# GENNY V.1.1


*Updated November 24th, 2019*

**Contents**



## 1. Downloading and Installing GENNY

Thank you for downloading your very own copy of famous Sega Genesis/Megadrive

YM2612/SN76489 chip emulator plugin GENNY! If you found this PDF online and haven't in fact downloaded it yet, you can get it from here:

http://www.wonthelp.info/genny/viewtopic.php?f=4&t=2

Installing GENNY is pretty easy- First you'll need a DAW, which is a bit of software meant for making music. There are some pretty decent free ones, LMMS (or Linux Multimedia Studio, which in fact runs on Windows aswell!) is a good one:

https://lmms.io/download/#windows

https://lmms.io/wiki/index.php?title=Working_with_VSTs

Any Windows DAW should work with the VST version of GENNY. If you want to use my absolute favourite DAW, FL Studio, there's a special FL plugin version of GENNY that supports automation and piano roll note bends! FL Studio is available as a free trial, but unfortunately it costs money for the full version... But, you by no means need to get FL Studio to enjoy the full benefit of using GENNY, the VST has basically all the same features and works just fine!

**Installing VST version -** Download and unzip 'genny_vst.zip' . Inside you'll find two files, 'Genny.dll' and 'Genny_x64.dll'. These are VST2 dlls, which will need to be copied to your VST folders before you can use them. Refer to your DAW preferences to find the locations where it looks for VST files. Typically there are seperate folders for 32 bit and 64 bit versions of plugins. Two common locations are:

*C:\Program Files (x86)\VstPlugins* (32-bit, put 'Genny.dll' here)

*C:\Program Files\Common Files\VST2* (64-bit, put 'Genny_x64.dll' here)

Now refresh the plugin list in your DAW and you should be able to select GENNY!

**Installing FL version -** Download and unzip 'genny_fl.zip'. Inside you'll find an installer, and a folder with 2 dll files ('GennyFL.dll' and 'GennyFL_x64.dll'). If you only have one version of FL Studio installed, you should be able to just run 'install.bat' and it will notify you of a successful install.

If you have multiple versions installed, or for some reason or another the install doesn't work it's OK! You can manually install the files. First, navigate to the 'Generators' folder inside your

version of FL's install directory. For example, in FL Studio 11 it's typically located here:

*C:\Program Files (x86)\Image-Line\FL Studio 11\Plugins\Fruity\Generators*

Now, just create a new folder inside it called 'GennyFL', and paste both 'GennyFL.dll' and 'GennyFL_x64.dll' into it. You should now be able to refresh your instrument list in FL and see the plugin.

# 2. Basic Usage

Once you load the plugin, you should immediately be able to press keys and hear it play notes with its '2019 Bass 01' preset (Provided your DAW supports keyboard play functionality!). This document will teach you a bit about FM Synthesis, and about using GENNY in general but it's by no means complete or acedemic. It's meant as a simple overview for the curious!

**Pond Frog**

Throughout this documentation, because I like that sort of thing, Pond Frog will show up to teach you simple excercises that can help you learn how to use GENNY and FM Synthesis in general! If you want to get started as quickly as possible and you don't much care about the technical details, just skim through this doc and read only the Pond Frog sections.

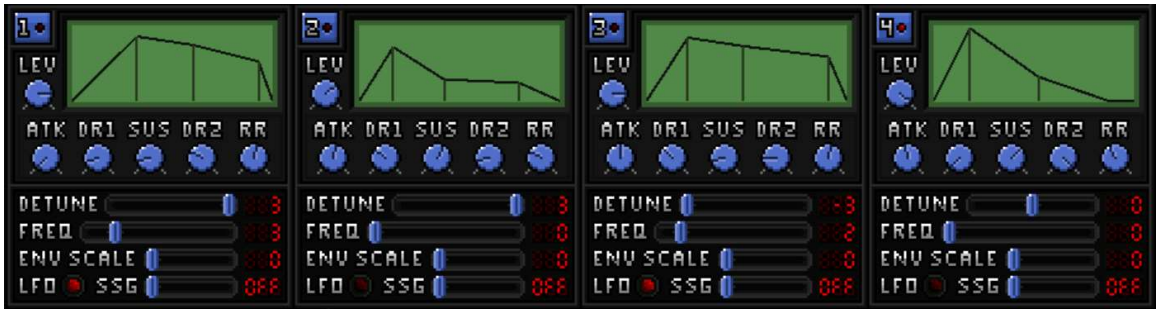
But, if you're interested in a bit of technical stuff, don't just skip the Pond Frog sections either. There's good stuff in there!

