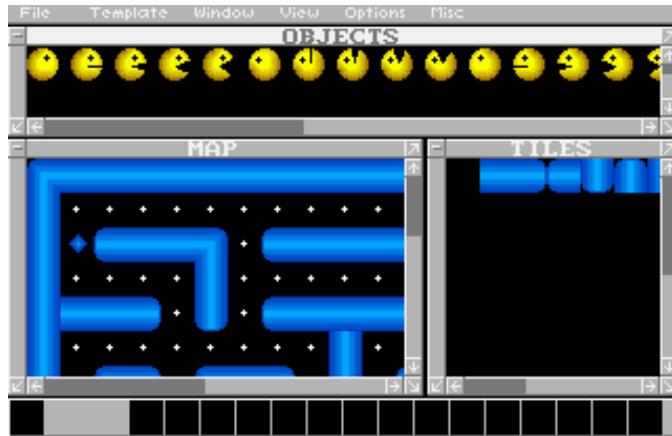


WGT Map Maker v5.1

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User's Manual

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1.0 System Requirements

IBM PC-compatible, 386SX or better
(S)VGA video card and monitor
Microsoft compatible mouse and drivers

2.0 Introduction

The WGT Map Maker is a utility which will provide the tools for creating a tile-based background for a game or animation. In recent years, a number of these games have set the standard which players and developers now expect from any new release. The idea is centered around the fact that the resolution of video displays can no longer meet the expected dimensions of a video game world. Players want to be placed into a world which is much larger than the visual screen, and therefore must be scrolled in various directions to get to a new location. WGT was the first publicly available toolkit to provide a full library of routines and a utility program for the creation of such games.

Creating an image which is larger than the visual screen would require a great deal of memory, so the technique used to reduce this requirement is called tiling. Basically the user will create a world using a set of basic images which are repeated throughout the scene. A large area of sky could be created by pasting a series of solid blue squares on the screen, with only one of the blue squares stored in memory. The WGT system will simply store a single number indicating which square is used to draw the background at each point. Each number requires 2 bytes, so there can be 65536 unique tiles on a map. Therefore, a 20*20 pixel image would require 400 bytes to store, and a 15*10 section of these squares requires another 300 bytes (one "tile" number each, indicating the sky piece). This totals 700 bytes for a resulting image which is 20*15+20*10 or 300 by 200 pixels. This would require 60,000 bytes of memory to store without a tiling system. The tile system has reduced our example to 1.2% of our original storage requirements.

3.0 System Statistics

When the program is run, a number of statistics about your computer are shown. They are:

Video: This always displays "VGA compatible card detected" if a VGA or better video card is found.

Mouse: This will display "Microsoft compatible" and the number of buttons the mouse has, if a mouse was found. It then reports what kind of mouse it is, out of the following:

- Bus mouse
- Serial mouse
- InPort mouse
- PS/2 mouse
- Hewlett-Packard mouse

The IRQ of the mouse driver is also shown.

Memory Status: This shows how much total memory is free, and a breakdown of the memory usage.

4.0 User Interface

The Map Maker provides you with a set of drop-down menus and windows to ease the development process. All program features are accessible through the menus, and most of them may be controlled entirely by the mouse (little keyboard control required). Some menus are disabled if your hardware is not sufficient to support the features (example: SVGA support for VIEW mode). By hiding the options unavailable to you, the program customizes itself to meet your situation.

Up to four windows are available, depending on memory status and loaded files. These windows contain simple close and resize buttons, along with horizontal and vertical sliders. Windows may be moved by clicking the mouse on the titlebar and holding the button down while moving the window to a new location. Two window activation modes are available. If the setup program has defined the windows as auto-raise, the windows will become active as the mouse passes over them. With auto-raise disabled, the user must click on the window itself in order to activate it. Be careful when using auto-raise mode because the larger windows will tend to override the smaller ones and make selection difficult.

Certain restrictions are placed on the files and images loaded in this release of the WGT Map Maker:

- 1) Tiles are to be created with the WGT Sprite Editor. The dimensions of each tile in a given file should be the same. Up to 65536 tiles (in slots 0-65535 of a sprite file) are permitted. Tile #0 must not be NULL (it must contain an image).
- 2) Objects are to be created with the WGT Sprite Editor. Objects may be any dimension, and are expected to use the same palette as the tiles. Up to 2000 objects may be placed with the Map Maker, and any objects exceeding this amount must be placed by the program itself.
- 3) One map file may be loaded at a time. Parallax editing is not supported. Create parallax maps one at a time and use your program to test the end result. All maps which are to be used as parallax levels should share the same palette.

