VERSION 9.0 | April 23, 2025

THIS VERSION INCLUDES SPECIAL CHANGES. PLEASE READ THE FOLLOWING NOTES BEFORE UPDATING

Make Backups ▲

As always, use **Fractal-Bot** in FM9-Edit to back up your System and Presets prior to upgrading.

Updating ▲

You must upgrade the firmware AND the Dyna-Cabs by installing two separate files:
1) Firmware 9.0 and 2) Dyna-Cabs Version 1.07
To install both files automatically, use **Fractal-Bot** from the Tools menu of the latest version of FM9-Edit.
To resolve "Dyna-Cabs Not Installed" or "Dyna-Cabs Incorrect Version", see this article.

FC Settings Update Automatically around new "Multitap Delay 2" block ▲

Firmware 9.0 introduces a second instance of the Multitap Delay block ("MTD 2"), requiring FC "Effect" switches to be updated. This happens automatically the first time you start the FM9 after updating to fw 9.0.

Note: This automatic update only occurs when firmware 9.x (or newer) detects older settings. FC "Effect" switch settings from version 9+ are therefore not compatible with earlier firmware versions. If you downgrade, you must manually review your FC settings or restore a system backup made under your previous firmware.

New USB Firmware ▲

A new USB firmware update (version 1.03) is also available. This is required if you want to use the Send MIDI Clock feature (introduced in 8.01) over USB. The update is available at:
https://www.fractalaudio.com/downloads/firmware-presets/fm9/usb/fm9_usb_rel_1p03.zip

Preset CPU and Factory Presets ▲

This firmware version includes major improvements to sound quality and performance. As a result, some presets now require more CPU. Older Factory Presets may exceed 80% CPU usage, especially on the standard (non-Turbo) FM9. To address this, new Factory Presets have been created for firmware 9.0. These are not installed automatically and must be downloaded separately:
https://www.fractalaudio.com/downloads/firmware-presets/fm9/9p0/FM9-Factory-Presets-9p00.zip

NEW FEATURES & UPDATES

AMP BLOCK UPDATES

- NEW Brit 800 Studio 20 amp model based on a Marshall SC20H.
- Added "Plexi Brown" tone stack based on EVH's amp with a 50K mid pot.
- Updated default Negative Feedback value for Friedman BE/HBE models. On the actual amp, the negative feedback comes off the speaker jack (for some weird reason). Previously the models assumed an 8 ohm cabinet which would make the feedback effectively off the 8-ohm tap. However, the matching cabinet is 16 ohms which results in more negative feedback and a "tighter" tone, so we're now using that as a default value as people seem to prefer that. The models were also "remastered" as a result.
- The Negative Feedback control is now available on the basic "Tone" editing page for the Friedman BE/HBE amp models, since this is also now a control on the actual amp.
- Improved triode modeling algorithms.
- Improved Amp block phase inverter grid clipping model accuracy.
- Renamed "Brit Studio 20" to "Plexi Studio 20".
- Remastered all "PVH" amp models. A soft reset is recommended to load the new default values.

DRIVE BLOCK UPDATES

- Improved PI Fuzz model. The new model also allows changing the type and quantity of diodes used in the transistor feedback paths, adds a "Wicker" switch which removes the feedback capacitors and adds a "Tone" switch which allows bypassing the tone circuitry.
- NEW PI Fuzz – Triangle model. This is based on a 1971 "Triangle" Big Muff PI.
- NEW PI Fuzz – Ram's Head model. This is based on mid-70's "Ram's Head" Big Muff PI.
- NEW PI Fuzz – Russian model. This is based on a Sovtek produced "Civil War" Big Muff PI.
- NEW Colortone OD model based on a Colorsound Overdriver (with added Master control).
- NEW Colortone Booster model based on a Colorsound Power Booster (with added Master control).
- NEW MOSFET Distortion model based on an Ibanez MT10 Mostortion.
- NEW Super Fuzz model based on a Univox Superfuzz. The model also features a tone control for varying the frequency of the notch. Use the Bias control to simulate the "Octave" control found on some clones.
- Added Integral Pre type to the Drive block. This is based on a TC Electronics Integrated Preamp
- NEW Tube Drive 5-Knob model.
- Updated DS1 Distortion model to Second Edition specs.
- Improved Tube Drive 4-Knob model. If you are using this model in a preset a soft reset of the block is recommended to load the new default values.
- Reworked Blackglass 7K model.
- Added 1N5819 Schottky and Yellow LED diode models to Drive block.
- Added "77 Custom OD" based on an MXR M77 Custom Badass Modified OD.

REVERB BLOCK UPDATES

- Improved Reverb block. Reverbs based on real spaces have more natural sounding reflections and are more immersive.

- Improved Spring Reverb algorithms. A soft reset is recommended for these types to load new default values.

- Added Vibrato-King Custom Spring type.

- Added adjustable Q to Low Cut and High Cut in Reverb block.
  Note: The Q only affects the response if the Slope is set to 12 dB/oct.

- Changed name of "Spring Drive" to "Dwell" as this is what is commonly used on spring reverb units. Note that the Dwell control is automatically compensated. Therefore, changing the Dwell will not affect the mix unlike a hardware spring reverb, but it will make the sound more "splashy".

- Rearranged Spring Reverb menu so that most commonly used controls are on the same line.

COMPRESSOR BLOCK UPDATES

NOTE: These changes may affect the sound of your presets and can also add to CPU usage.
  If you use the Compressor block in your presets you should audition them accordingly.

- New Dynami-Comp algorithm:

  - New algorithm accurately models various nonlinearities for faithful reproduction.

  - Added Knee Type to allow varying the knee shape, Tone control (like in various clones), Drive control for overdriving the OTA to add saturation, and new Input/Output graph.

  - A low-CPU version is available with the Econo-Dyno-Comp type.

- New "VCA Bus Compressor" algorithm (replaces "Studio FB Compressor"

  - Based on a VCA feedback design (e.g., SSL Bus Compressor).

  - Dynamic time constants. Extremely fast attack times are achievable as the actual attack time is always less than the programmed time (decreases dynamically). Removed Auto Att/Rel as it is not applicable.

- New Optical Compressor Algorithm:

  - Based on classic optical rackmount compressors. The smooth attack and release characteristics make it ideal for vocals and acoustic instrument sources.

  - Times are "doubly dynamic". The times are dynamic due to the feedback topology of the compressor and the attack and release times of the photocell are also dynamic. The Attack and Release Time controls set the nominal times of the photocell. However, the times will vary with the program level.

  - Whereas hardware optical compressors typically have a fixed compression ratio (usually about 4:1) and a limiting option, this algorithm allows adjusting the ratio from 4:1 to (nearly) infinite.

  - Due to the design of these compressors the minimum compression ratio is 4:1. Any settings below 4.0 will be clamped at 4:1.

  - Rather than input/output gain controls the algorithm allows adjusting the threshold instead which requires less fiddling with the makeup gain.

- The Emphasis control replicates the internal "Limiter Response" adjustment. This control may be on the front panel of some clones and the operation may be reversed depending upon the manufacturer. The Emphasis Frequency control allows shifting the frequency range of the curve.
- The "Drive" control allows overdriving the output stage for added distortion.

- New JFET Compressor algorithm:

  - Based on classic JFET rackmount compressors. Perfect for fattening up your sound and adding grit. Works well as a "finishing" compressor at the end of a chain (usually before time-based effects). Also great for vocals, bass and drums
  - Dynamic time constants. The Attack and Release times are the "native" times of the detector. The actual Attack and Release times will be much shorter (about 5 times). The native range of Attack Time for an 1176 is 0.1 ms to 5.5 ms. The Release Time range is 59 ms to 1.1 s.
  - Due to the design of these compressors the minimum compression ratio is 4:1. Any settings below 4.0 will be clamped at 4:1.
  - Due to the very fast attack times these types of compressors will distort. This is often used for effect. Low frequencies are distorted more.
  - The "Drive" control allows overdriving the output stage for added distortion.
  - Unlike the actual hardware the algorithm's threshold is variable so instead of varying the input and output gains we give you a more convenient method (and Automatic Makeup Gain).

- New JFET Pedal Algorithm

  - Based on pedals with a JFET as the shunt resistor in a non-inverting op-amp configuration.
  - Replaces the JFET Sustainer type.

- New Rockguy Compressor Type:

  - Similar to the JFET Pedal but with dynamic release time and several other enhancements.