**The Synthesizer - A Very Basic Introduction to FM Synthesis**

The plugin primarily emulates the YM2612 chip found inside of the Sega Genesis/Megadrive game console. It uses a process called FM Synthesis to generate sound, which basically means it smashes a bunch of enveloped sine waves together to make something crunchy. I'm not going to go into the teeny details of how to program GENNY in this document, but if you fiddle with the knobs in time you'll understand what they do! But, there are a few good places to start if

you want to get a feel for what the controls do and why.

**Operators**




In FM Synthesis, a number of wave forms are combined in some way to create the final sound, and each one of these wave forms is called an *Operator.* The YM2612 has 4 operators, each one is represented by a numbered graph in GENNY. Each operator is basically a Sine wave affected by a simple volume envelope, and they can be either a *Carrier* (One that generates sound) or a *Modulator* (one that modifies the sound of the *Carrier*). We'll learn a bit more about what that means in the Algorithm section.

**Quick Operator Lesson - Try it out!**

As an introduction to operators, we'll learn a useful way to use the LEV knobs:

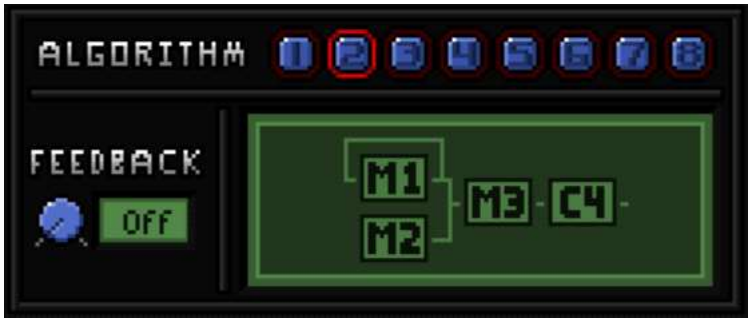

LEV knobs control the volume of each of the Carrier/Modulator waveforms, and changing them usually has an obvious effect on the sound of the instrument. Often you'll find that one of the knobs boosts or reduces distortion, makes the sound softer, or brings in some more complex waveforms to make the instrument sound fuller. You can usually come up with great new sounds tweaking only the LEV knobs!

For an example, open up GENNY and select the 'Comix Guitar 01' preset. Now, while

playing notes, reduce LEV knob number 3. Notice how the knob functions like a distortion knob on a real guitar- pretty cool!! Later you could even automate the knob or hook it to a controller and use it like a virtual pedal board when you're rocking out with your FM axe.

**Algorithm**

One great way to get interesting sounds without making too much of a mess, is to change the Algorithm:



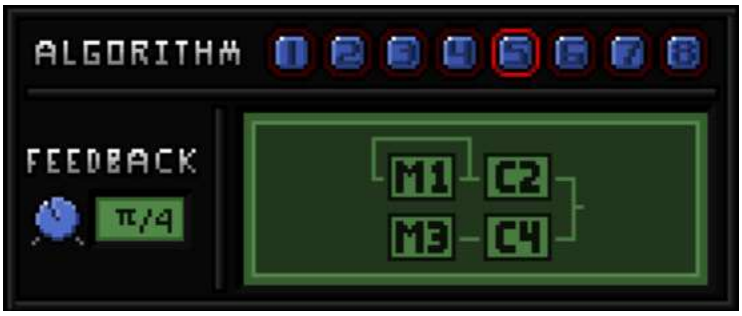

This tells the FM core how to modulate together the different wave forms.