5.0 File Menu

5.1 Project Files

C programmers know the benefits of a project file. Organization of a large group of source files and related data is much simpler when they may all be kept in a project file. The Map Maker provides just such a feature for its environment. When you save a project file, the system will save all current window positions, the names and paths of tile/object/map files loaded, window priorities, quick-pick banks, and the currently active bank number.

5.2 Load Project

Using the file selector, a project file may be loaded. All currently active files will be unloaded from memory and replaced with the new selections. If you have not saved any changes made to the current files, these changes will be lost. The project file contains full path information for all data files, so the program may crash if you have moved the files since the project was created or if you have deleted any of the files. After a successful load, the Map Maker will be in the same state as it was when the project was last saved. It is recommended that you save a project file before leaving the Map Maker (if you loaded one during your session). This will make sure that all changes (quick-pick selections, etc) are recorded properly.

5.3 Save Project

A file selector will prompt you for the filename to save. This filename should have the extension MPF (Map Project File). See the comments for LOAD PROJECT to find out more about the attributes which will be saved.

5.4 DOS Shell

A feature lacking in the previous Map Maker releases was a DOS SHELL option. It is now implemented to provide the user with the ability to escape to DOS to perform a few tasks, then return to the Map Maker by typing EXIT.

The program will run the command-line processor described in the system COMSPEC environment variable. Most users will simply have this set to the standard COMMAND.COM, but you may change this variable to reflect any program you wish. Simply type

```
set COMSPEC=c:\dos\command.com
```

or the full pathname to the processor you wish to run.

5.5 Load Tiles

Before any map may be created, a tile file must be loaded. Tiles are defined as a series of images all having the same dimensions. In WGT, tiles are allowed to be any size up to 64 pixels wide by 64 pixels tall. Tiles DO NOT need to be square in version 5.1 of WGT. 1 by 1 pixel tiles are permitted! Create a tile file in the WGT Sprite Editor and save it as a normal SPR file. Make sure that ALL tiles have the same dimensions. The Map Maker permits up to 65536 tiles per file.

If your tile file contains a few tiles which do not match the dimensions of the rest, a file called "BADTILES.DAT" will be created. This file lists the tile numbers which do not meet the expected size. Use it as a reference and fix up the file in the Sprite Editor before attempting to use it in the Map Maker.

The program will warn you if you have mistakenly loaded an object file. This assumption is made if more than half of the "tiles" do not share a common size. Do not proceed further if you get this warning. Leave the Map Maker and correct the tile dimensions or re-load a different tile file.

Once loaded, tiles will be placed in the TILE WINDOW. A window will prompt you for the dimensions of the map to be created. Please refer to MAP SIZE for more details on this window. Tile #0 is used to fill the background on any new map. The scrolling library in WGT does not like NULL pointers, so you must make sure that tile #0 actually contains some sort of data. If you want the tile to appear empty, simply use a solid color for the entire tile (such as black). When making parallax maps, it is assumed that tile #0 will not be shown for parallax layers, regardless of what image it contains.

5.6 Load Objects

The Map Maker provides an easy system for initial object placement on your maps. If your program had several hundred (or thousand) objects to place within the "world" once a map was loaded, the code would be immense. To avoid this, the Map Maker allows you to place up to 2000 objects on the map in their starting positions. Objects may be ANY size up to 320*200 pixels. Create an object file by drawing your objects in the Sprite Editor and saving the file as a normal SPR file.

Once a file has been selected, the Map Maker will load the images and place them in the OBJECT WINDOW. To see how much memory is available at any time, use the MEMORY STATUS menu item in the MISC dropdown.

5.7 Load Map

A previously saved map file can be reloaded using this option. Keep in mind that each map file is designed for a specific set of tiles and objects. If you load a map file which does not belong with the currently loaded images you may get undesirable results.

Once loaded, the MAP window will display the contents of the map itself. If the OBJECT bank is active, objects will be superimposed on the map tiles. See OBJECT MODE for further information on this feature.

All existing tile types, map data, and object positions will be overwritten with the information in the map file that has been loaded. Be sure to save any existing data before loading a new map. For file specifications, see the PROGRAMMER'S INFO section.

