FF7/Battle/Battle Scenes

< FF7 | Battle

Contents

Introduction

Scene.Bin file format

- Overview
  - Japanese format
- General file format
- Data file format
  - Battle Setup 1 format
  - Camera Placement Data format
  - Battle Formation Data
  - Enemy data format
  - Formation ID
  - AI Data
  - Binary "Cover Flags"

Useful downloads

Introduction

FF7 keeps each enemy battle configuration is a file called "scene.bin" This file is located in the following directories.

PSX Version	PC Version
/DATA/BATTLE/SCENE.BIN	/BATTLE/SCENE.BIN

This file is exactly the same in both versions. This holds all the battle configurations for all enemies encountered in the game.

Scene.Bin file format

Overview

The scene.bin file contains 256 gziped files which give us information for all the FF7 monsters. In order to find these files in scene.bin, you have to know that the file is structured with blocks exactly 0x2000 bytes in length. In the first table (scene.bin block), you will see what contains a block. Blocks are concatenated with each other to form the scene.bin file. So if you want to extract data from scene.bin, you'll need to find the correct blocks and to extract the gziped files from it. After that you simply ungzip those files and you'll find 256 files, with a length is 7808 bytes. Known information about those files can be found in the second table (The Data File specification). Because extracting file manually would be a pain, several tools was developed in order to help you. You can use Scene Reader (http://spinningcone.com/ff/stormmedia/projects/SceneReader.zip) for example, it's a win32 tool to extract and repack scene.bin archive.

Also note, that in kernel.bin there is a look-up table for scene.bin, which tells how many files there are in each section of scene.bin. You need to update it every time you repack the file and something changes. The table is at offset 0x0F1C of the third section of the kernel.bin file. You can use SceneFix (http://forums.qhimm.com/index.php?topic=7127.0) program, which'll update the table for you.

We have 1024 possible battle numbers: 0 - 1023. Each group of *4* Battle Numbers refers to a particular Scene file: for instance, Battles 0-3 refer to File 0 in Scene.bin, Battles 4-7 refer to File 1 in Scene.bin, and so forth.

Japanese format

In the japanese scene.bin, ennemies names and attacks names have a size of 16 bytes, instead of 32 bytes.

General file format

Offset	Length	Description
0x0000	4 bytes	Pointer to first data file. You must multiply it by 4 to get actual data file offset. If the pointer is equal to FFFFFFFFh then it means that the end of block has been reached.
0x0004	4 bytes	Pointer to second data file. You must multiply it by 4 to get actual data file offset. If the pointer is equal to FFFFFFFFh then it means that the end of block has been reached.
...		
0x003C	4 bytes	Last pointer, usually it equal FFFFFFFFh.
0x0040	4 * (pointer2 - pointer1) bytes	First data file in block. It's a gziped file. *Note: Sometimes it may finish by 0xFF bytes, because its size must be multiple of 4.*
pointer2 * 4	4 * (pointer3 - pointer2) bytes	Second data file in block. It's a gziped file. *Note: Sometimes it may finish by 0xFF bytes, because its size must be multiple of 4.*
...		
lastpointer * 4	4 * (2000h - lastpointer) bytes	Last data file in block. *Note: There are about 6 to 12 files in each block. Each block finishes by 0xFF bytes, because its length must be 2000h (8192d) bytes.*

Data file format

Offset	Length	Description
0x0000	2 bytes	Enemy ID 1
0x0002	2 bytes	Enemy ID 2
0x0004	2 bytes	Enemy ID 3
0x0006	2 bytes	Padding (always FFFFh)
0x0008	4 * 20 bytes	Battle Setup (4 records) (format explanation)
0x0058	4 * 48 bytes	Camera Placement Data (4 records) (format explanation)
0x0118	6 * 16 bytes	Battle Formation 1 (6 records) (format explanation)

0x0178	6 * 16 bytes	Battle Formation 2 (6 records)
0x01E8	6 * 16 bytes	Battle Formation 3 (6 records)
0x0238	6 * 16 bytes	Battle Formation 4 (6 records)
0x0298	184 bytes	Enemy Data 1 (format explanation)
0x0350	184 bytes	Enemy Data 2
0x0408	184 bytes	Enemy Data 3
0x04C0	32 * 28 bytes	Attack Data (32 records) (format explanation)
0x0840	32 * 2 bytes	Attack IDs (32 records)
0x0880	32 * 32 bytes	Attack Names (32 records, in FF Text format)
0x0C80	2 bytes	Formation 1 AI Script Offset
0x0C82	2 bytes	Formation 2 AI Script Offset
0x0C84	2 bytes	Formation 3 AI Script Offset
0x0C86	2 bytes	Formation 4 AI Script Offset
0x0C88	0 - 504 bytes	Beginning of Formation AI Data (format explanation)
0x0E80	2 bytes	Enemy 1 AI Offset
0x0E82	2 bytes	Enemy 2 AI Offset
0x0E84	2 bytes	Enemy 3 AI Offset
0x0E86	0 - 4090 bytes	Beginning of AI Data (format explanation)