The little diagram below the Algorithm selector, shows what configuration the 4 Operators are in. M means the wave is a Modulator, and C means it's a Carrier. The Carrier wave is the one that actually makes the sound, and the modulators don't make sound on their own but modify the carrier in some way.

**Quick Algorithm Lesson - Try it out!**

For an experiment, select Algorithm number 1. Try tweaking LEV knob 4 while playing notes- Then try clicking through the algorithms in order and pay attention to how LEV 4 affects their sound.


It's pretty much a volume control knob with algorithms 1 to 4! That's because algorithms 1 to 4 only have ONE Carrier (C is for Carrier in the diagram, and they all have C4. In FM Synthesis, the Carrier is the part that generates the sound!) But, with algs 4 to 8 the LEV 4 knob changes the sound, but doesn't exactly make it quieter. Let's take a look at the algorithm chart for number 5:




Notice how Algorithm 5 has 2 operators labeled as 'C'. That means there are 2 Carriers in this algorithm, so Operators number 4 AND 2 are both making sound. If you turn down 4 all the way, you'll only hear the sound produced by number 2 and visa versa.

By default, most GENNY presets are set to treat operator 4's LEV value as the volume level, so if you play notes more softly GENNY will automatically multiply LEV 4 by the velocity of your notes. As we've just learned, this method only works correctly for operators 1 to 4, and if I had any idea what I was doing when I first implemented the velocity system I really should have made it automatically adjust the levels of all Carrier operators by default! Luckily though, this is where the little lights on the operator numbers come in-


They're actually velocity enable buttons! When clicked on, the LEV value of each selected operator will be multiplied by the velocity of your notes. So if you have an instrument that doesn't behave correctly at different note volumes, try changing these boxes. You can also create some cool effects by only affecting one of the Carriers, or by affecting a modulator instead! Rewind to the Comix Guitar example- you could disable operator velocity 4 and enable

it on 3 instead, to make note volume work as distortion level. The dream is to one day allow all controls in GENNY to be configured as velocity controls, and define complex curves to make some really interesting velocity effects. One day I even want to let low velocity be defined as one preset, and high velocity be another, mixing 2 presets together as you change the volume of your notes. That would be awesome!

**Quick FREQ Lesson - Try it out!**

You may have noticed that each operator has a slider called FREQ. This is short for Frequency, it sorta represents the octave of the sine wave the operator generates.

For an experiment, select the 'Toejam Bass' preset near the bottom quarter of the list. It's a very funky and familiar preset! With it selected, try playing notes, and change the FREQ slider in Operator 1 from '1' to '0'


Notice how the sound gets lower, and more 'Bassy'? That's because you're lowering the frequency of the first operator, which is feeding into the other operators to generate the sound. Now try changing FREQ to '2' and notice how the pitch gets higher. Try changing the FREQ value on the other operators! Fiddling with the FREQ slider is a good way to get a feel for how each operator is mixing into the final sound, and is a simple way to help you change the range of an instrument!

**Instruments and Presets - Making a Song**

At the heart of GENNY, is the big LCD in the middle where you select presets and set up how each instrument interacts with the hardware.

