Axe-Fx Firmware Release Notes

NOTE: To encourage people to actually read these, firmware versions prior to 5.00 are now archived.

NOTE: IF UPGRADING FROM 6.07 OR EARLIER THE NEW INPUT VOLUME CONTROL WILL LIKELY NEED TO BE RESET AFTER INSTALLATION OF THE FIRMWARE. IN THE I/O->CTRL MENU SET "INTPUT VOLUME" TO "NONE" TO DEFEAT THIS FEATURE. YOU MAY NEED TO POWER CYCLE THE UNIT AFTER RESETTING THIS PARAMETER.

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9.03

The TRANSFORMER MATCH parameter in the amp block has been split into two new parameters: LF RESONANCE and HF RESONANCE. These parameters control the interaction of the virtual power amp with the virtual speaker in the low-frequency and high-frequency bands, respectively. The HF RESONANCE control is especially effective at brightening or darkening the amp model. The default value is 5.00 which is a relative value of 1.0 for each amp model's actual high-frequency resonance. Reducing this value to 2.5, for example, will lower the high-frequency resonance and give most of the high-gain amps the same high-frequency resonance as version 9.00 firmware.

Reworked Carol-Ann OD2 amp model.

Fixed incorrect values for SOLO 99 clean and rhythm models when bright switch off.

Added "Brit JM45" tone-stack and changed default tone-stack for Brit JM45 amp model to this.

Added "Citrus RV50" model.

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9.02

Fixed DC accumulation problem with Amp Drive filter.

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9.01

NOTE: This firmware version may change the sound of your presets. You should audition your presets carefully after upgrading to verify that they sound as intended.

Reworked power amp simulation more accurately models speaker coil inductance and interaction with transformer / power tubes. The net effect is that all amp models will be "chimier" in general.

Amp block now defaults Thump and Warmth to zero when selecting an amp model.

Added "CarolAnn OD2" amp model. Based on the OD2 amplifier designed by Alan Phillips of Carol-Ann Amplifiers, LLC.

Totally reworked "Tweed" amp model. Since this model is based on a '65 Deluxe Reverb the model name was changed to "Deluxe Verb".

Reworked "Jr. Blues" model.

Made some minor tweaks to the Blues, Brownface and Blackface models. Renamed Blackface to "Double Verb". Renamed Blues to "59 Bassguy".

Reworked CAE+ Rhy and Ld models slightly based on evaluation of Peter Frampton's unit.

Rewrote Bright Cap algorithm to take into account circuits where the cap on the series resistor is switched rather than the cap on the pot itself. Also accounts for circuits where the series resistor cap is left intact but the pot cap is switched out. This affects the Soldano, Recto, CAE, Fryette and PVH 5105 models.

Reduced Amp block CPU usage slightly.

Added "BB Pre" Drive model. Based on the Xotic BB Preamp.

Improved Compressor block:
  - Changed Studio Compressor RMS detector to true-RMS type.
  - Added lookahead feature to minimize popping when using high compression ratios. The amount of lookahead can be adjusted on the first page of the Compressor menu.
  - Added "AUTO" mode. When Auto mode is on, the attack and release rates are automatically varied according to the program material. The Attack and Release controls then set the minimum attack rate and maximum release rate, respectively (maximum attack time, minimum release time).
  - Added "RMS + Peak" detector mode. In this mode the detector normally runs as a RMS detector but switches to a peak detector on strong transients. This gives the attack speed of a peak detector with the smoothness of an RMS detector.
  - Reworked Pedal type algorithm. The Detector type parameter has been removed as it is no longer relevant.
  - Increased maximum compression of Pedal type.

Rewrote Spring reverb algorithm to improve realism.

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9.00

Improved preset switching times.

Changed log tapers in Volume block to more accurately model actual audio taper pots. Also changed Amp block tone control tapers accordingly.

Improved power amp modeling. Power amp compression is now more apparent but also more natural, especially with high Master and/or Sag settings. Improves note clarity and touch sensitivity.

New pre-amp modeling accurately simulates "cold-biased" stages. Models using this will now have much more "crunch". Even when playing light an underlying crunch will be evident. This also has the desirable side-effect of making some high-gain models feel "tighter".

Euro 1 & 2 models have been totally reworked.

Tweaked Depth frequency of Fryette models.

Corrected incorrect coupling capacitor value in Plexi 1 and Plexi 2 models.

Reworked CAA models and corrected incorrect bright cap value in CAA 3+ LD model.

Reworked X99 models and corrected math mistake on bright cap for Rhy model.

Fixed incorrect treble peaker value on Boutique 1&2 models. Also tweaked tone-stack for these models.

New Rotary Cabinet algorithm. New algorithm has independent motors for LF and HF rotors along with separate time constants. The LF rotor will change speed slower than the HF rotor. Rate control now goes to 0.0 allowing "braking" of the rotors. Virtual microphone positions have been changed to 90 degrees (previously 180 degrees). The new algorithm results in a more realistic and intense effect.

Added Horn Length control to Rotary block. This parameter adjusts the length of the virtual HF horn. Larger values increase the amount of doppler shift and result in a more intense effect.

Added ability to chose realtime sysex messages sent: None, All, Tuner Only or Tempo Only.

Reverb block has been reworked. Separate pre-delay and tail delay controls now allow precise control over the delay of the initial reflections and tail portions of the reverb. The reverb "tank" algortihm has been rewritten to provide a more natural sound. The new reverb algorithm has also been ported to the standard Axe-Fx.