- New Tube Compressor Algorithm (now called "Vari-Mu Tube Compressor"):

  - Based on a tube compressor using "remote-cutoff" tubes for gain control. This compressor has big, swoopy compression curves and a warm tone making it useful for adding "glue" to a track or mix.
  - Features dynamic attack times.
  - The actual compression ratio is somewhat nebulous due to the nature of the circuit but, in general, the minimum ratio is about 2:1 and the maximum ratio is about 20:1. The Threshold and Compression controls interact. The graph assists with adjusting the controls.
  - The "Drive" control allows overdriving the output stage for added distortion.

PHASER BLOCK UPDATES

- New "Vibe" algorithm in Phaser block. The default values have changed for the Vibe models and existing presets are automatically updated to the new defaults. If you have edited the default values, you may wish to audition your presets.
- New "Modern Vibe" model based on a classic UniVibe but with modern input buffer and LFO.

- New "LFO Mode" parameter to the Phaser block. When set to UNIVIBE the amplitude of the LFO is roughly proportional to the LFO Rate. When set to NORMAL the amplitude is constant. NORMAL allows deeper phasing at slow rates than would be possible with an actual Univibe.

- New Low Cut and High Cut controls for the wet path.

- Changed "Exponent" parameter name to "VCR Shape"as this is a more accurate description.

OTHER BLOCK UPDATES

- NEW Multitap Delay 2 block instance, allowing two Multitap Delay blocks at the same time.

- Exposed "Algorithm" parameter in the Multitap Delay block. This allows changing the underlying algorithm without changing the various parameters. This can be used to experiment with different algorithms without losing parameter settings as occurs when changing the Type.

- Improved Filter block Touch-Wah detector behavior.

- Improved Sweep Delay algorithm in Delay block, with a new selectable Filter Type control.

- Improved Quad Diffusor algorithm in Multitap Delay block, now with stereo output, adjustable stereo spread, and LFO controlled filters.

- New Tremolo "Ducking" control. This reduces the intensity of the effect as you play louder.

- Improved behavior of Plex and Multitap Delay blocks when changing channels or presets. If the type has changed the delay lines are cleared. If the type has not changed the delay lines are not cleared allowing for spillover between channels. If Spillover is on, the delay lines are not cleared between preset changes if the type has not changed.

- Improved Room modeling in Cabinet block. Mic Spacing is also changed to distance in cm. Default is the ORTF standard of 17 cm. This may change the sound of your presets. Audition your presets accordingly.

- Added new Filter page with graph to the Plex Delay block to assist with editing filter parameters.

- Added "1x12 Scholz" Dyna-Cab. This is a subset of the 1x12 West Coast Classic Dyna-Cab available in our store and is based on a MojoTone™ West Coast cabinet with a 12" Scholz SugarCone™ Classic speaker.
- Added modifier capability to Sensitivity parameter in Filter block (for Envelope Filter and Touch-Wah types).

FIXES

- Corrected internal pedal jacks configured as switches being ignored due to active sensing update.

- Fixed Send MIDI Clock 'USB' can interrupt Fractal-Bot file download.

- Fixed resistor mistakenly attached across drive pot on Plexi 2204 model.

- Fixed Phaser block LFO Reset now working properly for some types.

- Fixed wrong Miller capacitance value in Brit 800 models (probably not audible).

- Corrected AMP graphs in the editor window not redrawing in some cases.

- Fixed Tremolo block graph not working if Rate is set to LFO1 SYNC.

- Fixed wrong capacitor value in OD 250 and OD 250 Gray models.

RELEASE NOTES VERSION HISTORY

VERSION 8.01 | October 11, 2024

IMPORTANT: If updating from a firmware version prior to 8.0 you will need to upgrade to the current Dyna-Cab models which requires you to install two separate files:
1) the main firmware, and 2) a separate Dyna-Cab file. To install both files using automatic download, please use the version of Fractal-Bot that is built into the latest release of FM9-Edit.
https://www.fractalaudio.com/fm9-edit

IMPORTANT: An optional USB firmware upgrade (version 1.03) is included with this update. To use the MIDI Beat Clock Send option via USB you must be using USB firmware 1.03 or newer. Use Fractal-Bot to send the USB firmware update file to the FM9.

NEW FEATURES & UPDATES

EFFECT BLOCK UPDATES
·   **Filter Block Updates**
Added a **Touch Wah** type to the Filter block. This is similar to the Envelope Filter but uses a different type of detector and voltage-to-frequency converter. This type can be used to create interesting touch-sensitive filter sounds. It can also be used to replicate the Korg A3 Touch Wah sound as follows:
    - Set Mode to MIX
    - Set Start Freq to maximum. Set Stop Frequency to minimum.
    - Start with a fairly high Attack Time, around 500ms.
    - Set Release Time to around 200ms.
    - Adjust Sensitivity to taste.
·   Added the **Auto-Wah** type to the Filter block. This is based on the same "circuit" as the Envelope Filter but replaces the detector with an LFO.
·   Added LFO Tempo control to the Filter block.
·   Improved the Auto-Swell type in Volume block. Added Release time and Hysteresis controls to allow fine-tuning to playing style. Hysteresis controls how much extra the signal must fall below the threshold before the detector releases.
·   Changed the Envelope Follower in the Megatap, Multitap, and Plex blocks to use the same algorithm as the improved Auto-Swell algorithm in the Volume block. The purpose of the Envelope Follower is to generate volume swells.
·   Added Crossfade Time control to the Crystal Echoes type in Pitch Block.
·   Improved pitch shifting.
·   New **Lush Spring** Reverb type added.

· New **Sample/Hold Delay** Plex Delay type added.

<u>OTHER UPDATES</u>

· Added a **Send MIDI Clock** option. This can be configured to send MIDI beat clock messages to MIDI, USB or both (or off). The default setting is MIDI only. NOTE: USB Firmware 1.03 or greater is required to send MIDI Clock over USB.

· Added a selectable **Receive MIDI Clock** option. This can be configured to receive MIDI beat clock messages from MIDI or USB (or off). Default is MIDI.

· Added activity sensing to internal pedals, FC pedals and external controllers. This stops Auto-Engage from activating an effect if the pedal/controller is not connected. This prevents, for example, a Wah being engaged if Auto-Engage is on but no pedal is connected (i.e., you left your expression pedal at home).

· Improved tuner. The new algorithm is faster and more accurate.

· Added selectable Tuner color theme.

· Added date and time to the version information returned to FM9-Edit. This obviates the need to manually select "Refresh After New Firmware" if updating from beta releases (requires updated FM9-Edit).

· Now when loading a preset that was created using a previous firmware version the preset number will be shown in inverted text on the large font home GUI. This indicates that the preset needs to be saved under the current firmware to update it for compatibility with "Gapless Changes – ALL". Presets created and saved with the currently running firmware also load faster in general.

FIXES

· Fixed LFO Phase not working for Vibe modes in the Phaser block.
· Fixed the Copy Out1->Out2 setting not working correctly.
· Fixed the Erase All User IRs function.

VERSION 8.0 | Aug 28, 2024

IMPORTANT: Firmware 8.00 features new Dyna-Cab models and requires you to install two separate files: 1) the main firmware, and 2) a separate Dyna-Cab file. To install both files using automatic download, please use the version of Fractal-Bot that is built into the latest release of FM9-Edit.
https://www.fractalaudio.com/fm9-edit

NEW FEATURES & UPDATES

AMP MODELING UPDATES

·   Improved preamp algorithms, especially for amps with multiple gain stages. Tones are "gutsier" and have a more dynamic response with more "pop". Also improves accuracy when input of Amp block is driven by a Drive pedal (whether real or virtual).

·   New power amp algorithm. The new algorithm more accurately models bias excursion and duty cycle modulation. This results in a more complex tone with better, punchier feel.

·   Improved cathode follower algorithm improves accuracy near onset of clipping. This results in warmer tones at edge-of-breakup and better cleanup when rolling off the volume knob (for amps that use a cathode follower). Due to the new algorithm the "Grid Clipping" parameter has been removed.

·   Improved phase inverter modeling in Amp block. This yields more "weight" and a more open tone when driving the virtual power amp hard (i.e. non-MV amps or MV turned up high).

·   Updated phase inverter parameters for many models.

·   Updated Plexi 100W and 1959SLP models. A soft reset of the Amp is required to load new values.

·   Remastered Vibrato Lux model.

NOTE: The new amp algorithms are more accurate than prior firmware releases. This creates various "artifacts" that real tube amps produce. These include low-frequency intermodulation distortion, "clutter", spitting and other non-ideal behaviors. These behaviors, however, are precisely what gives tube amps warmth, dynamics and character. They go hand-in-hand. Without these, amp modeling sounds sterile and uninteresting.

CAB BLOCK UPDATES

·   Added two new Dyna-Cab types, **2x12 5153 Stealth** and **4x12 5153 Stealth.**

·   Added "**1x12 Friedman**" speaker impedance curve to the Amp block.

