Proteus 2000
Software Version 1.10

This Proteus 2000 software update reflects E-MU's commitment to constant improvement and long-term product value. Proteus 2000's advanced design stores the operating system in rewriteable Flash memory which allows you to download and run the latest software as new features are developed.

The current software for Proteus 2000 is always available on the official E-MU web site (www.emu.com) or from your E-MU dealer. E-MU's "OS Downloader" application (also available on our web site) makes it a snap to download the software into your Proteus via MIDI.

If you don't yet have access to the world wide web, you may obtain this software from your authorized E-MU dealer or you may contact us directly.

New Features!

New Preset PatchCords & Processors - Preset Ramp, Preset Lag & more!

50 Filter Types!

Proteus 2000 now contains 50 different types of E-MU's celebrated Z-plane filters. Swept Octave Equalizers, Phasers, Flangers, Vocal Formant Filters, and classic synthesizer filters are all represented, together with several completely new species. Many of these new types are 12th order filters. Most standard synthesizer filters are either 2nd or 4th order filters. Proteus 2000's 12th order filters provide far more control and power, enabling you to create new classes of sounds unobtainable on any other synthesizer.

Support for Proteus Sound Authoring

Now you can create your own custom Sound SIMMs for Proteus 2000!

Improved MIDI Responses

Proteus 2000's response to MIDI "All Notes Off", "All Sound Off" and "Reset All Controllers" has been improved. Proteus now works better with Roland and Kawai keyboards.

Other Improvements (Bug Fixes)

- The LCD now refreshes correctly after a SysEx Program Change
- Intermittent wrong FX delay times after rapid program changes - Fixed

Preset Modulation Processors

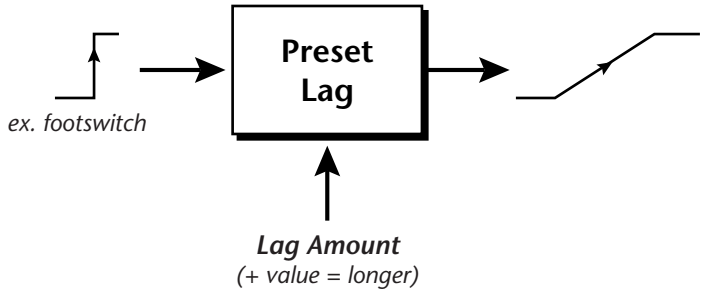
Preset Modulation Processors start working as soon as the preset is selected. The Layer Modulation Processors take effect only when a key is pressed.

There are also two "Preset Level" modulation processors located in the "Preset Patchcords" screen of the Edit menu. It is important to understand that although the preset processors *originate* at the *Preset Level PatchCords*, their output is used in the *Layer PatchCords*.

Preset Lag

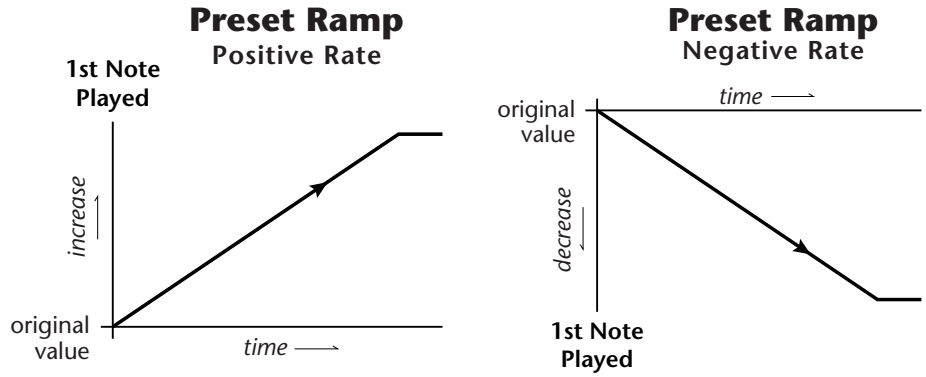
Like the Layer Lag processors, the Preset Lag slows down rapid changes in the input signal. The output "lags" behind the input at a pre-programmed rate. Unlike the layer level lag processors, the *preset lag* begins following it's input as soon as the preset is selected. In contrast, the layer level lag processors begin acting only after a keyboard key has been depressed. The Preset Lag also has a *Lag Amount* input which controls the lag time. Positive lag amounts increase the lag time. A MIDI controller *(front panel knob)* is commonly used to control lag amount.

