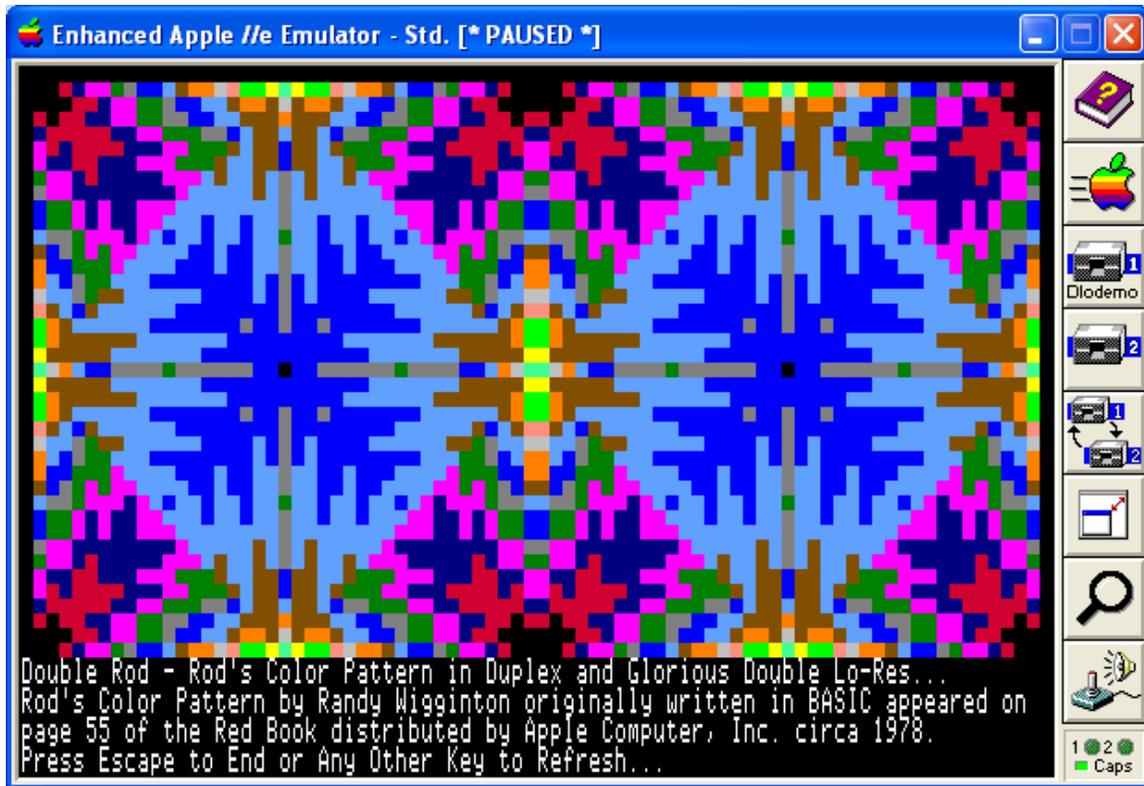


Capturing and Recycling AppleWin Lo-Res and Double Lo-Res Screens

A Tutorial by Bill Buckels, April 2013

Summary - Capturing an AppleWin Double Lo-Res Screen



The Apple II Double Lo-Res (DLGR) program screen above is displayed in [AppleWin](#)'s Color (standard) Screen Mode with "50% Scan lines" turned-off!

Capturing 560 x 384 screens (by pressing the [Print Screen] key) while displaying a DLGR image in AppleWin's Color (standard) Screen Mode provides a "true" color map of DLGR screen memory without "embellishments".

AppleWin DLGR screen captures done in this manner can be perfectly and accurately converted to Apple II DLGR binary files using a program like my command line utility, [AWINDLO.EXE](#) (AppleWin to Double Lo-Res). These binary files can then be used in your own Apple II programs.

AWINDLO.EXE also produces a smaller (more "appropriate" for editing) 24 bit BMP from the "oversize" AppleWin DLGR screen capture, (complete with a "color palette"), which can be edited and modified in Windows Paint or some other BMP editor.

After editing, your modified BMP can be converted back to Apple II DLGR binary files using a program like my command line utility, [BMP2LO.EXE](#) (BMP to Lo-Res). These binary files can then be used in your own Apple II programs.