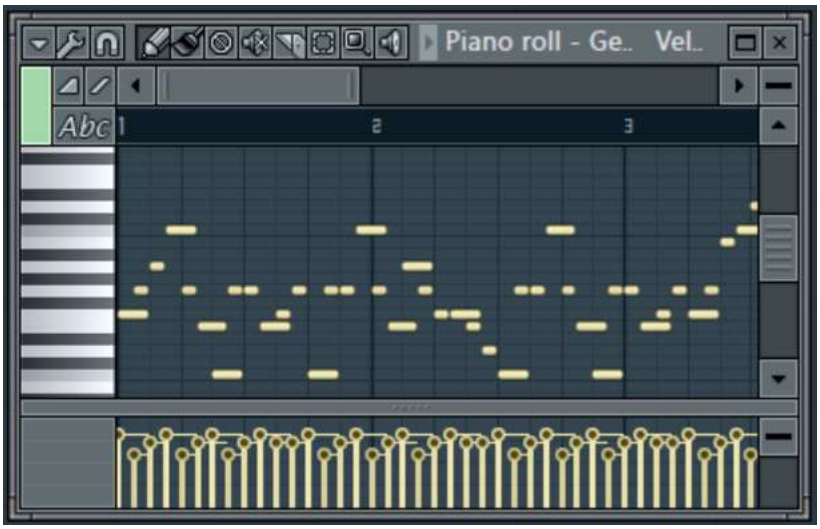

GENNY is designed to be used in on of two ways- Either as a single instrument where you'd load a dozen instances of the plugin into your DAW to make a song, or as a whole ensemble of instruments where you load a *single* instance of GENNY, and play multiple sounds through it to make authentic Sega Genesis music. Single instrument mode is simple enough, just load it up and select a preset- you're done! Multiple instrument mode is where the true power of the plugin comes out, and that's what we'll be learning about here.

Note that if you finish a song using only one instance of GENNY, you can use the VGM dumping features or listen to your song through the MEGA MIDI hardware. This allows you to hear your song played back on an honest-to-goodness Sega just like the OL' days.

To add a new instrument, press the '+' button next to the Instruments tab in the top left. By default it will be set to play notes on all 6 FM channels, and to respond to notes played on MIDI channel 1. In order to play multiple instruments through one instance, you'll need to set the instruments to respond to different channels, and send them midi notes accordingly.

**Playing Different MIDI Channels in FL Studio**

This is pretty easy in the FL Studio version:




If you click the colored square next to the 'Abc' button, you'll be presented with a choice of 16 colors. Each color corresponds to a MIDI channel, so all you have to do is set an instrument to channel 2, then pick color number 2 to play it. This will also affect which channel your keyboard input is playing on too, so be careful! When you start a new project, you may have to set the color back to 1 in order to hear notes played on a new instance of GENNY.

**Instrument Settings**


The CHANNELS section lets you select which YM2612 channels the instrument will play on, which will help you better manage the limited number of channels available when making hardware accurate music. If you have a bassline or something similar that is going to be monophonic, you should usually filter it out to a single channel and filter your other instruments to avoid using that channel so the notes don't cut each other off!

The RNG section can be used to filter notes outside of a certain range, which will allow you to

control multiple instruments with the same MIDI channel. There's a hard limit of 16 instruments that you can add, which will probably be removed in the future.

# 3. Import/Export Instruments and VGM Files


If you're tired of the built in presets, or you want to log a VGM file or save some of your own presets then this is the place to do it. The rundown:

**Import Bank** - Load a complete set of GENNY instruments from a bank or a VGM/VGZ file. Be careful if you're doing this with an existing project, it will overwrite existing instruments with complete disregard for which ones you're a fan of. Don't worry though, adding a new instance of the VST will restore the built in presets.

**Export Bank** - Pretty easy guess, this exports all GENNY's current instruments as a bank.

**Load State -** Loads the entire plugin state from a file, you can use Save state to save the entire state of the plugin, so you can load it into other instances when duplicating your setup between projects.

**Save State -** Saves the entire state of the plugin.

**Import Instrument -** Import an FM instrument from a file, be careful as it will overwrite the currently selected instrument.

**Export Instrument -** Saves the currently selected instrument to a file. Use the GEN format to save drums as well as FM and Square sounds!

**Log VGM -** Allows you to log a VGM file by setting down special logging notes and playing your project.

**Import Tuning -** Import micro tuning files! Not very tested, please let me know on the forums if

it doesn't work right!

