

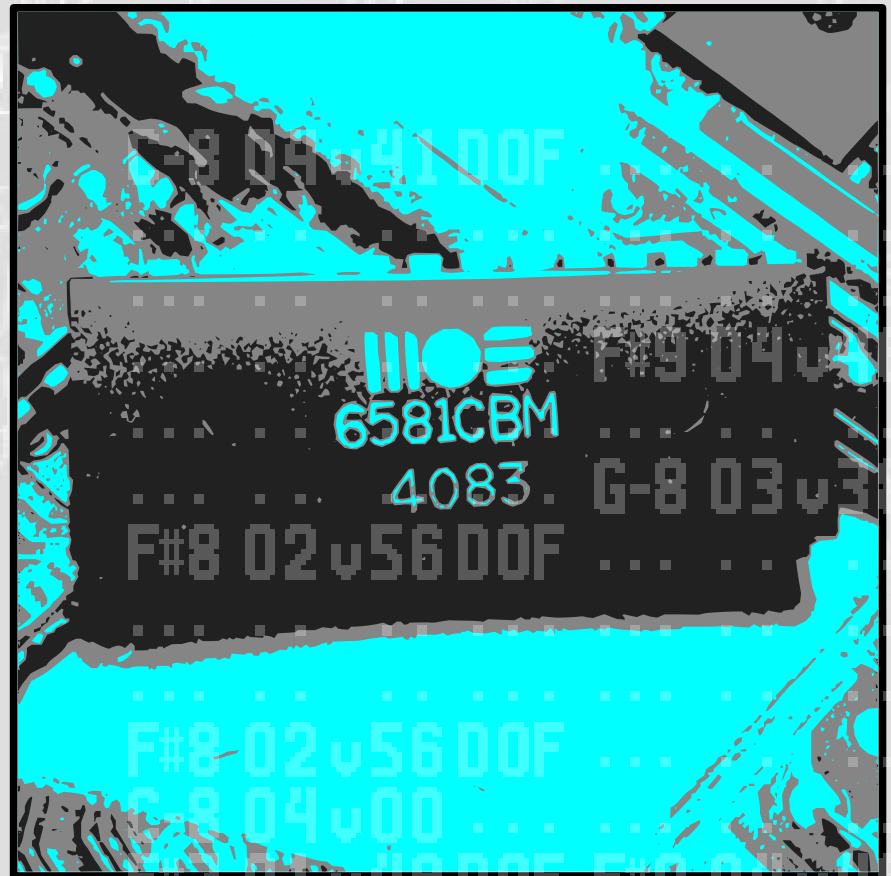
# going old school:

# chiptunes + trackers in games

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# *Retro City Rampage*



<http://RetroCityRampage.com>

# Retro City Rampage

- In Retro City Rampage almost all sounds & music are synthesized from pulse, triangle and noise waves
- Mod tracker allows composer control over parameters, synthesis and samples but is also tricky to learn
- **OpenModPlug Tracker** is free

#0	1: Pulse1	2: Pulse2	3: Tri	4: Noise	5: DPCM
00	C-3 01 .. E33	G-3 01 .. E33	E-2 05 v00RCE	C-2 06 ..	...
01	...	...	...	...	...
02	...	...	v22 R00	#2 06 v64 E00	...
03	...	...	v64 R00	...	...
04	...	...	...	...	...
05	...	...	...	...	...
06	...	...	...	...	...
07	...	...	...	...	...
08	...	...	...	...	...
09	...	...	...	...	...
0A	...	...	...	...	...
0B	...	...	...	...	...
0C	...	...	...	...	...
0D	...	...	...	...	...
0E	...	...	...	...	...
0F	...	...	...	...	...
10	C-8 04 v41 D0F	...	...	...	...
11	...	...	...	...	...
12	...	...	...	...	...
13	...	F#9 04 v46 D0F	...	...	...
14	...	...	...	...	...
15	...	G-8 03 v38 D0F	...	...	...
16	F#8 02 v56 D0F	...	...	...	...
17	...	...	...	...	...
18	...	...	...	...	...
19	F#8 02 v56 D0F	...	...	...	...
1A	C-8 04 v00 ...	...	...	...	...
1B	F#7 01 v48 D0F	F#9 04 v46 D0F	...	...	...
1C	...	...	...	...	...
1D	C-8 04 v41 D0F	...	...	...	...
1E	...	...	...	...	...
1F	...	...	...	...	...
20	...	...	...	...	...
21	...	G-8 03 v38 D0F	...	...	...
22	...	...	...	...	...
23	C-8 01 v27 D0F	...	...	...	...
24	...	...	...	...	...
25	...	...	...	...	...
26	F#8 02 v56 D0F	...	...	...	...
27	C-8 04 v00 ...	F#9 04 v46 D0F	DF2	...	...
28	F#7 01 v48 D0F	...	...	...	...
29	...	...	...	...	...
2A	...	...	...	...	...
2B	...	...	...	...	...
2C	...	...	...	...	...
2D	...	G-8 03 v38 D0F	...	...	...
2E	...	...	...	...	...
2F	...	...	...	...	...
30	...	...	...	...	...
31	...	...	...	...	...
32	...	...	...	...	...
33	...	...	...	...	...
34	...	...	...	...	...
35	...	...	...	...	...
36	...	...	...	...	...
37	...	...	...	...	...