EFFECT BLOCK UPDATES

·   **Drive Block Updates:**
    o   Improved Drive block. Remastered most models as a result.
    o   Drive block improvement; replaced fixed clip level value with data from the model itself.
    o   Updated Timothy models to V4 spec.
    o   Updated the Fat Rat model.

·   Fixed a problem that could occur while adjusting Drive level on the Rat model.

·   Added Kill-Dry option to the **Mega-Tap Delay** effect. (See firmware 7 release notes for more on Kill Dry)

·   Improved optical types in **Tremolo** block. Additionally, the LFO Type, Duty Cycle, and Shape are now set to the most appropriate values when selecting the Tremolo Type but may then be changed freely.

·   Reduced CPU usage of **Wah** block slightly.

· New **Envelope Filter** type in the Filter block. This is based on the classic Mutron™ (aka "touch-wah", "auto-wah") effect. Default values match the original pedal but there are also some modern touches:

- The start and stop frequencies are freely assignable.
  For "Down Mode" simply set Start higher than Stop.
- The Sweep Shape knob controls the mapping of the detector to the filter frequency. A value of 0.0 is a linear mapping (like the original). Negative values yield anti-log behavior and positive values yield log behavior, allowing fine-tuning the response.
- The detector source is selectable between the block input or any of the hardware inputs. This allows placing the filter after an Amp or Drive block but using the instrument input as the source.
- A meter makes it easy to adjust sensitivity to match your guitar and playing dynamics.

FIXES

· Cabinet Dyna-Cab Mic position default values updated to match Axe FX III. Double-click on mic position; controls in FM9-Edit now successfully reset to default.
· Fixed pops/clicks that could occur when changing Preamp Type and Mode in Cabinet block.
· Fixed pops/clicks when using Stack/Hold in Plex Delay.
· Fixed pops/clicks when adjusting the Rat Distortion drive level.
· Layout links will now execute properly for per-preset switches that change the current preset.
· Fixed stand-in switch Tap functions not working in some cases.
· Fixed wrong capacitor value in Band-Commander model.
· Fixed missing PI grid stopper resistor in Comet 60 and Comet Concourse models.

VERSION 7.00 - April 15, 2024

NOTE 1: The FM9 supports DynaCab speaker simulation, introduced in firmware 5.0. If you are upgrading from firmware 4.x or older, you will also need to install the DynaCabs update. If you already installed the DynaCabs update with 5.0 or newer you do NOT need to reinstall it as there have been no changes. If you see a message about DynaCabs not installed, please see this article:
https://support.fractalaudio.com/en-US/how-to-resolve-dyna-cabs-not-installed-or-incorrect-version-286538

NOTE 2: This version comes with updated factory presets. Differences include updated amp parameter values already saved (see below), controller LFOs updated in a few cases, and CPU level reduced on "Poltergeist Pig". Find them here.

NEW "CYGNUS X-3" AMP MODELING

Cygnus X-3 is the latest amp modeling technology for Axe-Fx III, FM9, and FM3. It improves the sound, feel, and accuracy of our amp models, making them closer to their real world counterparts, with more rumble and bite and other nasty things that tube amps do.

- Nearly all amps have been "remastered" using new measurement techniques and analytical methods.

- Improved Preamp, Power Amp, and Output Transformer modeling.

- As a consequence of the new modeling many default parameter values have been changed. Existing presets are automatically updated to the new parameter values upon recall. The updated parameters are:

Preamp Low Cut Freq	*Preamp Bias Excursion*	*Power Tube Grid Bias*
Preamp Hi Cut Freq	*PI Bias Excursion*	*Cathode Resistance*
Triode1/2 Plate Frequency	*Power Tube Bias Excursion*	*Cathode Time Constant*
All Cathode Follower parameters	*Transformer LF/HF*	*Negative Feedback*
Preamp Bias	*Transformer Drive*	*Supply Sag*

NEW FEATURES & UPDATES

- New "Sunrise Splendor" Drive model. The existing model was renamed "Sunrise Splendor Hi-Cut" to note that the switch is engaged.

- New "Class-A 30W Brilliant" Amp model.

- Added "Kill Dry" control to Delay, Multitap Delay, Pitch, Plex and Reverb blocks. When set to ON the dry signal is muted. This simplifies routing these blocks in parallel. When using these blocks in parallel the user can turn Kill Dry on and set the wet level using the Mix control, leaving the Level control at 0dB. This also has the advantage that the wet level is controlled by the global Reverb/Effects Mix, if desired.

- Improved Input block Noise Gate.

- Improved Classic Expander and Modern Expander types in Gate block.

- Input Trim control added for Mesa AMP models.

FIXES

- "Zoom" knob label doesn't interfere w/ edited preset warning message on main GUI screen.

- Modifiers using "External X" source with PCReset 'ON' will not override the stored parameter value in the default preset at startup.

- Corrected errors in Dimension1 Chorus type definition.
- Channel Select ; Previous Channel footswitch function corrected for AMP type.
- Fixed outgoing MIDI and MIDI pass-through messages could become garbled when using MIDI Thru 'ON' setting.
- Fixed wrong Miller capacitance value in Deluxe Verb Vibrato, Double Verb Vibrato, Super Verb Vibrato and all Vibrato Verb models.
- Delayed audio data for effects no longer on the routing grid after a preset change are cleared regardless of Spillover setting.
- Fixed wrong FX loop recovery gain in Suhr Badger models.F
- ixed global settings not recalled if MIDI data is present on the MIDI In jack during bootup.

VERSION 6.00 - February 9, 2024

IMPORTANT: Firmware 6.00 includes DynaCab speaker cab simulation technology. If not updating from version 5.00 or higher, this update requires you to install two separate files: 1) the main firmware, and 2) a separate Dyna-Cab file.

To install both files automatically, please use Fractal-Bot (standalone) version 3.00.18 or newer, OR the version of Fractal-Bot that is built into the latest release of FM9-Edit, version 1.02.01, or newer.
https://www.fractalaudio.com/fm9-edit/

NEW FEATURES & UPDATES

- **Gapless Preset/Scene/Channel Switching** : A new parameter in **SETUP > Global Settings > Gapless Channel/Scene/Preset** has three settings; Off, Channel & Scene, and All. For preset changes to use the gapless switching the preset must be saved under the currently running firmware version. To do so, perform a "store" operation on the preset from the FM9 panel using the "STORE" key. Alternatively, use the Save Preset (ctrl + s) function from the FM9-Edit Preset Menu. This is required even if there are no changes made otherwise to the preset. Note that the preset will no longer be compatible with previous firmware versions after the store operation. See the FM9 Firmware Update Guide for how to create backup files before upgrading.
  In addition, the Global Spillover option must be set to "All". When the gapless setting is "All" presets will use the gapless switching when these conditions are met.

- **Improved channel switching speed.** Regardless of the Gapless setting, channel changes – Amp/Cab block in particular — are much improved. This, in turn, improves all Preset and Scene switching times.

- **New Amp Models**

    - JS410 Lead Green
    - Brit 800 2203
    - Brit 800 2204 Low
    - 5153 100W Stealth
    - USA MKV Green
    - USA MK V Red

- **New Drive Pedal Models**

    - "Nobelium OVD-1" Drive model based on a Nobels™ ODR-1. The BC (Bass Cut) switch is modeled via the Bass Response control. Set the Bass Response to 1.0 to duplicate the response of the pedal with the Bass Cut switch engaged.
      Set Bass Response to 5.0 to duplicate response with BC switch disengaged.

    - Sunrise Splendor model based on a JHS™ Morning Glory.

    - Gauss Drive model based on a Mesa™ Flux Drive.

- **New Spring Reverb Algorithm:**

    - New algorithm is based on a digital waveguide with scattering nodes. This algorithm achieves accurate spring reproduction, recreating the iconic "drip" and flutter of classic spring tanks.

    - Added new "Tank Type" parameter. This defaults to the appropriate type based on the model.

        - The first type has all the springs in parallel. This is used by the "British Spring" and "Studio Spring" models.
          This is equivalent to an Accutronics Type 8 reverb tank.

- - The second type has a pair of springs in series, in parallel with one or more pairs of springs in series.
    This is equivalent to an Accutronics Type 4 (four springs) or Type 9 (six springs).

    For this type, the reflection off the junction between the coupled springs is controlled using the new "Scattering" parameter. Vintage Accutronics reverb tanks exhibit more reflection than modern, Asian-made tanks.
  - The "Drip" parameter controls the dispersion of the springs.
  - The various models have different tone controls.
  - Several new models have been added. The Tube Spring model is based on a 6G15 Tube Reverb and has an authentic tone control. Studio Spring is a hypothetical spring reverb with six long springs in parallel.
  - Note that the Modulation parameters have been removed as they are not compatible with the new algorithm.
  - Existing presets using Spring Reverb types are reset to default values. Audition as necessary.

