

M-AUDIO

Key Rig

Universal Virtual Keyboard Rack



User Guide

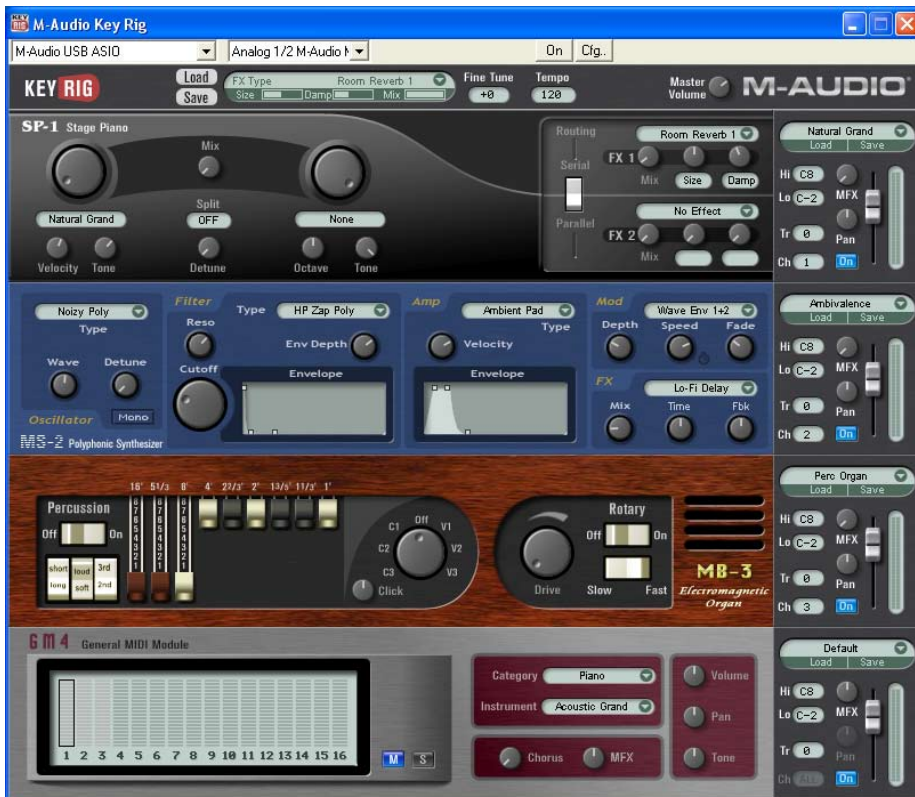
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Introduction

Congratulations on your purchase of the M-Audio Key Rig software. This multi-function application includes four high-quality instruments:

- The SP-1 Stage Piano module provides realistic reproduction of various acoustic and electric pianos, and allows two pianos to be layered together.
- The MS-2 Polyphonic Synthesizer is a subtractive synth that uses traditional analog-type oscillators, as well as wavetable and FM synthesis.
- The MB-3 Electromagnetic Organ is a faithful reproduction of classic tone-wheel organs, including a Leslie rotary speaker simulator.
- The GM 4 is a General MIDI sound module featuring all 128 GM sounds and a percussion kit.



System Requirements

Windows*

- Pentium III - 933 MHz or higher
(CPU may be higher for laptops)
- 512 MB RAM
- 350 MB free hard disk space
- DirectX 9.0b or higher
- Windows XP (SP2) or higher
(Windows 98, Me, NT or 2000 not supported)
- MIDI interface or USB-compatible MIDI keyboard
- CD-ROM drive for installation
- Internet connection (on any computer) for software certification

Other Requirements:

- VST 2.0 or RTAS compatible host software (when used as a plug-in)
- ASIO compatible sound card (for standalone operation)

**Home and Professional Edition only. Windows Media Center Edition is not currently supported.*

M-Audio suggests you also check the minimum system requirements for third-party software applications you plan on using with your new M-Audio software, as they may be greater than the above.