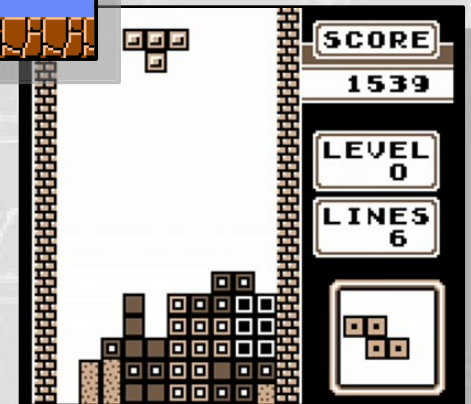
# Chiptune Examples



- Super Mario Bros (Koji Kondo)



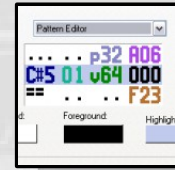
- Tetris ("Hip" Tanaka/traditional)



- "Do it" (Nelly Furtado / Timbaland)



# What is a “Chiptune”?



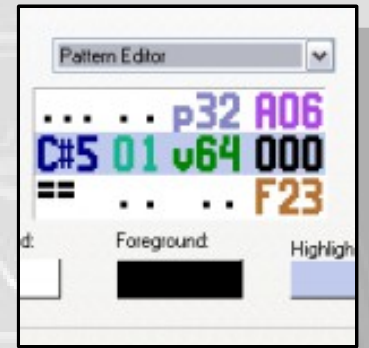
I've proposed<sup>1</sup> three definitions with each being less technically restrictive:

1. **Hardware** – A song made on a “classic” sound chip such as the NES Ricoh 2A03/07 or the C64 6851/8581
2. **Nostalgia** – The song follows the rules of a specific sound chip to preserve one's nostalgia of that chip
3. **Aesthetic** – A song has that “chiptuney” sound but not as restrictive as the above so this includes “fake bit”

<sup>1</sup> See “For the Love of Chiptune” chapter in the *Oxford Handbook of Interactive Audio*



# Why Tracker Music?



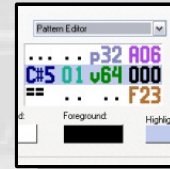
- Great for small download / RAM sizes
- Easy on the CPU & good for web
- Trackers can use samples of real instruments (SNES)
- “Open source” so others can learn & modify your score
- Fun and nostalgic in that it reminds us of simpler times
- You want a more mechanical sound & synthesis
- Great for adaptive music since instruments, effects, tempo and notes can all be changed on playback
- Composer is willing (& able) to chiptune

# Why No Tracker Music ?

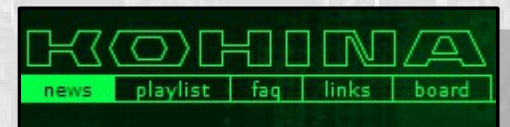
- Samples are great at capturing human performance
- You want an organic sound with acoustic instruments
- “Big production” music such as orchestral music
- When storage space is not an issue
- You want to avoid sounding like MIDI (ex. quantized, lower quality instruments & effects)
- You want to use long audio streams and avoid RAM
- You're short on time – good tracker music is difficult
- Composer can't (or won't) chiptune



# How to start ?



- Download OpenMPT, look through the example songs and read the very detailed online help files
- Read OpenMPT Offline Help [Manual](#) (200 pages!)
- Join the forum at [ChipMusic.org](#)
- Listen to [Kohina.com](#) and other online stations
- Buy a Gameboy, buy a flash ROM cart & do [LSDJ](#)
- Download [Famitracker](#) to do NES songs
- Try out [GoatTracker](#) for Commodore 64 songs
- + many, many more ways.. :)