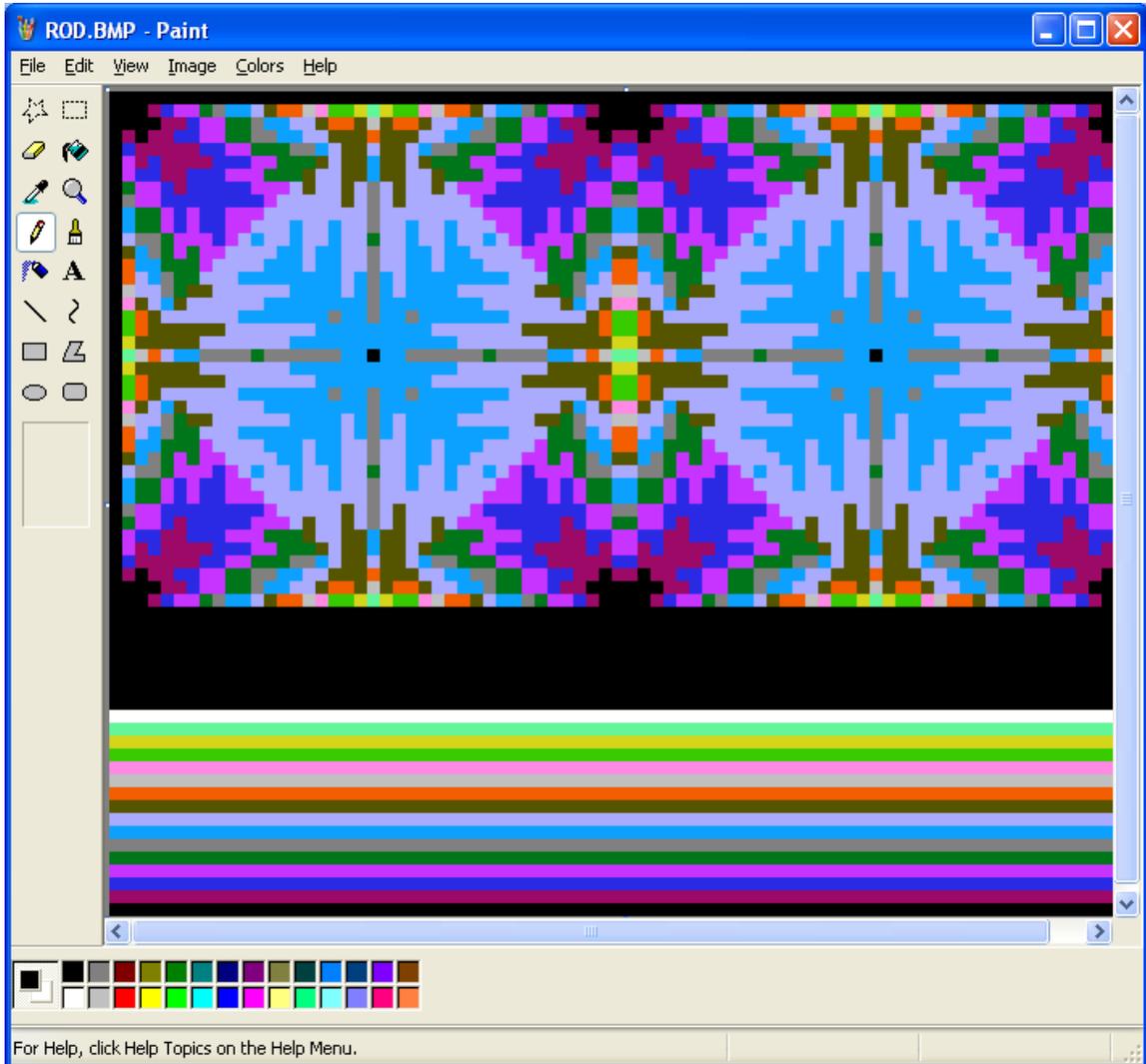
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Disclaimer: See the [Licence Agreement](#) in this tutorial for more details.