Installation of Key Rig Virtual Instrument Software

1. Insert the KeyRig 49 CD-ROM into your computer's CD-ROM drive.
2. The computer will automatically display the interactive install screen. If your computer fails to launch the installer, manually start it by clicking on Start > My Computer > KeyRig 49.
3. Choose Key Rig virtual instrument from the pull down menu and click "Install."
4. Follow the driver installer's on-screen direction prompts.
5. During setup, the installer will ask you to specify two directories on your computer. The first is for the Key Rig Data Directory and the second is for your VST Plugin Directory. The installer allows you to choose a location for the Key Rig Data (approximately 350 MB) and for your VST plug-in folder. You may specify a custom folder, or leave the default setting.
6. When the installer finishes installing the software, click "Finish."
7. M-Audio Key Rig is now installed on your computer. You will need to certify your copy of the software before you begin making music—please see "Certification" below for these directions.

Certification:

Online:

If your music computer is connected to the internet, follow these instructions for certification:

1. Start M-Audio Key Rig in standalone mode.
2. Click on the M-Audio logo.
3. Double-click the box labeled "Enter Certification Code Here." Enter your certification code (found on the front of the Quick Start Guide) and click Certify On-Line.
4. A website opens with a link to your personal certification file. Download this file to your computer and double-click on it.
5. Restart Key Rig to complete the certification process.

Offline:

If your music computer is not connected to the internet, follow these instructions for certification:

1. Start M-Audio Key Rig in standalone mode.
2. Click on the M-Audio logo.
3. Enter your certification code (found on the front of the Quick Start Guide) and click Certify Off-Line.
4. M-Audio Key Rig places an Internet Shortcut file on your desktop.
5. Using a disk, memory card, or other media, transfer the Internet Shortcut file to a computer with Internet access.
6. Double-click the Internet Shortcut, and a website opens with a link to your personal certification file. Download this file, and transfer it to your music computer.
7. Once transferred to your music computer, double-click the certification file.
8. Restart Key Rig to complete the certification process.

Using Key Rig as a Plug-in

M-Audio Key Rig runs as an RTAS or VST plug-in. Consult your host application's documentation for information on loading instrument plug-ins.

Using Key Rig in Standalone Mode

In addition to support for RTAS and VST plug-in formats, M-Audio Key Rig can run as a standalone application. The standalone version includes controls at the top of the application's window:



The controls are as follows (from left to right):

- Sound Card Selector: click this control to select the desired sound card for audio output. An ASIO-compatible sound card is required for the Key Rig virtual instrument software to operate in standalone mode.
- Output Selector: click this control to choose the audio outputs for Key Rig (for multi-output sound cards only).
- On Button: clicking this button turns Key Rig off or on.
- Cfg...: click this button to open the selected sound card's ASIO Control Panel.

MIDI Configuration

Key Rig does not have its own configuration dialog for the MIDI input port when running in standalone mode. Instead, the software receives MIDI from every MIDI interface installed on the system. This is useful when using multiple MIDI keyboards connected to the same computer in order to control more than one of Key Rig's instruments at the same time. To achieve this, make sure that each of the connected MIDI keyboards is configured to transmit on a different one of the 16 MIDI channels.

Using the M-Audio Key Rig

The M-Audio Key Rig is an application consisting of four instruments, a master effect generator, and global settings. Each of these sections are explained below:

Global

The strip at the top of the Key Rig sets global settings that affect all instruments.



Certification Dialog: to open the Certification dialog, click the Key Rig or M-Audio logos on the left or right side of the top strip of the rig. This window also displays the Key Rig version number information.

Load/Save: the Load/Save buttons at the top of the Key Rig are for loading and saving bank files. These files contain all program/patch information, MIDI channel and MIDI CC assignments, volumes, panning, key range, transpose, MFX (master effects) send, on/off status, etc. for all four instruments within the Key Rig, as well as the global MFX settings, fine tune, tempo, and master volume parameters. The user can also save and load banks via the menu that appears in their host application. Key Rig banks are saved and loaded from a folder called “Key Rig Patches.”

Master FX

Clicking the Master FX section produces a drop-down menu of 49 effects algorithms organized into submenus by type. This menu of effects is exactly the same as the ones available in the SP-1 Stage Piano and the MS-2 Poly Synth. For a listing of effect types, see “Appendix J - Effects Presets”.