5.8 Save Map

When selected, this menu item will present the user with a file selector. Files with the extension WMP will be listed. You may either select one of the existing files to save over, or you may enter an entirely new filename in the text field at the top of the selector. WMP stands for W(GT) MaP. You do not have to use this extension, but the selector will always default to WMP files.

All information regarding the map itself will be stored within the file. This includes dimensions, tile data, object placement and tile types. See the PROGRAMMER'S INFO section for file specifications.

5.9 Quit

Once selected, the Map Maker will end execution and return the user to DOS. All information which has not been saved at this point will be lost. This menu item must be used to end the program and return the computer to its original state (the state in which the Map Maker was started).

6.0 *Template Menu*

6.1 Load

Templates which have been saved using the SAVE menu option can be reloaded at any time by using this option. Template files do not store information regarding the necessary tile file, so be sure to have the proper tiles loaded before selecting LOAD.

The normal extension for template files is TPL. This is optional, and you may choose to name your files with any extension you wish. Once loaded, the template will be placed in the template window with the appropriate regions selected. The user is automatically placed in PASTE mode. All previous template data in memory will be lost.

6.2 Create

Before a template can be used, you must create one by highlighting the desired tiles in the template window. After placing the tiles in the template window (just as you would in the map window), select CREATE to start identifying the tiles to be used in template construction. Clicking the left mouse button will highlight (select) a tile. Clicking the right mouse button will deselect a tile. Once you have selected all the tiles for a given template, you are ready to try the USE menu option.

If you want a large area highlighted, it may be easier to select the tiles with the GRAB REGION menu option.

Selecting CREATE will clear out existing highlights. Be sure not to choose this menu option if you are already building a template.

6.3 Reset

If you are finished with an existing template and wish to create a new one, this menu option will clear out the previous template and prepare for a new one. The tiles in the template window are not cleared, but the highlights are cleared and any template being used is freed from memory.

6.4 Use

After highlighting the desired tiles with the CREATE option, this command will build the template in memory and place the user in PASTE mode. The lower toolbar will display a text notice indicating that you are in PASTE mode, and the quick-pick banks will be hidden. To leave the USE mode at any point, select the EXIT PASTE menu option. Paste the template on the map just as you would a regular tile (by clicking the left mouse button).

6.5 Exit Paste

When in template USE mode, the screen will contain a notice along the bottom toolbar. Selecting this menu option will return the user to either object mode or edit mode (depending on the mode in use before templates were activated). Return to PASTE mode by selecting USE again.

6.6 Save

Save both the template data and the highlighted template tiles by selecting this menu option. Files normally use the TPL extension, but you may change this to any extension you want. Information regarding the tile file is not saved, so you must remember which template files go with which tile files. It's a good idea to name the template files similar to the tile files to keep things simple.

6.7 Copy Map

This option will copy the entire map into the template window. You may then alter the tiles or highlight them to build a template. This makes it easy to build templates from existing areas of the map.

6.8 Grab Region

Highlighting tiles one at a time can be very time-consuming. This menu option will put the user into a reduced-template mode. The screen will look exactly like a reduced map except that it is using the data from the template window. Click the left mouse button to select a corner of a region to highlight. Click the left button again to select the second corner. The area selected will become white, indicating that those tiles have been highlighted. Click the right mouse button to return to the main program.

This option allows quick selection of large template regions. Each time you choose this menu item, the previous selections are kept, allowing you to build on the existing template highlights.

7.0 Window Menu

7.1 Tile Window

Once you have loaded a tile file (in the FILE dropdown), the TILE window will now contain all the tiles loaded. There are a maximum of 65536 tiles permitted in any given tile file. You should note that the Sprite Editor only allows for 2000 images to be stored in a sprite file. If you need more, you can combine multiple sprite files into one by writing your own program which uses the wloadsprites and wsave_sprites commands. When the mouse is positioned over a tile, you may click on it with either the left or right mouse button. This will assign that tile to the button you pressed, and the tile is now displayed in one of two boxes along the control bar at the bottom of the screen. Selecting the tile from the control bar will allow you to store it in the quick-pick bank (see Quick Picks later in this document). Use the window scrollbars to access the tiles which are out of view.

7.2 Map Window

The MAP window will contain all tiles and objects which have been placed by the user. Initially, this window is filled with tile 0, but it may contain info once a map file is loaded or the user "pastes" tiles or objects onto it.