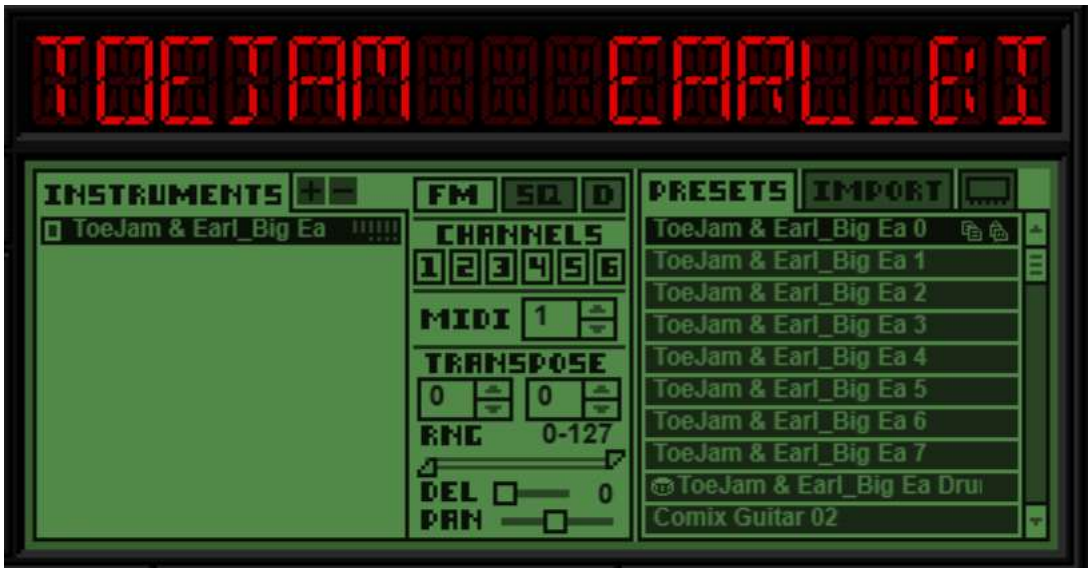
**Instrument Importing from VGM Files - Try it out!**

Have you ever been listening to a song from a Genesis game and thought to yourself "WOW! That brass kicks crunchy FM ASS." ?

Well, GENNY makes it possible for you to get that exact same sound! Let's try it out. First we need to pick a game, I really like the Bass guitar sounds in Toejam & Earl (So much infact that they're already presets in GENNY, so we don't really need to import them but let's try it anyway.) If you're not big on Toejam & Earl you can try a different game! Let's go to Project2612 and download the VGM format soundtrack https://project2612.org/details.php?id=82

Unzip all the songs somewhere, then open up GENNY and go to the IMPORT tab. Press 'Import Bank'


Now, find the song you want to import. Let's do the 'Big Earl Bump'. It might take a second, but when it's done you can go back to the 'PRESETS' tab and scroll to the top of the list to see the instruments that where imported. It even imported the drums!




## 4. MEGA MIDI Hardware Support


**AN IMPORTANT NOTE! Do not use the front USB ports on your computer for the MEGA MIDI. It might work, but I've run into bandwidth issues with the front ports that cause lag when**

**playing DAC drum samples through GENNY. Try to use a rear USB port if possible.**

If you're into that sort of thing, this section is for the truly *hardcore* who want hardware accuracy. An amazing hero of a person named Aidan Lawrence made something called the MEGA MIDI, a USB midi device which implements actual hardware YM2612 and SN76489 chips. It works great, and I've written a version of the firmware that integrates seamlessly into GENNY allowing you to replace the built in emulation sound with actual hardware sound.