Once an effect is selected, the effect name will be displayed and two specially chosen effect edit parameters, plus a mix parameter, will be displayed with useful preprogrammed preset settings. The names of the two effect edit parameters vary depending on the type of effect that is in use. For example, a reverb may display “Size” and “Damp” (room size and damping) for its parameters. A delay may display “Time” and “Fbk” (delay time (speed) and feedback (regeneration)).

- **Mix:** governs the MFX wet/dry balance.
- **Fine Tune:** adjusts the fine-tuning of all instruments in the Rig.
- **Tempo:** allows the user to set a song tempo that will set tempo-sync’ed delays and LFOs when there is no tempo detected from the host by the Key Rig.
- **Master Volume:** controls the output volume of the whole Key Rig.

MIDI CC Controls

Many of Key Rig's parameters can be manipulated remotely from a MIDI control surface or a MIDI sequencer. These devices can send standard MIDI controller messages (MIDI CC's) and program changes as defined in the MIDI specification. All useful parameters in all instruments in Key Rig have MIDI controllers pre-assigned to them.

Right-clicking a parameter opens a CC assignment menu. This enables you to customize MIDI CC assignments using one of two methods.

1. **CC:** Hover the mouse over this option to display a pop-up list of available MIDI continuous controllers, and select the desired continuous controller from the list.
2. **Learn:** Select this option and move a control on your hardware MIDI controller to assign it to the parameter automatically.

This CC assignment menu also has a "Forget" option. Choose this to remove a MIDI continuous controller assignment.

Note: *Each continuous controller may control only one parameter at a time and some host applications may limit the accessibility of MIDI remote features when using Key Rig as a plug-in. Consult your host software's documentation for details.*

Instrument Controls

To the right of all instruments in the Key Rig is an instrument control area and mixer.



Load/Save: in addition to the global Load/Save menus at the top of the Rig, each instrument has its own Load/Save menu and library of patches. Clicking the area above the Load and Save buttons produces a drop-down list of all factory content for an instrument. Patches can be loaded for the instrument by clicking a patch in the drop-down list. The patch will be loaded and its name displayed in the slot. When clicking Load or Save buttons, a Load/Save dialog appears. Patches are loaded and saved into folders with a name corresponding to the particular instrument chosen.

- **Hi/Lo:** sets the highest and lowest notes for the instrument's key range.
- **Tr:** transposes the instrument by any amount within a range of plus or minus 24 semitones.
- **Ch:** selects the MIDI channel used to play the instrument.
- **MFX:** sets the send level for the instrument to the MFX (master effects) at the top of the Rig.
- **Pan:** sets the instrument's pan position.
- **On:** turns the instrument on or off.
- **Volume:** the slider on the right-hand side of the instrument controls the instrument volume. A meter displays output level when the instrument is played.

SP-1 Stage Piano

The SP-1 Stage Piano will play two piano or pad presets simultaneously, chosen via the Preset Selector wheels. The two presets can be layered or split, or you can choose to play only a single preset by choosing “None” with one of the Preset Selector wheels. The presets include seven acoustic pianos, four electric pianos, and three pads (only available for the second Preset Selector wheel). The first 10 SP-1 presets are created using multiple velocity sample layers; preset 11 uses FM synthesis, and presets 12-14 (available only on Preset Selector 2) are made from a combination of sampled strings and analog synthesis. The SP-1 has two dedicated effects.



- **Preset Select Wheel 1:** this rotary knob chooses a piano preset from the following list.
 - 01 Natural Grand
 - 02 Bright Grand
 - 03 Soft Grand
 - 04 Hard Grand
 - 05 Concert Grand
 - 06 Upright
 - 07 Honky Tonk
 - 08 Electric Piano 1
 - 09 Electric Piano 2
 - 10 Wurl
 - 11 FM Piano
 - 12 None
- **Velocity:** adjusts the velocity (dynamic) response for preset 1. A setting of full (to the right) sets the largest dynamic range between hard and soft played notes. A setting of zero (to the left) velocity has no effect on dynamics.
- **Tone:** turning the knob to the left filters or reduces the brightness of the preset.
- **Mix:** sets the volume balance between preset 1 and 2.
- **Split:** sets the note at which the keyboard splits. Preset 1 always plays below the split point and preset 2 always plays above (including the selected note). Possible split notes are: C2, F#2, C3, F#3, C4, F#4, C5.
- **Detune:** turning to the right adjusts the tuning of preset 1 negatively and preset 2 positively.

