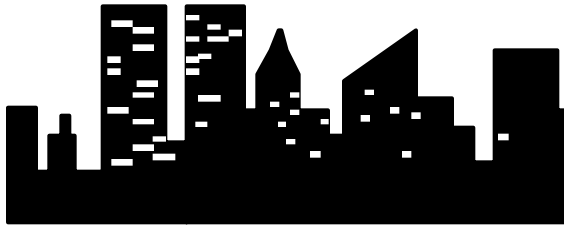


Windo Watch



DECEMBER 1995

Vol 1 No. 9

NEXT

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WHAT'S INSIDE

Vol.1 No. 9

December 1995

Editorial

VRML: Worlds of the Imagination

Herb Chong

Disaster Prevention and Data Recovery

Phil Leonard

The Windows95 Registry

Kent D. Bentkowski

Alice Writes a Column

Peter Neuendorffer

Windows Aspect: *A Tutorial - Part Eight*

Gregg Hommel

Stanley

Bob Miller

The Many Faces of Santa

Derek Buchler

Word Processing and the Suites

Frank McGowan

A Trip to All Points....Everywhere

Kyle Freeman

Surfing the Net From the Sticks!

John M. Campbell

DriveSpace3

Jim Gunn

Why Wizards Aren't so Wonderful

Robin Mabry

Idiots Redux

Bob Miller

Alice's Doors

Peter Neuendorffer

Dear Santa

Leonard Grossman

Jim Gets his Dream Machine

Jim Plumb

The In-Touch Sampler

Lance Jones

A Report From the Israel

Stan Kanner

Acrobat v2.1 Notes

Jim Plumb

'Twas the Night Before Christmas

Derek Buchler

Reflections of a ModemJunkie

Leonard Grossman

The Last Word

Ben Schorr

VRML, Netscape and Java-Java Jing-Jing!

1995 witnessed the extraordinary explosion of the Internet with a promise of much more of the same. With the coming of year's end, it becomes more difficult to pass off with a *so-what* shrug the formidable march of computer power and versatility onto our desktops. It's hard to believe that this enormous resource is so readily available, and even more astounding, so relatively cheap! The reality of the information age becomes so mind boggling that we must wonder aloud about new possibilities conflicting with ingrained habits, entrenched priorities of gatekeepers and raw corporate competitiveness.

The Internet, using very mundane tools like desktop computers, telephone technology, and modems have thrown open the gates to almost any idea, any place, and any possibility. But sadly, some things never seem to change.

Our curiosity keeps recycling us to the same place. We're still seeking a perfection on our desktops of speed, efficiency, and versatility while scarcely taking the time to learn or understand that which has already been delivered. Most of us work long hours trying to stay on top of the torrent information pull-ing us into a whirlpool - only to find ourselves standing in exactly the same place.

Microsoft has delivered a fine 32 bit operating system in Win95, .. not perfect but a monster step forward for the DOS/Windows world. The carping about system warts and black holes of disaster seem to be abating, - but we sense the need to refocus on a new target. It's strange that we have great tolerance and expectation from the new players... Netscape, Java, and VRML. As online publishing evolves into a completely unique standard, the OS wars are but an early sniff of controversy yet to come.

As we've all noticed, the new applications are huge. After finishing up this issue of [WW](#), I wondered if I should grovel to our readership because of its size -almost 1800k. Nope! I *am* however, going to simplify the life of the entire editorial staff (both of us) and announce the end of both the ascii and Readroom editions. Many of our articles are laced with pictures and to edit out all references to the graphics is just more work than we are prepared to do. As an aside the raw Word7 files toted up to eight Meg. Issue #9 will be the last of the ascii and Readroom editions.

* * * * *

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SUBMISSIONS and REQUESTS

Email using Internet
lois.laulicht@channel1.com
windowwatch@ins.infonet.net
winwatch@user1.channel1.com

Editor WindoWatch

Valley Head, WV 26294

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Virtual Reality Graphics Software

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It's now been several months since I have been adding a graphic into each issue of WindoWatch. It's time that I explained how I created them and how you can go about creating some yourself. At this time, doing virtual reality graphics like those I've been showing is not for the impatient. It takes hours and sometimes weeks to get something just right. Each of the images may take hours or days to render on a fast machine. You need to be able to think and visualize in three dimensions and have an artistic inclination, even if you don't have a huge talent.

Myst and Doom are the most well known of the computer games that use virtual reality. Myst's animations and images were all done on a Mac using an expensive professional software system. If you've seen Myst screens before, you'll see that they are hyper-realistic. Surfaces are a little too clean and sharp. On the other hand, it's pretty realistic how objects move and change shape around you when you move toward or past them. Doom is a different, less ambitious, virtual reality game. Absolute accuracy isn't the point. Notice that nothing casts shadows? However, its backgrounds and surfaces do otherwise and change properly as you move about the dungeon. More importantly, they change quickly so that on faster machines, there is no flicker at all, even though, the differences in perspective is generated as needed. By contrast, Myst uses pre-generated animations for all its movement. It blend them together seamlessly so that it looks like you are just moving, not playing carefully pre-planned movements of a camera.

Virtual reality graphics is computer art, although some say that computers and art are mutually exclusive. With the tools like those I will describe in this article, you will be able to create nearly

everything you can imagine. The better your ability to create new ideas and new ways of looking at things, the more amazing your imagery will be. I'll start off with some basic concepts of computer graphics and move onto the tools you need to get started. Then, I will show a gallery of some images from some projects I have worked on, or that other people have worked on and that I have captured. Finally, I will give a list of software that I have used, interesting places to visit on-line, and magazines to check out. Doing virtual reality graphics is tremendous fun and lets you turn some of the images in your mind into images others can admire.

Here is a sample, just to give you a flavor of what is to come. You can create an image just like this, with no artistic talent at all, in about 5 minutes. You do have to know a bit about how to use your program, but that's a different kind of talent. This is a cube, a cylinder, and three spheres. They are resting on a plane surface (the grass) and surrounded by a hemisphere (the sky and clouds). There are 2 lights illuminating the scene, and some of the objects glow a little too. The hardest part of doing this picture was figuring out how to get a perfect hemisphere and then trying to find a nice picture of sky and clouds to put on it. I created this picture using trueSpace 2.0, a program at the high end of the price range at about \$450 to \$500 in stores.

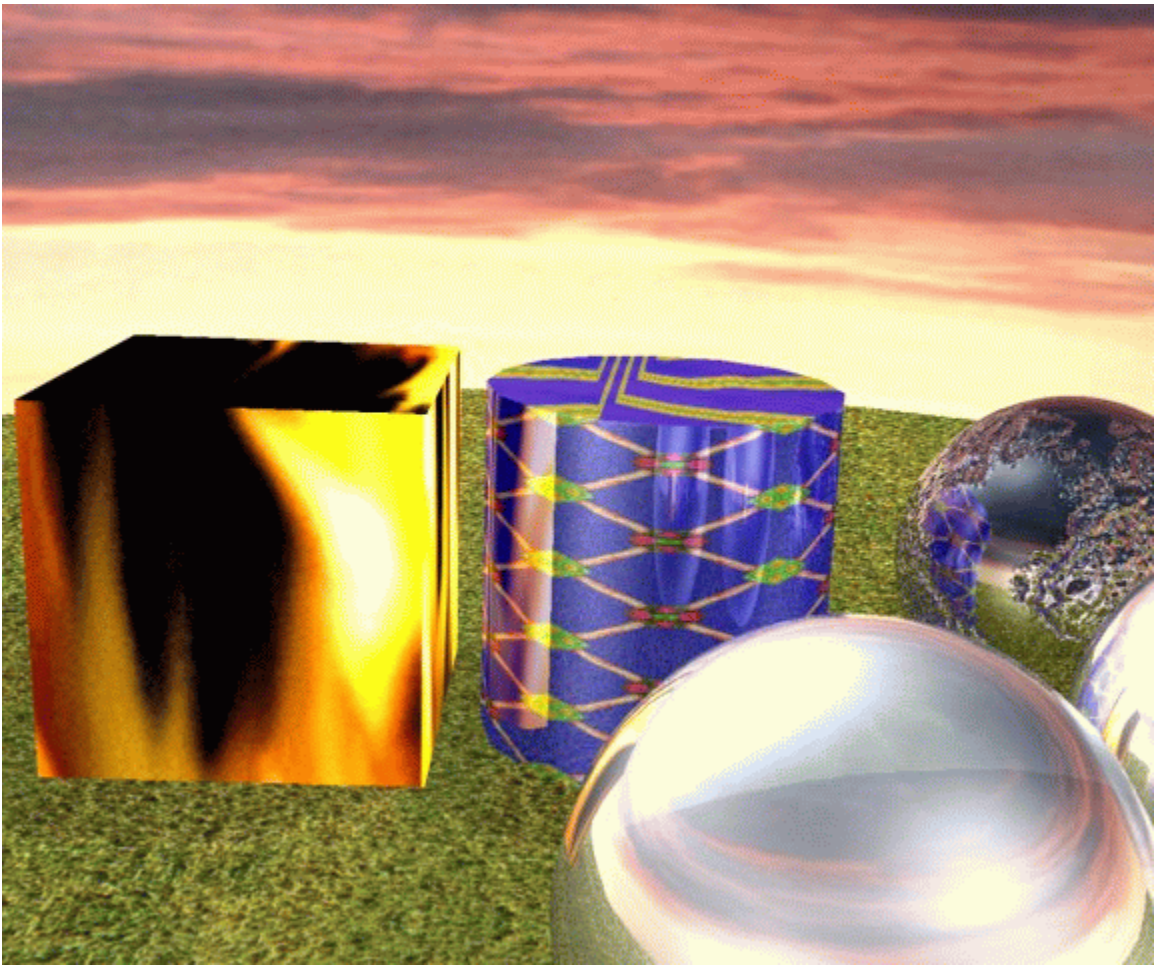


Figure 1 -

Basics

How does one go about creating an image like Figure 1. Let's start at the beginning. What do I mean by virtual reality graphics software? It means many things to many people. Some people insist that it's not

virtual reality unless you are wearing goggles, gloves, and experiencing the sights and sounds, and maybe even the smells, of a world as you move through it. That's pretty high tech stuff and, frankly, not only very expensive, but not nearly as realistic as the advertising would have you believe. Some people call Doom a virtual reality game. Well, it is, but only in the sense that you can move about and interact with a world someone else has created for you. The Doom construction sets make worlds or levels of your own, but there are only certain things you can do.

The kinds of virtual reality graphics software I am going to tell you about are the kinds that an artist would use to create images and movies of objects and scenes. The art might be for its own sake, as part of another image, or it might be used to visualize the sequence of events in an accident investigation called forensic graphics animation. There might be only a single image or a sequence made into a movie. Another limitation on the software I'm going to talk about is that it can't be too expensive. The prices of the software I'm going to describe range from free to about \$500. This covers the range from very simplistic software to complex software used by professionals. The truly professional software used to make movies in Hollywood start in the several thousand dollar range and go up. Normally, commercial virtual reality movie studios have specialized hardware to help them make their movies faster. I'm not going to look at any of that software or hardware.

Modeling

The first thing that virtual reality graphics software has to do for you is to be able to model or represent the world that you want to create as an image or movie. The modeling tool can be an integral part of a program, a separate program part of a virtual reality graphics package, or a completely separate program that can create objects you can load into a scene builder. The modeler might be so simple that it only allows you to import 2D or 3D clipart to a full-blown CAD program that can completely design an office building. No matter

what it's capabilities, the modeling program's job is to create and manage objects for you.

Most modeling program have a set of primitives that they can create if you don't import any clipart. Usually, they are simple shapes like sphere, circle, cube, cone, flat plane, and cylinder. A good modeling program lets you use these objects to build almost anything you can imagine. All modeling programs let you load pre-created objects and modify them to some degree. Some programs allow only one object format, usually a proprietary one. Most allow you to use files from CAD programs too. The higher end tools also understand some of their competitor's object formats and import them.

What do you do with objects in a modeling program? For most such tools used with virtual reality graphics software, one of the most important things they do, is let you alter an object's geometry. This means reshaping the object. If a lamp is just a little too big, you might want to shrink it. If you're framing a picture, the frame might be a little too thin. Modeling programs also let you deform objects, sometimes arbitrarily, sometimes only in certain ways, and they can let you stretch and shape and twist parts to your heart's content. If you want to bend a cone to touch its toes, you should be able to do it. You'd be amazed at what shapes four spheres and a cube can be end up like with about two minutes manipulation. I'll show you in one of the images in the art gallery at the end of this article. The remaining manipulation a good modeling program can do is to break apart groups or join together objects into groups.

The next important thing that a modeling program does for you is that it allows you to apply textures or materials to the surfaces of an object. Some programs will let you create your own textures. Others give you only a fixed palette to work from. Whatever the modeling program's texture manipulation capabilities, they all allow you to pick a texture and apply it to an object.

Texture in virtual reality graphics programs is a more general concept than common English use of the word implies. Before a

texture is applied to an object, the object's not visible, just like some ghosts are supposed to be. Once a texture is applied, light can interact with it. These are the lights that you work with in the virtual reality graphics software, not the lights in your office around your computer! What are some examples of textures? Well, water is a texture. An entire object, the contents of a swimming pool, is made of water. It has certain properties and certain interactions with light. Concrete is another texture. The important thing to remember here is that to virtual reality graphics software, a texture is a solid and not just a surface property. Yes, you can apply a texture only to the surface of an object, but usually that is not sufficient. Materials that allow light to pass through them like water and glass need to be made entirely of a material, not just painted on the surface with a coating.

The technique used to generate the scene governs just how much of a material's bulk properties need to be modeled. There are two major ways of rendering images in software of the target price range, shading, and ray tracing. I won't get into the details of either until I finish talking about scenes, but suffice it to say for now that shading requires less modeling of a material's properties than ray tracing. More details later.

The remaining features in modeling programs vary so much that I'm not going to describe them. Suffice it to say that the kinds of things you can do to text with a text editor or word processor, you can do to objects with a good object modeling program, like cut, paste, rearrange, move, and so on. Time for some more pictures. Figures 2 and 3 are images I created using Visual Reality 2.0. It's a program that typically retails for under \$200. It comes on 7 CD-ROMs with a huge 3D clipart library and pre-built scenes. Figure 2 is from the Simply Scenes CD Jurassic Adventure. It's a scene full of plants and landscaping and all set for populating with any one of ten dinosaurs (included but not in this image). The volcano looks pretty realistic, doesn't it. Figure 3 is from the Orbit City Simply Scenes CD. It's a city floating in space. This is a view looking out from the center of the city past the hydrodome and the landing pad to the planet surface

below. You can take objects out of and put your own objects into the scenes.