- **New Plate Reverb Algorithm**
  - This updated algorithm captures the dispersion (Star Wars™ laser "pew, pew" sound) and unique stereo imaging of classic plate reverbs. Dispersion is adjustable via the "Dispersion" parameter. Typical plates are around 25-50%. Set to higher values to exaggerate the effect. Stereo imaging is adjustable via the "Pickup Spacing" parameter.
- Added "Pre-Delay Tap" parameter to Reverb block. This selects the input to the reverb engine. When set to OUTPUT the behavior is as before. When set to INPUT the initial delay is absent. This allows more natural "Echo-Verb" sounds. This is now the default for these types of models and existing presets are automatically updated.
- Added "Pitch High Cut" parameter to Reverb block. This can be used to darken the pitch-shifted component of the reverb.
- Updated many of the Reverb models. Existing presets are not affected. Reselecting the model will load the new default values.

- **New Optical Tremolo Algorithm**
  - The Optical Tremolo algorithm used in the Tremolo/Panner block has been completely rewritten and now has three types:
    - Optical Trem 1: based on optical pedal tremolos where "Depth" controls the intensity of the LED.
    - Optical Trem 2: based on optical pedal tremolos where "Depth" controls a "mixer" pot.
      This type has more "throb" than Optical Trem 1.
    - Neon Trem: based on classic "Blackface" amps which use a neon bulb to illuminate the LDR.
  - Note: the "Tremolo" type has been renamed "VCA Trem" and is based on a voltage-controlled amplifier topology.
  - An LFO waveform monitor has been added for appropriate types.

- **Improved Stack/Hold in the Delay block:**
  - Improved transition between Stack/Hold states.
  - In "Hold" mode, repeats are now infinite (or nearly, may degrade over many minutes/hours).
    - Note that if the Compander is enabled and/or Bit Reduction is in use the echoes *will* degrade. If you want infinite repeats, set "Compander" OFF and "Bit Reduction" to zero.
    - Note that the Mono Tape algorithm is inherently lossy (like a real tape) and echoes can still degrade over time.
  - Added "Stack Feedback" and "Hold Feedback" parameters. This allows adjusting the decay time independently for the stack and hold modes.

- **Improved Tape Delay algorithm.** The LFO1 Target and LFO2 Target parameters have also been removed from the Modulation tab as they are not applicable.

- **Improved Tape Chorus algorithm.** The "Number Voices" parameter was removed for this type as it is not applicable.

- **New Controller LFO "Shape" control**. (Controllers>LFO1, LFO2) Based on the new Tremolo LFO, "Shape" controls the shape of the LFO for all types except Square and Random. This replaces the old "Astable Beta" parameter. To learn how this and other LFO parameters interact, watch the Monitor as you make changes. NOTE: Previously, the LFO 'Duty Cycle' parameter had no effect on certain LFO waveform types (e.g., Sine). However, it now does. To obtain the previous default setting, set the Duty Cycle to 50%.

- Improved Intelligent and Noise Reducer gate types in the Input block to eliminate the slight "squeaking" sound as the gate releases when using aggressive settings.

- Added Modifier capability to High Cut parameter in Delay block.

- Changed default values of Speaker Drive and Speaker Thump to better align with measurements of typical speakers.

- Added "2x12 USA C90 Open Back" speaker impedance curve.

- Improved Amp block triode algorithm. Many amps have had their preamp bias points updated. Existing presets are automatically updated upon recall.

- Added "NFB Compensation" switch in Amp block. This defaults to On. Turning it off disables the negative feedback volume compensation at the output of the Amp block.

- Improved speaker compression and amp interaction modeling.

- Improved/Updated the following amp models
  - Brit Silver
  - Fryette D60 models
  - Citrus RV50
  - CA3+ Rhythm/Lead models
  - Friedman BE/HBE models.
  - Recto1 and Recto2 models.
  - USA JP IIC+

- Changed Presence control taper on all 6160 and 5153 amp models to replicate the actual amp. Audition and adjust accordingly.

- Changed Master Volume taper for Recto1 models to agree with actual amp. This will slightly reduce the volume into the virtual power amp. Audition and adjust accordingly.
- Updated all JS410 Lead models based on a current production JVM410HJS. The Crunch models did not require updating.
- Added "Global MV" control to JS410 amp models. Master Volume has been renamed "Channel MV". These two master volume controls can be used to balance the tone into the power amp (as in the real amp). The Channel MV decreases the high frequencies as it is turned down whereas the Global MV is transparent.
- Improved accuracy of TX Star models. Global MV controls have been added as the Channel MV in these amps affect the tone (and interacts with the Presence control).
- Renamed "Brit 800" to "Brit 800 2204 High"
- AMP effect now has 32 less sample times of latency.

FIXES

- Fixed LFO2 not working in Chorus block.
- Fixed wrong Distortion pot taper in DS1 Distortion models.
- Fixed wrong Gain pot taper in Angle Severe models.
- Fixed wrong output pad in USA JP IIC+ Green model.
- Fixed wrong default tonestack in 1959SLP and Plexi 100W 1970 models.
- Fixed attack behavior of Dynamicomp model to strong input signals. Default attack time also adjusted to match reference pedal.
- Fixed wrong PI bias point in Class-A 30W models.
- Fixed several mistakes in Div/13 CJ amp models.
- Fixed several mistakes in Two Stone J35 models.
- Fixed wrong phase inverter bias excursion parameters in Car Ambler model.
- Fixed excessive delay from Pitch block at first use if the Shift and Detune amounts are both 0.0.
- Removed Presence control from Two Stone J35 models Authentic menu because real amp doesn't have one.
- Modifiers set to PCReset 'ON' will not override the stored parameter value in the default preset at startup.

VERSION 5.01 – October 25, 2023

IMPORTANT: Firmware 5.01 includes DynaCab speaker cab simulation technology. If not updating from version 5.00, this update requires you to install two separate files: 1) the main firmware, and 2) a separate Dyna-Cab file.

To install both files automatically, please use Fractal-Bot (standalone) version 3.00.18 or newer, OR the version of Fractal-Bot that is built into the latest release of FM9-Edit, version 1.02.01, or newer.
https://www.fractalaudio.com/fm9-edit/

UPDATES

- Added safeguards to prevent Cab-Lab from inadvertently disrupting factory cab content.

FIXES

- Corrected a bug that could silence the cab block when switching to DynaCab mode.

- The front panel controls for re-ordering Songs in a Set List now work correctly for all Set Lists.

- The tuner now correctly disables the status message when offsets are OFF.

VERSION 5.00 – August 7, 2023

IMPORTANT: Firmware 5.00 is the first version to feature new DynaCab speaker cab simulation technology. This update requires you to install two separate files: 1) the main firmware, and 2) a separate Dyna-Cab file.

To install both files automatically, please use Fractal-Bot (standalone) version 3.00.18 or newer, OR the version of Fractal-Bot that is built into the latest release of FM9-Edit, version 1.02.01, or newer.
https://www.fractalaudio.com/fm9-edit/

NEW FEATURES

Version 5 Introduces Dyna-Cab™ cabinet modeling.

- The Cabinet block now has two modes of operation: Legacy and Dyna-Cab. Legacy is the previous style of operation.

- Dyna-Cab cabinet modeling allows freely positioning the microphone. We took an approach of quality over quantity:
    - Dyna-Cab IRs are 1024 samples.
    - Mic positions are sampled at a fine spatial resolution.
    - Four mic choices are available: Condenser, Ribbon and two Dynamic types.
    - All IRs are time-aligned with each other. They have been processed using a new algorithm that ensures alignment
        without destroying phase information. You can mix-and-match IRs from different cabs/mics and they'll always
        be perfectly aligned.

- The Amp block now features "Auto Dyna-Cab Impedance". When set to ON the speaker impedance curve of the Amp block will follow the Cabinet Type in the first mixer slot of the associated Cabinet block. I.e., if the Cab Type in the first mixer slot of Cabinet 1 is, say, 4x12 5153 and the Mode is DynaCab then Amp 1's speaker impedance will automatically be set to 4x12 5153. If both Amp and Cab blocks are in the grid then Amp 1 will follow Cab 1 and Amp 2 will follow Cab 2. If only Cab 1 is in the grid both Amp blocks will follow Cab 1.

- Added Speaker Impedance Curves for "2x12 Class-A 30W Silver", "2x10 Heart Key" and "4x12 1960BV".