Introduction

1. The [AppleWin Emulator](#) can be used to capture Color (standard) mode DLGR and LGR screens from a running Apple II program and save to a Windows BMP file. AppleWin has “hot keys” to do this. The [Print Screen] “hot key” captures to a 560 x 384 x 256 Color BMP. This particular size is symmetrically “laid out” in 7 x 8 pixel (color) cells for DLGR, and 14 x 8 for LGR, which is perfect for conversion back to native Apple II LGR/DLGR Screen Files.



2. These color screen captures are enormous compared to the “coarse” resolution of the 80 x 48 x 16 Color DLGR screen or the 40 x 48 LGR screen. When AWINDOW converts an AppleWin screen capture to native Apple II DLGR or LGR files, it replaces the AppleWin screen capture file with a smaller 24 bit BMP suitable for editing in the same colors as AppleWin Version 1.22.

The top of the AWINDLO BMP is the 160 x 96 (or optionally 80 x 48) LGR/DLGR image and the bottom contains a “color bar palette” of the 16 available colors for editing. The “eyedropper” tool in Windows Paint can then be used to set the “draw color”, without “mucking about” entering RGB values.

3. After editing, BMP2LO converts your finished work directly back to native Apple II DLGR or LGR screen files, which can either be titled in AWINDLO and then re-converted and re-re-re-titled and re-edited ad-in-finitum, or used as-is.

When converting back to Apple II DLGR or LGR files from the BMP with “color bar palette” using BMP2LO, the color bar palette area (at the bottom) is ignored and left alone as a color reference for future editing.

4. These “recycled” graphics can be placed back on an Apple II disk image again using utilities like [CiderPress](#), and subsequently used in your own programs or slide-shows (or for whatever purpose you see fit).

Please consult the documentation for AppleWin, Windows Paint, CiderPress, and the documentation and source code for my own utilities for additional information.

More Information about AWINDLO.exe and BMP2LO

This tutorial provides a general overview about using [AWINDLO.exe](#) and [BMP2LO.exe](#). The documentation for these utilities can be reviewed for more information by clicking-on the links above.

Capturing and Recycling Applewin Screens from HGR and DHGR Modes

[Hi-Res \(HGR\)](#) and [Double Hi-Res \(DHGR\)](#) AppleWin Screen Captures *CAN'T* be converted using the utilities described in this tutorial. They have their own utilities and tutorials. Click on the links above for more information.

Some Applications for Managing Apple II ProDOS Disk Images

- [CiderPress](#) - No other Apple II Disk Manager has as many features or supports as many formats. Actively developed and supports CF (compact flash) storage etc.
- [Apple II Oasis Disk Manager](#) – Has “Batch Commands” and great support for DOS 3.3 disk images as well as ProDOS, but not actively developed.
- [AppleCommander](#) – Cross-Platform Support, written in Java and actively developed. Targeted towards Apple II Developers with support for the cc65 compiler, but can be used by casual Apple II enthusiasts as well.

Getting Started – Capturing Apple II 16-Color LGR or DLGR Screens



The AppleWin Application comes with a Windows Help File. Please consult AppleWin Help for attributions and AppleWin information not included here.