But, it's a bit pricey: https://www.aidanlawrence.com/product/mega-midi-5/

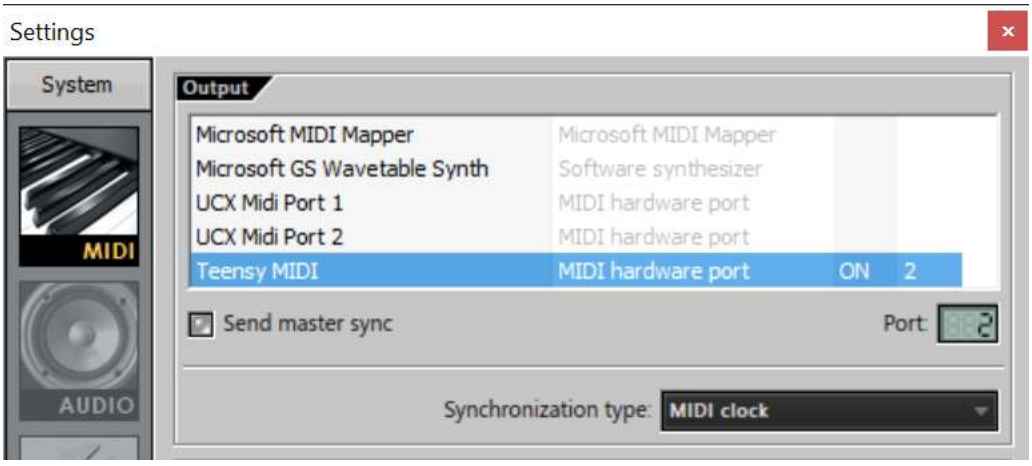
I think he might build them himself, so it makes sense! I suppose the MEGA MIDI is only really for people who are obsessed which is absolutely me so I had to get one.

So, If you're ready for the final frontier of GENNY tech, you'll need one of those and you'll also need a hardware flashing device. That's not as scary as it sounds, they're ~$20 and you pretty much just plug them in and go. This is the one I use:
https://www.dfrobot.com/product-405.html

But any AVR programmer should work! The firmware only works with the latest version 5.0 available on the site currently, though I'm working on support for older versions.

You can get the new firmware from the GENNY forums:
http://www.wonthelp.info/genny/viewtopic.php?f=4&t=2

Once the firmware is installed, plug in your MEGA MIDI and it should show up as a USB MIDI device. Configure an Output port for it in your DAW, I've used Port 2 and this is how it looks in FL Studio:



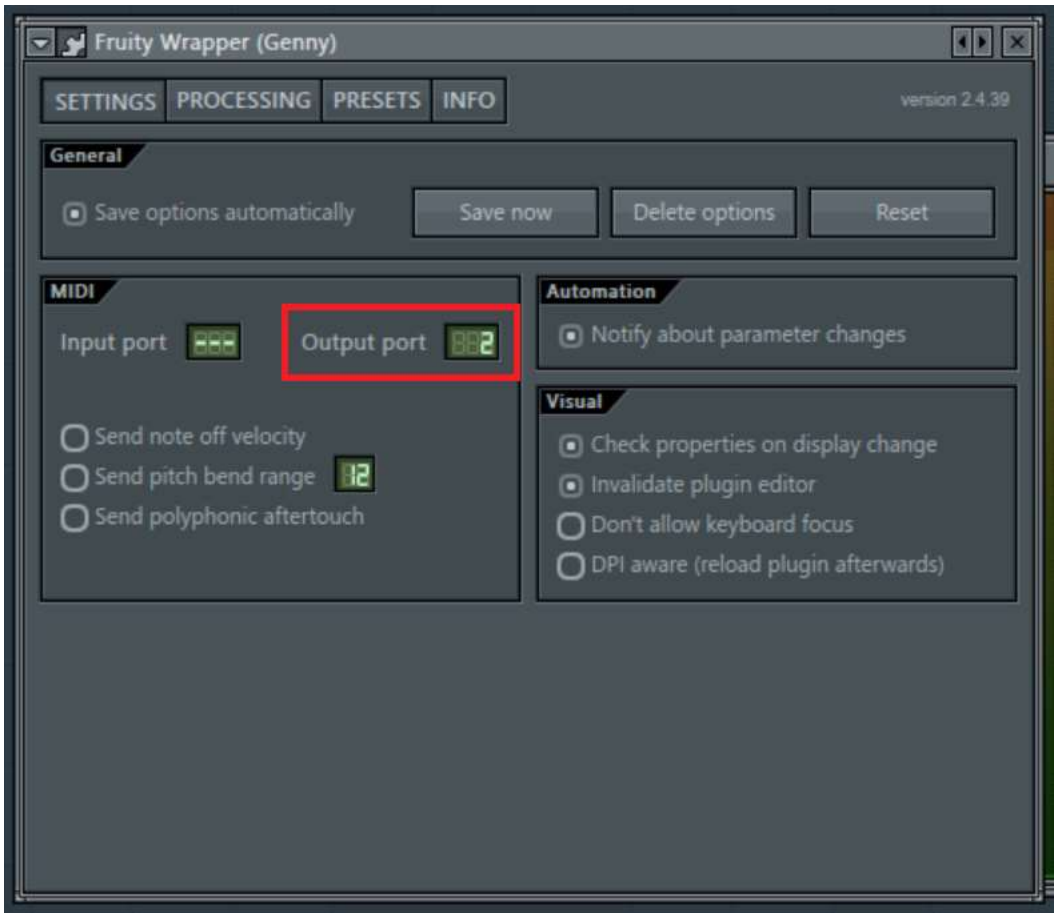
Now load up GENNY and open the chip tab.