The following parameter changes have been made to the reverb block:
  - "Early Delay" parameter has been removed.
  - "Pre Delay" now controls time to initial reflections and is adjustable from 0 to 250 ms. Default value varies with type
  - "Reverb Delay" sets the start of the decay portion of the reverb relative to the initial reflections. Range is 0 to 250 ms. Default value varies with type.
  - "Echo Density" sets the density of the decay portion of the reverb. Range is 2 to 8. Lower values result in a more sparse and coarse sounding tail. Higher values give a smoother sound.

The Spring type has been removed and replaced with a "Cathedral" type. The Vintage type has been renamed to Spring.

Fixed bug in Vintage (now Spring) reverb corrupting global vector.

NOTE: Presets created with firmware prior to 9.00 are incompatible with
the new algorithm so the reverb block is reset upon recall. The preset will
sound similar but many of the parameters will be reset by necessity. You should
audition your presets carefully after upgrading as unexpected changes can occur.

Reworked Phaser block and particularly the Vibe mode. The Freq. control in the
Phaser block now controls the center frequency of the sweep range (as opposed to
the start frequency previously). The range of this parameter has been changed
accordingly. Existing presets will probably sound the same but auditioning them
is reccomended.

A new Vibe algorithm has been written and accurately models the classic Univibe
sound. A new parameter, BULB BIAS, has been added to the Advanced menu. This
parameter allows you to control the quiescent current of the virtual light bulb
used in the algorithm. Real Univive pedals have an internal poteniometer to
control the quiescent bulb current. Varying this parameter controls how "lumpy"
the frequency sweep beahves. Unlike a real Univibe, the Axe-Fx compensates so
that the center frequency doesn't change with the bias (the bias affect on the
center frequency parameter is calculated and removed) allowing easier control of
the sweep range. This parameter has no effect in the normal phaser modes.

NOTE: Existing presets will need to be auditioned as the sound of the Vibe
mode has changed significantly. Furthermore, the LFO type is required to be
SINE for the vibe mode (previously it was EXP). You can use other LFO types for
the vibe mode but it will not replicate the vintage effect then. When selecting
the Vibe type the LFO is automatically changed to SINE. You can override the
LFO type afterwards, if desired.

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8.09

Fixed Multidelay not working under certain settings.

Disabled streaming tempo sysex if in Utility menu.

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8.08

Added Number Springs and Spring Tone parameters to Reverb block. These
parameters, in the advanced menu, only affect the Vintage types. Number Springs
allows you to vary the number of virtual springs from two to six in increments
of two. The Vintage Small defaults to two, Medium to four and Large to six
(previously all defaulted to six). The Spring Tone parameter allows you to vary
the tone of the Vintage type. The models now all default to a value of 5.00.
Presets created with earlier firmware will read 0.0 and can be left as is or
adjusted to taste. A setting of 0.0 will result in the same tone as earlier
firmware.

Added Extern Startup Value parameters to I/O -> MIDI page. This parameter
chooses the startup value of each external controller on power-on. A value of
0% starts the external controller at the minimum, a value of 100% starts it at

maximum. You may use this parameter to define the startup state of external
controllers when assigned to a MIDI CC# but no MIDI controller is connected.

Added tempo averaging. When tapping the TEMPO button, or sending a Tempo CC
message via MIDI, tempo is averaged over the number of taps, up to ten taps. If
more then ten taps are entered the average is over the last ten. The averaging
is reset if more than two seconds elapse between taps.

Added MIDI Tempo sysex message for use with MFC-101. The SEND TUNER SYSEX
parameter in I/O->MIDI is now SEND REALTIME SYSEX and enables sending of the
tuner and tempo sysex data. Set this to ON to enable these features for use
with the MFC-101.

Added OFF VAL parameter to Modifiers. This parameter allows you to select the
point at which the effect automatically disengages. The default value is 5%.
Values of 50% or less cause the effect to disengage when the controller is below
the value programmed. Values greater than 50% cause the effect to disengage
when the value of the controller is above the threshold. This can be used, for
example, to program a Wah to disengage at heel down (less than 50%) or toe down
(greater than 50%). For example, to program the Wah to disengage at toe down,
set the OFF VAL to, say, 90% and turn AUTOENG on.

Added default CC values for all items in I/O->CTRL menu. Using the Reset System
Parameters utility will now set the CC values to these values rather than
setting all to zero. The new default values are required for the MFC-101 "Axe-
Fx Mode" of operation.

Fixed I/O->MIDI parameters not being reset when running Reset System Parameters
utility.

Added Nav Left/Right accelerators to Modifier menu.

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8.07

Fixed LFO Phase control non-functional for triangle LFO waveform in Chorus.

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8.06

Fixed bug in Ultra Pitch Detector causing crash under certain circumstances.

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8.05

Increased range of Intelligent Pitch to +/- 15 scale degrees. This allows up to
two octaves of shift for standard Western scales.

Fixed Intelligent Pitch not calculating proper shift for negative harmonies.

Fixed incorrect modifier range for Drive parameter in Drive block.

Changed Continuous Controller defaults to defined values for use with MFC-101.

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8.04

Improved Intelligent Pitch algorithm so that it interpolates between harmonies rather than jumping when using Smooth Tracking Mode, i.e. if the current harmony is a minor 3rd and a half-step above would result in a major 3rd the shifter will gradually increase the amount of shifting as the note is bent up rather than suddenly jumping from a minor to major 3rd.

Improved Drive modeling for some models.

External Controllers now default to maximum on power-up as opposed to zero. If assigned to a MIDI CC and no MIDI data incoming then value will remain at maximum. This allows using unit with no MIDI controller attached more easily, i.e. Volume block has External Controller assigned to Volume parameter.