When the control bar is displaying the active tiles and the tile quick-pick bank, the user is placed in map edit mode. When the mouse button is clicked within the window, the appropriate tile (for that button) is copied into the map. A highlighted box appears to show you exactly where the tile will be placed. There is no ERASE feature built into the program because all 65536 tiles may be used, so it is recommended that you have a tile which is a solid color (usually black) which may be used to erase mistakes.

If the control bar is displaying the active object and the object quick-pick bank, the user is placed in object mode. When the mouse button is clicked within the window, the active object is "pasted" onto the map at that location. If you wish to "lock" the positions into a grid which matches the tile size, press 'G' to activate grid-lock (or again to de-activate). Up to 2000 objects may be stored on a single map, and it can get confusing trying to locate or modify existing objects when there are a lot. To avoid confusion, you may want to see the object numbers superimposed on the screen (do so by pressing 'N', or 'N' again to de-activate). If you want to manually store/locate objects, use the OBJECT MENU.

Pressing 'O' will activate the OBJECT MENU, or you may also find the option in the MISC dropdown. This menu displays the entire structure which is stored for each object, and features several buttons which make life easier for the developer. See OBJECT MENU later in this documentation for more info.

7.3 Object Window

After loading an object file (in the FILE dropdown), the OBJECT window will appear with all the objects displayed in the window's client area. To select an object from the window, position the mouse over the object and click with either button. Only one object may be selected at any given time (unlike TILE mode which allows two selected tiles). Once again, you may use the window scrollbars to access items which are out of view. Selecting the object displayed on the control bar will allow you to place the object in the quick-pick bank (see Quick Picks later in this document).

7.4 Template Window

The template window and the map window behave in a similar fashion. Tiles may be placed in the template window just like you do in the map window. The window resolution is 320*200 tiles, allowing for large templates to be designed. All template operations are performed in this window. See TEMPLATE MENU for more information.

9.0 View Menu

9.1 Supported View Modes

When you have a map created in memory, it might be hard to visualize what that map looks like in a larger view area than the window. To provide a better viewing mode, you may select one of several supported video modes from the VIEW menu.

Since WGT uses 320*200*256 (all VGA cards support this mode), this option is always available from the VIEW menu. When selected, you will see the map as a full screen presentation with actual tile sizes. The map will look exactly like this when used in your

programs. If you want to see a larger area of the map at once, you can view it in a higher resolution.

Higher resolutions are supported through VESA. If your monitor and video card support Super-VGA (SVGA) modes, you may install a VESA driver in your AUTOEXEC file. Most video cards come with software drivers for this support. Supported video modes will depend on the card manufacturer, model, and memory size. The Map Maker will detect which modes are available and will present these along with the default 320*200 mode in the menu. Simply select the mode you want and follow the same process from here.

Once in a viewing mode, the map will be displayed (along with all currently placed objects) and the mouse cursor is hidden. Use the grey cursor keys to maneuver your way around the map. If you reach the edge of the map (in any direction), the key will no longer respond.

Supported keys in view mode:

LEFT ARROW	-	Move viewpoint left one tile.
RIGHT ARROW	-	Move viewpoint right one tile.
UP ARROW	-	Move viewpoint up one tile.
DOWN ARROW	-	Move viewpoint down one tile.
PAGE UP	-	Move viewpoint up half a screen.
PAGE DOWN	-	Move viewpoint down half a screen.
CTRL LEFT ARROW	-	Move viewpoint left half a screen.
CTRL RIGHT ARROW	-	Move viewpoint right half a screen.
O	-	Toggle object display.
ENTER or mouse button	-	Exit map view mode.

9.0 Options Menu

9.1 Reduced Map

A reduced map option has been implemented just as in the previous version of the Map Maker (v4.2). This feature will allow you to display the map using 1 pixel to represent each tile. The system will make its best guess as to which color to use to represent the tiles. The mouse cursor will become a rectangular shape with the same dimensions as the MAP window (reduced).

Simply move the cursor over the area of the map you wish to edit and click with either button. The cursor MAY be extremely small if only a few tiles can be displayed within the MAP window. This happens when the window is small or the tiles are large. Do not be alarmed if you can't see the cursor at first, because it is there!

9.2 Tile Types

Each of the first 256 tiles may be assigned a number from 0-255 which will indicate a property or "type". For example, all tiles which are assigned a value of 1 may indicate a solid tile (like ground or walls), while all tiles which are assigned a 0 will indicate sky pieces or transparent tiles. This option presents you with a dialog box in which you may change the assigned values.