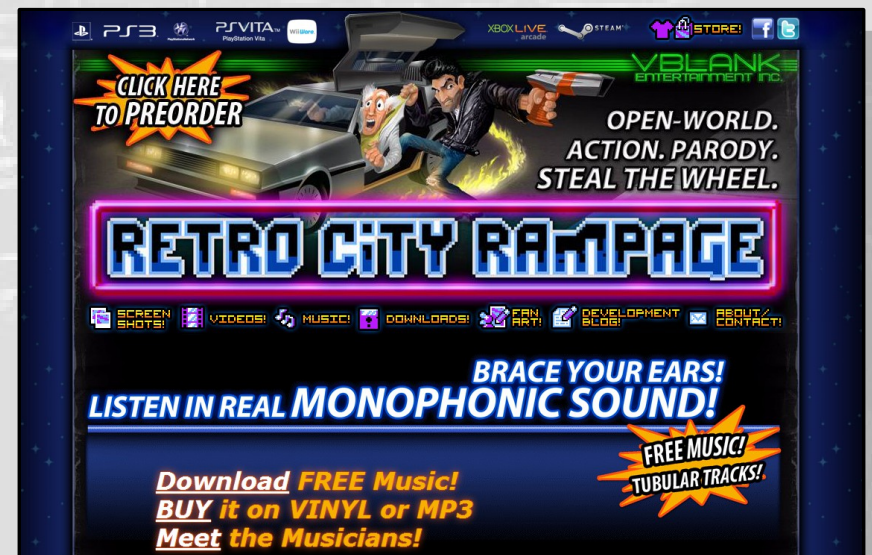




# Download the RCR Theme



- We've released the [source](#) to the theme music of Retro City Rampage
- It is in .it (Impulse Tracker) format which works best in OpenMPT
- Have a look through the tasty details by [virt](#)
- Stems are on [SoundCloud](#)
- [MIDI](#) file available too
- All good for remixing..!



# Ahh the details...

#15	1: Pulse1	2: Pulse2	3: Triangle	4: Noise	5: DPCM
66	F-5 01	C-3 01v44	F-4 15		C-5 22 SD2
67				S00	
68	F#5 01	C-5 01v44	F-5 15	A-5 24v40	D-5 22
69	G-5 01			S00	
70	F#5 01	A#4 01v44	D#5 15		C-5 22
71				S00	
72	C-6 01	F#4 01v44	B-4 15	G-5 24v20	C-5 22
73				S00	
74	F#5 01	C-4 01v44	F-4 15		C-5 22
75				S00	
76	C-6 01	C#4 01v44	F#4 15	A-5 24v40	D-5 22
77				S00	
78		F#3 01v44	B-3 15		C-5 22
79	H00			S00	
80	H00	C#4 01v44	F#4 15	G-5 24v20	C-5 22
81				S00	
82	H00	C-4 01v44	F-4 15		C-5 22
83	H00			S00	
84	F#5 01	A#3 01v44	D#4 15	A-5 24v40	D-5 22
85				S00	
86	C-6 01	C#4 01v44	F#4 15		C-5 22
87				S00	
88	F#5 01	C-4 01v44	F-4 15	G-5 24v20	C-5 22
89				S00	
90	F-5 01	A#3 01v44	D#4 15		C-5 22
91				S00	
92	D#5 01	G-3 01v44	C-4 15	A-5 24v47	D-5 22
93				S00	A-5 23 SD1
94	C-5 01	F-3 01v44	A#3 15		E-5 23 SD2
95				S00	
96	G-5 01	G-3 01v44	C-4 16	C-5 24v40	C-5 22
97		F-3 01v44 SD1	A#3 16		SD1
98	D#5 01	G-3 01v44 SD2	C-4 16	SD2	C-5 22 SD1
99				SC2	
100		A#3 01v44	D#4 15	A-5 24v40	D-5 22
101	C-5 01				SD1
102					C-5 22 SD1
103					
104	F-5 01	C-4 01v44	C-4 16	C-5 24v40	C-5 22
105		A#3 01v44 SD1	A#3 16	SD1	C-5 22 SD1
106	C-5 01	C-4 01v44 SD2	C-4 16	SD2	C-5 22 SD2
107				SC2	
108	D#5 01	A#3 01v44	D#4 15	A-5 24v40	D-5 22
109					
110	F10				
111					
112	D#5 01	C-5 03v30 J00	C-4 15	G-5 24v40	D-5 22
113				S00	D-5 22 SD1
114		C-6 03v30 J00	C-5 15	G-5 24v30 SD2	C-5 22 SD2
115				S00	
116	H8F	C-5 03v30 J00	C-4 15		C-5 22
117	H00			S00	G-5 24v40 SD1
118	H00	A#5 03v30 J00	A#4 15		C-6 23 SD1
119	H00			S00	C-6 23 SD2
120	H00	C-5 03v30 J00	C-4 15	G-5 24v30	F-5 23
121	H00			S00	F-5 23 SD1
122	H00	A-5 03v30 J00	A-4 15	A-5 24v40 SD2	A-5 23 SD2
123	E10			S00	
124	E00	C-4 03v30 J00	C-4 15		A-5 23
125	E00			S00	D-5 23 SD1
126	E00	A#5 03v30 J00	A#4 15		D-5 23 SD2
127	E00			S00	

- Pattern 15: 0:53-0:57 seconds into the song
- Lead guitar on Pulse1
- Second guitar on Pulse2
- Bass on Triangle
- Hi-hat & snare on Noise
- Kick, snare & toms on DPCM
- Plenty of arpeggios (J00)
- Tripplets (SD1 & SD2)
- ... + plenty more details!