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8.03

Improved pitch shifter algorithm. Improved algorithm reduces echo on notes, especially when using small shift amounts.

Improved pitch detector algorithm when using Local Poly for the Pitch Source. New predictive algorithm has better stability which improves clarity of shifted notes.

Changed Drive block Drive control to replicate range of modeled device. Previously the Drive control had a range of 40 dB irrespective of the model. Now the Drive control range varies from 20 dB to 40 dB depending on the model. NOTE: exisiting presets will likely sound different and should be auditioned. The following models are affected by this change:
    - SUPER OD
    - TS808 OD
    - TS808 MOD
    - FULL OD
    - SHRED DIST
    - BENDER FUZZ

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8.02

Added back support for presets created before 6.10.

Increased Gate Threshold to -100 dB.

Added HICUT FREQ parameter to QuadChorus block. This parameter, in the Advanced menu, allows you to control the corner frequency of a lowpass filter on the wet

signal. This can be used to replicate the limited frequency response of analog chorus/flanger units.

Fixed clicking in Pitch block when modifier connected to Master Pitch.

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8.01

NOTE: This firmware release does not support presets created with firmware prior to Version 6.10. If you are upgrading from 6.09 or earlier upgrade to 7.18 first and run the "Update All Presets" function in the utility menu to convert your presets to the latest protocol.

Fixed bug in sending presets to edit buffer.

Fixed pitch detector locking on false octave at C#6.

Added "MIDI PC OFFSET" to I/O menu. This parameter adds a fixed offset to all incoming MIDI Program Change messages. For example, setting this to 10 would recall preset 13 when receving a MIDI PC value of 3. This parameter is irrelevent if mapping is on. NOTE: THIS VALUE MAY NOT BE ZERO AFTER UPDATING THE FIRMWARE. TO ENSURE PROPER PRESET RECALL BE SURE TO CHECK THIS VALUE.

Added HICUT FREQ parameter to Chorus and Flanger blocks. This parameter, in the Advanced menu, allows you to control the corner frequency of a lowpass filter on the wet signal. This can be used to replicate the limited frequency response of analog chorus/flanger units.

Changed taper of input and output volume controls to standard "15A" audio taper.

Volume block now has four tapers: Linear and three log tapers. The number in the log taper represents the percentage at midpoint, i.e. 15A is 15% when the control is at noon. "Log 30A" is the same as LogA before and "Log 10A" is the same as LogB before.

Added selectable Delay and/or Reverb spillover. You can now select whether Delay or Reverb or both spill over on patch change.

Added 3-band EQ to Drive block with semi-parametric Midrange control. This can be used to fine-tune the Drive tones.

Reworked Drive models. The Drive models are now very accurate in terms of gain, frequency response and output level. Most of the models were completely reworked and may sound different. You should audition any presets using the Drive block and adjust as necessary. Note that the Drive control in the Drive block has a range of 40 dB irrespective of the model. Many actual drive pedals have less range than this so there isn't necessarily a one-to-one correspondence to the knob position on the model and the knob position on the actual pedal. Furthermore, the models all have a log taper for the Drive and Level controls. Some pedals have linear pots for one or both of these controls. For example, the Boss SD-1 has 30 dB of range for the drive and a linear output pot.

Increased gain of Treble Boost Drive model by 10. The original Dallas Rangemaster, on which this model is based, had no Drive control, only an Output

level control. Set the Drive control to 5.0 to replicate the original
(previously the Drive had to be set to 10 to replicate the original).

Added "4558/DIODE" clip type to Drive block. This clipping type models diodes
in the feedback path of a JRC4558 op-amp. The JRC4558 is a really lousy op-amp
that produces a lot of distortion even when operated in its linear region. This
new clip type reproduces that distortion as well as the clipping of the diodes.

Added "Bender Fuzz" Drive model. Based on a 1967 Vox Tonebender.

Changed Clip Type of Super OD model to "4558/DIODE" type (see above).

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7.18

Added "Pres/Depth Type" parameter to amp block. "Passive" sets the Presence and
Depth controls to behave like a real tube amplifier. "Active" sets the controls
to behave like idealized versions. This setting defaults to Passive when the
amp block is initialized but retains its setting across amp type changes. For
pre-7.17 behavior set this to "Active". "Active Pres" sets the Depth to passive
and the Presence to Active. "Active Depth" sets the Depth to active and the
Presence to passive.

Added support for new OEM LCD driver chip.

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7.17

NOTE: This release will likely alter the sound of your presets slightly. It is
highly recommended that you audition your presets after installing this update.

Reworked Presence and Depth modeling algorithms. The Presence and Depth
(formerly Deep) parameters in the amp block now responds like an actual amp's
Presence and Depth (sometimes called Resonance) controls rather than idealized
ones. The Depth control in particular has a more noticable effect on the tone
than before.

Added Bypass Mode and modifier to Volume block.

Changed "Corncob R100" model to account for new Depth algorithm.

Increased the Transformer Match range slightly. Setting Transformer Match to
5.0 is now equivalent to setting it to 5.5 with earlier firmware.

Added "Air" parameter to cabinet block. This control modifies the impulse
response to provide a more present sound and gives more bite and body to the
tone. The effect is most noticable when using high gain. The "Air Freq"
parameter determines the critical frequency of the Air effect. Experiment with
both controls to determine the best settings.

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7.16

Totally rewrote Noise Gate. New algorithm is based on Ultra Gate/Expander algorithm and is a true downward expander. Added Attack Time control.