Battle Setup 1 format

Offset	Length	Description
0x0000	2 bytes	**Battle location, as follows:**
		0000h : Blank 0001h : Bizarro Battle - Center 0002h : Grassland 0003h : Mt Nibel 0004h : Forest 0005h : Beach 0006h : Desert 0007h : Snow 0008h : Swamp 0009h : Sector 1 Train Station 000Ah : Reactor 1 000Bh : Reactor 1 Core 000Ch : Reactor 1 Entrance 000Dh : Sector 4 Subway 000Eh : Nibel Caves or AForest Caves 000Fh : Shinra HQ 0010h : Midgar Raid Subway 0011h : Hojo's Lab 0012h : Shinra Elevators

0013h : Shinra Roof
0014h : Midgar Highway
0015h : Wutai Pagoda
0016h : Church
0017h : Coral Valley
0018h : Midgar Slums
0019h : Sector 4 Corridors or Junon Path
001Ah : Sector 4 Gantries or Midgar Underground
001Bh : Sector 7 Support Pillar Stairway
001Ch : Sector 7 Support Pillar Top
001Dh : Sector 8
001Eh : Sewers
001Fh : Mythril Mines
0020h : Northern Crater - Floating Platforms
0021h : Corel Mountain Path
0022h : Junon Beach
0023h : Junon Cargo Ship
0024h : Corel Prison
0025h : Battle Square
0026h : Da Chao - Rapps Battle
0027h : Cid's Backyard
0028h : Final Descent to Sephiroth
0029h : Reactor 5 Entrance
002Ah : Temple of the Ancients - Escher Room
002Bh : Shinra Mansion
002Ch : Junon Airship Dock
002Dh : Whirlwind Maze
002Eh : Junon Underwater Reactor
002Fh : Gongaga Reactor
0030h : Gelnika
0031h : Train Graveyard
0032h : Great Glacier Ice Caves & Gaea Cliffs - Inside
0033h : Sister Ray
0034h : Sister Ray Base
0035h : Forgotten City Altar
0036h : Northern Crater - Initial Descent
0037h : Northern Crater - Hatchery
0038h : Northern Crater - Water Area
0039h : Safer Battle
003Ah : Kalm Flashback - Dragon Battle
003Bh : Junon Underwater Pipe
003Ch : Blank
003Dh : Corel Railway - Canyon
003Eh : Whirlwind Maze - Crater
003Fh : Corel Railway - Rollercoaster
0040h : Wooden Bridge
0041h : Da Chao
0042h : Fort Condor
0043h : Dirt Wasteland
0044h : Bizarro Battle - Right Side
0045h : Bizarro Battle - Left Side
0046h : Jenova*SYNTHESIS Battle
0047h : Corel Train Battle
0048h : Cosmo Canyon
0049h : Caverns of the Gi
004Ah : Nibelheim Mansion Basement
004Bh : Temple of the Ancients - Demons Gate
004Ch : Temple of the Ancients - Mural Room

		004Dh : Temple of the Ancients - Clock Passage 004Eh : Final Battle - Sephiroth 004Fh : Jungle 0050h : Ultimate Weapon - Battle on Highwind 0051h : Corel Reactor 0052h : Unused 0053h : Don Corneo's Mansion 0054h : Emerald Weapon Battle 0055h : Reactor 5 0056h : Shinra HQ - Escape 0057h : Ultimate Weapon - Gongaga Reactor 0058h : Corel Prison - Dyne Battle 0059h : Ultimate Weapon - Forest
0x0002	2 bytes	Upon defeat of all opponents in current formation, begin battle with Formation ID without ending battle scene
0x0004	2 bytes	Escape Counter
0x0006	2 bytes	Unused/Align 'FF'
0x0008	4 * 2 bytes	Formation ID of candidates for next Battle Arena battle. (default of 03E7h)
0x0010	2 bytes	Escapable Flag (Along with other flags)
0x0012	1 byte	Battle layout type (normal, ambush, side). 0-8 types.
		00 - Normal fight
		01 - Preemptive
		02 - Back attack
		03 - Side attack
		04 - Attacked from both sides (pincer attack, reverse side attack)
		05 - Another attack from both sides battle (different maybe?)
		06 - Another side attack
		07 - A third side attack
		08 - Normal battle that locks you in the front row, change command is disabled
0x0013	1 byte	Indexed Pre-Battle Camera position

Camera Placement Data format

48 bytes per Formation

Offset	Length	Description
0x00	12 bytes	Primary Battle Idle Camera Position
	0x0	Camera X Position
	0x2	Camera Y Position
	0x4	Camera Z Position
	0x6	Camera X Direction
	0x8	Camera Y Direction
	0xA	Camera Z Direction
0x0C	2 * 12 bytes	Other Camera Positions in the above format referenced in enemies' animations.