- **Preset Select Wheel 2:** preset 2 contains the same piano presets as preset 1, but has three additional pads.
 - 01 Natural Grand
 - 02 Bright Grand
 - 03 Soft Grand
 - 04 Hard Grand
 - 05 Concert Grand
 - 06 Upright
 - 07 Honky Tonk
 - 08 Electric Piano 1
 - 09 Electric Piano 2
 - 10 Wurlie
 - 11 FM Piano
 - 12 Straight Pad
 - 13 Sweep Pad
 - 14 Long Reso Pad
 - 15 None
- **Octave:** transposes preset 2 up or down by one or two octaves.
- **Tone:** turning the knob to the left filters or reduces the brightness of preset 2.
- **Serial/Parallel**
 - **Serial:** Both presets input to FX 1, the output of FX 1 is then input to FX 2.
 - **Parallel:** Preset 1 is input to FX 1. Preset 2 is input to FX 2.
- **FX Preset Drop-Down Menu:** clicking anywhere inside the white FX name field produces a drop-down FX presets list, featuring the same effects presets available in the master “FX Type” menu.
- **Mix:** sets the wet/dry balance of the effects.
- **Effects Edit Controls:** the two white fields to the right of the FX mix controls display the effect parameters that can be edited, which vary in name depending on the selected effect preset.

MS-2 Polyphonic Synthesizer

The MS-2 is a polyphonic synthesizer with preset oscillators, filters, amp, modulation, and effects settings. The synthesis is generally analog, but oscillators are also created with wavetables and FM.



Oscillator Section

- **Oscillator Type:** clicking in the oscillator “Type” field produces a drop-down menu of 85 oscillator presets (see “Appendix D – MS-2 Oscillator Presets” for more information). An oscillator type can include any combination of up to three analog oscillators, two wavetables, a sub oscillator (square wave) and white noise. Analog oscillators are created from combinations of saw, unison saw, square, pulse and sine waves. FM oscillators are made with a single sine wave carrier and up to two sine wave modulators. Presets are organized into “Styles” (pads, polys, leads, etc.) yet all oscillators can be used for any kind of sounds and in combination with any of the different filter, amp, and modulation presets.
- **Wave:** all oscillator types have a pre-programmed “Wave” knob assigned to the most useful parameters for changing the sound of the oscillator. This varies and could be, for example, the width of a pulse wave, the detune of a unison sawtooth wave, the amount of sync for a sync wave, the balance of noise to a pitched oscillator, wavetable position or FM modulator level, etc. This wave parameter is also available to be modulated in various ways via the modulation presets (see “Appendix G – MS-2 Modulation Presets”).
- **Detune:** specific oscillators within each preset have been assigned detune ranges for widening the sound.
- **Mono:** all oscillator presets can play polyphonic or monophonic. Logical oscillators such as “Leads” or oscillators designed to play in unison with detune will load monophonically by default, but can then be set to poly. Polyphonic types can also be set to mono.

Filter Section

- **Filter Type:** clicking in the filter “Type” field produces a drop-down menu of 47 filter presets (see “Appendix E – MS-2 Filter Presets” for more information). A filter type includes settings such as whether the filter is high pass or low pass, resonance amounts, filter velocity response, key tracking, and filter envelope settings.
- **Reso:** controls resonance amount.
- **Env Depth:** controls the depth of the filter envelope and can be set positively or negatively from the zero position (12 o’clock).
- **Cutoff:** controls filter cutoff frequency.
- **Envelope:** the graphical envelope allows you to edit or set the filter envelope’s attack, decay, and release times, as well as sustain level, by clicking and dragging the three square handles.