The preset lag is often used to "spin-up" and "spin-down" an LFO which controls some other effect, perhaps left/right panning, pitch, or the filter. A MIDI footswitch could be used as the input to the lag which acts to slow down the instantaneous change of the switch. The slowly changing output value is then routed using a layer patchcord to crossfade between layers or change the speed of an LFO.



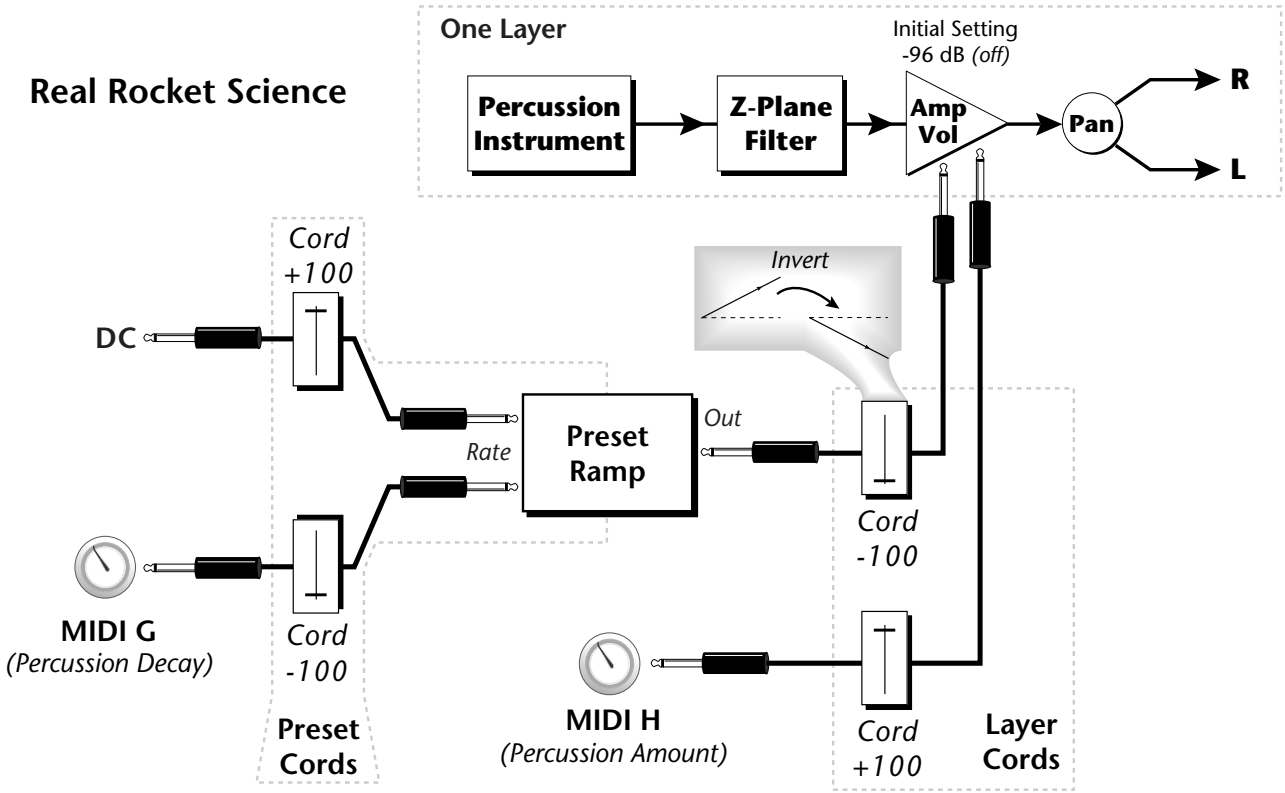
Preset Ramp

This processor generates a positive or negative going slope whenever the **first** key is depressed on the MIDI channel.



