Flashback 3DO Technical Notes

Figure 1: Flashback Logo

Files

Same format as Amiga

Extension	Description
.CT	Level grid, compressed with bytekiller
.LEV	Room tiles attributes, compressed with bytekiller
.PAL	Amiga 16 colors palettes (RGB444)
.MBK	Graphic tiles
.PGE	Triggers
.RP	
.SGD	Graphic tiles for Level 1 (Jungle)

Rendering

Flashback was originally developed for the Sega Megadrive and its rendering code is based on a tile based hardware. The backgrounds are made up of several tiles (of different resolutions, eg. 128x44, 16x16) composed when loading. This is very efficient on hardware supporting these. Load the graphics to the dedicated memory and load the attributes to the other dedicated memory.

As the PC does not have this kind of hardware acceleration, it comes with pre-processed level backgrounds. The .MAP files contains all of the backgrounds bitmaps (256x224) of a given level. The Macintosh version also used the same pre-processing. Loading and displaying since then just a matter of decoding the bitmap directly to a video buffer.

The 3DO does not come with preprocessed background bitmaps but draws in software the background bitmaps by reading the .LEV files for attributes (flipping, xy) and decoding the graphic tiles found in .BNQ and .SGD files.

The executable relies on 256x228 .cel files as place-holders where the software decoded graphics are rendered to.

Differences with Amiga/PC

Texts

On Amiga/PC, the in-game texts are stored in the executable. The 3DO reworked that and texts are now read from .BIN files (under the Langs/ directory).

Passwords

On Amiga/PC, the passwords are not stored in clear in the executable. Each password character is obfuscated by reversing the bits and a xor.

Running ‘strings’ on the executable of the 3DO lists the level access codes.

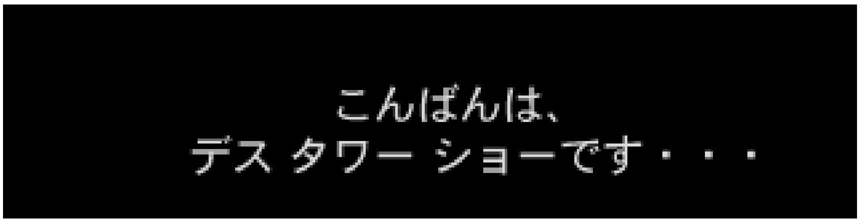
```
GATORSDIABLOPMBRTNEXPO  PATROLBOOGIETREK  LEAGUEANIMALQUASI BANG
TIMERSSTALIOSHKSPRLASSO STRIKEKNOCK POKER ATOMICKNUCKLDYNSTYANNUIT
```

Cutscenes

This version includes CG cutscenes, replacing the original polygons based. The quality is similar to the PC CD-ROM release.

The videos are encoded with Cinepak.

Japanese subtitles are present and can be rendered on top of the video.



こんぱんは、
デス タワー ショーです・・・

Figure 2: voyage.sub

The .DAT files contains the timing information (frame number) indicating when the bitmaps need to be rendered on top of the video. The bitmaps are stored in .SUB.

Sounds

The PC version uses Fibonacci-delta encoded samples at 6000Hz. The Amiga version uses uncompressed PCM at sample rate (PAULA / 650).

The 3DO version comes with uncompressed 8 bits mono samples at 8000Hz.

Checkpoints

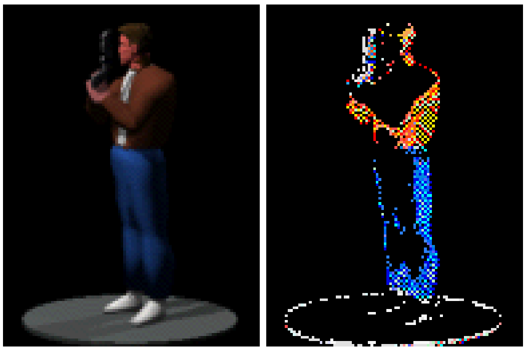
The 3DO version plays a voice sample (‘Game saved’) when the game state has been written. Although there is an existing playSound opcode, the change has been done directly in the engine code when performing a game state save.

```
.text:0000A034     ADR     R1, aGamesave_aif ; "GAMESAVE.AIF"
.text:0000A038     MOV     R0, #66
.text:0000A03C     BL      load_aif

.text:000125DC ; jumptable 00011FC8 entry 104
.text:000125DC     BL      pge_op_saveState

.text:00007328 pge_op_saveState
.text:00007344     MOV     R0, #66    ; gamesave.aif
.text:00007348     BL      play_sound
```

Unused assets

Menu animation

The Conrad animation played in the main menu comes with two encodings. One ‘Uncoded16’ (RGB555) and another one ‘coded8’ (paletted)



Conrad.coded8 is loaded if Conrad.smlanim.Uncoded16 fails

```
.text:00009C4C     ADR     R0, aBootGlobalConr ; "$boot/Global/Conrad.smlanim.Uncoded16"
.text:00009C50     MOV     R1, #0x40000
.text:00009C54     BL      load_cel_anim
...
.text:00009C60     TEQ     R0, #0
.text:00009C64     BNE     return
.text:00009C68     ADR     R0, aBootGlobalCo_0 ; "$boot/Global/Conrad.coded8"
.text:00009C6C     MOV     R1, #0x40000
.text:00009C70     BL      load_cel_anim
...
.text:00009C7C     TEQ     R0, #0
.text:00009C80     BNE     return
.text:00009C84     ADR     R0, aCanTLoadConrad ; "Can't load Conrad animation\n"
.text:00009C88     SVC     0x1000E
```

Level music

Background level music can be found in the tunes/ directory. At least with the US version, the music is only played when in demo mode. During regular playback, only sounds can be heard.

Looking at the disassembly, this is seems done on purpose. The code has three checks if a demo file (Demo/DEMOx.TEST) is loaded :

- cutscene playback is disabled
- sounds are not played
- background level music is played

```
.text:00008B28     LDR     R0, =_demoNumTestPtr
.text:00008B2C     LDR     R0, [R0]
.text:00008B30     TEQ     R0, #0
.text:00008B34     BNE     loc_8B40
.text:00008B38     MOV     R0, #0
.text:00008B3C     BL      play_cutscene

.text:00008BBC     ADR     R0, aBootLevelsLe_5 ; "$boot/Levels/LEVEL1.CT2"
.text:00008BC0     BL      load_file
...
.text:00008BCC     LDR     R0, =_demoNumTestPtr
.text:00008BD0     LDR     R0, [R0]
.text:00008BD4     TEQ     R0, #0
.text:00008BD8     BEQ     loc_8BE4
.text:00008BDC     MOV     R0, #2
.text:00008BE0     BL      play_music
```

Patching the executable (eg. by changing the BEQ instruction to a NOP) enables playback of both background music and sound effects during game play. A playthrough of the first level shows no major glitches. It is unclear why the feature was conditioned.