Added Input1 and Input2 as possible Sidechain sources for Gate/Expander block.

Added Input1 and Input2 as possible Sidechain sources for Compressor block.

Changed maximum Release Rate of Multiband Compressor to match that of regular Compressor block. Existing presets should be auditioned.

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7.15

Changed Noise Gate algorithm. New algorithm has less "chatter" near threshold and faster release, if desired.

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7.14

Added "Reset on Program Change" to Modifier parameters. When set to ON the controlled parameter will be reset to the stored value upon loading the preset. The modifier will not control the parameter until the controller has changed from its previous value. Once the controller has been changed, i.e. pedal moved, the modifier then has control of the parameter.

Increased power detector filtering in Compressor block. This reduces distortion when Attack and Release values are set to very high values. The range of the Release rate parameter has been changed. Existing presets should be auditioned.

Improved Noise Gate by changing filtering and increasing available ratio.

Improved Intelligent Pitch CPU usage.

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7.13

Returned global pitch detector speed to pre-7.12 settings.

Fixed Q4 parameter in Resonator block incorrectly mapped in GUI.

Fixed Compressor Bypass Mode not able to be set.

Improved Octave Divider algorithm. Improved tracking and reduced intermodulation products.

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7.12

Fixed Editor unable to profile Noisegate.

Improved tuner accuracy and stability.

Changed some Reverb defaults.

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7.11

Fixed crash in Multidelay if Master Rate set to zero (divide-by-zero).

Fixed crash if bass at zero on Jazz model and tonestack frequency changed.

Improved CPU usage for modulation effects when using sine waveform type.

Improved Pitch Shifter "smoothness".

Improved Plex Delay algorithm and added Master Time parameter.

Added Reverb spillover. Note: Reverb will NOT spill over if going to/from a
Vintage type from/to a different type.

Added navigation features:
   - When in a list menu pressing right or left arrows moves by four items.
   - In a knob menu pressing up or down moves by two knobs.

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7.10

Improved Gate/Expander algorithm and CPU usage. Note: the ranges of the attack,
hold and release parameters have changed. Existing presets should be
auditioned. The Gate can now open and/or close faster, if desired.

Improved Multiband Compressor algorithm and CPU usage.

Added Byp Mode parameter to Compressor.

Fixed midiSetGrid() function checksum fail bug.

Fixed inadvertent 6 dB boost in HF level in Rotary.

Fixed Freq knob in Synth block stuck.

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7.09

Improved Studio Compressor algorithm.

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7.08

Fixed Pedal Compressor gain sticking on preset change. Also improved behavior
when sustain is modified.

Added ability to turn off Tuner sysex data streaming. To disable data streaming
set "SEND TUNER SYSEX" to "OFF" in the I/O->MIDI menu.

Increased Output Clip detector sensitivity slightly. This will ensure that
clipping is detected before onset.

Fixed Tuner Offsets text corrupted if activating tuner by MIDI CC. This was
simply a display issue and did not affect the actual offsets.

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7.07

Fixed Synth block frequency being overwritten by 2nd Synth block.

Fixed Delay block LFO depth not being updated on tempo change.

Fixed Drive block mix control affecting balance.

Replaced "4x12 V30" cab with new IR. Sounds similar to pre-7.05.

Replaced "4x12 30W" cab with new Mesa IR.

Reprocessed the following IR's for better sound quality:
2x12 Boutique
4x10 Bass
4x12 75W
4x12 T75

Set "MR Z 38 SR" bias to default to 0.75 (as it should, previously defaulted to
0.35).

Increased amount of drive available in Cab block. Any presets using the Drive
parameter will need to be auditioned.

Improved speaker distortion modeling in Cab block. New algorithm models change
in impedance as voice coil leaves air gap.

Improved Pedal type in Compressor block. Improved detector algorithm. Also,
independent control over attack and release rates is now provided. Existing
presets will need to be auditioned.

Added several functions to support new editor software and upcoming MFC-101 MIDI
Controller.

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7.06

Fixed Master knob in Amp block not moving if modifier attached.

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7.05

Fixed garbage in Compressor input detector if selecting a null sidechain source.

Improved variable delay algorithm (chorus, flanger, etc.). Sidelobe clutter now reduced to immeasurable levels.

Improved interpolation filters (again) by fine-tuning window.

Removed "4x12 V30" IR and replaced with Marshall V30 IR.

Removed "4x12 Recto2" IR and replaced with new Oversize Mesa IR.

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7.04

Fixed tuner displaying wrong string number.

Added "Corncob R100" model.

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7.03

Fixed wrong treble peaker cap value on Fryette D60 models.

Added "Solo X99" models. All three channels modeled.

Reworked Solo 100 model. Now has a bit more gain and "heavier" sounding.

Reworked Recto 1 model. Now more accurate. Renamed "Recto Orange". Sounds fuller and grittier.

Reworked Recto 2 model. Now more accurate. Renamed "Recto Red". Model now defaults to no Damping as in the original Dual Rectifier Solo head. You can turn the Damping up if desired.

Reworked Class A and Top Boost models. Minor tweaks.

Changed Delay drive to emulate tape overdrive. Makes overdrive sound more natural and pleasing.

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7.02

Added Input Diffusion to Vintage Reverb types.

Fryer models renamed to Fryette with permission from Fryette Amplification.

Improved Power Supply modeling in Amp blocks.

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7.01

Fixed bug in Intelligent Harmonizer and Arpeggiator where shifting down more than an octave caused dropouts on very low notes.