The preset ramp instantly resets when all notes have been released and the next *first key* on the MIDI channel is pressed. The Ramp Rate polarity *(+ or -)* determines if the ramp will be positive or negative going. The value of the ramp rate sets the increment. Large values produce fast ramps and small values produce slow ramps. Multiple inputs can be connected to the ramp rate (just like all the other destinations in Proteus 2000).

The patch below shows an application for the Preset Ramp which generates an adjustable decay envelope ONLY on the first note played to bring in the sound from another layer. Instead of routing the output to the Amp Volume you could just as easily route it to control Pitch, LFO Speed or any other destination you can think of. Study this patch if you want to learn a few new tricks using the patchcords.



The combination of the DC & MIDI G Cords has the effect of reversing the MIDI G knob. The decay time increases as the knob is turned up.

1. **DC** - Sets initial ramp Fast-Positive (+100)
2. **MIDI G** - Inverted value slows ramp as the knob value is increased.
3. **Ramp Out Cord** - Inverts Ramp slope (downward).
4. **Amp Vol** - Initial setting is Off (-96dB). Ramp cannot overcome this negative bias.
5. **MIDI H** - When this knob is turned up, the positive bias on the Amp is restored so that so that the Ramp can now affect Amp Volume.
6. **Volume Envelope** - Fast Attack, Full Sustain, No Release

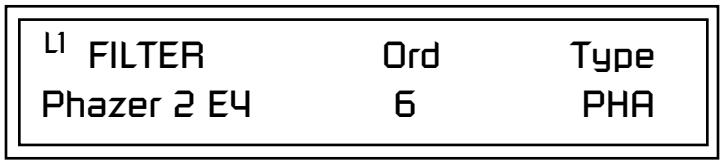
50 Filter Types

Proteus 2000 contains 50 different types of E-MU's celebrated Z-plane filters. In addition to the standard Low pass, High pass and Band pass filters, Proteus 2000 contains Swept Octave Equalizers, Phasers, Flangers, Vocal Formant Filters, and digital models of classic synthesizer filters.

In the filter chart below you will notice that the "Order" of the filters varies from 2nd to 12th order. Higher order filters have more sections and can produce more complex formants. Proteus 2000 can produce 128 filters of up to 6th order or 64 filters of 12th order complexity. Therefore, if you decided to use all 12th order filters, Proteus 2000 would be limited to 64 voices. Proteus 2000 dynamically allocates the available filter sections as needed for maximum channel count. *See the Programming Basics chapter in your manual for more information about the "order" of filters.*

Filter Types

This screen allows you to choose the type of filter for the current layer.



Filter Types	
LPF	Low-pass filter
HPF	High-pass filter
BPF	Band-pass filter
EQ+	EQ boost
EQ-	EQ cut
VOW	Vowel / formant
PHA	Phaser
FLG	Flanger
REZ	Special resonance
WAH	Wah-wah
DST	Distortion
SFX	Special Effect

Filter Name	Order	Type	Description
Smooth	02	LPF	Typical OB type low-pass filter with a shallow 12 dB/octave slope.
Classic	04	LPF	4-pole low-pass filter, the standard filter on classic analog synths. 24 dB/octave rolloff.
Steeper	06	LPF	6-pole low-pass filter which has a steeper slope than a 4-pole low-pass filter. 36 dB/octave rolloff!
MegaSweepz	12	LPF	"Loud" LPF with a hard Q. Tweeters beware!
EarlyRizer	12	LPF	Classic analog sweeping with hot Q and Lo-end.
Millennium	12	LPF	Aggressive low-pass filter. Q gives you a variety of spiky tonal peaks.
KlubKlassik	12	LPF	Responsive low-pass filter sweep with a wide spectrum of Q sounds
BassBox-303	12	LPF	Pumped up lows with TB-like squelchy Q factor.
Shallow	02	HPF	2-pole high-pass filter. 12 dB/octave slope.
Deeper	04	HPF	Classic 4-pole high-pass filter. Cutoff sweep progressively cuts 4th Order High-pass.
Band-pass1	02	BPF	Band-pass filter with 6 dB/octave rolloff on either side of the passband and Q control.