Visual Reality comes with two other Simply Scenes collections, the Starter Pack, and Northern Castle. Imagine the computer games you could create scenes for in a dark and gloomy castle!



Figure 2

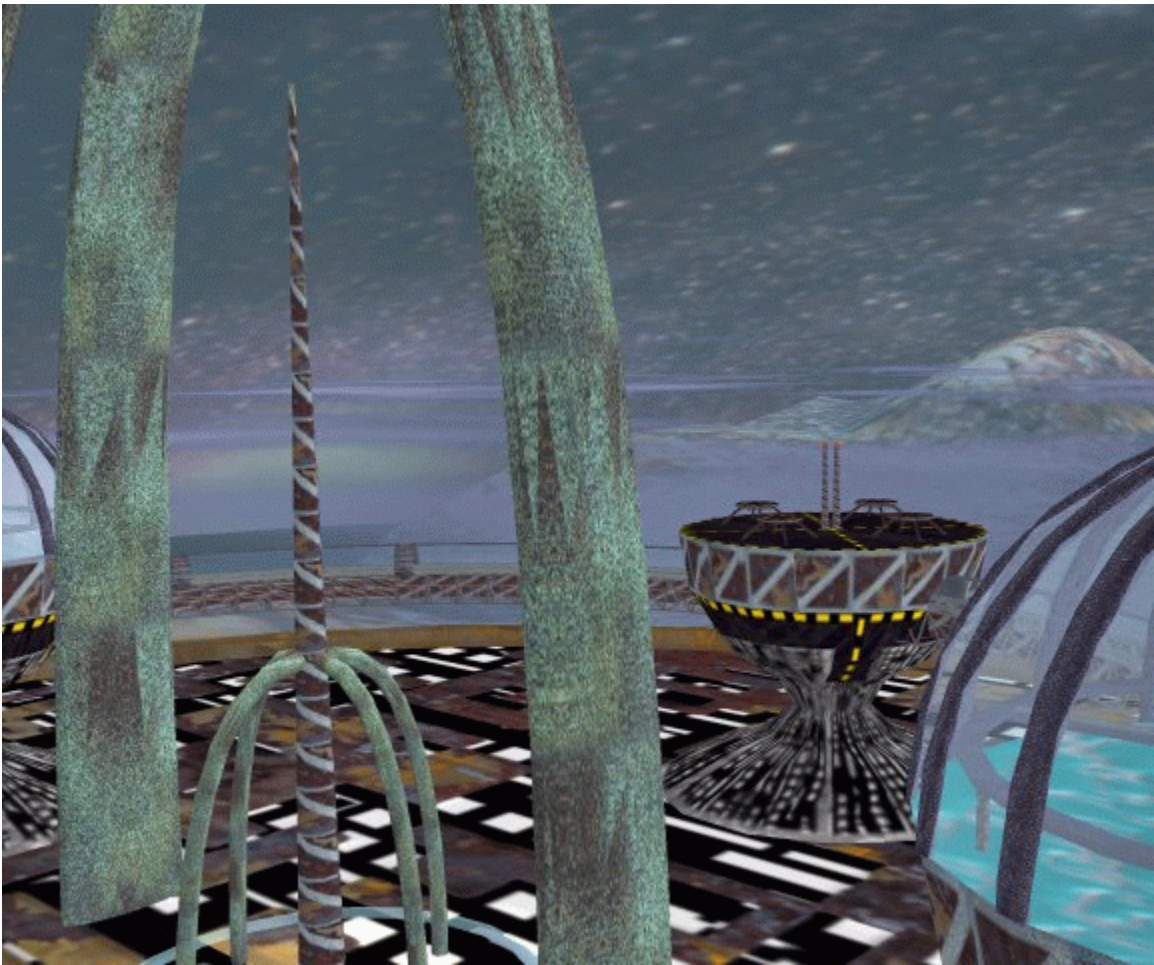


Figure 3

Scenes

Once you have a bunch of objects, you still don't have an image, and certainly not a movie. Scenes are where everything starts to come together. Although terminology varies in the manuals, a scene is a collection of objects, their positions, and orientations, lights, background, and a camera. The lights have intensities, possibly direction and scatter, and sometimes shadows. The camera has a position,

orientation, and a focal length. Varying the focal length is zooming, just like you would with a zoom lens on a camera. The scene editor might be a separate program, or it might be the same program as the modeling program. It's useful to be part of the modeling program because one of the things you do when building scenes is move objects around, perhaps rotating and scaling them, so that they are arranged just the way you want them to be. You move lights around in a similar way to get the right effect too.

Most of the scene editors work in wire frame mode. This means that you don't see the object as a solid object. Instead, you see a skeleton of each object. When there are many objects in a scene, it can sometimes become very hard to tell apart one object from another. Newer programs have a solid viewing option. Objects are drawn with surfaces visible so that you can tell what the relationships between objects are. You can see if two objects are touching or one is being blocked more easily. However, this costs lots of CPU power to do. Don't even think about it without a fast Pentium system and a very fast video card.

Building good scenes is easier if you have an eye for composition, but since this is all done on a computer, you can render a test image whenever you want to see if things look good or not. Most modeling programs will allow you to manipulate the camera and move it around to get the right view. Unlike real life photography, if the mountain is too big, you can shrink it a little. Talk about power! Don't like the clouds, get new ones. It's easier than hiring and firing extras in a real movie.



Figure 4

Speaking of mountains, it's time for another picture, of mountains, of course! Figure 4 has appeared in a prior issue of WindoWatch. It's a computer generated picture of Yosemite Valley looking from west to east, near El Capitan. Although it is quite realistic, you can tell that it's computer generated. The trees have no shadows under them, the leaves are too sharply visible, and there are "creases" in the rocky cliffs in the background. I created this image using Vista Pro for Windows 3.0. It's a program that takes US Geological Service Digital

Elevation Model (DEM) data of sections of land, and allows you to model the surface and populate it with plant life. You can also get a DOS version. It's slightly faster than the Windows version, although the Windows version has some additional features. If you buy the CD-ROM version, you get maps of most of the US at low resolution and some selected areas at higher resolution. If you don't like pictures of the Earth, on the CD-ROM are compatible maps covering about 1/2 of the surface of Mars. If that's still no enough, there are simple ways to generate your own landscapes.

Rendering

Leave it to computer types to come up with a complicated name for a simple idea. When you render the image, you do the equivalent of clicking the shutter button on a camera. In this case, the camera is a virtual one in the virtual world you have created. How fitting! Under the covers though, a tremendous amount is happening. Because many people spent many years figuring out how to do something they thought was simple, they couldn't just call it something ordinary, so everyone in the know now calls it rendering.

There are two types of rendering used in virtual reality graphics software of the target price range, shading and ray-tracing. They take two opposite approaches to how to figure out what appears in your images. Both have their advantages and disadvantages. Expensive programs sometimes use a lighting model called radiosity to generate realistic images. It takes tremendous amounts of CPU power to use and for some situations, generates very unrealistic images. Shading and raytracing have been around for a while and, compared to radiosity, much faster.

Shading first figures out from the viewpoint, view direction, and view focal length, what objects are visible. If an object is partly visible, the program conceptually cuts the object off so that only the visible portion is left. Next, it examines every visible surface and looks to see what lights are shining on it. If there are any, it uses a mathematical formula to figure out, given the color of the light and the surface

material, what the apparent color of the part of the surface should be. If there is no light, then the program might assume a *default* ambient light and calculates the resulting color. Then it figures out, for each dot (pixel) in your image, what is visible from the dot, and colors the dot appropriately. This was the first solid view of objects generated for computers. Prior to shading, only wire frame models were used. There was neither the theory nor the computing power available to do any better. Shading was invented in the late 1960's and early 1970's.

Ray tracing takes a completely different approach. It goes from the view point, in the direction of the view, out in the exact direction of each dot that will appear in your final image. This is a backwards ray of light tracing back from where it would have hit the view point, out through the target dot. It keeps going backwards until it hits an object. When it does, the program figures out how much of the ray would have bounced, any change in color caused by the texture, splits into two and refracts as necessary, and keeps going back until it hits a light, doesn't run into any more objects, or has been dimmed so much by its reflections that nothing could have come from that ray and made it to the camera. The last case is easy. The program paints the dot black. The first case is almost as easy. Now that the program knows that it has hit a light, it knows the color and brightness of the light. It retraces the path from the light to the viewpoint, altering the brightness and color as appropriate, until it reaches the dot. Whatever the color the light last was set to is the new color of the dot. If the ray has split into two because of refraction and reflection, the two contributions are added together and the blended ray ends up at the dot. This can happen many times to build up the color of a single dot if the scene has plenty of partly transparent, refractive, or reflective objects. What does this really mean? Time for more pictures. Figures 5 and 6 are of the same scene. Figure 5 was shaded while Figure 6 was raytraced. There are two important differences you should note: the shiny cone isn't reflecting anything except light in the shaded version, and the colored glass cube is rendered completely differently. Look at the base of the shine cone in the raytraced version. You should be able to see on the bottom right and tiny part of the sphere reflected back. Similarly, looking through the purple glass cube, you can see that the

cone is reflecting both the picture on the cube and the back of the purple cube. Finally, you can see on the faces of the cube both reflected and refracted images of the cube and the sphere. That's the difference you get with raytracing. So why doesn't everybody do raytracing by default? It took about 30 seconds on my system to render the shaded image at 640x480. It took about 15 minutes to do the raytraced version. This is for a very simple scene. In the scene I'm working on for my current animation, I am working with several thousand objects at once. It takes just over 100 megabytes of RAM to load the scene and another 100 megabytes of RAM to ray trace it. It takes about 6 to 10 hours to raytraced a single 640x480 frame.