How to Tell What “Screen Mode” is Currently Displayed in AppleWin

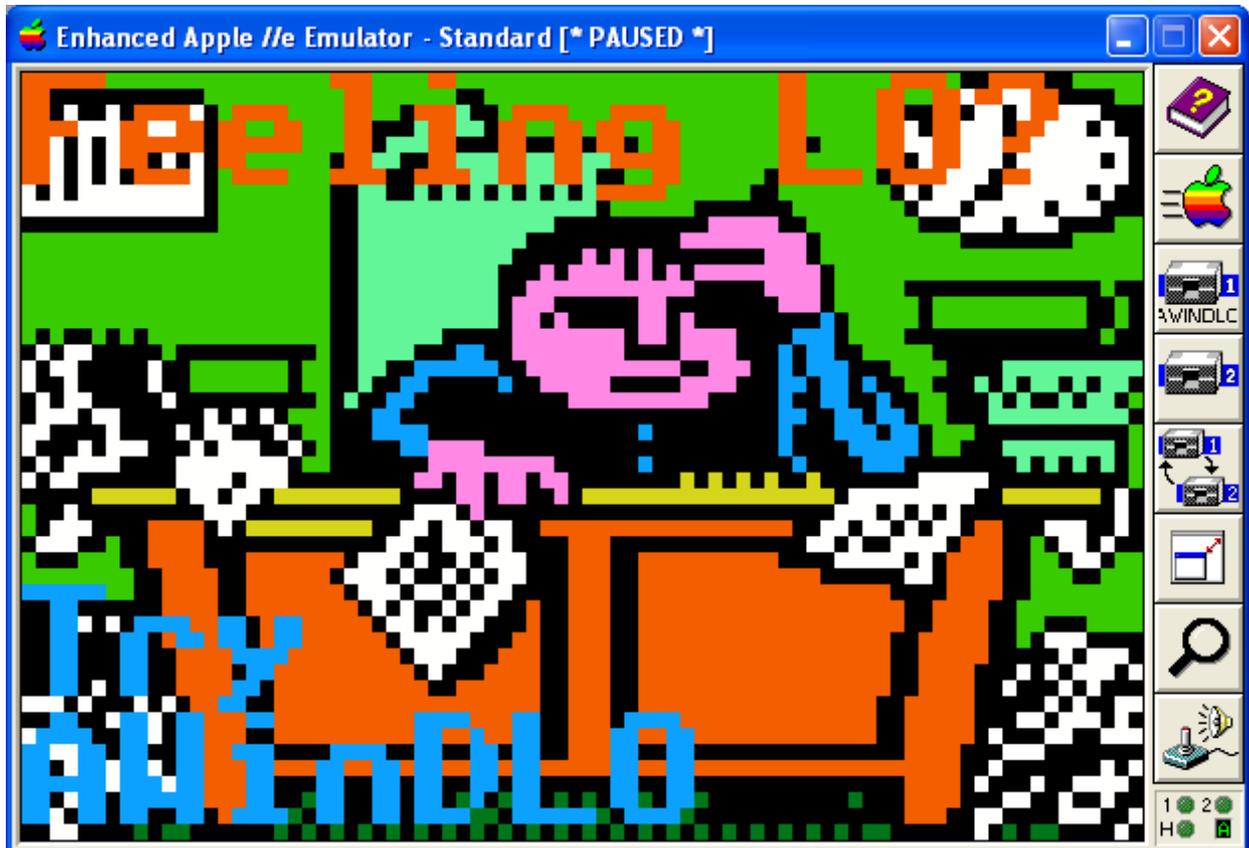
1. Pause AppleWin by Pressing the Pause Key
2. Open the AppleWin Debugger by Clicking On the Magnifying Glass Icon
3. The Bottom Right side of the screen displays the Apple II Graphics Mode
4. Close the AppleWin Debugger by Clicking On the Magnifying Glass Icon
5. Press the Pause Key Again to Resume AppleWin

Selecting a Folder (Directory) for AppleWin Captures

- Use the AppleWin Toolbar to select a disk image for drive 1 from the directory you wish to save to. Clicking-on a disk image (File Associations) will *NOT* work to select your AppleWin Capture Directory! And that’s a good thing when you think about it or folks like me who rummage around would have screen captures scattered in every corner.
- After you select your AppleWin Capture Directory do not use the AppleWin Toolbar to load disk images for capture unless they are in the capture directory.

Click-on disk images (Use File Associations) to load subsequent disk images from other directories. That way, “screen-grabs” from subsequent disk images will also be saved in the AppleWin capture directory that you previously selected.

- Keep Windows Explorer Open in your capture directory at all times. That way you will always see AppleWin’s captured BMP’s at the end of your file-list. If you need to “boot-around” to other directories to “click-on” (load) subsequent AppleWin disk-images containing DLGR screens you want to capture, use another copy of Windows Explorer to “boot-around”.



Keyboard Capturing Keys

The Pause Key – Stop or Restart a Running Apple II Program

Use the Pause Key to Pause/Resume the Apple II Program you are capturing screens from. That way, you can pause a program to “grab” the title screen, or in fact any screen, then resume (by pressing Pause again) to capture the next screen.

PrintScreen – Capture a 560 x 384 SVGA BMP

Always capture to this size for LGR/DLGR images to be converted. Always capture LGR/DLGR screens in AppleWin’s Color (standard) Screen Mode, and always capture any screen to be converted using my utilities with 50% Scan lines *OFF*!