0x24	12 bytes	Unused/Align 'FF'

Battle Formation Data

4 Possible battle formations per scene, maximum of 6 enemies per battle. Each enemy entry contains the following data:

Offset	Length	Description	
0x00	2 bytes	Enemy ID	
0x02	2 bytes	position X	
0x04	2 bytes	position Y	
0x06	2 bytes	position Z	
0x08	2 bytes	Row	
0x0A	2 bytes	Binary "Cover flags"	
0x0C	4 bytes	Initial condition flags. Only last 5 bits are considered.	
		0x0001	Visible
		0x0002	Indicates initial direction facing if players get a side attack.
		0x0004	Unknown
		0x0008	Targetable
		0x0010	Main Script Active

Enemy data format

Offset	Length	Description
0x0000	32 bytes	Enemy's name (completed by FFh bytes)
0x0020	1 byte	Enemy's level
0x0021	1 byte	Enemy's speed
0x0022	1 byte	Enemy's luck
0x0023	1 byte	Enemy's evade
0x0024	1 byte	Enemy's strength
0x0025	1 byte	Enemy's defense
0x0026	1 byte	Enemy's magic
0x0027	1 byte	Enemy's magic defense
0x0028	8 bytes	Element types (8 records): 00h - Fire 01h - Ice 02h - Bolt 03h - Earth 04h - Bio 05h - Gravity 06h - Water 07h - Wind 08h - Holy 09h - Health

		0Ah - Cut 0Bh - Hit 0Ch - Punch 0Dh - Shoot 0Eh - Scream 0Fh - HIDDEN 10h-1Fh - No Effect 20h-3Fh - Statuses (Damage done by actions that inflict these statuses will be modified) FFh - No element
0x0030	8 bytes	Element rates for elements above, respectively (8 records): 00h - Death 02h - Double Damage 04h - Half Damage 05h - Nullify Damage 06h - Absorb 100% 07h - Full Cure FFh - Nothing
0x0038	16 bytes	Action animation index (1 byte each).
0x0048	32 bytes	Enemy Attack ID's (2 bytes each).
0x0068	32 bytes	Enemy Attacks Camera Movement Id for single and multiple targets (2 bytes each). If set this will overwrite camera movement set in attack itself.
0x0088	4 bytes	Item drop/steal rates. These are chances to get items listed in next section. 1 byte per item. If the rate is lower than 80h, for e.g. 08h - then this is a drop item and has 8/63 [63 is max] chance for drop. But if rate is higher than 80h, let's say... A0h, then this is an item for steal, and chances for successful steal is A0h - 80h = 20h = 32/63.
0x008C	8 bytes	This is a list of Item ID's which are described above. 2 bytes per item. FFFFh means no item.
0x0094	6 bytes	Indexes of up to three attacks (2 bytes each) that enemy can perform while manipulated or berserked
0x009A	2 bytes	Unknown data
0x009C	2 bytes	Enemy's MP
0x009E	2 bytes	AP points you receive when you win the battle
0x00A0	2 bytes	Enemy can be morphed into this item. FFFFh if it can't be morphed into anything.
0x00A2	1 byte	Multiplier for back damage. damage = damage * 0xXX / 8.
0x00A3	1 byte	align 0xff.
0x00A4	4 bytes	Enemy's HP
0x00A8	4 bytes	Exp points you receive when you win the battle
0x00AC	4 bytes	Gil you receive when you win the battle
0x00B0	4 bytes	Status immunities
0x00B4	4 bytes	Unknown [Always FFFFFFFFh]

Formation ID

Formation ID is an index to a formation within a given scene. It is the scene index bit shifted 2 to the left plus formation index within the scene.

```
0 1 2 3 4 5 6 7 8 9 A B C D E F
[ - - - - - - - - - - - - - - ] [ ]
       scene index         formation index
```

For this reason, the Formation ID will not exceed 03FFh.

example: Formation 028Dh bit shift two to the right to get scene

```
028D >> 2 = 00A3 (right-most bits are truncated)
```

This is Scene 163 Formation Index is just the ID ANDed with 3.

```
028D AND 3 = 01
```

Formation 1 So this is Formation 1 in scene 163. (SOLDIER:3rd x2)

AI Data

This section contains Battle Script that is executed before or/and during every fight. Every enemy has it's own script, and this script is divided to a number of sections. Each script starts with 32 bytes of header that are divided into 16 parts representing 16 script types. The 2-byte number in any section is an offset relative to the beginning of this 32 byte block that tells the script reader where the script starts for that script type.