Added code to detect if Delay Type was Looper in source and destination preset and allow spillover of Looper data.

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7.00

Added Input Diffusion and Diffusion Time parameters to Reverb (Ultra only). The input diffuser can be used to thicken the reverb tail and delay the onset of the decay. This improves intelligibility and reduces clutter while improving overall reverb sound. Diffusion has been renamed "Wall Diffusion" as this more correctly describes its function

Increased Tuner display filtering slightly.

Fixed active tonestack midrange controls not working properly for some models.

Fixed Mixer not responding properly to Enter button.

Added code to clear Delay block if previous preset was looper and Delay Spill is on.

Totally reworked power amp modeling. New power amp model is tighter and more defined than before with more "character" and responsiveness.

Added Power Amp Bias control (PWR TUBE BIAS in Advanced menu). This parameter can be used to fine-tune the virtual power tubes' bias points. A value of zero corresponds to full Class B operation. A value of one corresponds to full Class A operation. Values in between are therefore Class AB. For traditional Class AB power amps (i.e. Marshall, Fender, etc.) a value of 0.35 is considered the "optimum" bias point. For traditional Class A amps, (which aren't really true Class A, i.e. Vox, Matchless, etc.) a setting of 0.75 corresponds to the typical bias value these amps are run at. Lower values of bias increase the amount of crossover distortion, add "hair" to the sound and make the power amp more "explosive" since the transfer function slope increases with input level. Higher values of bias yield less distortion, "rounder" sound, more linear response and a more compressed feel. At high Master Volume settings the effect of bias may be subtle. As the Master Volume is turned down the audible effect is more pronounced. Increasing the Damping increases the linearity of the power amp and also serves to reduce the audible effect of the bias control.

Added "USA MIIC+" models. Both are lead channel models. First model is with pull bright off, second with it on.

Added "Fryer D60" amp models. The "L" is with the gain switch in the Less
position, "M" in the More position.

Added "Mr. Z 38 SR" amp model.

Added "Euro Uber" amp model.

Added "PVH 5105" amp model. High-gain input, lead channel modeled.

Tweaked Recto models slightly. Tightened up bass slightly.

Added "M-Zone Dist" drive model.

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6.10

Added Dry Delay parameter to Flanger block. This allows Through-Zero Flanging
(TZF). By experimenting with combinations of Time and Dry Delay you can achieve
wild TZF effects. Also added capability to phase invert either or both wet
signals. In conjunction with the Dry Delay this can further accentuate TZF
effects.

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6.09

Fixed bug where removing route caused instability.

Fixed global amps not recalled correctly.

Set default delay ducking amount to 0.0 dB.

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6.08

NOTE: THE NEW INPUT VOLUME CONTROL WILL LIKELY NEED TO BE RESET AFTER
INSTALLATION OF THE FIRMWARE. SET TO "NONE" TO DEFEAT THIS FEATURE. YOU MAY
NEED TO POWER CYCLE THE UNIT AFTER RESETTING THIS PARAMETER.

The Enhancer, Filter and Volume blocks now have Pan Left and Pan Right controls.
The controls allow panning the left or right output signal in the stereo field.
Theses blocks can now be used as generic stereo manipulation blocks. You can use
these controls to adjust the stereo image, pan both signals to one side or turn
a stereo output into two mono outputs.

To eliminate confusion many controls previously labeled "PAN" are now labeled
"BAL" (balance) as this is more representative of the control's function.
Balance adjusts the relative level of the left and right signals. Pan, on the
other hand, adjusts the position of a single signal in the stereo field.

Added features to Enhancer block. You can now invert either or both channels
and control the panning of each channel.

Changed Master Pitch range to –100 to +100 percent. Any presets using Master Pitch other than 100% will need to be auditioned/edited.

Added Input Volume control. You can now adjust the input volume (using a pedal input or MIDI CC). Some people prefer adjusting the volume at the input as this mimics a volume pedal before an amp and allows effect tails to ring out. NOTE: Be sure to check the setting of this on the I/O->CTRL page!!! The value after installation of the firmware will likely be PEDAL 2 and if PEDAL 2 is set to latching will result in no sound from the unit. Set to NONE to defeat. You may need to power cycle the unit after resetting this.

Added modifier capability to Amp block Drive control. NOTE: This places a heavy burden on the CPU. If you attach a modifier to the Drive control your CPU usage may increase several percent. The Boost function has been moved to below the Type knob.

Added modifier capability to Amp block Master control.

Exposed amp modeling power supply filter capacitance. This parameter, under the advanced page and labeled "B+ CAPACITANCE", allows you to adjust the B+ capacitance of the amp model. Defaults to preset value on type change. Increasing value stiffens response and tightens bass. Decreasing value loosens response. Use in conjunction with Sag control to set response.

Added Bright Cap parameter to Amp block. You can now adjust the value of the "Bright Cap" across the virtual Drive pot. Defaults to a preset value on type change. Naturally, the Bright Switch (under the Treble control) must be on to hear the effect.

Added Deep parameter to Amp block. This replaces the previous Deep switch and allows the actual amount to be varied. This is analogous to the Deep control on some modern guitar amps. The Deep control is on Page2 of the Amp menu. Its value defaults to a default value upon type change. The old Depth control has been moved to the Advanced page and relabeled TRNSFRMR MATCH (Transformer Matching) as this is more descriptive of its function.

Tweaked "Jr. Blues" model. Adjusted speaker resonant frequency and preamp-to-poweramp coupling capacitor. Fixed wrong value for bass pot. Changed mid pot taper to agree with newer "cream" models.