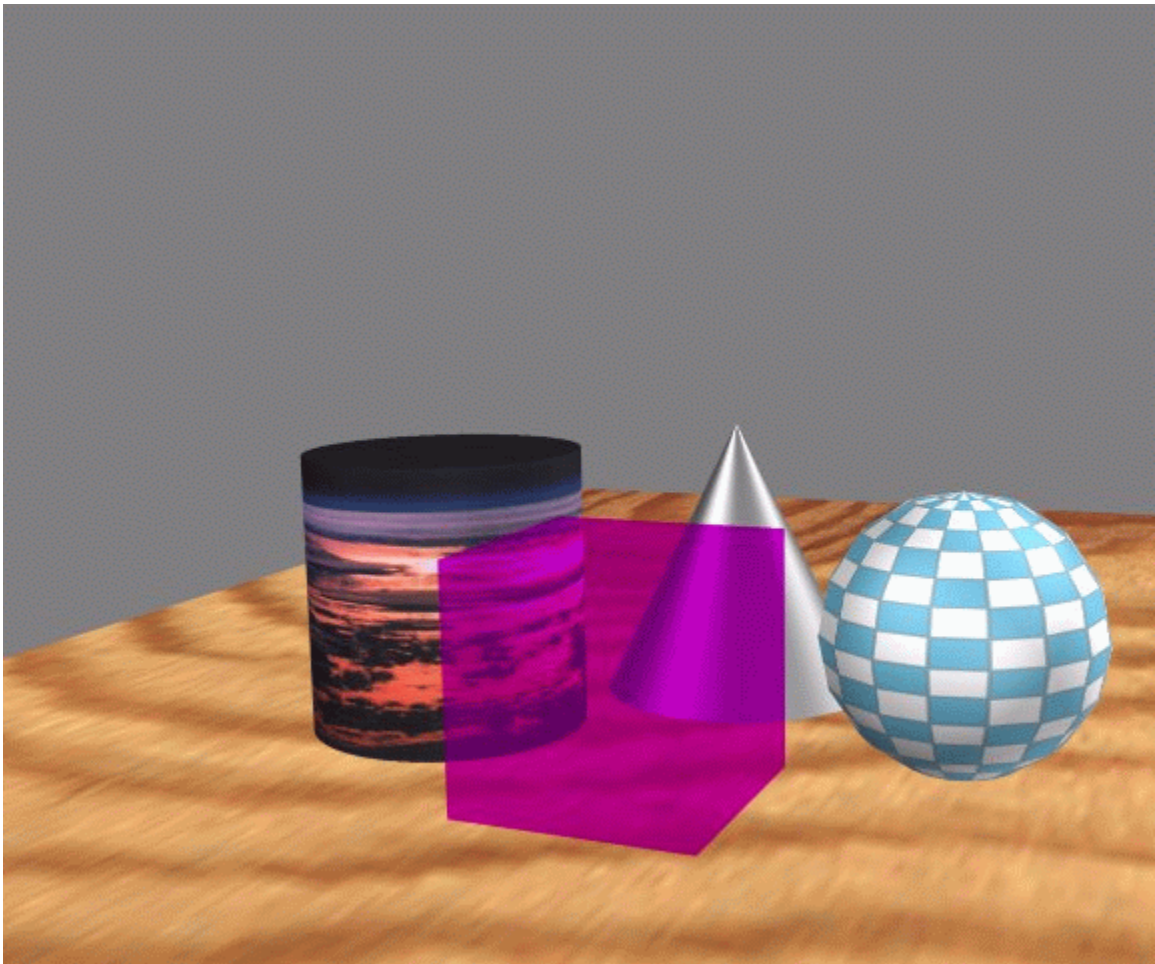


Figure 5

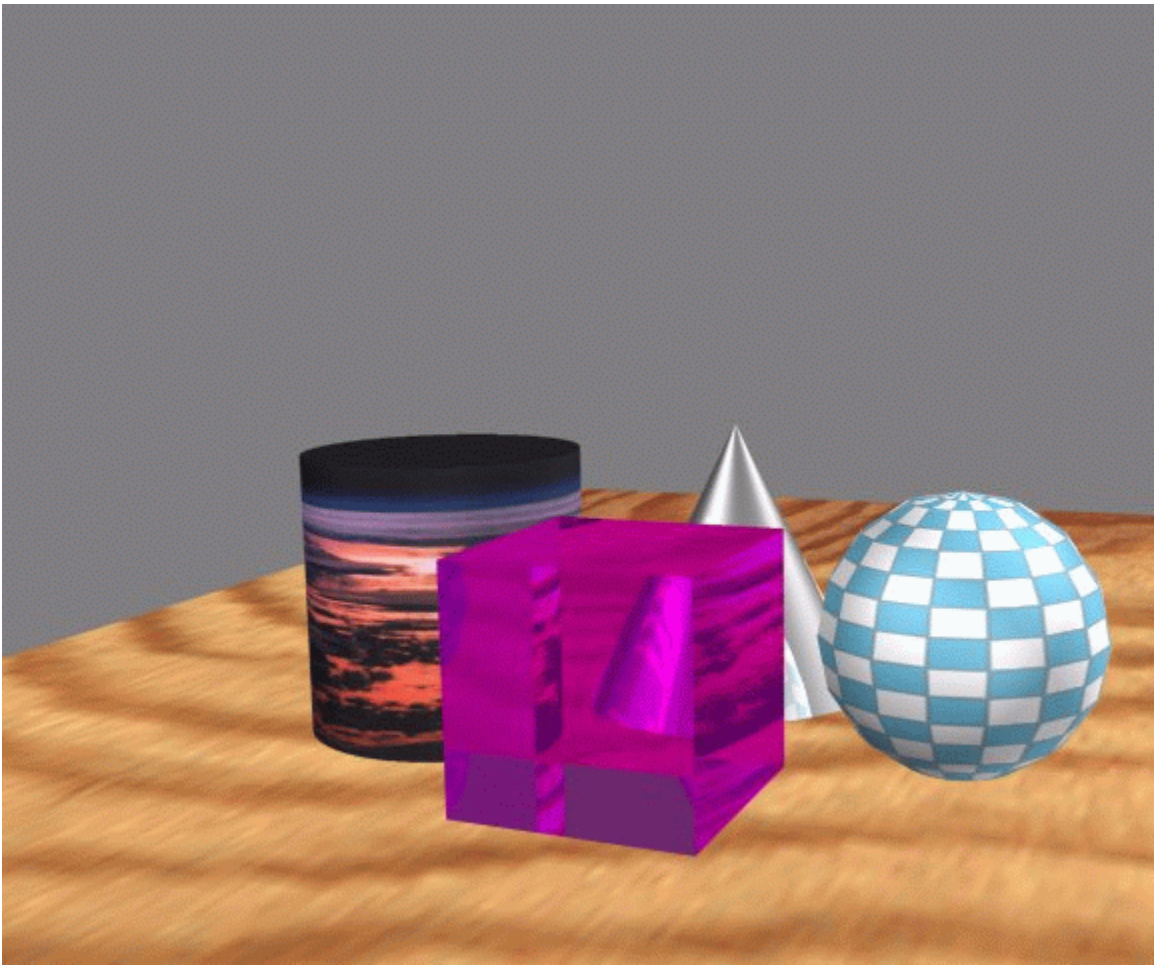


Figure 6

There is one refinement left that is commonly used in raytracing programs. Notice that there are no shadows in both images. Although one can generate realistic shadows for shaded images, ray traced images are where the best details are from . Figure 7 is the same scene raytraced with shadows enabled on the lights. Notice that now you can tell that the glass cube is floating in the air. There is a shadow under the entire cube.

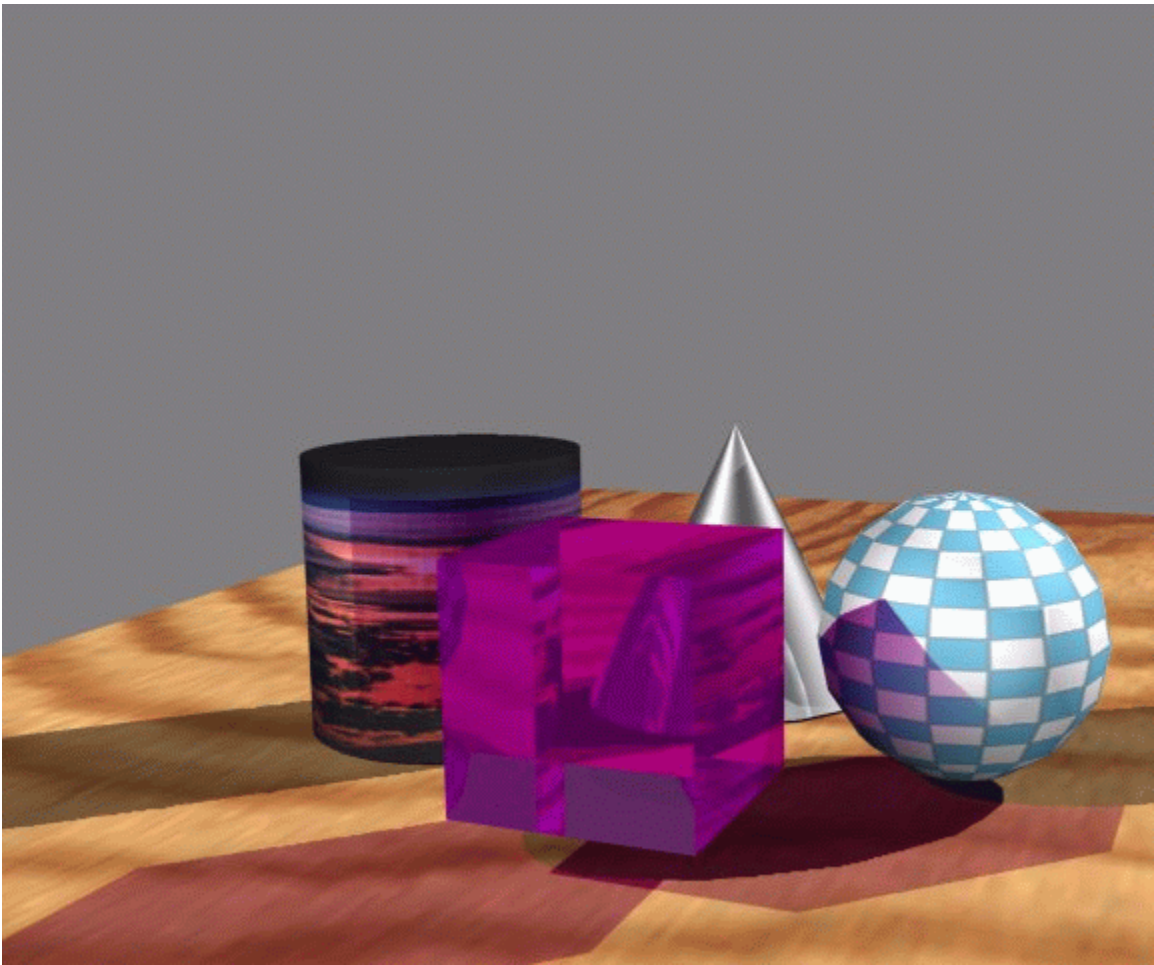


Figure 7

Animation

If you have a fast enough computer, the really exciting stuff happens when you begin doing animations. Animations are nothing more than a sequence of images played back sufficiently fast that you can't see the individual frames changing. Instead, you just get the impression of a continuous image that is changing. This is how both television and motion pictures both work.

With a good rendering program, you can create single frames or whole bunches of frames. However, if you try to use a plain rendering program to make a movie, you're going to be disappointed. Just like trying to use an ordinary camera to make movies by slowly moving and taking a picture and playing back in a movie projector, you get too rapid and jerky changes in the picture. To get smooth animation, you have to move the camera or objects on a smooth path and with small enough movements to make the motions not too abrupt. For normal amateur computer video work, this means you need to generate frames at 15 per second.

Time to do some arithmetic. A twenty second clip is 600 frames. If you run a small image and stick with simple scenes and rendering techniques, the frames might take about a minute each. Six hundred minutes is ten hours of rendering time. Don't plan to do animations unless you have a fast computer or a lot of patience. I normally generate video animations at a size of 320x200 pixels. This translates into a 192K output BMP at 24-bit color (no animation program I mention in this article outputs less). Six hundred such frames occupy at least 112 megabytes of disk space. You need lots of disk space to do this too. I reserve a 1GB drive just for outputting my animations. I have created ones with up to 5000 frames. That almost filled the output drive.

To get the smooth paths you need for smooth animations, you need a program that can generate good camera movement paths. The more sophisticated tools will have animation tools designed just to edit paths. These days, almost all program work with something called B-splines. Corel Draw is an example of a program that generates and works with B-spine curves. However, Corel Draw's drawing package only does two dimensional B-splines. For animation work, you need three dimensional B-splines. Programs like VistaPro and Visual Reality have separate modules that animate parts of a scene. TrueSpace has the animation builder all included. Besides animating the camera, you can animate other objects in the scene. Objects can move on their own spine path. So can lights. Fancier animation programs like trueSpace can animate textures too, so that an object's

surface can change as you go by it. Objects can even deform from frame to frame of an animation.

If you had to specify every state of every object in every frame of an animation, you would never get anything interesting done. Imagine trying to co-ordinate six hundred individual movements of only one object for the twenty second hypothetical example. Instead, animation building tools work with something called key frames. The term is borrowed from the cartoon motion picture industry. The main artists drawing an animation sequence don't draw every frame. Instead, they draw just the important ones. At a certain time (frame number) they know that something has to be a certain way. For instance, the hammer head starts at frame 3 and hits the glass at frame 9. A bunch of apprentice artists, called 'tweeners, fill in the missing frames so that everything looks smooth when all the frames are put together. They're called 'tweeners because they fill the "in between" frames. Fortunately for you and I, we own computers. Yes, you still have to figure out the keyframes and get them right, but then you can tell the computer to fill everything in.

If all you want to do is to fly past something for the six hundred frames on a straight line, you just tell the program where it is supposed to be on frame 0 and where it is supposed to be on frame six hundred. The computer takes care of everything else. If you want a curved path, you need to do more work. If the line between two places doesn't have to be straight, all kinds of things can happen. This is where B-splines come in. They are a way of specifying smoothly curved paths with a few "control points" and some "tension" adjustments. The control points are exactly where you want to have a keyframe. By adjusting the tension of the path on either side of a key frame, you can come up with amazingly complex paths with only two key points. If you want to get fancy, you might want to use several dozen control points, but you don't need to. The computer knows the path and just divides it up smoothly based on how much time (number of frames) happens between the points.

Unfortunately, animations are huge. Figure 8 is the first frame of an animation I have been working on for a while. I created a ten second clip of it and compressed it as much as I could and still preserve enough detail to see what the camera is flying past. It is just over 800Kb in size. This is in Video for Windows AVI format with the Cinepak compressor. If you have any version of Video for Windows 1.1c or higher, you can play back the file. Video for Windows has other compressors which make different tradeoffs of quality versus file size. Most Windows rendering programs allow you to choose what output format to use. However, none of them explain which animation format makes which tradeoffs. MPEG does the best compression for a given quality or file size, but there are as of yet not that many good MPEG players available.

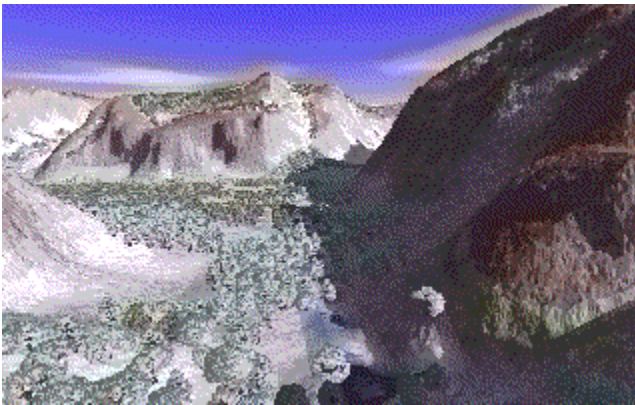


Figure 8

Fancier rendering programs allow much more than path, object, or texture animation. Figure 9 is similar to one that has appeared before in WindoWatch and was used on the WindoWatch home page for a while. It was created using Typestry for Windows 2.0. This is a program specialized just for raytracing and animating text. You would probably use it to do a logo for TV.

One thing you can see in this picture is that there is fog surrounding the letters. With Typestry, it's possible to have the fog flow by, rippling and swirling as it passes. Talk about neat effects! You can also put the type on a flag and have the flag blowing in the wind, and some other effects too.



Figure 9

Summary

So, here we are. I've shown you some of the art I have done using virtual reality graphics software and given you some insight into what goes into creating some of the images I have done. I've also mentioned some of the software I have used and how much it takes to use it. This article is a bare overview of what is available and what can be done in virtual reality graphics. You should have an idea now of what terms

are used by people and what to look for when trying to decide if you should jump in or not. If you intend to do more than dabble in virtual reality graphics, be prepared to spend the time to learn to use your software well, and be prepared to spend lots of time at it. Some of the images I did for this article took more than a twenty-four hours to render on a 486/66. I have done images which have taken 60 or more hours to render. The 5000 frame animation took, with interruptions, more than 11 hours to do the low resolution preview and 10 days to render the final version on my Pentium. Raytracing also takes plenty of RAM. Several of the images in the gallery took more than 80Mb of RAM to load and another 60MB of RAM to raytrace. Shading would have been a bit less expensive at about 25MB more. If you really want to design and build worlds of your own, you need to invest plenty in it, but how often do you get to design a world just the way you like it?

Abbreviated List of Resources

3D Design - a magazine devoted to virtual reality graphics software published by Miller Freeman. Contact them on Compuserve in the DDDMAG forum, 600 Harrison St, San Francisco, CA 94107, or 1-415-905-2200.

Caligari - trueSpace 2.0 and trueSpace/SE - modeling, rendering, and animation packages. The full version of trueSpace has a street price of under \$500. The SE version is basically just trueSpace 1.0. It has a street price of under \$100. Both versions allow you to pick shading or ray tracing rendering techniques. I like trueSpace because everything is in one module. It is really good at rendering and modeling changes on the fly so that you can try things as they occur to you. You can check out their web page at <http://www.caligari.com>. They are also on Compuserve in the Graphics Vendor C forum. Otherwise, you can contact Caligari at 1933 Landings Drive, Mountain View, CA 94043 or 1-415-390-9600.

Corel Corporation and Ray Dream Software - Corel Draw 6.0 includes a package called Corel Dream. This is a repackaging of Ray Dream Designer by Ray Dream Software. Both do modeling and

rendering using raytracing. If you want to do animation, you need to look at Ray Dream Studio. It is Ray Dream Designer with added animation, clipart, and textures. Corel Draw 6.0 has a street price under \$500. Ray Dream Designer 4.0 is available for under \$100, while Ray Dream Studio 4.0 is under \$300. Contact Corel at 1600 Carling Avenue, Ottawa, Ontario, Canada K1Z 8R7 or 1-613-728-8200.

Pixar - Typestry for Windows - it's a modeling, rendering and animation package for typefaces only. The other drawback is that it only raytraces. This means that it can take a long time to do images. You can get it for under \$200 street price. If you need to do logos or anything that involves fancy text, Typestry is your program. Contact Pixar at 1001 West Cutting Boulevard, Richmond, CA 94804 or 1-510-236-4000.

Virtual Reality Labs - VistaPro and Makepath Flight Director - Vistapro is a modeling and rendering package only. If you want to do animation, you need to use Makepath Flight Director. Vistapro costs under \$90 street price, but you'll most likely have to pay list price for Makepath Flight Director as very few places carry it. You'll have to get it from VRLI directly. List price is \$69. You can contact VRLI at 2341 Ganador Court, San Luis Obispo, CA 93401 or 1-805-545-8515.