1. Make sure you have Windows Explorer open in your capture directory.
2. Pause AppleWin.
3. Press and release the Print Screen Key.
4. Wait for AppleWin to finish saving. Before you resume AppleWin, look at the bottom of the file-list to make sure you got a “grab” and a new bmp exists.
5. Verify - Click-on the new bmp file that AppleWin created to make sure you got what you wanted before resuming AppleWin.
6. Resume AppleWin.



File Names of AppleWin Screen Captures

When you follow the steps above, AppleWin saves screen captures to bmp files using automatic naming convention. Bmp file names begin with the disk image name followed by a sequential number. For example, captures from a disk image called “Winter_Games.dsk”, will result in bmp files named “Winter_Games_000000000.bmp, Winter_Games_000000001.bmp, Winter_Games_000000002.bmp, etc”.

Use Short File Names

Rename the bmps that you wish to convert to an MS-DOS 8.3 naming convention. For example, “Winter1.bmp, Winter2.bmp, Winter3.bmp, etc.” are OK. “Winter_Games.bmp” is too long a name, because “Winter_Games” is more than 8 characters in length.

My MS-DOS/Windows utilities ***DO NOT*** support long filenames, and they use the bmp file’s “base name” to create Apple II files from bmp files. For example, “Winter1.bmp” will become “WINTER1.DLO” or “WINTER1.SLO”, etc.

These MS-DOS/Windows utilities are written for distribution with the Aztec C65 MS-DOS cross-compiler for the Apple II. The Aztec C65 Apple II compiler will also run on other platforms like Linux (or Windows 7) in an MS-DOS emulator (like DOSBox), so I have created these utilities as MS-DOS programs to work outside of versions of Windows (like Windows XP) that do not necessarily need an emulator like DOSBox .

To make a long story short, make your long filenames short!

Getting Started – Editing Converted Apple II LGR and DLGR Screens

You can skip editing if you don’t need to make any changes. AWINDOW directly creates Apple II Native LGR/DLGR Files when it converts from a captured Color AppleWin LGR/DLGR screen.

AppleWin Changes between Versions

For the purposes of this document, and testing the utilities discussed herein, I used AppleWin versions 1.16, 1.17, 1.20 and 1.22.

When I first wrote BMP2LO, I used only AppleWin version 1.16 to test my program and I never took the time to test on my real Apple II. I did not upgrade from AppleWin 1.16 until just recently, and afterwards none of my DLGR “stuff” worked properly, so I got to work and fixed it. This was because until AppleWin version 1.17, DLGR colors were broken in AppleWin’s presentation of the DLGR Screen’s Auxiliary Memory, and slothfully, I did not test properly on a real Apple II so sadly propagated my ignorance across the Apple II omniverse, consequently misleading tribes of my followers.

AWINDLO offers a command line switch for an AppleWin version number. If you are still using version 1.16 and your screen captures look “wrong” you can still convert them properly; just enter 116 on the AWINDLO command line following your AppleWin Screen Capture MS-DOS 8.3 BMP file name. A better solution would be to install AppleWin version 1.20. AWINDLO works properly with DLGR screen captures in versions 1.17, 1.20, and 1.22.

No matter what happens, you can always temporarily install one of the above noted older versions of AppleWin, as a “work around” to do DLGR screen captures if AWINDLO “breaks” with future versions of AppleWin.



Editing Tips - Consider Your Editing Layout

Pixels

By default, AWINDLO creates a double-scaled BMP for DLGR. When you are editing a double-scaled BMP, produced by AWINDLO, you need to consider the size of your Apple II pixels relative to your BMP pixels. For DLGR they are 4 BMP pixels (two high and two wide). For LGR Apple II pixels are two BMP pixels high and a whopping 4 wide.

AppleWin BMP pixels are enormous when compared to AWINDLO BMP pixels, but you may wish to scale-down your output BMP even further, especially for LGR. A

scaled-down AWINDLO LGR BMP is still 2 BMP pixels wide and but a scaled-down AWINDLO DLGR BMP has the same number of pixels as its Apple II counterpart.

If you are happy working with a very tiny BMP or if you wish to save some disk space (scaled-down AWINDLO BMPs take only 25% of the disk space compared to the default double-scaled size), enter S on the AWINDLO command line following your input file name.