Filter Types

LPF Low-pass filter

HPF High-pass filter

BPF Band-pass filter

EQ+ EQ boost

EQ- EQ cut

VOW Vowel / formant

PHA Phaser

FLG Flanger

REZ Special resonance

WAH Wah-wah

DST Distortion

SFX Special Effect

Filter Name	Order	Type	Description
Band-pass2	04	BPF	Band-pass filter with 12 dB/octave rolloff on either side of the passband and Q control.
ContraBand	06	BPF	A novel band-pass filter where the frequency peaks and dips midway in the frequency range.
Swept1>1oct	06	EQ+	Parametric filter with 24 dB of boost or cut and a one octave bandwidth.
Swept2>1oct	06	EQ+	Parametric filter with 24 dB of boost or cut. The bandwidth of the filter is two octaves wide at the low end of the audio spectrum, gradually changing to one octave wide at the upper end of the spectrum.
Swept3>1oct	06	EQ+	Parametric filter with 24 dB of boost or cut. The bandwidth of the filter is three octaves wide at the low end of the audio spectrum, gradually changing to one octave wide at the upper end of the spectrum.
DJAlkaline	12	EQ+	Band accentuating filter, Q shifts “ring” frequency.
AceOfBass	12	EQ+	Bass-boost to bass-cut morph
TB-OrNot-TB	12	EQ+	Great Bassline “Processor.”
BolandBass	12	EQ+	Constant bass boost with mid-tone Q control.
BassTracer	12	EQ+	Low Q boosts bass. Try sawtooth or square waveform with Q set to 115.
RogueHertz	12	EQ+	Bass with mid-range boost and smooth Q. Sweep cutoff with Q at 127.
RazorBlades	12	EQ-	Cuts a series of frequency bands. Q selects different bands.
RadioCraze	12	EQ-	Band limited for a cheap radio-like EQ
AahAyEeh	06	VOW	Vowel formant filter which sweeps from “Ah” sound, through “Ay” sound to “Ee” sound at maximum frequency setting. Q varies the apparent size of the mouth cavity.
Ooh-To-Aah	06	VOW	Vowel formant filter which sweeps from “Oo” sound, through “Oh” sound to “Ah” sound at maximum frequency setting. Q varies the apparent size of mouth cavity.
MultiQVox	12	VOW	Multi-Formant, Map Q To velocity.
Ooh-To-Eee	12	VOW	Oooh to Eeee formant morph.
TalkingHedz	12	VOW	“Oui” morphing filter. Q adds peaks.
Eeh-To-Aah	12	VOW	“E” to “Ah” formant movement. Q accentuates “peakiness.”