Visual Software - Visual Reality 2.0 and Simply 3D 2.0 - these two packages also do modeling, rendering, and animation. Visual Reality is the full featured package and can be had for under \$200 street price. Simply 3D is under \$40 street price. Both are powerful rendering and animation tools. Simply 3D is much less capable at modeling, but it's really cheap. Both come with a big collection of scenes and clipart for you to use. The only thing I don't like about either of these is that you need to work in separate programs for each phase of the rendering process. You need to get models in the modeler and then assemble the scenes in the rendered and scene editor. This means more planning to get the right effects. Programs that are all in one like trueSpace allow more experimentation. However, Visual Reality has more control over its animation. You can contact Visual

Software on the Animation Vendor A forum on Compuserve, at 21731 Ventura Boulevard, Suite 310, Woodland Hills, CA 91364, or 1-818-883-7900.

POV-Ray Team - POVRAY is a freeware ray tracing program. You can do tremendous things with it and you have huge amounts of control over the objects you work with. There are two problems however. First, it's only a DOS program. Second, it uses an ASCII scene description file as input. You have to work out the coordinates of everything yourself. However, free is free. You can obtain POVRAY from the Graphics Developers forum on Compuserve, many BBSs, and from Walnut Creek CD-ROM. Walnut Creek publishes "The Official Poverty CD-ROM". It contains the software, all the documentation, hundreds of scenes for you to render, hundreds of images to look at, and dozens of animations too. You can check out Walnut Creek on the Internet at <http://www.cdrom.com>. Otherwise, you can contact them at 4041 Pike Lane, Sta D-902, Concord, CA 94520 or 1-510-674-0783.

*As anyone can plainly see, this article of **Herb Chong's** represents both a major effort and a major contribution. We are very proud that he allowed **WindoWatch** to publish his work. In the last weeks, Herb has become a member of IBM's research team. He is the Contributing Editor of **WindoWatch** and will be the Guest Editor of The **WindoWatch** Anniversary Issue or Vol.2 No.1 mid-January of 1996*

A Crash Recovery Tour!

DISASTER PREVENTION AND DATA RECOVERY WITH WIN95

Copyright 1995 by Phil Leonard

Things are good! You just upgraded your machine to Win 95 and everything runs pretty smoothly. Then one day, your system *Crashes*. Your hard drive is *Toast*. Are you prepared for this sort of disaster? If not, then this column is for you. I will take you on a tour. *A Crash Recovery* tour with a live demonstration. You will get step by step instructions on how to prepare your own Disaster Prevention and Data Recovery Strategy.

By now, you should have noticed, that it is not as easy to backup and restore data using Windows95 as it was with Windows 3.x. Your choices are the same, backup and restore in DOS, or load Windows and restore. But now you must protect your Long File Names. 16 bit Win 3.X utilities no longer work properly in Win95. In order to use DOS based backup utilities, you must save and restore Long File Names. So this must become a part of your Disaster Prevention Strategy.

Follow me then, through a simulated crash. The *sacrificial lamb*, so to speak, is an old Maxtor 250MB hard drive. Let me swap out the drives now, and install the blank Maxtor drive. I will be using a Conner 250 / QIC 80 tape backup drive in Windows with Win95's Backup program and a Conner 3200 / Travan tape backup drive in DOS with Arcada's Backup Exec Software.

WIN95 DISASTER PREVENTION

If you have not already done this, you must create a Win 95 System Disk on a blank floppy. Go into *Control Panel (Start | Settings | Control Panel)* and open *Add/Remove Programs*. Select the *Startup Disk* tab and press the *Create Disk* button.

With *Notepad*, open *c:\autoexec.bat* and print out a copy. Remove all of the *Rem* statements Win95 created and remove all of the directory switches.

(Rem LH C:\Windows\command\MSCDEX.EXE /S /D:MSCD000 /M:9 /L:J becomes LH MSCDEX.EXE /S /D:MSCD000 /M:9 /L:J)

Save this newly created *Autoexec.bat* to your floppy in the A:| drive. Here is an example:

```
A:\>type autoexec.bat
SET BLASTER = A220 I7 D1 T4
SET SOUND=C:\SGNXPPO
SET DIRCMD=/O
SET TEMP=C:\WINDOWS\TEMP
SET PATH=C:\WINDOWS;C:\WINDOWS\COMMAND;C:\DOS;
LH MSCDEX.EXE /S /D:MSCD000 /M:9 /L:K
```

Open *C:\Config.sys* and print out a copy. Remove all of the *Rem* statements Win 95 created and remove all of the directory switches. (I.e.*rem*

devicehigh=c:\dos\mouse.sys becomes *devicehigh=mouse.sys*) Save this new *Config.sys* to your floppy in the A:| drive. Here is an example:

```
A:\>type config.sys
device=himem.sys
buffers=40,0
dos=umb
lastdrive=k
fcbs=16,0
numlock=on
dos=high
shell=COMMAND.COM C:\ /e:2048 /p
device=emm386.exe noems
devicehigh=mouse.sys
devicehigh=sgcdm.sys /d:mscd000 /p:320 /i:11 /m:10
```

Take the two printouts for your *Autoexec.bat* and *Config.sys* and open Explorer. Reading line by line, copy each driver needed from your C:\ drive to your A:\ drive. (copy C:\windows\command\mscdex.exe to the floppy in your A:\ drive.)

You will find *emm.386* and *himem.sys* in your C:\Windows directory.

Test out your *Emergency System Disk*. Exit Windows and shut off your machine. Restart with your *Emergency System Disk* in the A:\ drive. When you see *Starting Windows 95* press the F8 function key. Step through each *config.sys* and *autoexec.bat* line on the floppy. Be sure each driver loads properly and then fine tune accordingly. Once everything seems to be working properly, we can continue.

WIN 95 BACKUP IN DOS

1. Download a free program called DOSLFNBK v 1.0 by Duncan Murdoch. You can ftp it from

ftp://ftp.cica.indiana.edu/pub/pc/win95/sysutil/doslfn10.zip. This program is an adaptation of LFNBK.EXE included on the Win95 CD. If for some reason you do not have the ability to download DOSLFNBK.EXE, you can follow the readme included on the CD. (CD:\ADMIN\APPTOOLS\LFNBACK\Lfnbk.exe & Lfnbk.txt)

2. Exit Windows and restart in DOS. Do not just shell to DOS. Create backup copies of all of your Long File Names by running DOSLFNBK.EXE for each hard drive on your system. You can create a small batch if you prefer. You can leave the backup created on the hard drive so that it ends up on the backup tape. You do not need to keep DOSLFNBK.EXE on the *Emergency System Disk*.

To Back Up Long File Names on your C:\ Drive to the file name C:\BACKUP.LFN:

At the C:\ drive type *DOSLFNBK C:\ /V*

To Back Up Long File Names on your D:\ Drive to the file name D:\BACKUP.LFN:

At the D:\ drive type *DOSLFNBK D:\ /V*

3. Start your DOS based Backup program and prepare your backup.

Tip: Be sure to select all Hidden, System and Read Only Files.

Tip: Be careful not to overwrite Backup.lfn. Keep each drive separate.

WIN 95 RECOVERY IN DOS

1. Start your system with the Emergency System Disk in the A:\ drive.
2. FDISK to partition the drive.
3. Type "Format C: /s" to format and transfer the system.
4. Install your tape backup software.
5. Restore all the files on your system from your backup tape in DOS.

IMPORTANT:

You should not overwrite IO.SYS, but you SHOULD overwrite MSDOS.SYS. It is a hidden read-only system file in your root directory. A good way is to erase MSDOS.SYS before starting the restore use ATTRIB from the startup disk to remove the system, hidden, read-only attributes. Type in

ATTRIB MSDOS.SYS -H -S -R then DEL MSDOS.SYS).

Then tell your backup program not to overwrite existing files.

6. Restore your Long File Names
LOCK C:

DOSLFNBK C:\ /R /V
and if you have a D:\ partition:
LOCK D:
DOSLFNBK D:\ /R /V

Reboot your system and things should be back as they were.

WIN 95 BACKUP AND RECOVERY FROM WITHIN WINDOW

The other option you have is to restore Win 95 with the backup utility Microsoft Backup, included with Windows 95. This procedure requires that you re-install Windows 95 and then restore your backup tape. Although backing up a system in DOS is as easy as backing up a system in Windows, it is certainly easier to restore a system from Windows than it is to restore a system from DOS. This option is not always available to everyone due to incompatible tape drives.

- 1. Start your system with the “Emergency System Disk” in the A:\ drive.**
- 2. FDISK to partition the drive.**
- 3. Type “Format C: /s” to format and transfer the system.**
- 4. If you have the CD version of Win95 to install, select that drive and type SETUP and *enter*. If you have the floppy version, install the first disk in the A:\ drive, select the A:\ drive and type SETUP and *enter*. Install Windows95.**
- 5. In Windows, select Microsoft Backup and restore your system.**

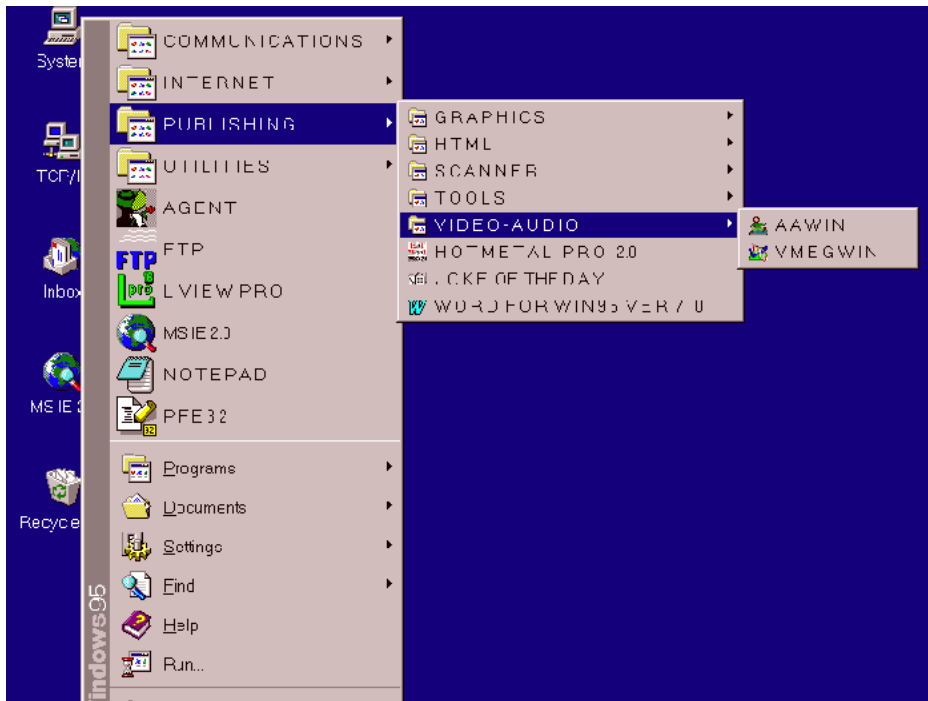
FINAL THOUGHTS

It is important to be prepared for a disaster. Unlike previous versions of Windows, you can not simply copy your system from one drive to

another without losing all of the hundreds of Long File Names present on a typical Win95 system. Therefore you must prepare a strategy. You should test out the strategy in the event of a disaster. This only makes good computer sense. Enjoy!

PHIL'S WIN 95 TIP OF THE MONTH

Make the Win 95 START MENU really work for you. Instead of just adding shortcuts to the START MENU, add new FOLDERS. When you add a folder to the START MENU it creates a cascading effect. Folders within folders create menus within menus. Right click on the START BUTTON | OPEN | NEW | FOLDER and fill in a menu name. Open the new folder, and either drag in shortcuts, create new shortcuts, or add more folders. Now you have plenty of room for program descriptions up to 70 characters long. When naming programs, add a space in between each L E T T E R like so. Move all of your frequently used programs here. No more sifting through Program Manager Folders and menus. Programs you use most often are instantly available at all times. And there is no limit to the number of programs or folders you can add. Stay tuned next month for my Win95 Tip of The Month.



Phil Leonard continues to come up with these pithy road maps which solve problems. This backup routine is no exception. Phil is a regular *Windo Watch* contributor and is a Comptroller during the rest of the time.

From KB Bentkowski's Windows95 Registry F.A.Q

Secrets of the Windows95 Registry

Things You Need To Know About The Registry!

by Kent Daniel Bentkowski
Perfik Graphix - Buffalo, New York

Based on Win95 Pre-release Version 0.95 Beta
August 15, 1995

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TABLE OF CONTENTS

- [1] Legal Mumbo Jumbo
 - [1-1] Disclaimer - Use this FAQ at your own risk!
 - [1-2] Trademark Information
 - [1-3] Copyright Notice
 - [1-4] Suggestions, Contributions, and E-Mail
- [2] Introduction
 - [2-1] A word from the author
 - [2-2] About the Windows 95 Registry FAQ
 - [2-3] Getting the Windows 95 Registry FAQ
 - [2-4] Adding to the FAQ
 - [2-5] Acknowledgments
 - [2-6] Technical Support? Surely, you jest!
 - [2-7] Conventions used in this FAQ
- [3] Registry Architecture
 - [3-1] What exactly is the Windows 95 Registry?
 - [3-2] Recovering Registry Data
 - [3-3] Configuration Backup
 - [3-4] The Registry Editor (REGEDIT.EXE)
 - [3-5] The six Hkey Handles of the Registry
 - [3-5-1] Hkey_Local_Machine
 - [3-5-2] Hkey_Current_Config
 - [3-5-3] Hkey_Dyn_Data

- [3-5-4] Hkey_Classes_Root
- [3-5-5] Hkey_Users
- [3-5-6] Hkey_Current_User

[3-6] SubKeys of the six Hkey Handles

[3-6-1] Hkey_Local_Machine

- [3-6-1.1] Hkey_Local_Machine\Config
- [3-6-1.2] Hkey_Local_Machine\Enum
- [3-6-1.3] Hkey_Local_Machine\Hardware
- [3-6-1.4] Hkey_Local_Machine\Network
- [3-6-1.5] Hkey_Local_Machine\Security
- [3-6-1.6] Hkey_Local_Machine\Software
- [3-6-1.7] Hkey_Local_Machine\System

[3-6-2] Hkey_Current_Config

[3-6-3] Hkey_Dyn_Data

[3-6-4] Hkey_Classes_Root

[3-6-5] Hkey_Users

[3-6-6] Hkey_Current_User

[4] Customizing Windows 95

- [4-1] Icons from the actual bitmaps
- [4-2] Drag shortcuts onto the Desktop
- [4-3] Change the Desktop folders Default.Icon

- [4-4] Add the Control Panel to the Start Menu
- [4-5] Control Panel power at your fingertips!
 - [4-5-1] Still More Control Panel Power!
- [4-6] What you need to know to edit the Recycle Bin
- [4-7] Removing unwanted items from the Desktop
- [4-8] How to change the My Computer Default icon
- [4-9] Renaming "My Computer"
- [4-10] Dragging "Scraps" to the Desktop
- [4-11] Change the Desktop's default folder

[5] Fine Tuning Windows 95

- [5-1] New design for the Start-Up screen
- [5-2] Turn off the Windows 95 Start-Up Logo
- [5-3] New designs for the Log Off screens
- [5-4] Edit essential folders
- [5-5] Boot to MS-DOS 7.0 instead of Windows 95
- [5-6] Quickly clearing the Recent Documents Menu
- [5-7] To change font size on Taskbar buttons

[6] Problem Solving in Windows 95

- [6-1] If an application cannot find its' Help File
- [6-2] A tip for Multi-Boot users

[7] Registry Tricks

- [7-1] Speed-up the Start Menu!
- [7-2] My city isn't on the time zone map!!!
- [7-3] Editing the Windows TIPS at start-up
- [7-4] Friendly "Short" Names
- [7-5] 3-D Objects: Highlights and Shadows
- [7-6] Reappearing values in the Registry?
- [7-7] Adding sounds to application events

[8] Windows95 Registry Binary Value Reference List

- [8-1] Control Panel
- [8-2] Printers
- [8-3] Recycle Bin
- [8-4] My Computer
- [8-5] Dial-Up Networking
- [8-6] Network Neighborhood
- [8-7] Inbox
- [8-8] Desktop
- [8-9] Shortcut

[9] Registry Editor Command Reference

[1] Legal Mumbo Jumbo

[1-1] DISCLAIMER: Use this FAQ at your own RISK!!!

