Bundle Index		
27	Edge Type		
28	Edge Width		
29	Edge Color		
30	Edge Visibility		
31	Fill Reference Point		-
32	Pattern Table		
33	Pattern Size	-	
34	Color Table		
35	Aspect Source Flags		-

Escape Elements: Class 6

1	Escape		-

External Elements: Class 7

1	Message		-
2	Application Data		-

The following text fonts are recognized and are mapped onto the Macintosh fonts, provided that the name of the font exists in the CGM Font List command -

CGM Font name	Macintosh Font name
New York	New York
Geneva	Geneva
Monaco	Monaco
Venice	Venice
London	London
Athens	Athens
San Francisco	San Francisco
Toronto	Toronto
Chicago	Chicago
Cairo	Cairo
Los Angeles	Los Angeles
Zapf Dingbats	Zapf Dingbats
Bookman	Bookman
New Helvetica Narrow	New Helvetica Narrow
Palatino	Palatino
Zapf Chancery	Zapf Chancery
Times	Times
Helvetica	Helvetica
Courier	Courier
Symbol	Symbol
Taliesin	Taliesin
Avant Garde	Avant Garde
New Century Schoolbook	New Century Schoolbook
Sans Serif	Helvetica
Serif Stroke	Times
Swiss	Helvetica
Swiss Raster	Helvetica
Sans-Serif Stroke	Helvetica
HERSHEY:CARTOGRAPHIC_ROMAN	Courier
HERSHEY:CARTOGRAPHIC_GREEK	Symbol
HERSHEY:SIMPLEX_ROMAN	Courier
HERSHEY:SIMPLEX_GREEK	Symbol
HERSHEY:SIMPLEX_SCRIPT	Venice
HERSHEY:COMPLEX_ROMAN	Times
HERSHEY:COMPLEX_GREEK	Symbol
HERSHEY:COMPLEX_SCRIPT	Venice
HERSHEY:COMPLEX_ITALIC	Courier
HERSHEY:COMPLEX_CYRILLIC	Venice
HERSHEY:DUPLEX_ROMAN	Helvetica
HERSHEY:TRIPLEX_ROMAN	Times
HERSHEY:TRIPLEX_ITALIC	Times
HERSHEY:GOTHIC_GERMAN	London
HERSHEY:GOTHIC_ENGLISH	London
HERSHEY:GOTHIC_ITALIAN	London
NBS HERSHEY:CARTOGRAPHIC_ROMAN	Courier
NBS HERSHEY:CARTOGRAPHIC_GREEK	Symbol
NBS HERSHEY:SIMPLEX_ROMAN	Courier
NBS HERSHEY:SIMPLEX_GREEK	Symbol
NBS HERSHEY:SIMPLEX_SCRIPT	Venice
NBS HERSHEY:COMPLEX_ROMAN	Times

NBS HERSHEY:COMPLEX_GREEK	Symbol
NBS HERSHEY:COMPLEX_SCRIPT	Venice
NBS HERSHEY:COMPLEX_ITALIC	Courier
NBS HERSHEY:COMPLEX_CYRILLIC	Venice
NBS HERSHEY:DUPLEX_ROMAN	Times
NBS HERSHEY:TRIPLEX_ROMAN	Helvetica
NBS HERSHEY:TRIPLEX_ITALIC	Times
NBS HERSHEY:GOTHIC_GERMAN	London
NBS HERSHEY:GOTHIC_ENGLISH	London
NBS HERSHEY:GOTHIC_ITALIAN	London
COURIER B	Courier
COURIER OBLIQUE	Courier
COURIER OBLIQUE B	Courier
HELVETICA B	Helvetica
TIMES B	Times
TIMES ITALIC	Times
TIMES ITALIC B	Times
TIMES ROMAN	Times

Undefined Fonts or Fonts not appearing in this list will be arbitrarily mapped onto Macintosh Fonts.