- Added "4 Band JMPRE-1" type to Graphic EQ block. Note that the upper two bands of this type have more boost/cut range than the version in the Amp block.

- Added "Revv Gen" amp models based on a Revv Generator 120. There are three models for each of the Purple, Red, and Green channels corresponding to the three levels of the "Aggression" switch.

UPDATES

- Drive effect default Input Select setting is changed to 'LEFT'.

- Small improvement to the Amp block channel switching speed.

FIXES

- FC: Edit Setlist page on the front panel will now refresh appropriately when inserting/deleting songs.

- Klon Drive model noise when bias set to 0.0 is removed.

VERSION 4.01 – April 7, 2023

IMPORTANT: 4.01 adds several features that expand the System Settings memory storage size. These settings cover the Global, I/O, MIDI/Remote, Tuner, and Foot Controller sections. As a result, System Settings created using firmware version 4.01 are not backward-compatible with earlier firmware versions. To restore System Settings after reverting for any reason to firmware older than 4.01, use a backup file created previously under the older firmware to restore System Settings.

NEW FEATURES

- Added new Amp type: "**59 Bassguy Reissue Jumped**".

- Added new Drive types: "**Bosom Boost**", "**OD-One Overdrive**".

- Added "**Paragon**" type to Wah block based on the Tycobrahe Parapedal wah.

- Added "**Oxbow Loadbox**" and "**Double Notes Loadbox**" speaker impedance curves based on a Universal Audio Ox and Two Notes Torpedo, respectively. (Note that these are amp block impedance curve options and not new IRs in the Cab block.)

- "**1x10 Metro Blues**" speaker impedance curve added to AMP effect..

- Added "**JP IIC+ Shred**" Input Boost type to Amp block. This replicates the "Shred" switch on the Mesa/Boogie JP2C.

- Added new Amp block parameter "**Input Dynamics**" (as found on Axe-Fx III). When set below zero, the amp input is compressed, resulting in a smoother, less dynamic sound. When set greater than zero, the amp input is expanded, resulting in a punchier, crunchier and more dynamic sound. Note that extreme values can have undesirable side effects such as pumping or clipping.

- Added new "**Startup Preset**" option under SETUP: Global Settings. This determines which preset is loaded at startup.

- Changed bypass/engage speed for the following blocks: Filter, Graphic EQ, Parametric EQ, Tremolo and Wah. These blocks now bypass/engage with a gentle fade as rapid bypass/engage with these types of blocks can sound abrupt.

- New **large fonts display mode** for the main Presets/Scenes view (Home page of the Home menu). Turn Knob B ("Zoom") to switch between small fonts and large fonts. In Large mode:

  - Turn the Value knob and then press ENTER to change the preset. (Presets are shown in "preview" as dim text until you press Enter.) When previewing presets, NAV left/right = -1/+1 preset and NAV down/up = -10/+10 presets.

  - Once any preset is loaded,use NAV keys to change scenes.

- Signal level meters have been added to the I/O menu "Input" page for use when adjusting input sensitivity. The Instrument Input (In 1) meter will display input signal clipping via its color.

- An Instrument Input (IN1) signal clipping warning is added to the mini-tuner graphic. If this clipping indicator appears, reduce the input 1 input sensitivity in SETUP: I/O: Audio: Input.

UPDATES

- Improved Compressor block:

  - Improved "Studio FF Compressor 1" type. New algorithm yields smoother release and "fatter" compression. This type is suitable for a wide range of uses now including bus and mastering. Type has been renamed "Studio FF Compressor".

  - Improved "Optical Compressor" types. New algorithm features improved ballistics and an inherent soft knee for vintage optical compression sounds.

  - Improved "Dynamics Processor" type. New algorithm also supports various detector types.

  - Improved "JFET Compressor" type.

  - Added "Optical Sustainer" type based on optocoupler-based pedal compressors.

  - Added "Analog Sustainer" type. This is an upwards compressor using the same "analog" gain computer as the Analog Compressor type yielding a natural soft-knee response.

- ○ Added "JFET Sustainer" type. This is based on a rare JFET-based pedal compressor where the JFET is in the op-amp's feedback network.

- ○ The range of "Release Time" now goes from 2ms to 2s.

- ○ Added a graph for "Analog Compressor" and "Sustainer" types.

- ○ New "Auto-Makeup Gain" algorithm for most types provides better output level tracking vs. Threshold and Ratio.
  Note: As a result, the output level of the compressor block may be slightly different compared to previous versions. Auditioning presets that use the Compressor block is recommended.

- ○ Selectable Auto-Makeup Gain has been added to Optical, Tube and Analog Compressor types.

- ○ Studio "FF Compressor 2" has been renamed "Studio FF Sustainer".

- ○ Compressor types have been alphabetized.

- Improved Gate block:

  - ○ Improved "Downward Expander" type. The "Hold Time" parameter has been removed as it is not compatible and no longer needed with the new algorithm. This type has been renamed "Classic Expander" as it is based on classic analog downward expanders.

  - ○ Added "Modern Expander" type. This type uses a novel approach to the envelope detector resulting in improved ballistics compared to traditional analog expanders. A new "Knee Type" parameter allows selecting between hard-knee expansion and varying degrees of soft-knee expansion.

- Improved Noise Gate in Input block:

  - ○ Improved performance based on a new algorithm developed for the Gate block.

  - ○ A "Mode" page has been added to the gate with "Easy" and "Advanced" options. In "Easy" mode the number of parameters is reduced, simplifying the adjustment procedure for those who are unfamiliar with the finer details of gates/expanders for guitar noise reduction applications.

- Updated PVH 6160 Block and PVH 6160+ models. New models have more accurate Gain knob response.

- Reduced default Power Tube Grid Bias for PVH 6160 and Recto models as previous default was hotter than these amps are typically run due to the non-adjustable bias.

- Added "Treble Shift" control to Tone page of USA IIC+ models. This is an alias of the "Fat" control found on the Preamp page and performs the same function.

- Added Fat control to Tone page of USA Rhythm 2, which is just a duplicate of the control found on the Preamp page.

- Updated "**Speaker Thump**" to latest from Axe-Fx III.

- Input and Output volume pedals (MIDI/Remote menu) filtering is reduced. This causes the level to react quicker, similar to Axe FX III.

- **2x12 Bassguy** speaker impedance curve is updated to match Axe-FX III.

- Improved tuner:

  - Changed filter to tracking bandpass, rejects harmonics and noise.

  - Changed strobe tuner so that indicator rotation frequency is constant vs. error as a fraction of desired frequency

  - Changed Tuner Mute behavior so that Mute: INPUT only mutes the selected Input source.

FIXES

- Corrected a bug when using a modifier on the Klon Gain value or other mathematically complex parameter.

- Corrected a bug that caused pedals/switches connected to faslink FC#2 to function as if they were connected to FC#1.

- Turning soft knob 3 on the layout GUI, 'Block Level', will no longer make an empty banner message appear on the LCD when a valid effect block is not highlighted.

- Corrected a bug causing a crash when assigning control to scene inc/dec in the 'MIDI/Remote' menu 'Other tab'.

- Fixed Transformer and Vintage preamp types in Cabinet block not ported correctly during a previous firmware update. This manifested as the distortion not being frequency dependent.

- Fix for IR(s) not loading on channel change if one or more slots has SOLO engaged.

- Side-chain filters are now working for the Gate effect.

- Reverb effect low cut slope control is now working.

- Fixed a filter in the Wah block not being initialized.

- Corrected a condition that caused the shunt block outline color to draw incorrectly on the layout grid GUI.

- Fixed setting the Ratio parameter to '1' in certain compressor effect model types causing an audio signal loss requiring reboot.

- Using the '**Ignore Redundant PC**' setting no longer prevents preset 0 from loading at startup.

- Parameters controlled via a modifier viewed on a 'Perform' GUI will not send an incorrect parameter update message when loading the Perform GUI screen.

- Corrected an error with individual block muting during scene changes that causes an accidental disruption of signal in a delay or reverb effect.

- Corrected a display error causing the AMP effect block to appear in the wrong bypass state on the layout grid.

- FC: Song/Setlist, using "default" for scene loads the correct scene.

- FC: Effect: Channel functions will now work correctly when Effect is set to Controllers.

- FC: Changed how the lower right footswitch works when the Master Layout Menu ("MLM") Switch Combo is enabled. Because this switch has an extra "hidden" hold function that helps show the MLM, its tap function would be skipped if you accidentally held the switch for too long. Now, the tap function will fire in these cases as long as there isn't also a separate Hold function assigned.