This FAQ is intended to help inform the public about the Windows 95 Registry, and about how to edit the Registry files. In no way should this provoke you to actually edit the Registry. The information contained herein is offered without warranty and/or liability. In other words, if you use this information, you are on your own.

Additionally, Kent Daniel Bentkowski and WindoWatch claim NO responsibility regarding ANY activities relating to this FAQ, either directly or indirectly. The information contained in this FAQ reflects Microsoft Corporation only indirectly, and questioning it regarding any information in this FAQ is not recommended.

EDIT THE REGISTRY AT YOUR OWN RISK!! Microsoft Corporation is not supporting the Registry as part of their Windows 95 end user technical support. BEFORE you proceed, please have the good sense to read the section of this FAQ regarding the back-up and restoration of the Registry files.[Editor's Note: Also look at Microsoft's help for the Regedit program.

[1-2] TRADEMARK INFORMATION:

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[1-3] COPYRIGHT NOTICE:

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If you would like additional rights beyond those granted above, write to the author at "KentDB9438@aol.com" on the Internet.

[1-4] Suggestions, Contributions, and E-Mail:

If any reader of this Windows 95 Registry FAQ would like to send the author comments, corrections, updates, or suggestions, please follow the procedures listed below. It is the ONLY way that we can process the vast amount of mail that this FAQ may generate.

Any mail that relates to this FAQ must be sent to the FAQ's e-mail address, which is "regeditFAQ@aol.com". Any e-mail that is sent to the author regarding issues of this FAQ, cannot be answered. Please save us both some grief, and send your e-mail to the FAQ directly.

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How your mail will be dealt with will depend on what the Subject line reads. Please follow these simple steps:

MAIL Send ALL MAIL to the FAQ at: regeditFAQ@aol.com

SUBJECT LINE Please place one of the following commands in the SUBJECT line, depending on the nature of the message.

COMMENT - If you wish to tell us how you like the FAQ.

CORRECTION - If you discover that information in this FAQ is incorrect, please tell me. I am only human, and will make a few mistakes. If you are able to verify your correction, I will acknowledge your contribution in the next update of the FAQ.

SUGGESTION - If there is something particular you would like to see covered in this FAQ, send us a suggestion. If we incorporate it into a future edition of the FAQ, you will become famous by seeing your name in print here.

TIPS & TRICKS - If you know of an undocumented feature or discover one of Windows 95's many well hidden secrets, please give us a holler! If your TIPS & TRICKS submission is used, you will receive thanks and acknowledgment in a future FAQ.

Any e-mail that doesn't follow these simple guidelines will be returned unread. I am expecting a high volume with this FAQ, and this is the ONLY way to correspond with us.

You can download this article from the WindoWatch Home Page or other places as indicated by the author.

Thank you in advance for your compliance . . .

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[2-1] A Word From The Author

Try mentioning the word Registry on the Windows95 Technical Support telephone line, and the support technician will tell you in no uncertain terms that Microsoft isn't supporting that feature to end users. Additionally, they will try to convince you that you'll trash your entire system if you try to edit one single Registry entry!

Nonetheless, it is the single feature in all of Windows95 that brings total system control to the user. If only they would tell us how it works! The Windows95 Resource Kit, which is a powerhouse technical manual the size of a phone book, contains a scant eighteen pages on the Registry. Believe it or not. However, the Resource Kit contains nearly as much information about their new online service.

Accepting the challenge, I plugged in the Configuration Backup utility that comes with the Resource Kit, and began poking and prodding the various Registry entries. I discovered small and mundane techniques, like renaming the Recycle Bin, remapping icon files so that the corresponding bitmaps are displayed instead, and the secret to removing the Exchange Inbox from the Desktop --and more!

But still, no official documentation to speak of, until now, that is.

Enjoy! But be careful.

[2-2] About the Windows 95 Registry FAQ

The Windows 95 Registry FAQ is my attempt to fill in an enormous void of information from Microsoft. This is the first version of the FAQ, with much more to come. Among my future plans are to get the complete Registry API Command Reference, and rewrite it into English, so that many more people can understand this gibberish.

Be sure to read this entire document so that you do not trash your system. There are plenty of warnings and instructions to prepare you for the task at hand. Take heed of these warnings to prevent a terrible mess, loss of data and time.

Updates to the Registry FAQ will be released approximately once every thirty days. As soon as the Windows95 Registry FAQ Home Page is finished, I will post the URL widely.

[2-3] Getting the Windows 95 Registry FAQ

Until further notice, send an e-mail request to the following address, to receive the Windows95 Registry FAQ: regeditFAQ@aol.com

This document is freeware for the time being or until the book is published. Until then, those who wish to post this FAQ to their World Wide Web home page, FTP site or BBS, please do so, with my blessings.

However, PLEASE send an e-mail to the address listed above so that I can compile a list, and keep it up to date.

[2-4] Adding to the FAQ

For complete information on how you can submit information to be included in the Windows95 Registry FAQ, please refer to section [1-4] *Suggestions, Contributions, and E-Mail*. It is there you will find the procedures that you must follow to add your voice to the Windows95 Registry FAQ.

[2-5] Acknowledgments

The following people provided vital intellectual leadership, help, and general support for this project. Some are friends while others are obviously icons like...

Bill Gates: Thank you for having the dream of a computer on every desk and one in every home.

And...

Brian Livingston: For indispensable advice in his weekly Window Manager columns.

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However,

Rob Maciok: For getting me started on this journey.

Andy Satori: One of the most knowledgeable programmers I know and he answers all questions.

Glenn Stewart: He gave me the idea by putting a small list of Win95 tips on the Internet. I had the time to do the work.

[2-7] Technical Support? Surely, you jest . . . !

Please recognize that Microsoft is not offering end-user technical support on the Registry at this time so do not waste time calling them.

Nor can Kent Daniel Bentskowski or Perfik Graphix offer advice by Email on technical support issues or editing the Registry.

If you venture into these uncharted waters, it is common sense to take some safety steps before you begin EACH of your editing sessions.

1. Make back-ups on 3.5 floppies by copying these Registry files from Explorer.

SYSTEM.DAT SYSTEM.DA0
USER.DAT USER.DA0

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Update these back-ups immediately preceding each editing session. If a problem occurs, you then have a safe back-up of the configuration that was last working properly..

DO NOT USE the Windows95 BACKUP.EXE TO MAKE THESE BACK-UPS!!!

If you have the Windows95 Resource Kit, make sure you install the Configuration Backup and use it on a regular basis prior to each editing session. Again, you are completely on your own so be careful. Enjoy!

[2-8] Conventions used in this FAQ

In the creation of this document, certain abbreviations and symbols are used in place of the long form name. You should have little problem figuring this out. However, there are several commands that pertain to the mouse and keyboard where I've used an alternate form to save space:

Abbreviations and What They Mean!

d.click	Double click the mouse
r.click	Click the right mouse button
shift+click	Press the shift while clicking the mouse

shift+r.click	Shift and clicking right mouse button
Right-Shift	Shift and right mouse again
CTRL+D/r.click	Press CTRL, D, and r.mouse all at once
r.mouse	Right Mouse button
l.mouse	Left Mouse button
keypad	Refers to the numeric keypad on the side of the keys, not across the top of them
ARROW keys	These are the directional arrow keys
Parent	The main window or folder in a group
Child	The window within a window in a group

[3] Registry Architecture

[3-1] What exactly is the Windows 95 Registry?

The Registry is a central database that is created by Windows 95 during installation. The entries in that database consist of the hardware, software, users, and preferences data for a single PC, or any PC on a network. Whenever the user makes changes to the Control Panel settings, File

Associations, System Policies, or installed software, the changes are reflected in the Registry. These Registry settings can be viewed with the Registry Editor (REGEDIT.EXE), which is installed in the Windows\System folder ONLY when Windows 95 is installed from CD-ROM.

By default, REGEDIT.EXE will NOT appear on any of the system's menus, or in the Start menu. You will have to add your own shortcut, or you can use the START button, select RUN, type REGEDIT and press ENTER. If the Registry Editor is installed on your system, it will appear ready to use.

The Registry replaces the dreaded INI files from Windows 3.1, and because the information is presented in hierarchical form, the Registry supports nested folders, which .INI files do not support. One of the many benefits of this is that in a network environment, users can log onto any PC in the network, just as it were the PC on their desk. In addition, several users can store configuration data on a single machine.

POWER TIP

You can add an icon shortcut for the Registry Editor to your desktop by using the right mouse button to drag the file REGEDIT.EXE from Explorer to the desktop.

Registry Editor displays the contents of the Registry in six subtrees called Keys. Keys can contain data strings, as well as SubKeys. Each of

these six Keys begins with Hkey_ which indicates it can be used by a program to access resources. When you first look at the Registry Editor, this structure looks complicated. Think of the Registry Editor as another type of Windows Explorer, only this one ventures into the uncharted waters of your system's configuration!

[3-2] Recovering Registry Data

In Windows95, data is written to the Registry only when a flush occurs – that is, when something happens after changed data has aged more than a few seconds or when an application intentionally flushes the data to the hard disk.

Each time Windows95 successfully starts, the operating system backs up the Registry by copying the current SYSTEM.DAT and USER.DAT files to SYSTEM.DA0 and USER.DA0, respectively. If Windows 95 fails to start, the backed-up Registry from the last successful startup can be copied over the current Registry. This method recovers the last successful settings after a system failure.

If the Registry should ever become damaged, it can be salvaged WITHOUT reinstalling Windows95. All you have to do is look for a hidden system file called SYSTEM.1ST in the root directory of the drive on which Windows95 is located. This file is a copy of the Registry that was created when the Windows 95 setup was first deemed successful.

However, you must change the file attributes of the file by locating it in the Windows95 Explorer, and right clicking on it. Choose properties and the General Properties dialog appears. Change the file attributes from READ-ONLY and HIDDEN to ARCHIVE and copy it to the Windows95 subdirectory.

You must then, rename the file from SYSTEM.1ST to SYSTEM.DAT, over writing the corrupt file, and replacing it with workable system profiles.

**Power
TIP**

You can also maintain back-ups of the Registry with the Configuration Backup utility on the Windows95 Resource Kit diskette

To Restore the Registry

1. Click the Start button, and then click Shut Down.
2. Click Restart The Computer In MS-DOS Mode, then click "Yes".
3. Change directory to your Windows directory.
4. Give the following six commands. (Note that SYSTEM.DA0 and USER.DA0 contain the number 0.)

```
attrib -h -r -s system.dat
attrib -h -r -s system.da0
copy system.da0 system.dat
attrib -h -r -s user.dat
```

```
attrib -h -r -s user.da0  
copy user.da0 user.dat
```

5. Restart your computer again, this time in Windows.

This procedure restores your registry to its state when you last successfully started it--before you made the changes in the registry.

For additional safety, there is the file named SYSTEM.1ST mentioned above. You can change its attributes from read-only and hidden to archive and copy it to SYSTEM.DAT.

[3-3] Configuration Backup

It is sheer suicide to attempt to edit the Windows 95 Registry without backing up the necessary files before you begin. There is a little life-saver of a utility that comes with the Resource Kit called Configuration Backup (cfgback.exe). It not only lets you backup the Registry data, but also allows the complete backup, restoration, and storage of up to NINE SEPARATE system configurations!

Before you edit the Registry, I strongly recommend also backing up your present configuration. Name it something meaningful, so that you can recognize it in case it needs to be restored at some point. Then, if a mistake is made in editing the Registry, or if your changes lead to undesirable

or disastrous effects, you simply open up the Configuration Backup and select RESTORE. When you reboot your machine, the restored configuration returns your system to the settings just BEFORE the problem occurred.

The result is that regular use of this utility minimizes the danger involved in editing the Registry, and lets you return to an earlier configuration of your choice.

[3-4] The Registry Editor (REGEDIT.EXE)

The Registry Editor is a powerful tool that configures and edits your Windows 95 system settings. It can be used to view or modify a Registry on a local computer or on another computer on the network. However, both the administrator's computer and the remote computer require the Microsoft Remote Registry service to have remote Registry access.

When you run the Registry Editor, it displays its' data in two panes. On the left side, you have the six Keys, which are shown as folders in "My Computer." Each key can have a set of values. Each value entry is comprised of three parts: the name of the key, its' data type, and the value itself.

The Registry Editor stores this information in .REG files, which are essentially text files containing the data in a specific format. If there

is a small plus sign next to a key, then it will have further data below called a SubKey, more commonly known as nested folders. This simply means that folders can themselves contain other folders.

The value entries in the right hand pane are associated with the selected key in the left pane. A value entry has three parts: the data type of the value (which appears as an icon), the name of the value, and the value itself. A value entry must limit itself to 64k or less, while the size of the actual total Registry is dependent on available hard disk space.

Data types can either be Binary numerical data or readable text. Most of the hardware information is stored as binary data, and can be displayed as either binary or hexadecimal information.