Appendix C: Output CGM Elements

Appendix C: Output CGM Elements

Listed below are the CGM Elements that ***PICT to CGM*** supports in the CGM creation process.

output
- ignored

Element Code	Element Name	***PICT to CGM*** support

Delimiter Elements: Class 0

1	Begin Metafile	
2	End Metafile	
3	Begin Picture	
4	Begin Picture Body	
5	End Picture	

Metafile Descriptor Elements: Class 1

1	Metafile Version =*1* normally =*2* only when the the Pixel Map output option, "Cell Array" is selected along with the Direct color mode option. The CGM Admendment 1, (version 2) allows changes of the color mode between direct and indexed modes within the same picture body.	
2	Metafile Description	
3	VDC type *Integer*	
4	Integer Precision *16*	
5	Real Precision *32-bit fixed point* Only as a description in the CGM.	
6	Index Precision	*16*
7	Color Precision	*16*
8	Color Index Precision	*16*
9	Maximum Color Index	-
10	Color Value Extent *(0, 0, 0) to (1000, 1000, 1000)*	
11	Metafile Element List	
12	Metafile Defaults Replacement	-
13	Font List Only if option is selected.	
14	Character Set List *1* basic 8-bit or *4* complete code, *(*:* for Macintosh	
15	Character Coding Announcer	-

Picture Descriptor Elements: Class 2

1 Scaling Mode
Abstract
Metric
2 Color Selection Mode
Indexed
Direct
3 Line Width Specification Mode
Absolute
4 Marker Size Specification Mode
Absolute
5 Edge Width Specification Mode
Absolute
6 VDC Extent
7 Background Color

Control Elements: Class 3

1 VDC Integer Precision	*16*
2 VDC Real Precision	-
3 Auxiliary Color	-
4 Transparency	-
5 Clip Rectangle	-
6 Clip Indicator	

Graphical Primitive Elements: Class 4

1 Polyline	
2 Disjoint Polyline	-
3 Polymarker	-
4 Text	
5 Restricted Text	-
6 Append Text	-
7 Polygon	
8 Polygon Set	-
9 Cell Array	
cell representation mode	
1 packed list mode	
10 Generalized Drawing Primitive	-
11 Rectangle	
12 Circle	
13 Circular Arc 3 Point	-
14 Circular Arc 3 Point Close	-
15 Circular Arc Centre	-
16 Circular Arc Centre Close	-
17 Ellipse	
18 Elliptical Arc	-
19 Elliptical Arc Close	-

Attribute Elements: Class 5

1	Line Bundle Index	-	
2	Line Type		
3	Line Width		
4	Line Color		
5	Marker Bundle Index		-
6	Marker Type	-	
7	Marker Size	-	
8	Marker Color	-	
	Markers are output as text type.		
9	Text Bundle Index	-	
10	Text Font Index		
11	Text Precision	-	
12	Character Expansion Factor		-
13	Character Spacing	-	
14	Text Color		
15	Character Height		
16	Character Orientation		
17	Text Path	-	
18	Text Alignment		
19	Character Set Index	-	
20	Alternate Character Set Index		-
21	Fill Bundle Index	-	
22	Interior Style		
23	Fill Color		
24	Hatch Index		
25	Pattern Index		
26	Edge Bundle Index	-	
27	Edge Type		
28	Edge Width		
29	Edge Color		
30	Edge Visibility		
31	Fill Reference Point	-	
32	Pattern Table		
33	Pattern Size	-	
34	Color Table		
35	Aspect Source Flags		-

Escape Elements: Class 6

1	Escape	-

External Elements: Class 7

1	Message	-
2	Application Data	-

Appendix D: References

Appendix D: References

ANSI X3.122-1986 American National Standard for Information Systems - Computer Graphics - metafile for the storage and transfer of picture description information.

The CGM standard is also being processed through the International Standards Organisation (ISO). It is known as ISO 8632.

The American National Standard for Binary Floating-Point Arithmetic (ANSI/IEEE 754-1985) is used for the floating-point representation within the binary encoding.

ANSI®
American National Standards Institute, Inc.
1430 Broadway, New York, New York 10018

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