- FC: When editing switches from the front panel, the 'Mini-Display Label' setting of 'Custom' will now allow access to the 'Custom Label' for all switch categories.

VERSION 4.0 – December 2, 2022

FM9 firmware version 4.00 implements Fractal Audio Systems "Cygnus X-2" amplifier modeling. The default values of various parameters have been updated. Existing presets are automatically updated to the new values upon loading.

NEW FEATURES

- Added new amp models: "Brit Studio 20", "Plexi 50W 6CA7 Jumped", and "Herbie MK3".

- Added "Overdrive Volume" parameter to Dumble-type amp models (ODS-100, Two Stone, etc.). This is sometimes labeled "Ratio" or "Lead Master". As the Master Volume on these amps often has a bright capacitor, the Overdrive Volume control allows setting the Master Volume higher to counteract the bright cap and then lowering the power amp drive with the Volume.

- Added "Plate Suppressor Diodes" parameter. This value is set automatically when the amp model is chosen, but the user can override the default setting. Most amps do not have suppressor diodes but some do (e.g., Trainwreck Express). These diodes (also called "snubber" or "flyback" diodes) prevent undershoot on the power tube plates due to inductive kick and reduce upper harmonics thereby reducing "fizz".

- Added "Griddle Cake" Drive model based on a Crowther Hot Cake. The "XLF" switch on the pedal can be replicated by turning the Bass Response knob fully CW.

- Improved the amp block output transformer algorithm. The new algorithm more accurately models B-H curve, resulting in a clearer low end. The new algorithm now also accounts for the effect of speaker impedance on transformer response.

- Improved power tube modeling. This yields better dynamics and improved low frequency accuracy.

- Improved cathode follower algorithm. Provides more accurate "cleanup" when volume is rolled off.

- Improved triode algorithm which more accurately models plate bypass capacitors.

- Improved Drive block modeling to more accurately model effects of op-amp finite open-loop gain and GBW product.

- CPU overload is now re-evaluated when a new preset is loaded via the edit buffer from FM9-Edit.

UPDATES

- All amp models are updated for use with Cygnus X-2.

- The Ideal amp controls have been updated.

- Renamed USA Clean to USA Rhythm 1 to be more in line with actual amp.

FIXES

- Normally closed type stand-in switches operate properly.

- FC "Banner Messages" being displayed no longer causes the entire LCD to redraw.

- The SPDIF clock will be used automatically upon boot when a valid input signal is preset and SPDIF Word Clock mode is selected.

- The Reverb effect wet/dry mixing strategy is changed to match the latest Axe FX III method (constant power).

- The AMP effect speaker impedance curve graph is now calculated using the same method as the Axe FX III.

- The Foot Controller layout will not inadvertently be changed when using controls that cause "Banner Messages" to be displayed.

- External foot controller stand-in switch assignment mapping is corrected.

- Fixed wrong coupling capacitor value in 1959SLP Treble, 1959SLP Jumped and 1987x Treble amp models.

- Fixed wrong resistor value in the tone stack of Solo 88 Rhythm and Lead models.

- Fixed low frequency behavior of Recto2 models due to loss of precision.

- Fixed wrong treble pot taper in CA3+ models.

- Fixed wrong capacitor value in Friedman HBE V1 Fat model.

- Fixed wrong resistor value in AC-20 12AX7 models.

- Fixed wrong Depth knob taper in Archean models.

- MIDI PC Mapping "To Scene" function is corrected.

- The "Scene Revert" setting is taken into account when recalling a scene with a MIDI CC command.

- "Prompt on Edited Preset Change" dialog displays when changing preset via a foot controller.

- Fixed rare issue that could cause data corruption in Delay and Reverb blocks resulting in blocks outputting noise.

VERSION 3.01 – November 22, 2022

- Fixed rare issue that could cause data corruption in Delay and Reverb blocks resulting in blocks outputting no

VERSION 3.00 – August 15, 2022

- Added new amp models: "PVH 6160 Block Crunch" and "Diamante Fire" (based on a Diamond Del Fuego.)

- Added new Drive effect types "Klone Chiron", "Esoteric Bass RCB", and "BB Pre AT".

- Added new Setlists/Songs feature, which can be used with onboard footswitches or an FC Controller to access presets and scenes in custom order during live performance. A new area of the SETUP menu provides full access from the front panel, with a corresponding new area of FM9-Edit which also offers import/export and more. For additional details, please see the Setlists & Songs Mini-Manual, located at: https://www.fractalaudio.com/sss-manual

- New "Block Mixer" algorithm results in faster/quieter scene and channel changes. This new algorithm allows placing Amp blocks in series without the concomitant sound bursts that would normally occur when switching scenes.

- New Speaker Drive algorithm in Amp block. This new algorithm more accurately models the frequency dependent distortion of guitar loudspeakers. The default value (upon resetting the block) is 2.0 which gives roughly 1 dB of compression. Setting the value to 0.0 defeats the speaker drive modeling. Higher values give a smoother and more focused sound, rounding off the "sharp edges" and yielding greater compression.

- Added Speaker Thump control to Amp block. Speaker Thump models the dynamic, nonlinear behavior of a guitar speaker. A value of 5.0 roughly corresponds to an amplifier running into a speaker rated at the same power as the amplifier, i.e., a 100W amplifier running into a 100W speaker. The reset value is a conservative 2.5 which represents, i.e., a 50W amp running into a 100W speaker. Note that the majority of the response is in the subsonic region and the effect is primarily tactile. Existing presets are not affected and the value will be zero

- Added ability to use Pre-Delay in Reverb block as a simple echo. Pre-Delay now features Tempo, Feedback and Mix parameters. The pre-delay time has also been increased to 1 second. Several new types have been added to demonstrate these capabilities.

- Added ten new speaker impedance curves in the Amp block.

- Added Depth control to Authentic/Tone page for Brit Super, Brit 800 Mod and JMP-1 amp models.

- Added "Scene Ignore" to most blocks. When set to ON, Scene Ignore causes the block to ignore scene changes. Scene Ignore is a per-channel parameter. This allows turning Scene Ignore to OFF on one or more channels which will then allow a scene change to set the block to a desired state if the block is on that channel.

- Factory default FC Layout #8 now contains a new Setlist/Song layout. To load this layout, you can either re-load all of the factory layouts from in **SETUP: FC Controllers: Reset**, or download the layout and instructions a la carte from:
  https://www.fractalaudio.com/downloads/manuals/fas-guides/SSS-Sample-FC-Layouts.zip

- Added "Aurora Delay" type to Multitap Delay also added new cross feedback to Quad Parallel type.

- Support for new FM9 Turbo hardware.
  https://forum.fractalaudio.com/threads/announcing-fm9-turbo.185877/
  Note that the FM9 Turbo cannot be used with firmware versions older than 3.0

UPDATES

- Improved Amp block transformer/speaker interaction modeling. The "Voice Coil Resistance" parameter has been repurposed/renamed "Speaker Impedance". The various parameters work as follows: Transformer Matching: Sets the impedance ratio (square of the turns ratio) of the output transformer. Speaker Impedance: Sets the relative nominal impedance of the speaker. To simulate connecting, e.g., a 4-ohm speaker to an 8-ohm output you would set Speaker Impedance to 0.5. Conversely to simulate connecting a 16-ohm speaker you would set it to 2.0.

- Update PI Bias Excursion parameters for many Amp models based on new measurement technique.

- Improved Amp block output transformer modeling. This requires updated Transformer LF/HF values for the amp models. Existing presets are automatically updated to the new values upon recall.

- Changed Compressor block so that times display actual milliseconds for the various pedal types.

- Improved speaker impedance curve fitting algorithm. This results in more accurate and more "colorful" modeling as the previous algorithm tended to damp box resonances somewhat. All the speaker impedance curves have been updated using the new routine. Existing presets are automatically updated to use the updated curves based on the new global setting option "Update Pre-3.x Presets Spkr Imp Upon Load." If you have modified the stock curve, i.e., changed the LF/HF Resonance parameters, then you will need to re-enter those values into your presets if set to "YES."

- Changed "Drive" to "Gain" for Amp block preamp gain control as this is more consistent with naming in real amps.

- Muting algorithm improved around FM9-Edit operations such as Block Library, Cabinet download, Patch download.

- Decreased minimum diffuser time in Delay block to 1%.

- The DRIVE effect is updated to correspond with the latest Axe-Fx III firmware release.

- Patch edited status is set to 'On' when an existing preset is loaded and the speaker impedance curve data has been updated automatically.

- Preset store functionality is improved. Presets take less time to write to storage. "Level & Save" FC functions will no longer cause a gap in audio.

- Presets created prior to version 3 will be loaded with updated default values for AMP Excursion Time and Recovery Time.