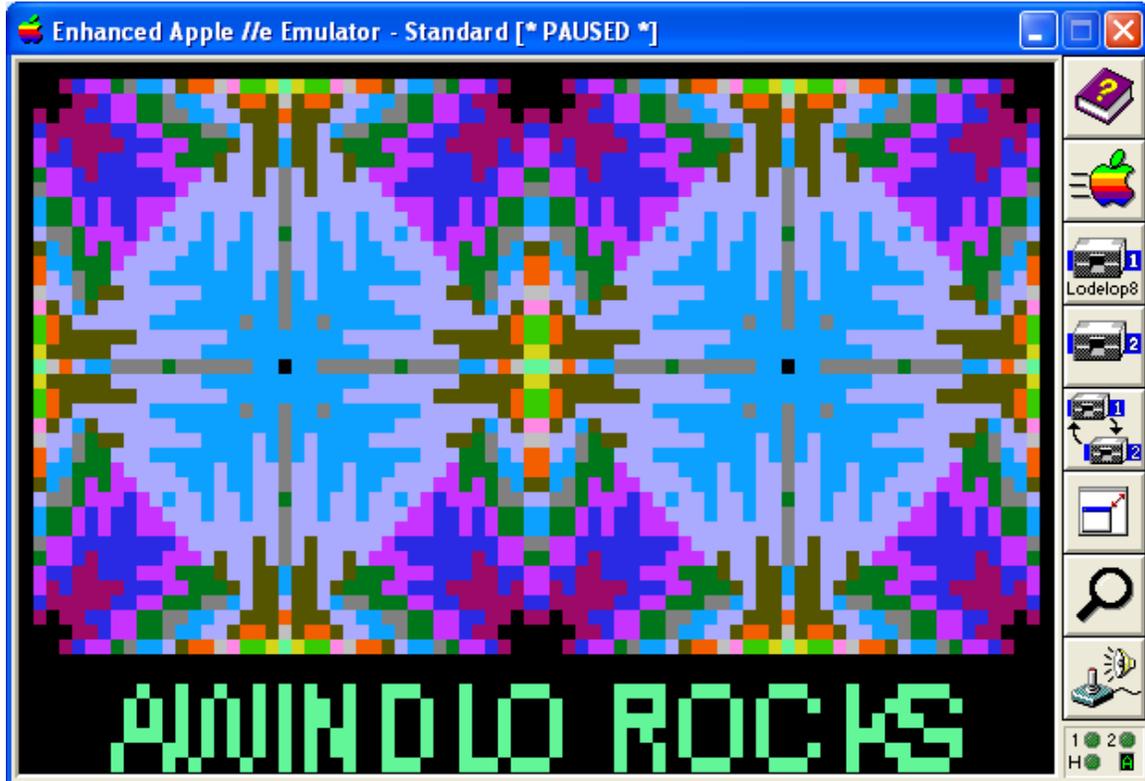
Colors

You cannot just use any color you please in an “LGR/DLGR BMP” image and expect it to map properly to the Apple II. You must do any editing with the 16 colors supported by AWINDLO and BMP2LO if you want to properly convert to the Apple II after editing.

In Windows Paint, you use the “eyedropper” tool to select an existing color from the palette at the bottom of the BMP that AWINDLO produces from an AppleWin LGR/DLGR Screen Capture.



Preparing Text and Line Graphics for Discrete Color Conversion



Masking and Layering

This section applies primarily to editing of DLGR images. LGR's horizontal resolution is only 40 pixels wide which doesn't amount to much more than block graphics which by definition are aliased and jagged and more like icons than images.

Windows Paint supports a transparent paste, a flood fill, a color eraser, and an "eye-dropper" tool, and a color viewing and adjustment dialog. These are all essential features that you should be familiar with, for proper editing of any bitmapped graphics. You can consult Windows Paint Help for more information about how to use these.

Anti-Aliasing and Dithering of Colored Text and Primitives

When you create text or a line in a 24 bit bmp, Windows paint will "smooth" (anti-alias) curved or diagonal edges. Sometimes it will anti-alias for no apparent reason. This creates convoluted extra colors that will not convert properly back to the 16 colors you are allowed by AWINDLO or BMP2LO.

When you scale an object or create text in a 16 color bmp, pixels in more than one color are likely to occur, sometimes for no good reason, which will create a dithered effect and reduce the clarity of the text or object your converted image.