Filter Name	Order	Type	Description
UbuOrator	12	VOW	Aah-Uuh vowel with no Q. Raise Q for throaty vocals.
DeepBouche	12	VOW	French vowels! “Ou-Est” vowel at low Q.
PhazeShift1	06	PHA	Recreates a comb filter effect typical of phase shifters. Frequency moves position of notches. Q varies the depth of the notches.
PhazeShift2	06	PHA	Comb filter with slightly different notch frequency moving the frequency of notches. Q varies the depth of the notches.
FreakShifta	12	PHA	Phasey movement. Try major 6 interval and maximum Q.
CruzPusher	12	PHA	Accentuates harmonics at high Q. Try with a sawtooth LFO.
FlangerLite	06	FLG	Contains three notches. Frequency moves frequency and spacing of notches. Q increases flanging depth.
AngelzHairz	12	FLG	Smooth sweep flanger. Good with vox waves. eg. I094, Q =60
DreamWeava	12	FLG	Directional Flanger. Poles shift down at low Q and up at high Q.
MeatyGizmo	12	REZ	Filter inverts at mid-Q.
DeadRinger	12	REZ	Permanent “Ringy” Q response. Many Q variations.
ZoomPeaks	12	REZ	High resonance nasal filter.
AcidRavage	12	REZ	Great analog Q response. Wide tonal range. Try with a sawtooth LFO.
BassOMatic	12	REZ	Low boost for basslines. Q goes to distortion at the maximum level.
LucifersQ	12	REZ	Violent mid Q filter! Take care with Q values 40-90.
ToothComb	12	REZ	Highly resonant harmonic peaks shift in unison. Try mid Q.
EarBender	12	WAH	Midway between wah & vowel. Strong mid-boost. Nasty at high Q settings.
FuzziFace	12	DST	Nasty clipped distortion. Q functions as mid-frequency tone control.
BlissBatz	06	SFX	Bat phaser from the Emulator 4.
KlangKling	12	SFX	Ringing Flange filter. Q “tunes” the ring frequency.

Preset Patchcords

Preset PatchCords give you real-time control of global parameters. The effect processors are a powerful synthesis tool and this feature lets you control and use them in exciting new ways. For example, you can dynamically adjust the effects mix during a sequence or live performance.

There are 12 Preset PatchCords per preset with a source, a destination and an amount control. The amount can be set from -100 to +100. The Preset PatchCord controls are ***added*** to the FX Send Amounts set in the Master or Edit menus. In other words, multiple sources connected to destinations are ***summed***.

The Preset Cords allow you to crossfade between effects.

1) Set FXA Send 1 to 100%.
2) Set FXB Send 1 to 0%.
3) Set FX Cord #1 to FXA Send 1 at -100.
4) Set FX Cord #2 to FXB Send 1 at +100.

Increasing the controller amount will crossfade from FXA to FXB.

Modulation Sources:	**Modulation Destinations**
Off	Off
PitchWhl (Pitch Wheel)	Effect A Send 1
Channel Pressure	Effect A Send 2
ModWhl (Mod Wheel - Controller 1)	Effect A Send 3
Pedal (Controller 4)	Effect A Send 4
MIDI Volume (Controller 7)	Effect B Send 1
MIDI Pan (Controller 10)	Effect B Send 2
MIDI A-L	Effect B Send 3
Footswitch 1	Effect B Send 4
Flip-Flop Footswitch 1	**Preset Lag In**
Footswitch 2	**Preset Lag Amount**
Flip-Flop Footswitch 2	**Preset Lag Rate**
Footswitch 3	**Preset Ramp Rate**
Flip-Flop Footswitch 3	
DC	

*Sources and destinations shown in **Bold** are new in version 1.10.*

The following table shows all the Layer level modulation sources and destinations in the Proteus 2000. The new sources are highlighted in **Bold**.