- AC/RC Boost and BB Preamp models now use accurate bass and treble controls.

- "PVH 6160 Block" AMP type is renamed as "PVH 6160 Block Lead"

FIXES

- FC: Layout Link will no longer unduly trigger when exiting the Tuner.

- FC: Fixed an issue that prevented the Hold function from working for some Stand-in Switches.

- FC: Preset: Select in Bank switches now stop flashing when the preset is changed by any means other than an FC footswitch (editor, front panel, etc.)

- FC: Preset: Select in Bank switches now flash consistently when used with Bank: Select switches.

- FC: Preset: Toggle in Bank switches now consistently and correctly load the "Primary" preset after changing the bank.

- FC: The STARTUP VIEW of the FM9 will now behave appropriately in all circumstances when an external FC-6 or FC-12 is present.

- FC: Corrected Layout: Inc/Dec mini-display labels when set to Destination # or Destination Name and wrapping is enabled.

- Fixed wrong drive taper in Mr. Z Highway 66 model.

- Fixed wrong capacitor value in Friedman Smallbox model.

- Status messages on the main LCD will not immediately be cleared when viewing the Tuner GUI screen.

- Status messages on the main LCD display and clear properly in all cases when viewing the Setup menu.

- Text labels that would overrun the assigned text field on the LCD GUI are now truncated to fit.

- Selecting output configuration "MUTE" no longer causes USB signals to be summed to mono.

- Parametric EQ and Megatap blocks no longer cause a GUI hang if modifier attached to parameter and update rate is set to FAST.

- Adjusting a Custom Scale value no longer causes the next value to be zeroed despite the value shown in the edit field.

- Using the MLM switch combo on the FC-6 more than once changes between the MLM layout view windows.

- The speaker impedance graph updates correctly when "Reset Current Channel" is selected in FM9-Edit.

- Standard resolution cabinet graph data shows correctly in the "Align" interface.

- Scene MIDI LCD GUI screen updates correctly on scene change.

- The modifier graph will update and re-draw on screen automatically when adjusting Scale and Offset parameters.

- FC: Fixed Layout: Inc/Dec mini-display labels when set to Destination # or Destination Name and wrapping is enabled.

- 3rd Party MIDI Command "Status Dump" is now enabled.

VERSION 2.02 – April 20, 2022

- Ten-Tap Delay effect bypass modes operation corrected.

VERSION 2.01 – April 15, 2022

*FM9 Version 2.01 is a massive upgrade featuring new amps, new effects, and much much more. It was first released in December 2021 as "public beta 2.0", but so many updates have been added since that a new beta was released as **2.01**, and now as official firmware version 2.01.   The 2.0 beta release notes are integrated below. **NOTE:** You can upgrade to this version directly from firmware 1.0, or from public beta 2.0 or public beta 2.01.*

AMP BLOCK UPDATES

Version 2.01 represents the first use of the Chase Nonlinear Feedback (CNFB) technique in the FM9. The virtual power amp has been completely rewritten, providing improved accuracy, especially in the clipping and power supply sag behavior vs. frequency.

- New amp models: 59 Bassguy Normal, 5F8 Tweed Normal and 5F8 Tweed Jumped.
  59 Bassguy and 5F8 Tweed models now include both "Normal" and "Bright" input drive controls.

- New amp models: JMPre-1 Clean1/2. Note: The real amp has a fixed, passive tone stack with an active 4-band EQ. Therefore, the Bass/Mid/Treble controls when using Authentic Tone Controls are mapped to the Graphic EQ. The passive tone stack itself, however, is adjustable. With all controls at noon the tone stack is equivalent to the real amp's fixed tone stack.
  You can access these controls using the Advanced menu page or via FM9-Edit.

- Updated JMPre-1 OD1/2 models. As with the Clean1/2 models the Bass/Mid/Treble controls now are mapped to the Graphic EQ when using Authentic Tone Controls.

- New JMPRE-1 Output EQ type in Amp block. This type replicates the active EQ used in the JMP-1 preamp (see above).

- New Amp model: "FAS Buttery"

- Added 11 new power tube types from various manufacturers.

- Added "RCB Boost" to Amp block Boost types.

- Improved Phase Inverter Bias Excursion accuracy for some models (mostly non-MV types). *Note: The improved PI Bias Excursion accuracy results in an increase in bias excursion in most cases. Bias excursion primarily manifests as intermodulation distortion, particularly subharmonic distortion. This produces a chunkier tone with more growl and also yields a thicker tone when rolling off the volume or playing lightly. The amount of bias excursion can be adjusted using the PI Bias Excursion control in the Advanced menu.*

- The Amp block headroom meter is improved.

- Updated default cathode follower values for Matchbox D-30 model.

- Renamed "Speaker Impedance" to "Voice Coil Resistance" to more accurately describe the function of the control. Note that this includes all other "parasitic" resistances, i.e., speaker cable resistance, output transformer winding resistance, etc.

- Rearranged order of pages in Amp block so that "Input EQ" and "Output EQ" are after the "Tone" page.

- Fixed Amp block Transformer Match control not working properly.

- Fixed Bludojai Lead model missing resistor between last preamp stage and power amp.

- Fixed names of Dizzy V4 2 and Dizzy V4 3 swapped.

- Fixed wrong resistor value in Solo 88 Lead input circuit. Impact is probably negligible.

- Fixed wrong resistor value in USA Pre LD2 overdrive circuit. This increases gain slightly. You may need to audition any presets using these models and adjust gain accordingly.

- Fixed Amp block power tube "kvb" not being set correctly in rare circumstances. This caused the output level of the amp block to change depending upon the previous preset used.

- Fixed wrong B+ voltage for Tremolo Lux amp model.

- Added check to prevent excessive message queuing, i.e., when selecting an amp model using Value knob.

- Added global "Speaker Impedance Curve" option (Setup: Global Settings: Config page). The selected curve is whenever you change to a new amp model. When set to "DEFAULT", the default curve for a newly selected model is used. Also added several new Impedance Curves; thank you to Dr. Bonkers Soundlab for these.

- Improved Amp block transformer/speaker interaction modeling. The "Voice Coil Resistance" parameter has been repurposed/renamed "Speaker Impedance". The various parameters work as follows:

  Transformer Matching: Sets the impedance ratio (square of the turns ratio) of the output transformer.

  Speaker Impedance: Sets the relative nominal impedance of the speaker. To simulate connecting, e.g., a 4-ohm speaker to an 8-ohm output you would set Speaker Impedance to 0.5. Conversely to simulate connecting a 16-ohm speaker you would set it to 2.0.

- Update PI Bias Excursion parameters for many Amp models based on new measurement technique.

DRIVE BLOCK UPDATES

- New Drive Types: "Valve Screamer VS9" and "Maxoff 808" including a new diode SPICE model, "1S1588T" which is the Toshiba version of the 1S1588 and reportedly the "best sounding."

- New "Hi Mid" control in EQ section.

- Improved accuracy of "G-taper" used for tone control in some Drive models, i.e., T808, VS9, Super OD, etc. Impact on existing presets is likely negligible but any presets using Tube Screamer models and their variants should be auditioned.

- Renamed Timothy and Suhr Riot Drive models to clarify switch position.

- Fixed Blackglass 7K model as reference pedal was defective. Also added new "Grunt" and "Attack" controls (Grunt switch on pedal is a selectable low cut so knob duplicates Low Cut control).

- "Fixed" the "Attack" control of the "Horizon Precision Drive" so it matches the actual pedal (was reversed previously).
  Any presets using this model should be adjusted accordingly.

- Fixed wrong op-amp clip threshold for DS1 models in Drive block.

- Fixed DS-1 Drive types have no gain when Drive is at 0.0.

- Improved accuracy of Drive block Drive control for low settings.

COMPRESSOR BLOCK UPDATES

Overhauled the Compressor Block based on the latest Axe-Fx III updates:

- Added Input Level switch. When set to INSTRUMENT the detector is optimized for guitar-level signals, i.e., before an amp block. When set to LINE the detector is optimized for post-amp level signals.

- Added Emphasis frequency to the sidechain.

- Improved Pedal, Optical, Tube, Analog, JFET and Dynamicomp types in Compressor block. Auto Attack/Release has been removed from Pedal and Dynamicomp types as it is no longer applicable.

- Improved Auto-Makeup gain behavior for types with this option.

- Increased maximum sustain for various compressor types.

IMPORTANT: Due to these changes, the behavior and level of the Compressor may be different in existing presets. It is recommended to audition any presets using the Compressor block and adjust as required.

OTHER BLOCK UPDATES

For additional details about new features below, see the updated Fractal Audio Blocks Guide, available on our website.