Amp Section

- **Amp Type:** clicking in the amp “Type” field produces a drop-down menu of 27 amp presets (see “Appendix F MS-2 Amp Presets” for more information). An amp type includes settings such as velocity-to-amplitude, panning, key tracking, and amp envelope settings.
- **Velocity:** controls the velocity-to-amplitude response.
- **Envelope:** the graphical envelope allows you to edit or set the amplitude envelope’s attack, decay, and release times, as well as sustain level, by clicking and dragging the three square handles.

Mod Section

- **Mod Type:** clicking in the Mod ‘Type’ field produces a drop-down menu of 28 modulation presets (see Appendix G for more information). A Mod ‘Type’ includes all useful combinations of LFO’s and Envelopes routed to pitch, the ‘Wave’ parameter, Filter, and Amplitude.
- **Depth:** controls the amount of the modulation.
- **Speed:** controls the speed or rate for LFO modulations and the attack time for envelope modulations.
- **Clock Symbol:** determines whether the LFO modulations are tempo-synced or free-running.
- **Fade:** controls the delay time for LFO modulations, and controls the decay and release time for envelope modulations.
- **FX Section:** same as all other FX sections.

MB-3 Electromagnetic Organ

The MB-3 is a Classic Tonewheel Organ with Leslie rotary speaker simulator.



- **Percussion On/Off:** switches percussion section On/Off.
- **Short/Long:** selects duration of percussion.
- **Loud/Soft:** loud or soft percussion.
- **3rd/2nd:** 3rd or 2nd harmonic for percussion.

■ Drawbars

Laid out as per a classic Tonewheel Organ:

16'	Fundamental	
5 1/3'	3rd Harmonic	1 Octave and a Fifth Higher
8'	2nd Harmonic	1 Octave Higher
4'	4th Harmonic	2 Octaves Higher
2 2/3'	6th Harmonic	2 Octaves and a Fifth Higher
2'	8th Harmonic	3 Octaves Higher
1 3/5'	10th Harmonic	3 Octaves and a major 3rd Higher
1 1/3'	12th Harmonic	3 Octaves and a Fifth Higher
1'	16th Harmonic	4 Octaves Higher

■ **Click:** sets the level of mechanical key on and off clicking.

■ Scanner Vibrato

Classic Tonewheel Organs had an additional chorus/vibrato section. The 'V' settings are vibrato settings while the 'C' settings are choruses.

V1 & C1: produces the lightest modulation.

V2 & C2: produces a deeper modulated sound.

V3 & C3: are the deepest and grittiest settings.

■ **Drive:** allows you to add tube overdrive before the rotary speaker.

■ **Rotary On/Off:** turns rotary speaker on/off.

■ **Slow/ Fast:** sets rotary speed.

Note: Rotary speed can also be controlled by the pitch wheel. Moving the pitch wheel up sets the rotary speed to fast while moving it down sets it to slow.

GM 4 General MIDI Module

The GM 4 is a 16-channel, multi-timbral GM sound player with 128 patches and a GM standard drum and percussion kit.



- **Channels 1-16:** The M-Audio GM Module has 16 individual channels that correspond to the 16 channels defined in the MIDI specification. Any combination of GM 4's 16 channels can simultaneously produce sounds. Each of these channels can be set to a different instrument and has its own Volume, Pan, Tone, Category/Instrument, Chorus, Reverb, Mute and Solo controls. The displayed controls always only affect the selected channel. To select a channel, click on its level meter located above the channel's number. The selected channel will appear with an outline around its level meter. The set of controls to the right of the channel meter display will only affect the selected channel. The General MIDI standard provides for 16 MIDI channels, 15 of them with the same set of 128 available instruments. Channel 10 is an exception and plays a special role since this channel is always mapped to the General MIDI drum kit. This assignment is fixed and cannot be changed. By default, the SP-1, MS-2 and MB-3 modules use MIDI channels one through three respectively. Since all sound modules within the Key Rig software are sharing the same 16 MIDI channels, GM 4's channels one through three are muted by default. This prevents interference between the GM 4 and the other three Key Rig modules. It is also useful to use the other three Key Rig instruments at times to replace GM (General MIDI) instruments with "better" sounds in a GM arrangement.
- **M:** GM channel mute for the selected channel. The level meters of muted channels appear in a lighter shade of gray and will not show any meter activity – even if MIDI messages are received on this channel. A muted channel does not output any sound.
- **S:** GM channel solo for the selected channel. Soloing a channel will mute all other 15 channels of the M-Audio GM Module. Accordingly, all channels with exception of the Soloed channel will be displayed in a lighter shade of gray and will not show any meter activity – even if MIDI messages are received on these channels. Only the Soloed channel will output sound while all other channels will remain silent.
- **Category:** The M-Audio GM Module arranges its sounds into the General MIDI standard categories. Clicking this field produces a drop-down menu of all categories. Appendix I shows a list of all available instruments.