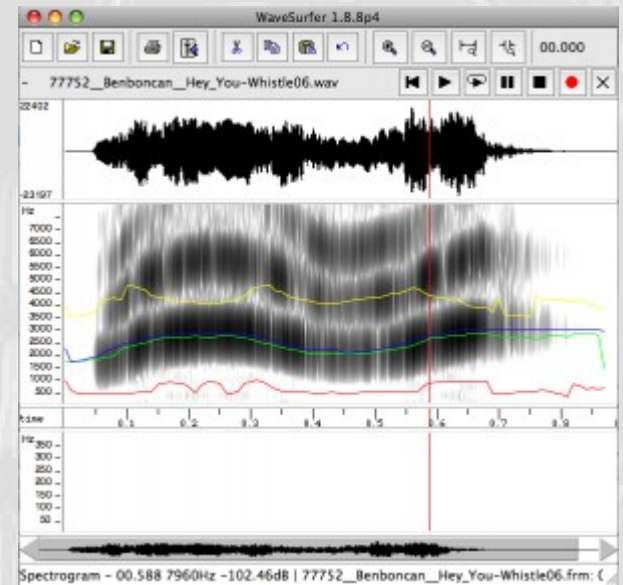
# Chiptune Sound effects?



- We've released some RCR sound effect sources and have a whole article on how they were created on [CreatingSound.com](http://CreatingSound.com)
- Sounds are made exactly the same as the music but less “music-ish-ly”

# RCR Tracker Sound Effects

- Spectral analysis of existing sound effects and approximate using synthesis of NES (additive synthesis)
- Decompile existing NES .nsf (Nintendo Sound Files) and reconstruct
- Capture the feel of the NES sound rather than being stuck in technical details



# Chiptunes in Your Game



- You can download the OpenMPT [tarball](#) & compile directly under VS 2012
- Open source code is easy to review
- You can use [FMOD](#) to play back tracker files
- [Unity3D](#) can play tracker files too
- Free playback code for Famitracker (NES) songs
- Plenty of web player options as well:
  - [Flod](#) (HTML5/JS/AS3)
  - [Hxmikmod](#) (Flash 10)



# Advanced Uses

- You can use it for adaptive music by muting tracks, changing tempo/instruments/fx/etc..
- Synchronized meta data can easily be added to songs (or sfx) to allow game to sync with specific hits in the music or to do visualizations defined by composer
- The addition of extra commands can enable behaviour changes such as randomization between patterns (branching) or even the insertion of scripting into the patterns themselves
- Can use as an open multitrack format
- Custom software synths and effects can create a more convincing songs similar to temp MIDI scores

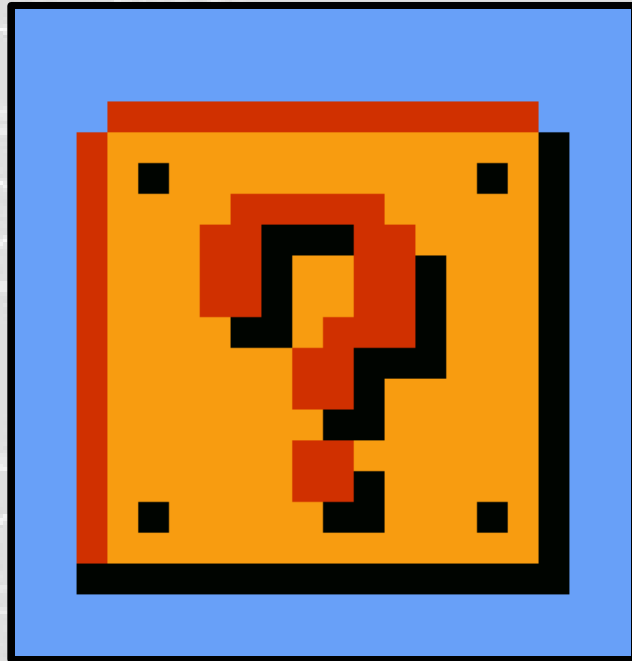
# Games → Make your Own :)

- 2012/13 – *Retro City Rampage*



RetroCityRampage.com

# Questions?



# Contact

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