Click on the current tile number to change to another tile. Click on the NEW TILE value to set the type for the current tile. Choose QUIT to leave this dialog when you are done. Tile types are saved with the MAP file, so you must remember to save the current map after changing tile types. Applications which require more than 256 tile types (or type settings for tiles beyond 256) should store them in an array using their own code instead of relying on the Map Maker to do so.

9.3 Object Menu



Objects may be placed on the map by switching to the object quick-pick bank and simply pasting objects on the map window. This is known as "object mode". While in object mode, you may toggle numerical display by pressing N. If active, this will display the object numbers superimposed on the upper-left corner of the actual objects within the map window. This makes it easier to determine which object is which. You may increase or decrease the current object image used for placement by pressing the plus or minus keys. This changes the image number, not the object number. Objects may use positions up to 2000 in this version of the Map Maker. Managing such a large number of objects can be difficult, so an object menu has been implemented.

When the MAP window is active and the object quick-pick bank is being used, the object menu is available to the user. This menu provides total control over the object image numbers, positions and display status.

The object information structure for the current object is displayed in the dialog box. You may alter any of the figures by clicking on the number and typing in a new one. Object numbers range from 0-2000, on/off status must be 0 or 1, x and y coordinates may be anywhere from -32768 to -32767, and the image number is based on the object file loaded.

To move to another structure, use the PREV or NEXT buttons. To find the nearest empty structure, use one of the FIND buttons. The leftmost FIND button will search below the current object number, and the rightmost button will search above the current object number. Use the DELETE button to erase the current object structure or the DELETE ALL button to erase ALL object structures in memory. If you want to see where the current object is on the map, choose the GOTO button. The lower right-hand corner of the dialog will show the image used for the current object structure. Change the image quickly by clicking on the plus or minus buttons instead of typing in a new value.

9.4 Map Size

This option will allow you to set (or change) the dimensions of the map you are creating. Dimensions are displayed in units of tiles. With tile sizes up to 64*64, your coordinate system can go as high as (320*64) by (200*64) or 20480 by 12800 pixels. Current dimensions are displayed in the middle of the dialog box. Click on the number you wish to change with the mouse button. Type in the new number and press ENTER. When you are done (even if you didn't change anything) choose QUIT. If you have been editing a map with larger dimensions and decide to shrink the map, the extra data will not be lost until you leave the Map Maker. Later on during your session you may expand the map size again and recover the extra data.

9.5 Export PCX

Sometimes it is desirable to create screen captures of your programs to use as advertisements. The PCX export feature will allow you to output the entire map (currently in memory) as a compressed image file. PCX is a standard image format which was introduced by PC Paintbrush for Windows. Even with the compression technique used, image files may be very large when created with this feature. Make sure you have enough room on your hard drive before you select this option. Once selected, the program will prompt you for a filename to save the image under, and then it will display its progress as each line of the output image is saved.

Once created, the PCX file can be altered using any of hundreds of available image processing programs or loaded using the WGT system library. Most commonly the pictures will become part of an advertisement for your game.

10.0 Miscellaneous Menu

10.1 Memory Status

```
MEMORY STATUS
Memory free: 4797k

Tiles  : 5376 bytes
Objects: 5632 bytes
Map    : 7600 bytes

PRESS ANY KEY TO EXIT
```

This is one of the most important features of the system. It will tell you exactly how much memory is used and available.

The dialog box which appears will display the total amount of system ram free, and the total memory used by tiles, objects, and map data. When you are done checking the totals, press any key or click a mouse button to close the dialog box. If you notice that memory levels are low, it is highly recommended that you save all current data. The program may crash if it attempts to allocate memory which does not exist.

10.2 Disk Space

This option will allow you to see how much space is available on any of the valid hard drives installed on your system. The dialog displays info such as:

```
DISK SPACE
Current drive is D:
Type: HARD DISK
Free (bytes): 50356224
Used (bytes): 138215424

[QUIT] [NEXT]
```

Click on NEXT to advance to the next logical drive available. Drive listings will loop around once you reach the last available drive. Click on QUIT to leave this dialog box at any time. Floppy drives are not available with this feature.

Do not attempt to save files on a disk which does not have enough space. Check the MEMORY STATUS dialog to see roughly how much memory is required by the map itself. You can expect up to 14k extra to be added to this total when saving (depending on the number of objects stored with the map data).