Added "Eggie R20" model.

Added Low Cut, Hi Cut, Clip Type and Bias parameters to Drive block. These parameters default to values when the Drive type is selected but may be overridden.

Tweaked the default high cut frequency on some of the Reverb types.

Improved pitch detection algorithm. False locks have been eliminated. Tracks better on complex chords. Tuner can detect lower notes.

Removed Delay Ducker on/off switch as this was redundant. To defeat ducker simply set Ducker Attenuation to 0 dB.

Added Filter Slope selection to Delay block. Filter slope can be selected as 6, 12 or 18 dB/octave.

Tap Tempo now intelligently detects momentary or latching tap.

Fixed a couple knobs responding to Enter that shouldn't.

Tweaked MIDI code some to improve editor interaction. Will require new editor version for best benefit.

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6.07

Reduced pops when changing between presets, especially when "Top Boost" and certain other models were involved.

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6.06

Improved anti-aliasing filter performance by tuning window coefficients.

Added Master Feedback control to Delay block Stereo and Dual types.
NOTE: Existing presets may be affected by this addition. Audition your presets for proper operation. Set Master Feedback to 100% if not already.
Updated factory presets are available on the website.

Improved pitch tracking for Synth block.

Re-worked Tube Drive model.

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6.05

Fixed crash when selecting Trapezoidal type for LFO.

Tuned CA3+ LD model.

Tuned Energyball model.

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6.04

Fixed minor glitch in amp block drive parameter if drive set to max for certain amp types.

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6.03

Added "CA3+" rhythm and lead models.

Improved preset switching speed.

Fixed wrong labels on Auto Pitch menu.

Added Trapezoidal LFO waveform. Expanded chorus to be able to use the entire
range of LFO waveforms. If anything but sine is selected, however, the maximum
number of voices is limited to two.

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6.02

Fixed user cabs not mapped if upgrading from 6.00 or earlier firmware.

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6.01

Reordered cabinets to group like types together. Old presets are automatically
parsed and converted on recall, no need to manually update.

Fixed incorrect bass cap and pot taper in Energyball tone-stack.

Fixed compressor input filter not working.

Fixed compressor soft-knee mode not soft. Reworked soft-knee algorithm. There
are now three soft knees to choose from: soft, softer and softest. The knee
transition region is 5, 10 and 20 dB respectively.

Tweaked code to reduce CPU utilization slightly.

Removed MIDDLE tone-stack position. PRE now automatically puts the tone-stack
in the appropriate position for the selected amp model.

Added layout editing shortcuts. When in the Layout->Edit menu pressing EXIT
when on an effect will jump to changing that block to a shunt. If the block is
a shunt pressing EXIT will jump to none.

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6.00

NOTE: THIS IS A MAJOR RELEASE. YOUR PRESETS MAY SOUND DIFFERENT. AUDITIONING
YOUR PRESETS IS HIGHLY RECOMMENDED.

Added the following cabinet models:
    - 1x12 E12L: Based on EV 12L 1x12
    - 1x12 STUDIO: Based on Mesa Studio 22 1x12
    - 1x12 OPEN: Based on open-back Eminence 1x12
    - 1x12 BLUES: Based on open-back Fender 1x12
    - 1x15 BLUES: Based on Peavey Delta Blues 1x15
    - 2x12 BOUTIQ: Based on Matchless 2x12

- 2x12 GOLD: Based on Celestion Gold 2x12
- 2x12 G12H: Based on Celestion G12H 2x12
- 4x12 RECTO: New IR from Mesa Oversized 4x12
- 4x12 V30: Based on Framus 4x12
- 4x12 T75: Based on Marshall 4x12
- 4x12 GERMAN: Based on Bogner 4x12
- 4x12 METAL: Based on Engl 4x12
- 4x12 JM2000: Based on Marshall JCM2000 4x12
- 4x12 SOUTH: Based on Peavey 6505 4x12
- 8x10 BASS: Based on Ampeg SVT 8x10
- 1x15 BASS: Based on SWR 1x15

Reprocessed all cabinet IR's to 1024 samples. Cabinet block can now be run in three modes:
- MONO HIRES: Mono 1024 sample convolution
- MONO LORES: Mono 512 sample convolution
- STEREO: Stereo 512 sample convolution

Mono Lores can be used to decrease CPU requirements as processing load will be cut roughly in half.

NOTE: Any presets using user cabs will be affected. The cabinet type will incorrect and require adjustment. Also, user cabs will need to be reprocessed and reloaded to support the new IR length.

To load user cabs now the location is determined by the selected user cab in Cabinet1 block. To load an IR into a user location select the desired user cab location, i.e. "USER 2" and then send the sysex file. The IR will load into the USER 2 cabinet location.

Reworked several amp models slightly. Adjusted final output gain.

Added "Thump" modeling to power amp simulation. This models the output transformer interaction with the speaker impedance. The amount of thump is adjustable from 0 – 10. Value is set to a default value when amp type is selected. When using a tube power amp you may want to set this to zero as the tube power amp will produce it's own thump. To facilitate this the global power amp bypass has an additional mode that deactivates the thump modeling.

Reworked Hiwatt (HIPOWER) models. Refined cathode cap values, tone stack and tone stack placement. Be sure to reselect amp type to load new values.

Added new tone stack position: MIDDLE. This places tone stack midway between gain stages.

Added bass amp model SV BASS. Modeled after Ampeg SVT.

Added Slew Rate limiting modeling to drive block. This models the slew rate limiting produced by early op-amps. Increasing the SLEW LIMIT parameter limits the large signal frequency response of the virtual op-amp. Adjust to taste. Set to zero to deactivate.