Right-click anywhere in the Registry Editor, and you can create a NEW Key (or subkey), string value, binary value, or DWORD value.

[3-5] The Six Hkey_ handles

[3-5-1] Hkey_Local_Machine

Contains computer specific information about the type of hardware, software, and other preferences on a given PC. This information is used for all users who log onto this computer.

[3-5-2] Hkey_Current_Config

This Key points to a branch of the Key Hkey_Local_Machine\Config containing information about the current hardware configuration.

[3-5-3] Hkey_Dyn_Data

This Key points to a branch of Hkey_Local_Machine that contains various bits of information regarding the system Plug and Play configuration. This information is DYNAMIC, meaning that it may change as devices are added to or removed from the computer.

[3-5-4] Hkey_Classes_Root

This Key points to a branch of Hkey_Local_Machine that describes certain software settings. It contains essential information about OLE and drag and drop operations, shortcuts, and core aspects of the Windows95 GUI.

[3-5-5] Hkey_Users

This Key contains information about the users who log onto the computer. Both generic and user-specific information is used, and each user of the system has their own Subkey.

[3-5-6] Hkey_Current_User

This Key points to a branch of Hkey_Users for the user who is currently logged onto the system.

[3-6] SubKeys of the six Hkey Handles

[3-6-1] Hkey_Local_Machine may contain the following Subkeys

SubKeyDescription

Config - A collection of configurations for the local computer.

Enum - Information on the system's installed hardware devices.

Hardware - Info on the ports and modems used with HyperTerminal.

Network - Information created when a user logs on to a networked PC.

Security - Information on network security and remote administration.

Software - Information about software and its configuration on a system.

System - Database that controls system start-up, device driver loading, Windows 95 services, and OS behavior

[3-6-1.1] Hkey_Local_Machine\Config

This subtree contains information about alternate hardware configurations for the computer. For example, it can contain information about multiple configurations to be used when the computer is connected to a network, and when it is undocked from a docking station, etc. Each alternate configuration is assigned a unique identifier, and this configuration ID has a subkey under the Config key. Each configuration appears in the list of hardware profiles in the System option in the Control Panel.

When Windows95 checks the hardware configuration at system startup, one of three things occurs.

- ⇒ In most situations, the configuration ID is mapped to a unique configuration. Windows 95 selects the appropriate one automatically, and the settings for the related Config subkey are used for system configuration.
- ⇒ If the computer is started for the first time with new hardware components, Windows95 creates a new configuration for the new configuration ID, and a new Config subkey is added to the Registry.

⇒ If the configuration ID is mapped to more than one configuration (for example, because Windows 95 cannot distinguish between two configurations), the user is prompted to choose which one to use.

[3-6-1.2] Hkey_Local_Machine\Enum

Windows95 bus enumerators are responsible for building the hardware tree. This includes assigning an identification code to each device on its bus and retrieving the device's configuration information, either directly from the device or from the Registry. For more information about the hardware tree and bus enumerators, see Introduction to System Configuration, and Windows95 Architecture.

Bus enumeration information is stored in the Hkey_Local_Machine\Enum subtree. For all types of devices, subkeys contain information such as device type, assigned drive letter, hardware ID, and device manufacturer, plus driver-related information for network components.

The following table shows which devices are enumerated in typical subkeys.

SubkeyDevice enumeration

ESDIFixed disk devices

FLOPFloppy disk devices

ISAPNPPlug and Play devices on an ISA bus

MonitorMonitor devices

NetworkNetwork protocol, server, and bindings

RootLegacy devices

[3-6-1.3] Hkey_Local_Machine\Hardware

Information about serial ports and modems used with the HyperTerminal program.

[3-6-1.4] Hkey_Local_Machine\Network

Network information created when a user logs onto a networked computer, including the user name, primary network provider, whether the logon was validated by a server, and information about the system policies processor.

[3-6-1.5] Hkey_Local_Machine\Security

Information about the network security provider and remote administration capabilities.

[3-6-1.6] Hkey_Local_Machine\Software

This subtree contains configuration information about all installed software that can write information in the Registry. The entries in this key apply for anyone using this computer, and

include definitions for file associations and OLE information. The software subkey contains, for example, the information you add when registering an application to use a specific filename extension and information added during installation of Windows-based applications.

This subtree also contains several subkeys, including the Classes subkey, plus description subkeys for all installed software that can write to the Registry, as described in the following sections.

[3-6-1.7] Hkey_Local_Machine\System

The data in this subtree is organized into control sets that contain a complete set of parameters for device drivers and services that can be loaded with Windows95. All data that controls startup is described in the CurrentControlSet subtree under this key. This control set has two parts:

- ⇒ The Control key contains information used to control system startup, including the computer's network name and the subsystems to start.
- ⇒ The Services key contains information to control the loading and configuration of drivers, file systems, etc. The data in the Services key also controls how these services call each other.

The following will be included in future versions of the FAQ.

[3-6-2] Hkey_Current_Config may contain the following Subkeys

[3-6-3] Hkey_Dyn_Data may contain the following Subkeys

[3-6-4] Hkey_Classes_Root may contain the following Subkeys

[3-6-5] Hkey_Users may contain the following Subkeys

[3-6-6] Hkey_Current_User may contain the following Subkeys

[4] Customizing Windows 95

4-1] Creating Icons from the actual bitmaps

Did you know that you can make the icons of bitmap files from the actual bitmap? With OLE 2, they can also automatically update themselves, as they are edited.

Here's all you have to do:

1. Run the Registry Editor (regedit.exe)
2. Open the HKey_Classes_Root key

3. Open the Paint.Picture folder.
4. If there isn't a DefaultIcon folder, you will have to create one. You can do that by selecting the Key Paint.Picture, and right clicking on it. Select New, and then select KEY. What will happen next is that new folder will appear under the Paint.Picture folder.
5. Rename this new folder "DefaultIcon".
6. Open the new DefaultIcon folder that you just created.
7. Double-click on the "default" item.
8. Change the value to "%1"
9. Exit the Registry Editor.

That is all there is to it! Now you have some KILLER .BMP icons! They may display a little more slowly than regular icons but the effect is stunning. The files are lots easier to identify when you are in Windows95 Explorer.

Try it and see for yourself!

[4-2] Drag shortcuts onto Desktop

Any OLE 2.0 compatible application, that lets you drag text or other objects, will let you drag onto the Windows95 desktop. These shortcuts appear as

icons on the desktop. Shortcuts can be dragged back into any OLE 2.0 application.

The result is another way of cutting and pasting that is very easy and very handy. You can have as many shortcuts on the desktop as you like. You can have shortcuts to files, folders, disk drives, printers, help files, programs, just to name a few examples.

[4-3] Change the Desktop Folders Default.Icon

In the registry find this Key:

HKEY_CLASSES_ROOT\Directory\DefaultIcon

The default value should read something like this example: C:\WINDOWS\SYSTEM\shell32.dll,3

This value points to the 4th icon (0,1,2,3) in the file Shell32.dll. To change this you need to replace this default value with the full path to the icon file. If the icon is imbedded in a .dll like the current icon, you need to know its placement in the sequence. The first icon in a dll is always 0, the next is 1, etc.

[4-4] A simple way to add the Control Panel to the Start Menu

All you have to do is drag a shortcut to the control panel onto the start button. The result is that the Control Panel will appear as a selection

on the start menu. It is a very nice trick but it is extremely limited and inconvenient.

[4-5] Control Panel Power at your fingertips!

The above tip requires you to go through the Start Button, select Control Panel, and click your way through any number of Properties Dialogs and Settings tabs. You have only created a shortcut to the Control Panel, a pointer that opens a regular folder window from which you still must choose a Control Panel applet.

With this second technique, you'll get a cascading menu off the main Control panel item. Here, all applets are presented as choices in this submenu. When in the normal main Control Panel window, you cannot select which applets you'd like to display (or even remove), while here the choices are completely customizable.

I suggest that you try both, let the menu selections coexist, and see which is a better for you. I'm pretty positive that you will agree that the second idea is the way to go.

1. Right click the Start Button. Choose EXPLORE.
2. Explorer opens with a view of the Start Menu.
3. Right click in the right-hand pane.

4. Left click "New" and then "Folder".
5. This will create an icon called "New Folder".
6. Type the Binary I.D. # for Control Panel to create a name for this new folder, including brackets and hyphens.

`ControlPanel{21EC2020-3AEA-1069-A2DD-08002B30309D}`

7. When finished, press ENTER.
8. Open up this new folder and copy the shortcuts to the Control Panel applets that you want to appear on the cascading menu. Place them in this newly created folder.
9. Close Explorer.
10. The next time that you click on START, the Windows95 Control Panel applets appear ready to use in a cascading menu! Very nice!

You can use this same technique to do the same with the My Computer, Printers, disk drives, and Dial-Up Networking folders. Just make sure that you have the proper binary I.D. for the cascading menu that you are trying to create.

`Printers {2227A280-3AEA-1069-A2DE-08002B30309D}`

The Control Panel is a special kind of folder in Windows95. Executables such as Control Panel and

other resources have their own unique IDs in the Windows95 registry.

To see these, click Start, Run, type REGEDIT and click OK. In the Registry Editor that appears, click Edit, Find and search for 21EC2020. This takes you to a section that identifies Control Panels' ID number and that of many other resources.

[4-5-1] Still More Control Panel Power!

The ONLY problem that I ran into when I tried out the technique above, was that the menu choice that was created was that item's binary data string, instead of simply Printers. I figured that at least the cascading submenu would reveal what choices were available . . until I was sent the correct answer.

The steps below will create a cascading submenu off the Start Menu. Try BOTH tips, [4-5] and [4-5-1], and see what I mean by the differences between them.

[4-5-2] Start Menu Cascading Folders

1. Right click on the Taskbar Start Button.
2. The Context Menu appears. Select Open.
3. A window displaying the contents appears.

4. Right click on any unoccupied area of window.
5. Another context menu appears. Select New Folder.
6. The name you give this new folder will also be the menu selection on the Start Menu.
7. Open up this new folder, and create new shortcuts or simply copy existing ones. You can also add folders, which creates another cascading menu off the new submenu you are creating.
8. You'll know you're in business when you see that your new folder, along with its' right pointing arrow appears on the Start Menu.
9. Close whatever windows or folders are open.

[4-6]What you need to know to edit the Recycle Bin

Start the registry editor.

Highlight the entry HKEY_CLASSES_ROOT

Now use Find to locate the recycle bin entry by clicking on Edit, then Find. For the Find what entry use recycle. The result is an entry on the right hand side of the screen that looks like this:

NAME	DATA
[icon](Default)	"Recycle Bin"

Highlight Default and right click, choose modify.

For Value Data, type in whatever name you want for the recycle bin.

Close the registry editor and restart Windows.

Your Recycle Bin will now have whatever name you chose

Changing the icon:

If you want to change the default icon for the Recycle Bin, just look for the Key DefaultIcon when you are at the SubKey above. There are two default icons for the Recycle Bin, one full and the other empty. The defaults are listed below:

Empty Recycle Bin - SHELL32.DLL,31

Full Recycle Bin - SHELL32.DLL,32

Default Recycle Bin - same as empty

When Windows95 starts, the Default Icon for the Recycle Bin is briefly shown while the system determines whether the Bin is either full or empty. In either case, the value for the Default Icon is dynamic; meaning that the current status

of the Recycle Bin (empty or full) is always written into the Registry to keep it up to date. If you want to change the Recycle Bin icons, all you have to do is enter the path where the icon is located. If the path is to an .ICO file, you don't need the number indicating the icon's position in the .DLL file.

Remember the Default is always equal to Empty.

Make sure the recycle bin is empty before you edit the icons. That way, there will be no confusion as to the value of the default.

[4-7] Removing unwanted items from the Desktop

When Windows95 is installed, it places several icons on the Desktop, including My Computer, Recycle Bin, Microsoft Exchange and Network icons. You will find that no simple way is provided to remove any of these objects but there is an undocumented trick that works every time.

1.Go to the following Key in the Registry Editor:

Hkey_Local_Machine\Software\Microsoft\Windows
\CurrentVersion\explorer\Desktop\NameSpace

2.You will find there a list of the icons placed on your Desktop.

3.All you have to do is delete the item that you want off the Desktop.

INBOX - {00020D75-0000-0000-C000-000000000046}

4.If you wish, the Recycle Bin can be removed this way as well, although why anyone would want to delete this helpful utility is unclear.

[4-8] How to change the My Computer Default icon

1.Search for My Computer. (This will be a string's value and be on the right)

2.Tab to go to the hex name of My Computer.

3.Under this hex name key, find subkey default icon.

4. This contains the "file name, and number of the icon in the file(starting from 0)"

5. Change this to any "icon file, number of icon"

6. **BE CAREFUL**

[4-9] Renaming "My Computer"

In Windows95, an icon on the Desktop is named "My Computer." Yuck----!

WW

Couldn't this be something more realistic--"486/66 DX-2"? The answer, of course, is YES!

There are actually TWO ways to do this; one is done right on the Desktop using the standard technique while the other involves use of the Registry Editor.

1. Open up Registry Editor, and go to:

HKEY_CLASSES_ROOT\CLSID

2. Locate the binary data string that identifies the My Computer entry:

MyComputer {20D04FE0-3AEA-1069-A2D8-08002B30309D}

3. In the right pane, right-click Default Name.

4. Choose MODIFY, and the Edit String dialog appears.

5. Type in the new name in Value Data, and choose OK.

6. Close the Registry Editor, and reboot your machine.

[4-10] Dragging "Scraps" to the Desktop

With Windows95, you can drag "Scraps" from your documents to the Desktop, or to folders, to create

Document Scraps. With these scraps, you can archive elements of your documents for later use or for sharing them.

I only tested the technique in WordPad so you might wish to experiment with it see if it works with other file types and applications. If you discover more about Scraps, please submit information to this FAQ as outlined in section [1-4].

[4-11] Change the Desktop's default folder

1. Go to the following Registry SubKey:

HKEY_CLASSES_ROOT\Folder\DefaultIcon

2. The current default icon points to the file shell32.dll in the Windows 95 System folder, and to the fourth icon in the series, which is actually 3.
3. You can change the .DLL file and the icon to whatever you would like to see on your system. For example, PC Tools For Windows 2.0 has a DLL file called FOLDERS.dll containing about 100 variations of the folder.
4. Make sure that you follow the following syntax: C:\Win95\System\Shell32.dll,x

Where "x" is the number of the icon in the DLL that you wish to use to replace the default.

5. Close the Registry Editor, and reboot your machine.

[5] Fine Tuning Windows95

[5-1] New design for the Start-Up screen

Tired of that advertising come-on for a product you already own or do you have some other reason for wanting to change it? I am referring to the "You are now starting Windows 95" splash screen. Perhaps you might like your favorite spiritual quotation to appear in its' place? Or maybe Beavis and Buttthead huh-huh-heh-ing your way into Windows 95 is more your style. Your call!