10.3 Clear All

If you wish to reset the Map Maker and start over, this is the menu item which will let you do it. This option will present you with a dialog box containing text only. It will instruct you to press "Y" to restart the Map Maker, or any other key to abort the reset (mouse clicks abort too). Any changes made to the files loaded will be lost. All items in memory are cleared and the program will start over from the very beginning. You should see the text screen again with the program statistics, followed by the menubar and an empty window area. At this point you are free to start fresh.

10.4 Create Source

Once a map has been created, this option will allow the user to save C source code for a WGT program which will instantly give life to the image. This option will not work unless the program has filenames for the tiles, objects and map. If you have created a map from scratch and haven't saved it, you must do so before attempting to use this. If you do not have any objects loaded you should do so (if you don't want objects, you still have to load in a dummy sprite file to get this option to work).

The program will present you with a screen which allows you to customize the code which is produced. Available options are window width/height, x and y location of the window, and the initial viewpoint of the window. Window (in this paragraph) refers to the scrolling window used in the WGT program, not the a window in the Map Maker. Window dimensions are based on tiles, not pixels, and the same goes for the initial viewpoint. X and Y locations are screen coordinates for the window (based in pixels).

To set the window dimensions or location, click on the button displayed and then use the mouse to select the positions on the screen. The Map Maker will allow values based on tile and map dimensions, therefore simplifying the user's input process. Clicking the mouse and dragging it to the second corner is all that's required for setting dimensions. One click is all that's needed for the window X and Y location.

An initial viewpoint is selected using a reduced map mode. The map is drawn on the screen and you simply click the mouse button when the cursor is highlighting the desired location on the map.

The EXIT button will abort code generation, and the GENERATE button will save source code based on the current settings. A file selector will prompt you for the filename to save.

11.0 Quick Picks



A new feature to the Map Maker is the addition of "Quick-Pick" banks. These banks are displayed along the bottom control bar. In one bank, the user may store the most commonly used tiles (for editing), and in the other bank objects may be stored. Instead of constantly moving to the tile window, selecting two tiles for editing, moving back to the map window and pasting tiles, it's much easier to use the quick-pick bank.

When the tile window is active, select a couple of tiles (one for each mouse button) and then move the cursor over the two leftmost boxes on the lower control bar. Clicking on one of the tiles will then place your cursor into the quick-pick bank. Move the cursor to the slot in which you want to store the tile, then click with the left mouse button. Clicking with the right button will cancel this action.

You may switch between quick-pick banks at any time by clicking the mouse button on the gray area of the lower toolbar. This area is located between the actual quick-pick slots and the active tiles (or object). This is not effective during template paste mode.

12.0 Programmer's Info

12.1 Map File Format

For those who want to attempt their own editor, or to access the map files from a different library, here's the map file format:

NAME	SIZE	Value	Meaning
MAGIC	2 bytes	8975	Magic number for v5.0 files
WIDTH	2 bytes	20-320	Width of map (in tiles)
HEIGHT	2 bytes	10-200	Height of map (in tiles)
MAPDATA	WID*HGT	0-255 each	Actual map data (stored in rows)
TILETYPES	256 bytes	0-255 each	Tile types for all 256 tiles
TOTALOBSJS	2 bytes	0-2000	Number of object structures stored
OBJECTS	7 byte struct		One for each object in file
<pre>typedef struct { char on; short x; short y; unsigned short num; } objects;</pre>			<p>Object structure Sprite is turned on=1 World x coordinate (max 320*64=20480) World y coordinate (max 200*64=12800) Sprite # from object file to show</p>

12.2 Project File Format

<pre>typedef struct { short x; short y; short x2; short y2; } coord;</pre>	<p>This defines a rectangular region</p>
--	--

The following structure is saved as the project file:

```
struct {
    unsigned char title[20];      Project file header string
    unsigned char tilepath[80];  Path to TILE file
    unsigned char mappath[80];  Path to MAP file
    unsigned char objpath[80];  Path to OBJECT file
    coord         tile;         Window coordinates (4 windows)
    coord         map;
    coord         object;
    coord         template;
    char          winorders[10]; Window priorities
    short         picks[18][3]; Quick pick banks
    unsigned char activebank;    Currently active quick pick bank
} PROJECT_FILE;
```

Notes:

3 quick-pick banks are saved, but only 2 are currently used
10 window priorities are saved, but only the first 4 are used