To overcome these problems when creating text and primitives you must use monochrome mode because it is the only mode in Windows Paint that supports aliased elements.

How to Create a “Masked Layer” in Windows Paint

Do all your text and line graphics in monochrome... do not do them in 24 bit color:

1. You need to create a 2 color mask to transparently paste “primitives” over your 24 bit image in a color that does not map to one of the 16 LGR/DLGR BMP color values supported by AWINDLO and BMP2LO for 24-bit BMPs. This is so you can keep your primitives separate from your main image when pasting, and color them later when you determine how they will work-out. You may end-up re-coloring your main image along the way to make it “less busy” and provide your primitives with a properly contrasting background.
2. After you have created your black lines or text on a white background in a monochrome bmp (keeping in mind your pixel size), save your monochrome bmp as a 16 color bmp, and flood fill your black lines with a bright color you can see like Magenta (basically “shocking pink”).
3. Then copy the resulting “Magenta Masked” text or line elements to the Windows ClipBoard and transparently paste over-top of your “candidate” 24-bit “LGR/DLGR BMP”.
4. As a final step, set your supported “target” color for the text or lines that you have pasted, using the eye-dropper and the palette at the bottom. Use the flood-fill, color eraser, or pixel tool to re-color your “Magenta Mask” to one of the 16 supported “LGR/DLGR BMP target colors” in the palette.

Scaling Monochrome Text for Double-Scaled BMPs

Use a thin font for text. Afterwards using the Windows Paint Clipping Box, surround your text, and skew the horizontal and vertical aspects 200%.to quadruple your pixels in size. On a Low-Res image, skew 400 % horizontal and 200% vertical.

Or you could create your text in [AWINDLO](#).

Best Practices for Editing

- Work to the scale of your output image.
- Work in the 16 colors provided for you.
- Use a “Magenta Mask” to preserve discrete colors (see above).

Getting Started - Converting Apple II “LGR/DLGR BMPs” to Apple II Format

BMP2LO Modes of Operation

BMP2LO.exe has two “modes” of conversion to LGR and DLGR files:

- Clipping Editor – Interactive – Single and Double Lo-Res Output. MS-DOS 4-color BAS and PCX files and 16 – Color BMPs only. Note: the Clipping Editor can be (or could be) called from the command line and uses the same command line options as the command line only mode (see below), but launches into the clipping editor’s MCGA graphics mode where you can clip from an input file of up to 9 individual graphics per input file and remap colors.
- Command Line Only - Non-Interactive – Single and Double Lo-Res Output. 24 – bit BMPs only. This mode is also “text mode” only. On systems that do not support MS-DOS graphics applications, this is your only option, besides running within an MS-DOS emulator like DOSBox that supports MCGA video mode.