Added 2nd-order mode to phaser.

Added "Pedal Style" compressor. The compressor now has a new pedal-style compressor based on feedback topology. Set the type to "Pedal" to select (set to "Studio" for the original compressor algorithm). This type is more responsive and may be more suited to certain guitar styles.

Fixed compressor CPU load changing when activated vs. bypassed.

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5.26

Fixed popping on preset change when using volume block.

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5.25

Fixed MultiDelay block crashing on modifying Master Q.

Improved preset switching speed.

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5.24

Fixed some knob positions not set properly when modified in Drive, Format, Synth and Quad-Chorus blocks.

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5.23

NOTE: Support for presets created with Version 3.xx or earlier firmware has been dropped. If you are upgrading from Version 3.xx or earlier, upgrade to 5.22 first and run the "Update All Presets" utility in the Utility->Preset menu.

Changed range of frequencies on Resonator block to allow more varied tones. Audition any existing presets that use the Resonator block.

Added Mono|Stereo input select to Resonator block. In Mono mode (default) left and right are summed and fed to all four resonators. In stereo mode the left input is fed to the first two resonators and the right is fed to the last two.

Improved preset change behavior to reduce pops and clicks.

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5.22

Changed Delay block algorithm to eliminate zippering on tempo changes. Reworked modulation for better sound quality.

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5.21

Fixed value strings being overwritten by Delay block when modifier attached to
certain parameters.  This typically showed up in the Global Amp type being
overwritten with a percent value.

Improved Reverse Delay algorithm.  Doubled the available snippet length, changed
crossfade method and improved overall performance and sound quality.  Phase
Reverse parameter now works as well.  NOTE: Crossfade range has been changed
from 1 to 255 ms.  Audition existing presets.

Added modifiers to Dual Delay Left and Right level controls.

Added Mix control to compressor.  For presets created prior to this release the
mix value will be zero.  You will need to adjust the mix to the desired amount
and re-save the preset.  Set to 100% for pre-5.21 sound.

Added Mix control to Drive block.

Added new tonestack placement option "END".  This places the tonestack after the
power amp simulation.

Added Warmth parameter to Power Amp simulation.  This parameter can be found in
the Advanced menu and controls the power tube and transformer interaction.  Set
to zero for pre-5.21 sound.  Increasing this value increases the apparent warmth
and depth of the tone, especially as the power amp is driven harder.  This
parameter defaults to a non-zero value whenever a new amp type is chosen.

Fixed bug in Whammy where pitch would be stuck.  Only affected standard models.


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5.20 (internal release)

Improved Reverb algorithm by adding initial density control.


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5.19

Fixed vector being clobbered bug in Out1-to-Out2 copy feature.


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5.18

Fixed Global Mix parameter not working in Ringmod and Resonator blocks.

Fixed level of Output2 6 dB greater than Output1 when using Out1-to-Out2 copy
and Out1 set to L+R sum.
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Improved power amp modeling by improving speaker interaction model.

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5.17

Fixed distortion in delay block if a very low value of modulation depth is being used.

Fixed vector corruption in Out1-to-Out2 copy feature when using certain routings.

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5.16

Added diffuser to Quad-Tap algorithm. The diffusor is located at the input of the delay line. This can be used to smear the echoes. Diffusion sets the mix level and Diff Time sets the length of the diffusers.

Added code to defeat filtering in Delay block if Lowcut and Highcut are at their respective minimum and maximum values. This allows for infinite delays with no degradation.

Added ability to attach modifier to Drive block Drive control.

Added "Copy Out1 to Out2" feature. This parameter is located in the I/O->Audio menu. When set to ON the data at the main outputs (Output1) is copied to Output2 if the effects loop is not in use. The data at Output2 is affected by the Output2 Global EQ but not the Output1 Global EQ. This allows easily configuring a separate stage monitor and FOH send. Use Output1 to FOH and Output2 to stage monitor. If the effects loop is in use this parameter is ignored.

Fixed Mega-Tap time and level values being corrupted on edit/recall.

Fixed unequal L/R levels when Output1 mode set to SUM L+R.

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5.15

Reprocessed all cabinet impulse responses to increase dynamic range. Reworked cabinet block to take advantage of increase.

Added "4x12 CALI" cabinet model. Nice sample of a Mesa Traditional cab.

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5.14

Fixed verify on preset backup to flash incorrectly stating failed (standard only).

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5.13

Fixed Ducker causing exception when Threshold at 0.0 (divide-by-zero).

Fixed Global Levels conflicting with MIDI map at 12 and 21. NOTE: you may need to reset your levels after update.

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5.12

Fixed Bright, Deep, etc. "pull" switches not being saved when using Global amp.

Fixed Quad Chorus crashing if all rate multipliers at minimum and master rate very low.

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5.11

Fixed 1x12 Thiele IR accidentally compiled into 1x6 Oval cabinet slot.

Fixed mild zipper noise in panner when using extreme widths/rates.

Added verify step to flash process. Added retry if verification fails. Unit now automatically reboots when flash is complete.

Added slightly more range to LCD contrast control.

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5.10

Fixed Dual Delay pan values not "sticking".

Added ducking capability to Multidelay block. Existing presets using the Multidelay will need to be auditioned. Turning "Ducker Atten" to 0.0 dB will defeat the ducker. Most, if not all, existing presets should have the attenuation set to 0 dB but you should check to be sure.