- New "Types" in the Flanger, Plex Delay, and Multitap Delay. These provide instant access to exciting effect settings without the need to adjust individual parameters. Special thanks to Leon Todd, Simeon Harris and Cooper Carter for some of the new contributions.

- New Delay Block Types: Worn Tape, Zephyr, and Diffused Delay.

- New "LFO3" in Delay block. This can be assigned to Level, Pan or Spread.

- New Megatap features including feedback, diffusion, and more. Maximum number of taps is now 64 on the FM9.

- New LFO in the filter section of the Plex Delay block allows creative modulation effects.

- New pitch shifting capability inside the Reverb Block. This can be used to create "Shimmer" more easily than using separate Pitch and Reverb blocks—and with less CPU usage. Several new types demonstrate this capability.

- New Pitch type, "Dual Detune Delay" offers exciting cross-feedback options with delays inside the feedback loop.

- New "Modern Gate" type in the Gate/Expander Block. This type is similar to the Classic Gate except it opens in a constant linear-in-dB manner. This makes the attack slower so this type can be used for both traditional gating and for special effects.

- Improved Input block gate performance.

- Improvement: Pitch Block and Pitch Follower use new pitch detection based on Axe-Fx III

- Added New "Max Loop Time" parameter to Looper. This sets the maximum recording time, allowing a loop time to be precisely pre-configured in advance of recording. When recording time reaches the maximum recording time the mode changes to that specified by Record 2nd Press (for the first pass of a new recording.)

- New "S-Taper" option in the Volume Block allows new and improved "Auto-Swell" sounds.

- Added Diffuser Modulation in the Multitap Delay.

- Added Spread control to Dual Delay and Tape types in Delay block. Spread acts as a "master pan" in this case and is modifiable.

- Added Modifier capability to LFO Enable and Mod Frequency in Filter block.

- Improved Tape preamp types in Cabinet block.

- Improved Stack/Hold implementation in Delay block so that "texture" is applied to audio when Stack/Hold is on.

FRONT PANEL DOUBLE-TAP

Improvement: The front panel now has various double-tap shortcuts:

- Double-tapping HOME enters the layout grid; Double-tapping EDIT edits the previous block; Double-tapping STORE prompts immediately.

- In the Home or Layout menus, double-tapping the A-E push-knobs does the following:

   - A enters the **A**mp 1 menu; B enters the Drive 1 menu (think "**B**oost")
     C enters the **C**ab 1 menu. D enters the **D**elay 1 menu. E enters the Reverb 1 menu (think "r**E**verb")

FOOT CONTROL UPDATES

- Added "Bank Switch Limits" ENABLE/DISABLE to the FC Config menu. These allow the FM9 to ignore the limits set on individual bank switches, thereby allowing access to ALL BANKS by default.
  IMPORTANT: If you want the "Bank Limit" function of existing footswitches to take effect, you must enable this new option.

- Added "Invert Mini-Displays" under the APPEARANCE section of the FC Controllers: Config page.

- Added "STARTUP VIEW" to the FC Controllers: Device page.

- Added an option for "2nd Press = Previous Bank" to **Bank: Select** function making it possible to toggle back to the previous entry.

- Added an option for "2nd Press = Previous Preset" to :**Preset: Select** and **Preset: Select in Bank** functions.

- Added the option "2nd Press" to **Effect: Select Channel** function. The two choices are "Smart Bypass" which is a pre-existing feature, and "Previous Channel" which toggles to the previously selected channel instead.

- New "Scene Level & Save" function increments/decrements the current SCENE LEVEL for selected output(s) and saves the preset.

- "Amp Level & Save" function now has an option for "0 dB" to allow saving a preset via a footswitch without also changing volume.

- Improvement: The FC functions "Amp Level + Save" and "Scene Level + Save" now wait 1.5 seconds before saving.
  This allows you to tap the footswitch repeatedly before the Save is executed. On-screen messages show the status.

- Added "Current" to the mini-display options for **Bank: Inc/Dec** function.

- Added "Current Name" and "Current #" to the mini-display options for **Preset: Inc/Dec** and **Scene: Inc/Dec** functions.

- Added "Current Channel" to the Mini-Display option for **Effect: Chan Inc/Dec**.

- Changed LED ring behavior for **Effect: Select Channel** function:
  When "Smart Bypass" is enabled, the LED will be dim instead of off when the effect is bypassed.

- Fixed: Tuner now exits more gracefully and reliably when using an FC switch.

- Fixed some stand-in switches not executing the tap function correctly when a hold function is assigned.

- Fixed an issue when changing function to "Bypass"if current effect does not have a Bypass function (e.g., Mixer, Multiplex).

- Fixed an issue when changing FC effect type from "MultiPlex" to an effect containing fewer channels.

- Fixed: Switch Ring Color settings of "Off" now work correctly.

- Fixed: LED ring will properly be dim when an effect is bypassed using **Effect: Chan Select** function.

ADDITIONAL UPDATES

- New 'MUTE' options for OUTPUT 1 MODE and OUTPUT 2 MODE cause only FM9 processed audio to be muted. USB audio will still be routed to and heard at a muted output, enabling certain applications when using a DAW with input monitoring. See the FM9 Owner's Manual for additional details.

- New option "ALL" for "Spillover" in SETUP: Global Settings: Config. In addition to Delay and Reverb, this includes Plex Delay, Multitap-Delay, Megatap Delay, and Ten-Tap Delay blocks, allowing spillover when switching presets. See the FM9 Owner's Manual for more on spillover.

- Performance Enhancements: General improvements of GUI, FM9-Edit Communications and IR Management.

- Scene changes where the channel is changed for two Amp Blocks are now as fast when one amp block is used.

- In the Edit menu of any block, the controls for Channel, Bypass and Reset have been consolidated into a single page.

- Added Damping control to Modifiers. The default, EXPONENTIAL, is the classic damping style where the modifier value has an exponential attack/decay. LINEAR selects a linear attack/decay.

- Added "Type" control to ADSRs. The default, EXPONENTIAL, is an analog style where the ADSR has an exponential attack/decay. LINEAR selects a linear attack/decay.

- The Tuner now displays note frequency and cents. Tuner indicator motion is also smoother.

- Improved scene switching to prevent signal "leaking" into bypassed blocks.

- New Delay and Reverb CPU use meter. Features added to the Delay and Reverb effects can overtax the effects' processor in extreme use situations. When viewing a Delay or Reverb effect editing GUI screen on the FM9 hardware a CPU meter will appear on the display if the cpu usage moves past 75% As with the primary effects core, the recommended maximum cpu use value is 80% to ensure best performance.

- Fix: Modifiers now update correctly on Preset/Scene changes. This fixes, for example, an issue which could cause a burst of sound when a volume pedal was used across sound changes.

- Fixed: Knob for "USB/Digital" Metronome level now works correctly.

- USB In/Out meters on the Home menu Meters tab are now labeled 1 through 8.

- Fix: FM9 now correctly loads IRs created by exporting Tone Match data from Axe-Fx III.

- Fix: Home menu screen will update when the scene is changed from any source, including MIDI.

- Fix: MIDI over USB messages are now detected in MIDI Learn mode in the Setup Menu.

- Fix: Amp block copy/paste in FM9 Edit will correctly transfer level, pan, and bypass settings.

- Fix: Onboard Pedal 2 and Pedal 3 jacks now allow independent "Switch Behavior" settings

- Fix: Preset "SAVED!" message is now shown reliably in all expected cases.

- Fix: Tuner-on-heel-down was causing artifacts in the main display.

- Fix: Amp block output transformer turns ratio is now being correctly calculated.

- Fix: Stand-in switches will now work correctly when assigned to a footswitch configured as a Per-Preset: Placeholder.

- Fix: Incoming MIDI now works to select preset bank.

- Fix: Amp block Input EQ and Speaker displays now update correctly when the channel is changed.

- Fix: Corrected an issue with reverb sound that appeared in the previous beta.

- Fix: Corrected a display problem that could happen on Reverb and Delay screens when the default saved channel was not 'A'

- Fix: Delay and Reverb parameters Mix, Level, and Bypass are again controllable via modifier.

- Fix: Parameter settings for Delay and Reverb that are controlled with a modifier will no longer carry over to the next recalled preset.

- Fix: Settings for an FC switch could be replaced with another's after firmware update is corrected.

- Fix: FC Per-Preset GUI menu scrolls up/down to keep selected item on screen always.

- Fix: AMP Speaker Impedance Curve name label will always be visible in the GUI.

- Other small fixes based on those made on the Axe-Fx III.

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NEW FEATURES

- First public release. See the FM9 Owner's Manual for details.