All you have to do is the following:

1. Create an alternate screen using LOGOW.sys as a template. You want to use this particular file as your template to assure that you are getting the color depth and aspect ratio correct. Otherwise, the system might not display the colors properly or crash.
2. Save it in .BMP format, and make a copy of it and call it LOGO.sys, placing the file in your root directory (i.e. C:\). Also make sure that the replacement logo isn't larger than 127k in size.

3. Go to the Start Menu, and select Shut Down.
4. Reboot your machine, and you will see your own artwork.

[5-2] Turn off the Windows 95 Start-up Logo

1. Open the file msdos.sys in the MS-DOS Editor.
2. Find the [Options] section in this file.
3. Add this line to the [Options] section:

Logo=0

4. Reboot your computer and there will be no logo on start-up!
5. The default setting is: "Logo=1" which gives you the animated Start-Up Logo.

[5-3] New designs for the Log Off screens

Many Preview Program participants who have young children have complained that the two 95 Log Off screens look so similar that they confuse someone who cannot yet read the words. These can be easily modified to a design that is more suitable for use by the youngsters. Or you may just want to change these screens for your own reasons.

There are two files involved which correspond to the "Wait while shutting down" and "You may safely turn off" screens displayed during this sequence. They are LOGOW.sys and LOGOS.sys (notice the W & S, for wait and safe?!) and can be found in the Windows95 root directory.

Even though both have a .SYS extension, they are normal .BMP files. Before editing them, make backup copies and save them to another directory, renaming them so that they have .BMP extensions. Now, you can use a program like MS-Paint, or Corel Photo-Paint. Edit them but make sure to change nothing which affects the files' resolution or color depth.

When you finish

- (1) make backups of the new modified files
- (2) then rename these edited files back to the original names of LOGOW.sys and LOGOS.sys,
- (3) copy them back into the Windows 95 root directory, and reboot your computer. If all works the way it SHOULD, the next time you Shut Down, you will see your custom Log Off screens!

POWER

TIP

If you have children who operate your PC, you can change these screens to something like a stop sign, a green light, or even the child's favorite cartoon hero!

WW

[5-4] Edit essential system folders

To change the name or location of any of these folders (such as Desktop, Fonts, Programs, Send To, Start Menu,) open the Registry Editor, and go to the SubKey:

```
HKEY_CURRENT_USER/Software/Microsoft/Windows  
/CurrentVersion/Explorer/ShellFolders
```

Simply edit the data to make your changes.

[5-5] Boot to MS-DOS 7.0 instead of Windows 95

If you prefer Windows 95 boot up in a MS-DOS session instead of the GUI:

1. Open the MSDOS.sys file in MS-DOS Editor.
2. Find the line "BootGUI=1" and change it to "BootGUI=0"
3. Or if this line is not in this file, simply add the line "BootGUI=0" near the top.
4. Save the changes, close the editor and reboot.

[5-6] Clearing the Recent Documents Menu quickly

The DOCUMENTS cascading menu off the Start Menu is always getting too long or filled up. To empty it,

you have to play click-click-click with the Start Menu. Wouldn't it be easier to have a Desktop icon to do this?

Okay, pull up a chair. And listen carefully.

1. Create this batch file:

```
echo y| del \windows\recent\*.*
```

2. Save it in a convenient directory and create a shortcut to it on the Desktop
3. Right-Click on the shortcut and choose Properties.
4. Select the Program tab.
5. Under RUN, choose Minimized.
6. Check the CLOSE ON EXIT checkbox underneath the RUN box.
7. Click on OK, and close the dialog.

To empty the Most Recently Used Documents Folder, just double-click on the shortcut.

[5-7] To change font size on Taskbar buttons

1. Right-click anywhere on Desktop and context menu appears.

2. Select Properties, then the Appearance tab.
3. Select "Active Title Bar" in Item: drop down list.
4. Adjust font size and select Apply to see what it looks like.
5. Select SAVE AS. Choose a name for your color scheme in the Save Scheme dialog box.
6. Select OK to close Display Properties.

This selection not only changes the Taskbar button font and size, but also the Active Title Bar in all of the programs that you run in Windows95. So choose a font that looks acceptable and readable in both places.

[6] Problem Solving in Windows 95

6-1] If an Application Cannot Find its' Help File

If you have an application that is having trouble finding its' Help File, you can add its' file name and full path to the following key:

Hkey_Local_Machine\Software\Microsoft\Windows\Help

There should already be several examples listed so add to them!

[6-2] A Tip for Multi-Boot Users

If you are tired of hitting F8 every time you boot your PC, here is a quick fix that will present a "Boot Menu" every time you start your machine.

1. Open up your MSDOS.sys file in the MS-DOS Editor.
2. Add the following line to the [Options] section: BootMenu=1
3. Save changes, and exit MS-DOS Editor.
4. Reboot and your new Boot Menu will appear.
5. You can also add the following line to the [Options] section of the MSDOS.SYS file:

BootMenuDelay=(number)

"Number" stands for how many seconds you want your machine to pause on the "Boot Menu." If the timer goes to zero before you act the BootMenuDefault is loaded.

[7] Registry Tricks

[7-1] Speed up the Start Menu!

Create a new string value under

HKEY_CURRENT_USER\Control Panel\desktop named MenuShowDelay and set it's value to a number from 1, the fastest, to 10.

[7-2] My City Isn't on the Time Zone Map !!!

Highlight the section on the world map that contains your city. Write down the string of cities.

An example is "Brisbane, Melbourne, Sydney"

Open Registry Editor, search for and then edit that string. You have easily edited a string that was not meant to be edited but with Windows95 you are given the option to edit nearly all strings.

[7-3] Editing the Windows TIPS at Start-up

You can edit those tips and add your own to the Welcome Dialog Box that appears at system start-up.

1. Go to the

H_KEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\explorer\Tips key of the Registry Editor.

2. Go to the above Key in the Registry Editor.

3. Go to the end of the list of existing UserTips. Fifty tips are pre-loaded.

4. To add a new String Value, right click with

your mouse at the end of the list.

5. Select NEW.
6. Type the next highest number from what' listed directly next to the **ab**.
7. Press ENTER.
8. Right click again on the number value just created.
9. Select MODIFY.
10. In the box marked VALUE DATA, type a new User Tip.
11. When you are positive that you have what you want select OK.

When you restart Windows 95 you will see the new Tips when the Welcome dialog box appears. This could be helpful, e.g., for new Win95 users on a network or as a handy dynamic tutorial list for you including important things easy to forget.

POWER
TIP

At the very beginning of your VALUE DATA, you might want to begin the Tip with, e.g., "My Tips" to remember with the ones you added.

WW

[7-4] Friendly "Short" Names

One of my favorite features in Windows 95 are the Long File Names. At last, we can leave eight-dot-three in the dust. There is the problem though if I have a program like Microsoft Office Professional 4.3, the 16-bit short file name edition.

In Explorer, I can save a file as "1995 Income Tax Returns". But when I open that file in Excel, I will find something like "1995In~1.xls". If you wanted to save several files with the prefix "1995 Income Tax" you would soon have a mess on your hands and be unable to decipher the short names.

Complete the following steps.

1. Open up the Registry Editor.
2. Open the SubKey:

HKEY_LOCAL_MACHINE\System\CurrentControlSet\
Control\FileSystem

3. Right-Click the right-hand pane of the Registry Editor window. On the context menu, select NEW, Binary Value.
4. Type in NameNumericTail and press ENTER.

5. Double-Click the entry you just created, and type zero (0) as the complete binary value.
6. Click OK, close the Registry and restart Windows.

This undocumented technique will assure that the short file names will resemble the long file names as much as it is possible. Windows95 will make sure that no two files will have the same long or short name.

[7-5] 3-D Objects: Highlights and Shadows

1. Open up the Registry Editor.
2. Go to the SubKey:

HKEY_CURRENT_USER\Control Panel\Colors

3. You will find a list of various system items, such as buttons, active title bar, etc. The list adds to the information that can be edited in the Control Panel's Display Properties dialog Appearance tab.
4. The information is presented as RGB data, which means that each color is represented by three values to simulate the various colors that will be displayed on your screen. The three values are Red, Green, and Blue. Each can have values between

zero (0), representing black, and 255, representing white.

EXAMPLE: 0 0 0 represents black
 255 255 255 represents white
 all other colors are somewhere in between

5. The RGB Color Model is an additive model that is used to determine how colors are displayed on computer monitors.
6. RGB values for the various colors can be found on your system under:

Control Panel, Display, Properties, Appearance,
Color, Other . . .

In this dialog, the RGB values are found in the lower right corner. Write down the values of your favorite colors, so they can be changed easily.

7. Knowing all this, you are ready to further customize the shadows and inverse colors of 3-D objects I in the Windows 95 system.

[7-6] Reappearing Values in the Registry?

If after several editing sessions in the Registry Editor, you discover that several entries and values that you deleted seem to reappear, it is NOT a problem with the Registry, the Editor, or your mind.

To keep that data from respawning, simply remove the offending items from your WIN.ini file!

[7-7] Adding Sounds to Application Events

You can add sounds to quite a few system events. Those can be located in the Control Panel Sounds dialog. But did you realize that, with the Registry, you can also add sounds to APPLICATION events?

1. Open up the Registry Editor.

2. Go to the SubKey:

HKEY_CURRENT_USER\AppEvents\Schemes\Apps

3. You will find two SubKeys .Default and Explorer.

4. Right-Click on the SubKey APPS, choose NEW KEY.

5. The new value should be the name of the application for which you wish to create event sounds.

6. Right-Click on the new SubKey, and select NEW KEY.

7. An example to get you started: Key: Open
Then, create another SubKey called Close.

8. Go to the Control Panel Sounds, and the Application Event SubKeys you just created will now appear in the list that is displayed in the Sounds tab.
9. Add whatever sound files you wish for these events.
10. The next time that you Open and/or Close that particular application, the sounds will play.
11. For each and every application on your system, you can add sounds to all these standard events:

Close Open
G.P. FaultRestoreDown
Maximize RestoreUp
MenuCommandSystemAsterisk
MenuPopupSystemExclamation
Minimize SystemQuestion

There may be other events possible, but that depends on the particular application events that are used in any given Windows application.

HINT: Button and Icon bars are NOT such events!

[8] Windows95 Registry Binary Value Reference List

[8-1] Control Panel
{21EC2020-3AEA-1069-A2DD-08002B30309D}

[8-2] Printers
 {2227A280-3AEA-1069-A2DE-08002B30309D}
[8-3] Recycle Bin
 {645FF040-5081-101B-9F08-00AA002F954E}
[8-4] My Computer
 {20D04FE0-3AEA-1069-A2D8-08002B30309D}
[8-5] Dial-Up Networking
[8-6] Net.Neighborhood
 {208D2C60-3AEA-1069-A2D7-08002B30309D}
[8-7] Inbox
 {00020D75-0000-0000-C000-000000000046}
[8-8] Desktop
 {00021400-0000-0000-C000-000000000046}
[8-9] Shortcut
 {00021401-0000-0000-C000-000000000046}

As I was getting deeper and deeper into the Registry, I was beginning to notice more and more that quite a few of the data strings were listed in some sort of binary HEX mumbo jumbo. I also noticed that some of these binary data strings remained constant throughout the entire Registry, from Hkey_Local_Machine all the way down to Hkey_Current_User.

I originally compiled this short list for my own personal reference. But, again and again, I was reading from the various newsgroups on the Internet, that people wanted to know the same information that was on this little slip of paper on my desk. So, I added this to the FAQ for general reference purposes.

It should save you from having to use the FIND shortcut in the Registry Editor to look up these very same values, which remain constant, no matter whose system they're on.

[9] Registry Editor Command Reference

A promise for the future version of this FAQ.

Kent Daniel Bentkowski has a bunch of positive attributes going for him. First of all he really knows how to organize a very complex subject in a concise and to the point fashion. He is writing about very important issues that many of us feel the need to master. And, finally, he hails from my home town. What more could an editor want?

He has been involved in the publishing industry for better than fifteen years and has been associated with computers for almost as long. He is currently a member of the Microsoft Developer Network, and was a Windows 95 BETA tester. It was that experience which lead to the writing of the Windows95 Registry FAQ. As an experienced BETA tester, he has tested several software applications, as well as games. Among them are; Windows 95, Windows NT, Complete Communicator, and PowerTools and PowerMail for America Online. Some of the games that he has playtested are; Bolo and OXYD, which are two games from Dongleware, LINKS 386 CD by Access Software. Currently Kent is playtesting the Network version of Battle Beast by 7th Level.

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To Whom it May Concern

Alice has decided to write her own column this month as I am suffering from sleep debt and exhaustion. She is typing away, exclaiming “Aha!” And “That’s it,” “Yeah, so what now?” “I now give you Alice:

At first I couldn’t think of a thing to say. No new inventions this week, and my mail has consisted of two chain letters, two preapproved Mastercards, and another free

time-disk for a major online service.

Ever know someone who keeps a journal? They take great care to choose the blank volume, and some even use wet ink to carefully inscribe their deepest thoughts. The artist Saul Steinberg was very aware of the connection of writing to materials, his drawings gracing the covers of The New Yorker for many years.

A single line became variously the pavement viewed from up high, a tight rope, a mountainscape and so on. Letters and numbers rained from the sky, and a distorted view of the globe showed New York City in grand relief, with a sliver of ocean and England peeking out the other side. A city-scape was infested with subway stairs reaching up from the depths.

Peter surely has the worst handwriting in the world, and the keyboard is a Godsend to him. A brief attempt to make him right-handed in grammar school has produced a calligraphic idiot. Graffiti artists are most interested in producing only their signature, and retired baseball players jealously guard the rights to their Nom de Plume appearing on baseballs.

Is the printing press the primary invention of mankind so far? The broadside - which still may be found today on light poles - led to the journals and public newspapers. Today anyone can read yesterday's world news each morning for less than the price of a cup of coffee. That is anyone where there is freedom of the press. The power of propaganda, though ever present can strangle the beliefs of entire cultures.

Today I will type this article and send it off over the wire, where it will be picked up in West Virginia, edited and included in an electronic document available world wide. The words will have never touched paper, becoming digital pulses and video flares.

Certain documents have sparked revolutions in culture, while personal letters have changed the course of people's lives. A note between Romeo and Juliet was not delivered in time and the protagonists ended up dead. A letter from Einstein to President

Roosevelt warned of the possibility of Germany building a nuclear bomb, leading to the mammoth secret Manhattan Project.