Modulation Sources:	**Modulation Destinations**
Off	Off
Key (+, ±)	KeySust (Key Sustain)
Velocity (+, ±, <)	FinePtch (Fine Pitch)
RlsVel (Release Velocity)	Pitch
Gate	Glide
Pressure	ChrsAmt (Chorus Amount)
PitchWhl (Pitch Wheel)	'SStart (Sample Start) -note-on)
ModWhl (Modulation Wheel)	SLoop (Sample Loop)
Pedal	SRetrig (Sample Retrigger)
MIDI A-L	FiltFreq (Filter Frequency)
PLagOut (Preset Lag Out)	'FiltRes (Filter Resonance -note-on)
PRampOut (Preset Ramp Out)	AmpVol (Amplifier Volume)
FootSw1 - 3 (Foot Switch 1-3)	AmpPan (Amplifier Pan)
FootFF (Flip-Flop Foot Switch 1 -3)	RTXfade (Real-time Crossfade)
MIDI Volume (Controller 7)	VEnvRts (Volume Envelope Rates -all)
MIDI Pan (Controller 10)	VEnvAtk (Volume Envelope Attack)
KeyGlide	VEnvDcy (Volume Envelope Decay)
VolEnv +, ±, < (Volume Envelope)	VEnvRls (Volume Envelope Release)
FilEnv +, ±, < (Filter Envelope)	FEnvRts (Filter Envelope Rates -all)
AuxEnv +, ±, < (Auxiliary Envelope)	FEnvAtk (Filter Envelope Attack)
LFO 1 & 2 (+, ±)	FEnvDcy (Filter Envelope Decay)
White (White Noise)	FEnvRls (Filter Envelope Release)
Pink (Pink Noise)	FEnvTrig (Filter Envelope Trigger)
XfdRand (Crossfade Random)	AEnvRts (Auxiliary Envelope Rates -all)
KeyRand 1 & 2 (Key Random)	AEnvAtk (Auxiliary Envelope Attack)
Lag 0 sum (summing amp out)	AEnvDcy (Auxiliary Envelope Decay)
Lag 1 sum (summing amp out)	AEnvRls (Auxiliary Envelope Release)
Lag 0 & 1 (Lag Processor)	AEnvTrig (Auxiliary Envelope Trigger)
Clk Divisors (Octal, Quad, Double Whole, Whole, Half, Qtr, 8th,16th)	LFO 1 & 2 Rate
DC (DC Offset)	LFO 1 & 2 Trigger
Summing Amp	Lag Processor In 0 & 1
Sum	Sum (Summing Amp)
Switch	Switch
Absolute Value	Abs (Absolute Value)
Diode	Diode
Flip-Flop	Quantize
Quantizer	Flip-Flop
4x Gain	Gain 4x
	Cord 1-24 Amount

Sound Authoring

E-MU Sound Authoring allows you to create your own custom Flash sound bank on an EOS Ultra sampler, then use this custom bank in your Proteus 2000. The following utilities allow you to Copy and Rename the Flash Preset and Sound data. The complete Sound Authoring guide is available on the official E-MU web site (www.emu.com).

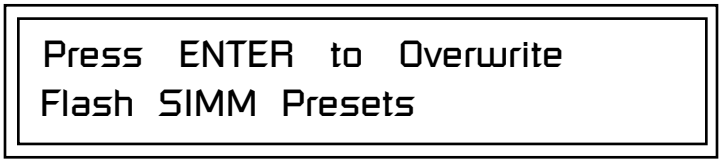
Copy User Bank to Flash

This is a special purpose function to be used with the Sound Authoring feature. Flash SIMMs created on an EOS Ultra sampler can be used with Proteus 2000 as custom banks. Presets are then created in one of the Proteus 2000 User banks. When the bank of presets is finished, it can be copied, using this function, to the FLASH ROM bank. Flash SIMMs contain two separate memory locations. One of these memories contains the sound samples and the other memory can hold four banks of 128 presets.

WARNING: dangerous voltages are exposed inside Proteus 2000! Make sure power is completely disconnected from Proteus 2000 before removing the top panel. Replace the top panel before restoring power to the unit. There are four sound SIMM sockets in Proteus 2000, marked 0, 1, 2 and 3, located behind the controller knobs on the circuit board. **The destination Flash SIMM must be placed in SIMM socket 1.**

▶ To Copy a User Bank to Flash

1. Make sure a Flash SIMM is inserted into an empty Proteus 2000 SIMM socket.
2. Press the Save/Copy menu button.
3. Rotate the Data Entry Control to select the "Copy User Bank" function shown above.
4. Move the cursor to the "From" field and select the User bank that you want to copy to the Flash SIMM.
5. Move the cursor to the "To" field and select the Flash bank that you want to contain the User bank.
6. Press Enter. The Enter LED will flash and the screen below appears.



7. Press Enter again to confirm. The following screen appears:

If there is no Flash SIMM in the unit, the error message, "Requires Flash SIMM" will be displayed.