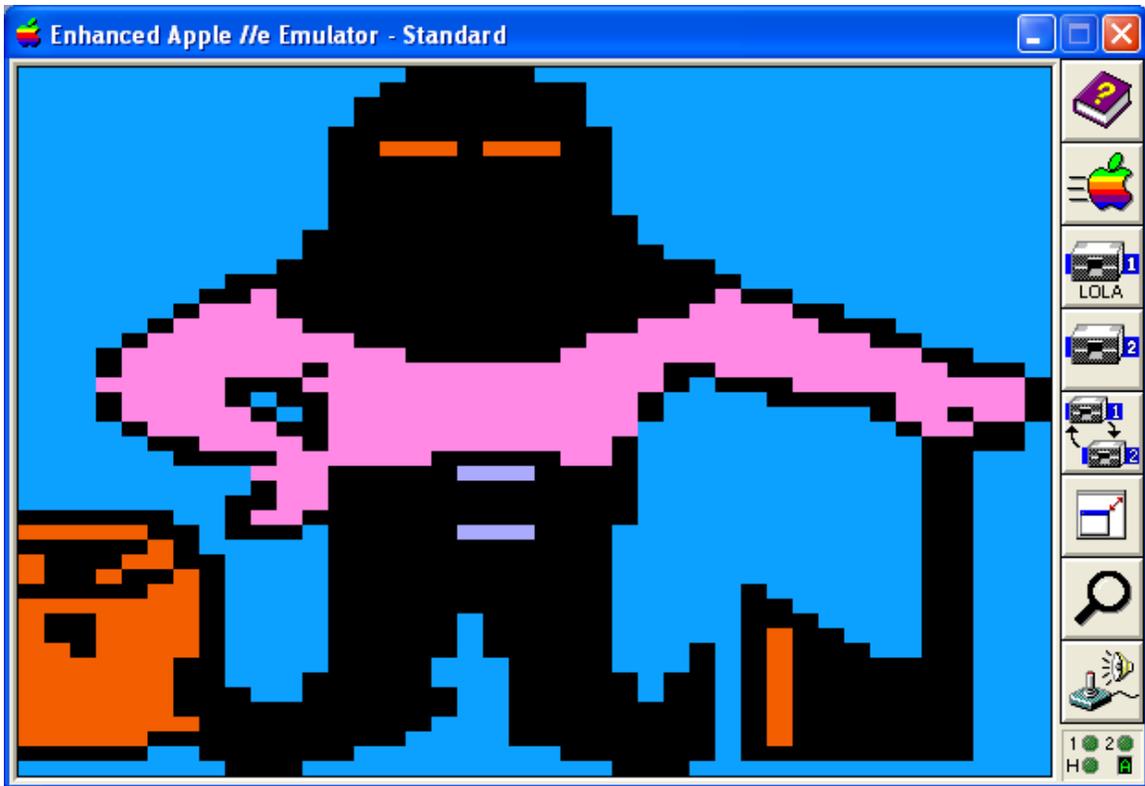
Interactive conversion is designed for “size-on” conversion of sheets of up to 9 “MiniPix” (88 x 52 Old Printshop Graphics) created by clipboard pastes from my ClipShop utility into a Windows Paint 16 Color BMP file. Another utility called Mini2BMP.exe is also distributed with BMP2LO for converting native Apple II Minipix to 16 color bmp files suitable for use with BMP2LO’s interactive conversion mode.

Command Line only conversion is designed for conversion of the 24 – bit BMP’s produced by AWINDLO and other 24-bit BMP’s in a fixed-size range. See below:

BMP Image Formats accepted by BMP2LO version 3.0

Non-Interactive Conversion	
24Bit.BMP	Sizes (resolution) below
AWINDLO or similar	160 x 96 - 160 x 128 - 80 x 48 -80 x 64
MINIPIX single file	88 x 52 or 176 x 104
Interactive Conversion	320 x 200 resolution
MINIPIX 9 clip maximum	CGA 4- Color GWBASIC BSaved Images
MINIPIX 9 clip maximum	CGA 4- Color PCX Images
Interactive Conversion	maximum 320 x 200 resolution
MINIPIX 9 Clip maximum	16 Color Windows Paint BMP Files of any size
MINIPIX single file	up to 320 x 200

After conversion, place the converted LGR/DLGR file on an Apple II disk (or whatever your intention is).



BMP2LO LGR “Lo-Res” Output – Command Line Option L

BMP2LO produces LGR output as well as DLGR output. When converting a BMP to Lo-Res Apple II files you must enter L (for “lo-res”) on the BMP2LO command line somewhere following the BMP input file name. By default, BMP2LO’s output is DLGR.

Starting AWINDLO, and BMP2LO

Both AWINDLO.exe and BMP2LO.exe work in basically the same manner when launched from the command line; enter either AWINDLO or BMP2LO, followed by the name of the file to be converted. For converting to LGR, AWINDLO uses the number 1 (one) as a command line option, and BMP2LO uses the letter “L” to convert from LGR. DLGR is the default for both.

You can also launch either program by clicking-on the program in Windows Explorer or from the “DOS prompt” without a bmp filename, and you will be prompted to enter the filename.

Again, read the individual documentation, source code, and use [AWINDLO](#), and [BMP2LO](#) to see how all this works for you.

This ends the LGR/DLGR AppleWin “Screen Grabs” tutorial.

Licence Agreement

You have a royalty-free right to use, modify, reproduce and distribute AWINDLO and BMP2LO, related source code, and related demos and the other stuff they come with (“baggage”) including this tutorial document. You may use these programs and their “baggage” for whatever you wish, provided that you agree that I have no warranty obligations or liability resulting from said distribution in any way whatsoever. This seems fair enough since the rest of the planet can do exactly the same thing.