Peter's mother is a person of letters. Peter always brightens up when he gets one from her. News of Dad's garden, and their retirement excursions such as a trip to Sturbridge historical village take on worldly importance. Occasional letters by Peter to his U.S. Senator always return a "Thank you for writing Senator..... He is always interested... blah blahIt is because of people like you... blah blah blah." Peter is currently awaiting a rejection slip from the New Yorker, and tries to pretend he is not waiting, as a watched pot never boils.

One's signature seems to be increasingly a function of the magnetic strip on a credit card, or ATM card. You are not OK'ing the transaction, a program on a computer is. As I am an imaginary person, I always pay in cash. Corporate logos seem to be a signature, with forgery a big concern among jeans manufacturers, the jeans worth is in the brand name. One would think that some products, since they are a household word - like jello or baking soda - would sell themselves. Apparently not, as both are currently advertised on television.

Well, this has been a brief discussion of writing, and I hope you will call your family together after the dishes are loaded in the dishwasher and before ER to each write a conclusion. Who knows, you might have a writer in the house.

Unfortunately Alice completely disinterested when we offered her a regular column with a by-line and all the other perks that WindoWatch routine provides for their fine writers. She sniffed at me in great disdain and stomped off. Peter has spoiled her rotten.

Window Aspect: A Scripting Language**A Tutorial: Part Eight Ghost BBS v3.20****© 1995 by *Gregg Hommel***

You've written the ultimate script for PCP/Win! But you face a dilemma: If you release the source code to the public, with the WAX file, people will try modifying that source code, and when it doesn't work, will be contacting you for help in fixing their altered code. Depending upon how complicated the source code might be and let's assume, very, such user modifications and the resulting problems might result in taking more of your time to handle than *legitimate* support of your own original code.

Nonetheless, you want people to be able to customize the operations of your script and to change the operation into something more suited to their needs. Whether it is to display an alternative set of information, or dialog boxes, or whatever, how can you satisfy both their needs and still support your original code?

If you haven't already guessed that the answer is via an INI format file, then you haven't been reading the previous columns!

I hate to keep using GHOST BBS as an example for this column, but it is something I am intimately familiar with, and it provides convenient examples of some of the issues I want to discuss here.

GHOST BBS uses a basic INI format file (GHOST.INI) for a variety of system information. We've already discussed that file to a fair degree, not only in terms of the more standard things contained in the file, but also with respect to some of the less normal items.

However, there are still obviously more ways that GHOST uses INI format files, or I wouldn't be writing this. I think perhaps, the best way to see how GHOST uses various INI format files is to follow what happens when GHOST is running, and a remote user calls. We'll begin after the two modems have negotiated a connection, since that procedure has nothing to do with our discussion here....

When you call a GHOST BBS system, the first thing GHOST has to know, is which of the multiple languages it supports and which one you, the user, wants displayed. If there is only one language set up, than, obviously, this is not necessary. The first thing GHOST does is checks the GHOST.INI file for a setting which tells it how many languages the system is set up for. If it is just one, then we simply continue on. However, if it is configured for multiple languages, GHOST then checks the GHOST.INI file to get a description of those languages in order to display a numbered list for the user, -you- , to opt for.

GHOST takes the language number requested, reads the GHOST.INI file for a base prompt file path and name, adds the language number and the extension .PMT to it, and now knows which file it needs to read for the various prompts it will be displaying. The fact is, that the .PMT file, in spite of the extension, is nothing more than another INI format file which is used immediately by GHOST. The next item required from the user is whether or not they wish to have ANSI graphics displayed. *Note.* This should be displayed in the language

which the remote user has just chosen. Therefore, GHOST accesses the PMT (prompt) file which it has just determined should be used, and locates the prompt asking the user which graphics mode he wishes, using standard INI format file read commands i.e. `profilerd`.

The user response to that prompt tells GHOST to *use* ANSI where an integer value of 1 is set or *not* where an integer value of 0 is set. This is important, as a large number of GHOST entries in all INI files depend upon that integer value to tell GHOST where to look for something, or what to display. For that matter, GHOST uses it immediately to determine the next prompt to display. The PMT file actually has two main sections, **[Prompt0]** and **[Prompt1]** . I will leave it up to you to determine what each section is for (**Hint: remember the value of the integer used to indicate whether or not to use ANSI displays?**)

GHOST now goes to the appropriate **[Prompt#]** section, of the already determined PMT file, and gets the prompt to be displayed asking for the remote user's name. It is here where we come across two other INI format files used by GHOST to store data.....

1. The first one, GHOST.USR, contains quite simple entries. Because GHOST can use multiple user record files, and has to, to overcome the 64K size limit on INI format files imposed by Windows, GHOST needs to know where a particular user's information is located. This is where GHOST.USR comes in with each entry in the format of...

[USER NAME]

UserData=x:\path\filename.ext

When a user types his/her name upon entering GHOST, it is checked here to determine the name of the single file which contains the data for that user. And this brings us to the second INI format file used here...

2. **USER#.REC** (where the # is a number from 1 to ?) which is still another INI format file which contains all data for a given user.

What if the user is *not* listed in the GHOST.USR file, you ask?

The answer to that query is simple, yet, at the same time, not quite as simple as it first looks! If the user name entered is not in the GHOST.USR file, GHOST assumes that it is a new user, and confirms this with the individual, using another prompt pulled from the previously mentioned PMT file. When the user confirms that they are new, GHOST has to go through some hoops to determine what to do then.

As mentioned above, Windows imposes a size limit of around 64K on any INI format file. GHOST takes a slightly more conservative view of INI format file sizes, at least, when it comes to the user record database. There are two reasons for this...

1. Although the theoretical limit is 64K, in practical terms, problems begin developing with INI files that are slightly smaller than that limit.
2. Each upgrade version of GHOST has, until recently, added more data to the user record information stored. The upgrade scripts in GHOST have taken care of this by writing the new user information to the REC files if and when necessary. Theoretically, it is possible for a GHOST BBS upgrade to *push* a user record database file over the 64K

limit, unless there is some leeway available to update the records without reaching that limit.

As a result, when it comes to GHOST user records, an internal file size limit of 55,000 bytes is imposed by GHOST. As a result, the first thing done by GHOST is to read the GHOST.INI file to determine the name of the REC file currently in use, locate that REC file, and check the size of it. If it is less than 55,000 bytes, a new record can easily be added without approaching that Windows imposed INI format file size limit of 64K.

However, if the file in question already is greater than 55,000 bytes, GHOST won't use it. We can't/won't tell the user he can't log on, so back we go to GHOST.INI, to check two things.. the name of the *base* file to read for user records, and the number of the file currently in use, both of which are stored there.

Using that information, GHOST increments the index number it got by 1, adds that to the base file name it read in GHOST.INI, and then adds the REC extension. As example, let's assume the current user file is **M:\GHOST\USERS\USER4.REC**

The GHOST.INI file will tell GHOST that the base name is **M:\GHOST\USERS\USER**, and the current index is 4. GHOST increments that current index to 5, adds it to the base file name, and then adds the extension which results in a new user record file of

M:\GHOST\USERS\USER5.REC

Once the new user has entered a password, and verified it, GHOST

uses a **PROFILEWR** command to record the basic information for the new user, and that **PROFILEWR** command automatically creates the new **USER5.REC** file. We discussed this automatic creation of an INI format file earlier, as it is one of the nice features of the **PROFILEWR** command.

From here on, the inner workings of **GHOST** are not at issue in this column, so we'll drop our imaginary **GHOST** user at this point, and review what we have discussed so far.

1. INI format files can be used to store all kinds of information needed by a script while it is in operation.
2. INI format files do not need to use the INI extension. They can have any extension which you like. It is the format of the file content which is the critical issue.
3. INI format files need not be stored in **C:\WINDOWS**. They can be stored wherever they are most appropriate. I prefer to keep them, as much as possible, with the files they apply to.
4. Reading from or writing to an INI format file is much simpler than doing the same thing in a non-INI format file. It involves one

command to read, and one command to write - with the write command resulting in the creation of the file if it doesn't already exist before the write command is invoked.

But how does this relate to *your* ultimate Wasp application?

An INI format file can be one of the most useful tools you have at your

disposal. It is not only useful for the storing of configuration information, but for the storage of *any* application data that you may need. This includes information which may be optional to the application, or cause the application to branch to a different *path* if set. Additionally, the information in the INI format file can be set on the fly, which makes it useful for modifying application operations also, and on the fly.

There is also another way that an INI format file can be most useful. Using it can help eliminate one of the few drawbacks to the Wasp language and that is the inability to pass a start up argument, singular or multiple, to a script.

If you have done any Wasp programming at all, you may have run across this. One thing which cannot be done in Wasp and which should be fixed as soon as possible, is to start a script with arguments on the command line.

When a script starts running under PCP/Win, it begins...period! You can't modify how it begins through the use of command line arguments, a normal procedure in most programming languages. This kind of a procedure can be extremely useful in modifying how a script operates when it is run.

Fortunately, in Wasp, there are three ways to work around this limitation...

1. If you spawn one script from another, you can use the Wasp internal global system variables ([S0-9](#), [I0-9](#), etc.) to pass start up arguments to the spawned script.

The drawback when doing this is that you are limited to 10 arguments of each type. **Additionally, the global system variable can be inadvertently modified by a script run before starting the one you want the argument passed to.**

2. You can store start up arguments in a text file to be read by the script.

The drawback here is that, in order to use the file, you have to locate it, open it, read it line by line, and locate the line that you need within the file using STRCMP and other commands. In other words, this can be a lot of work.

3. You can use an INI format file to store the arguments.

This eliminates the drawbacks of the system variables, since you can store as many arguments as you like, within the 64K file size limitation. The script has to explicitly change the entries in the file making an inadvertent change to the value much more difficult.

It also, eliminates the drawbacks of using a text file, because an INI format file never has to be explicitly opened as the PROFILERD command does that automatically. Additionally, you don't have to read in the file line by line using string manipulation commands to locate what you want. Again, the PROFILERD command finds the exact line you ask it for, quickly, and without error or string manipulations.

The next column will be in the New Year. For us, this isn't going to mean something completely new, as we are going to go back to our old friend, George, whom we have left hanging for the past couple of

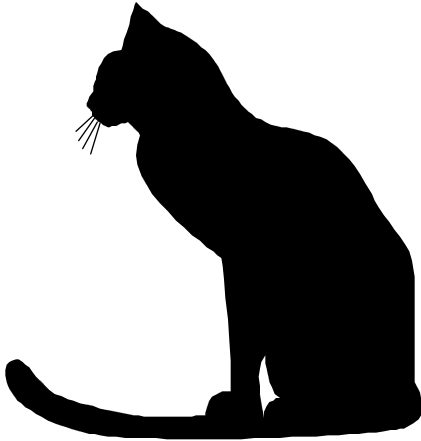
columns. The poor guy has been sitting there, logged on, and staring at a blank screen, for all this time, while went exploring elsewhere. So we are going to drop back in on him, and get him past the blank screen, and help him write a script that goes beyond a simple log in.

One last thing... I have found an ISP, and thus, now have a new email address, and even a Home Page of my own. Should you have any reason to contact me, my new email address is

gregghom@ophelia.waterloo.net or, you could browse to my Home Page, where you can download a copy of either GHOST BBS or PCB Freedom, and by the time you read this, even download my original Wasp 1.0 Tutorial, or my columns from *WindoWatch*. The URL for my homepage is <http://www.waterloo.net/~gregghom/>

*Gregg Hommel is a much respected Aspect script writer and programmer. He is well known on the various nets hosting any number of conferences. He is applying his considerable programming talents to the construct of his own homepage and ours. Gregg sits on our Editorial Board and is a regular *WindoWatch* contributor.*

The Cat's Out of The Bag!



The twenty pound black and
white furry Windows expert!
Copyright 1995 by Bob Miller

Bob Miller's Stanley Does Windows

Purrfectly Yours
by Stanley

Dear Stanley,

I've just switched to Windows 95 and I'm bewildered. Do I still need to use SmartDrive? What about Memmaker?

Dear Bewildered,

SmartDrive still serves a purpose for sessions being run from a prior DOS version or in SAM but is counterproductive when '95 is running. Memmaker still works, be absolutely certain, though, that you use the 95 version and not the old one. It's not needed by most folks!

Dear Stanley,

The swap file is using a HUGE amount of space on my hard drive. Should I change it? How?

Dear Space conscious,

You didn't say which version of Windows you are running. If '95, leave it alone. '95 uses a dynamic swap file that is much brighter than you are. However, if you are running an older version of Windows, you have encountered the brain dead algorithm that determines the size of the PSF. It is always too large. Most people find that a 4 MB PSF is just about purrfect.

Dear Stanley,

How come you know so much? Aren't you just a cat?

Dear dumb-dumb.

Just a cat indeed! Cats were once worshipped as Gods and we have never forgotten it. We have spent thousands of years domesticating you poor humans and, clearly, still have a ways to go. But, to answer your question, I started with Windows 1.0 and have used and tweaked every version since. I also get and read four national on-line message nets every day that are devoted to Windows.

But there is no substitute for trying things yourself. Just make sure that you have a current backup of all your important files.

WW

Dear Stanley,

I started my system today and got a *corrupt group* message. What happened and how do I prevent it from happening again?

Dear Corrupt,

Usually, this is caused by shutting off Windows while it is still running instead of exiting to a DOS prompt first as you should. But, sometimes, it just happens.

It is easy enough to recreate the lost group (Program Manager, File, New, Program Group) but it is better to have copies of all your .grp files (and .ini ones too) safely stored so that a rebuild is nothing more than a copy job. The .grp files are stored in Progman.ini.

Dear Stanley,

I have 16 megs of ram and 606 free when Windows starts but, when adding a new program, I get *very low on memory* messages or all my icons turn black. What is causing this?

Dear hi-color user,

You are running afoul of the maximum limit of icons per group window. This number is directly proportional to the depth of color you are using. At 256 colors, you can have 50 icons, at 65k colors, 27 and at 16.6mm, 16. No way around this so either reduce your color depth or use more groups. BTW, you are limited to 40 groups no matter what.

Dear Stanley,

I find Explorer hard to use. I wish Microsoft had left File Manager behind. Can I use my old one?

Dear missing,

You don't need to. There is a new, but not improved, version in '95. Just use the RUN command to start Winfile.

Dear Stanley,

What is the true meaning of life?

Dear True,

42. Tuna fish is also acceptable

Purrfectly yours,

Stanley

We understand from our sources, with the understanding that confidentiality will be preserved, that a special friend of Stanley's paid him a call over the Thanksgiving weekend. His handlers have leaked the news that Turkey is an acceptable substitute for tuna and he can be sent in lieu of an honorarium to his human bob.miller@msn.com The Butterball brand is one of his favorites.