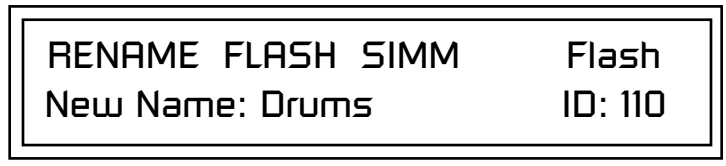
8. The Flash presets cannot be used until Proteus 2000 is rebooted (power off then on). Reboot the Proteus 2000 and verify that the new Flash bank has been properly copied.

Rename Flash SIMM

This utility allows you to rename the Flash SIMM and change its ID number. Flash SIMMs can have any five letter name you choose. Each Flash SIMM in a Proteus 2000 unit must have a unique ID number (106-119).

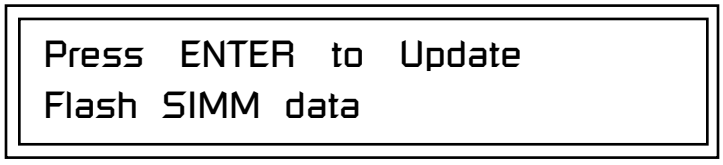
The field in the upper right corner selects between multiple Flash SIMMs. If only one Flash SIMM is installed, the field cannot be modified.

The Sound ID is the MSB of the MIDI Bank Select command used to select the Sound Bank.

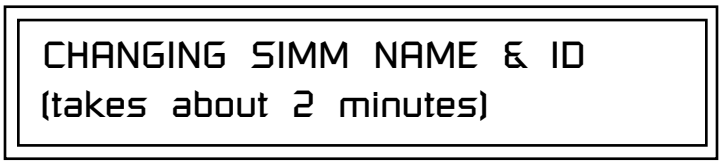


If there is no Flash SIMM in the unit, the error message, "Requires Flash SIMM" will be displayed.

1. Make sure a Flash SIMM is inserted in a Proteus 2000 SIMM socket.
2. Press the Save/Copy menu button.
3. Rotate the Data Entry Control to select the "Rename Flash SIMM" function shown above.
4. Move the cursor to the "New Name" field and rename the SIMM using the Data Entry Control to select the letter and the cursor keys to select the position.
5. Set the Sound ID number for the SIMM. It doesn't matter which number you choose as long as the same number isn't used in another SIMM.
6. Press Enter. The following screen appears and the Enter LED will be flashing.



7. Press Enter again to confirm or any other button to abort. The following screen appears:



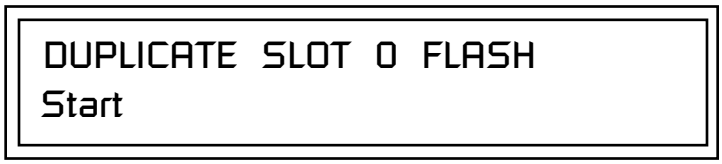
8. The Flash presets cannot be used until Proteus 2000 is rebooted (power off then on). Reboot the Proteus 2000 and verify that the new Flash bank has been properly renamed.

Duplicate Flash

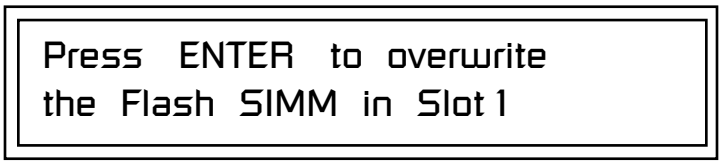
This utility allows you to duplicate Flash SIMMs using Proteus 2000. Both Sound and Preset data is copied when a Flash SIMM is duplicated. A factory sound SIMM cannot be copied using this utility.

WARNING: dangerous voltages are exposed inside Proteus 2000! Make sure power is completely disconnected from Proteus 2000 before removing the top panel. **Replace the top panel before restoring power to the unit.**

The sound SIMM sockets in Proteus 2000 are marked 0-3. These are located behind the controller knobs on the circuit board. The Flash SIMM you want to copy **MUST** be placed into SIMM Socket 0. The destination Flash SIMM **MUST** be placed in SIMM socket 1.