Offset	Script Type
0x00	Initialize
0x02	Main
0x04	General Counter
0x06	Death Counter
0x08	Physical Counter
0x0A	Magical Counter
0x0C	Battle End
0x0E	Pre-Action Setup
0x10	Custom Event 1
0x12	Custom Event 2
0x14	Custom Event 3
0x16	Custom Event 4
0x18	Custom Event 5
0x1A	Custom Event 6
0x1C	Custom Event 7
0x1E	Custom Event 8

Its structure and opcodes are described here.

NOTES:

- A monster's total AI size will always be an even number of bytes. If the actual scripts are an odd number, a single NULL (FFh) will be placed before the next monster's AI header (may not be required).
- Battle begins after all characters' Initialize scripts have been run (Players first, then enemies, then formation).
- The only character with "Battle End" is in Cloud's AI. It's meant to lower the character's Love Points with him if he lets them die or he dies with them in the party (not sure which).
- Pre-Action Event occurs on all battle participants prior to any actions performed by any participant regardless of actor or target. This includes all executed 92 commands that have a command index of less than 21h. If any 92 commands are called in this section, the command that caused this script to run has priority.
- The Custom Event sections are not called by any event. They only occur if they are called with the 92 command.

```
60 22 <- command index "Run script"
60 0X <- where X is the script section in hex (eg. X = 8 would call Custom Event 1 since it is script id 08
         [not to be confused with offset])
92
```

- Custom Event 8 is only used on Mystery Ninja (all), Ultimate Weapons in location other than above Cosmo Canyon, Safer Sephiroth, and the final "showdown" between Cloud and Sephiroth. These characters have scripts on them that do not remove them from battle when they are defeated.
- Custom Events 1-7 may not work. (not thoroughly tested)
- The order of scripts executed:

:* Beginning of battle

Pre-Battle (all participants)

- Once a "main-script enabled" enemy's time gauge is full:

Main (Enemy performs action)

- Pre-Attack (If enemy script uses a 92 command with a command index of 20h or less)

Pre-Action Setup (occurs on all participants)

- Post-Attack
  1. Death Counter (If script owner died, execution stops here)
  2. General Counter (Executed by all targets)
  3. Physical Counter/Magical Counter (Executed by all targets depending on damage type)
- Battle ends

Battle End (all participants)

Binary "Cover Flags"

These flags are used in conjunction with row to determine if a target can be selected as the target of a **short-range attack**. The determination of this is worked out in this way: An enemy exists in row 1 and another in row 2. If the enemy in row 1 shares a cover flag with the enemy in row 2 then the enemy in row 2 cannot be targeted until all enemies in row 1 that share a cover flag with the row 2 enemy is defeated. It works like this. Two active enemies exist, A and B.

```
If ((B's row > A's row) and (B's cover flags AND A's cover flags) > 0) then enemy B cannot be targeted by short-range
attacks.
```

for any enemies A and B.

Example:

Consider the Battery Cap x6 battle in the forest between Nibelheim and Rocket Town. Their cover flags (in binary) are:

```
Row 1:       00100
Row 2:    00110 01100
Row 3: 00011 00100 11000
```

The battery caps in row 2 cannot be targeted by a short-range attack until the one in row 1 has been defeated because they share the 0x4 cover flag. Once row 1 has been cleared:

```
Row 2:    00110 01100
Row 3: 00011 00100 11000
```

The battery cap on left in row 2 covers the left two in row 3 because it shares flag 0x4 with the one in the middle and flag 0x2 with the one on the far left. As long as it is active these in row 3 cannot be targeted. Similarly, the battery cap on the right in row 2 shares the 0x4 flag with the middle of row 3 and the 0x8 flag with the far right of row 3 so these cannot be targeted until the right side of row 2 is defeated.
It is also necessary to note that because row 1 does not share any flags with the extreme right and left of row 3, they can be targeted if the corresponding enemy in row 2 is defeated even if the row 1 enemy is still active.
Also of note is that enemies in the same row that share cover flags are not considered.
Only the first five bits may be considered even though the value is stored as a word.

Useful downloads

There are few programs written that will help you edit scene.bin file:

- Scene Reader (http://spinningcone.com/ff/stormmedia/projects/SceneReader.zip)
- SceneEdit (http://www.subfan.pl/mav/SceneEdit.zip)
- Scenester (http://aaronserv.dyndns.org/hosting/qhimmwiki/ramza_scenester_0.5.zip)
- Proud Clod (http://forums.qhimm.com/index.php?topic=8481.0)