**FL Studio Usage**


In FL, there will be a PORT selection on the chip screen. Just set it to the same number you set in the output configuration and you should be good to go. Once you've routed the output from your MEGA MIDI into FL Studio, you should be able to listen to it and go ahead using GENNY like you're used to, only with HARDWARE SOUND!

**VST Usage**


In the VST version, go to the chip tab and check the 'ENABLE' button. You'll also have to configure your VST's midi output port through your DAW to be the same port as your MEGA MIDI. I'm not sure how to do this in other software unfortunately, but in FL you click the Gear in the top left of the VST and set the output port here:




# 5. Thank You!

Thank you for using GENNY! I hope it works well for you and crashes as little as possible. If you run into any issues or have any feature requests please post on the forums and I'll try to help you as quickly as I can:

http://www.wonthelp.info/genny/index.php

I also have a Twitter in case you need more immediate help, or want to send me some music:

https://twitter.com/superjoebob

**Some Credits**

*hiro-shi / Jarek Burczynski / Eke-Eke - Wrote Genesis Plus GX 2612 implementation which I use.*

*The Eighth Bit - Created The Ultimate Megadrive Soundfont, which I use a lot and which helped*

*inspire this VST.*

*Sam - Created VOPM, an excellent YM2151 plugin that also helped inspire me.*

*Yamaha - For creating the YM chips and popularizing FM Synthesis in the first place. (shoutout to John Chowning)*

*spritesmind.net - An awesome Mega Drive / etc development forum filled with incredibly helpful people.*

*Project2612.org and all the wonderful people who run it and upload music there.*

*Tiido Priimägi - was very patient with my lack of knowledge and was my go-to guy for YM2612 questions.*

*Mixer P - For making Mixer's Mega Genesis Drum Pack which is just the best thing.*

*Shout out to Aly James for FMDrive, we happened to independently develop seperate YM2612 VST's at the same time.He was kind enough to reach out to me, and he helped out with a number of chip related questions that helped me to finish GENNY.*

*Thanks to Aidan Lawrence for MEGA MIDI, I LOVE THIS THING!*

*Howard Drossin, John Baker, Tommy Tallarico, Matt Furniss, Masato Nakamura,*

*Masaru Setsumaru, Yuzo Koshiro, Jredd, Yuzo Koshiro, Yuzo Koshiro etc -*

*made awesome Genesis music, are awesome composers, and are all around major influences on my life.*