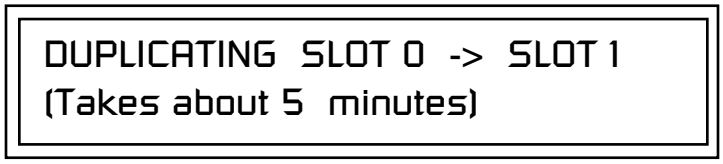


1. Make sure the two Flash SIMM are located in the required Proteus 2000 SIMM sockets.
2. Press the Save/Copy menu button.
3. Rotate the Data Entry Control to select the "Duplicate Flash SIMM" screen shown above.
4. Move the cursor to the bottom line and press Enter. The following screen appears and the Enter LED will be flashing.



5. Press Enter again to confirm or any other button to abort. The following screen appears and the SIMM is copied.

If there are no Flash SIMMs in the unit, or if the SIMMs are in the wrong slots, an error message will be displayed.



6. When Proteus 2000 has finished duplicating the SIMM, turn power off, remove the copied SIMM, then reboot. That's it!

MIDI Fixes

MIDI All Notes Off / All Sound Off / Reset All Controllers

The response to these MIDI Mode Messages has changed in OS 1.10 to be compliant with the MIDI 1.0 Spec. In previous versions of software these messages had a number of bugs. Note that these changes could affect compatibility with sequences authored with earlier versions of Proteus software.

In previous versions the software did not honor the MIDI channel of these messages. Instead, it incorrectly affected all channels. It now correctly only affects the notes started on the MIDI channel of the message. If you want All Notes Off on all MIDI channels you must send individual messages for each channel.

In addition, All Notes Off now correctly honors the state of the sustain pedal. It will no longer shut off notes if the sustain pedal is down on its channel at the time of receipt of the mode message. This behavior is especially important to owners of certain keyboards that send All Notes Off whenever all keys are released (i.e. Kawai, Roland).

Also, receipt of All Notes Off now correctly puts the targeted notes into the release phase instead of shutting down the voice immediately.

All Notes Off is basically equivalent to sending Note Off messages on all notes of a particular MIDI channel. This means that if the sustain pedal is held, the notes are not shut down, but remain in the sustain state until the pedal is released. If the sustain pedal is not down, the notes go to the release phase, allowing the volume envelope to control the shutdown of the notes. All Notes Off should not be used as a Panic message to shut down hung notes since notes will not be turned off if the current state of the sustain pedal is down. In addition, the sound will not necessarily stop immediately, since it goes to the release phase, which means the behavior is preset dependent. If you want the sounds to always shut down immediately, you should be using the All Sound Off message instead.

All Sound Off also incorrectly ignored the channel of the message in pre-1.10 software. It now correctly honors the channel. All Sound Off is different from All Notes Off in that it does not look at the state of the sustain pedal, and shuts off the sound of the notes immediately, ignoring the volume envelope. This is the message to use if you want to send a Panic

message because notes are hung. Note though that this is still a channel based message, so if you really want ALL sound off for the whole box, you need to send this message on each of the active MIDI channels.

Note that if sequences were written assuming the behavior of the pre-1.10 Proteus 2000 software they will need to be re-worked by the user. There has been no attempt to maintain compatibility, since this is considered a bug in the old implementation.

E-MU World Headquarters
E-MU / ENSONIQ
P.O. Box 660015
Scotts Valley, CA USA
95067-0015
Telephone: 831-438-1921
Fax: 831-438-8612
Internet: www.emu.com

Europe, Africa, Middle East
E-MU / ENSONIQ
Suite 6, Adam Ferguson House
Eskmills Industrial Park
Musselburgh, East Lothian
Scotland, EH21 7PQ
Tel: +44 (0) 131-653-6556
Fax: +44 (0) 131-665-0473