Added Gain control to Global Output EQ's. This can be used to reduce/increase the overall level of all presets. When boosting bands on the Global EQ's, output clipping can occur. This control allows you to compensate for this. The value of this parameter should be verified after installing the new firmware.

Fixed crash when using "Vintage" tone-stack due to arithmetic exception.

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5.09

Improved power amp modeling by more accurately modeling high-frequency
interaction with speaker impedance.

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5.08

Fixed Volume blocks taper not sticking.

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5.07

Fixed CC bypass of effects not working properly if autoengage on and Ignore
Redundant Program Change true.

Added MIDI bypass of Volume blocks. Volume1-4 now show up in I/O->MIDI menu and
will likely need to be set/initialized. Wah1,2 controller numbers will also
likely need to be reset.

Reduced autoengage point to 15%.

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5.06

Fixed loading single preset via MIDI hang.

Returned Autoengage to pre-5.05 operation and changed engage point to 20%.

Added Marshall Bluesbreaker and Shredmaster Drive models.

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5.05

Fixed Multiband Compressor mute bypass mode not muting.

Mute output if exceeding CPU limit to prevent "stuck vector" squeal.

Added Master Pan parameter in Dual mode for Delay block.

Changed bypass control so that setting bypass state via MIDI operates the same
as setting state via front panel. This will cause Edited LED to light and is
considered normal operation.

Vectorized wet/dry values to eliminate chirping and volume surges when
engaging/bypassing effects.

Totally reworked Drive block. Changed tone control to passive emulation.
Updated/tweaked all models. Fixed mistakes in Big Muff Pi and Boss SD-1 models.

Changed names of some models. Removed old Super OD model and replaced with new Boss SD-1 model. Put MXR Distoriton+ where old SD-1 model was.

Changed Drive block level control position to eliminate volume surges when engaging/bypassing.

Fixed clicking/popping on preset changes to presets using Multidelay block due to shared semaphore.

Fixed delay spilling over when delay spill off if delay time very long.

Changed Global EQ's to 8-band Graphic. Moved phase controls to I/O menu. NOTE: If updating firmware the 8-band Graphic EQ's will need to be set/updated (double-click BYPASS to zero all bands).

Fixed Autoengage incorrectly engaging blocks due to "leftover" data from previous preset.

Reworked Autoengage to operate better. Now engages at any point above 5%.

Fixed Pitch Shifter not shifting correctly for certain scales due to incorrect min/max shift limits. Fixed custom scales not loading right on preset recall due to scale being shared by both blocks and therefore being overwritten.

Fixed Harmonic Minor and Melodic Minor scale type labels swapped.

Added offset nulling to Amp and Drive blocks to reduce clicks and pops on preset changes.

Fixed Reset System Parameters not working due to SRAM lockout.

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5.04

Added code to ignore MIDI Active Sense messages.

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5.03

Fixed modifiers not being disconnected properly on patch recall.

Added input select to Amp block.

Decreased preset recall latency.

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5.02

Fixed shunt not being placed when using editor.

Changed LCD update process to prevent command corruption.

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5.01

Added modifier checking to delete bogus modifiers connected to illegal effects/parameters.

Changed preset recall routine to run faster and switch quieter.

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5.00

Added passive tone control option to amp blocks. Global parameter allows choosing between active and passive as default when selecting amp type.

"Reference Class" pitch shifting including:

        Improved intelligent pitch shifter, especially for large shifts.

        Improved forward/reverse shifter used in Plex Detune, Plex Shift and Crystals algorithms.

        Selectable in-block pitch detector allows for detecting pitch at block input giving far greater stability when using pitch feedback.

        New hybrid time-domain/frequency-domain pitch detector in pitch block can track chords (Ultra only).

        Pitch-tracking now compensates for shift amount resulting in more natural shifts.

        Wider filter on pitched notes gives more bell-like and musical quality.

        Adjustable low-pass filter.

Fixed shared memory error between pitch blocks.

Master feedback in pitch block now affects crystals algorithm as well. Existing presets may default to 0%. Set to 100% for proper operation.

Added mono options to I/O. User can now select between stereo (default), L+R sum or copy left to right options.

Added many new possible tempos, i.e. 15/16, 1/64., etc.

Changed formant Q range from 2-20 to 4-40. This allows for a more intense effect. Existing presets will need to be auditioned due to range change.

Added filter type selection to outer bands on parametric EQ block. Choices are now shelving, peaking and blocking (i.e. highpass).

Fixed "WRECKER 1" model tone frequency. Originally it was incorrectly set at 200 Hz.

Fixed Powerball model. Schematic was intentionally incorrect leading to a myriad of improper values. Changed name to "ENERGYBALL".

Added "PLEXI 2" amp model. Similar to original Plexi model but with different treble peaker on volume control and other minor changes.

Improved biquad and 1st-order filter performances. Results in smaller footprints and improved execution times.

Improved interpolation algorithm (Ultra only) used in chorus, flanger, and pitch blocks.

Improved allpass filter performance, gives slight improvement to phaser execution speed.

Reworked GUI code to improve efficiency and responsiveness, especially at high CPU loads.

Added RUN parameter to sequencer. This starts/stops sequencer. Parameter is modifiable. NOTE: parameter defaults to OFF and any old presets will need to be updated.

Added tempo controls to the Delay block LFOs.

Added "FET BOOST" type to Drive block.

Added "TAPE DIST" type to Drive block. This simulates distorion as would be encountered when overdriving a studio reel-to-reel tape recorder.

Reworked Drive block for better sound.

Added delay time parameters to Pitch block for Detune mode.

Added mod ability to dual delay times.