Note: Although selecting a new Category changes the display of the Instrument control, it is necessary to select a sound from the Instrument control to load it. This is useful when using the Key Rig software in live performance situations where it may be undesirable for the first sound in a category to immediately load. In such situations, it is usually preferred to have the previous sound loaded until you select the particular sound from within a category.

- **Instrument:** Clicking this field produces a drop-down menu of all patches within a category for selection. A complete list of sound patches is contained under the heading "Appendix I - GM 4 Patches" at the end of this User Guide.
- **Chorus:** Applies a standard GM chorus to the selected channel. Turn this dial clock-wise to increase- and counter clock-wise to decrease the amount of chorus applied to the selected channel / instrument.
- **Reverb:** Applies a standard GM reverb to the selected channel. Turn this dial clock-wise to increase- and counter clock-wise to decrease the amount of Reverb applied to the selected channel / instrument.

- **Volume:** Sets the volume for the selected channel. Turn this dial clock-wise to increase- and counter clock-wise to decrease the volume of the selected channel / instrument.
- **Pan:** Controls the pan position for the selected channel. If the dial is centered, equal amounts of signal will be sent to both, the left and the right side of the stereo panorama. If the dial is moved clock-wise, the right side of the stereo panorama will increase in level while the left side of the panorama will decrease in level. As a result, an instrument will appear as if positioned further to the right in the stereo panorama. The opposite effect applies when turning this dial counter clock-wise.
- **Tone:** The tone control adjusts the brightness of the patch. Turn this dial clock-wise for a brighter sound and counter clock-wise for a decrease in brightness.

GM 4 Standalone Operation with an External MIDI Keyboard

Most MIDI keyboards are pre-configured to transmit MIDI messages only on MIDI channel 1. If you are using Key Rig with such a keyboard, then you will most likely only see activity on the first one of the Level Meters. If you do not see activity on any channel, make sure that channel 1 is not currently muted, as this is the default setting. Check your MIDI keyboard's documentation for instructions on how to change the MIDI transmission. If your MIDI keyboard does not allow splitting it's keybed into multiple zones (virtually dividing the keybed into smaller sections), then you will only be able to control one of M-Audio GM 4's Channels/Instruments at a time. If your MIDI Keyboard's keybed can be split into multiple zones (e.g. M-Audio Keystation Pro 88) while each zone is assigned to a different MIDI channel, then you can address as many of M-Audio GM 4 Module's channels as your MIDI keyboard has zones. Create layered sounds by letting the zones overlap in part or in full.

GM 4 Standalone Operation with an External MIDI Sequencer

M-Audio GM 4's 16 individual channels are most useful in conjunction with a MIDI sequencer. As opposed to using it with a MIDI keyboard, you are not limited by the amount of hands, fingers or keybed zones since a sequencer can output prerecorded MIDI messages on all 16 MIDI channels at the same time. MIDI sequencers usually have multiple tracks and each of these tracks can be configured to transmit on one of 16 MIDI channels. Simply match each of the sequencer track's MIDI output channels to the desired M-Audio GM Module's channel number.

Troubleshooting

Key Rig has been tested in a wide range of systems and operating conditions. However, there are virtually limitless numbers of operating scenarios, any of which could affect your system's performance. Though this section cannot cover all possible situations you may encounter, we would like to offer some suggestions for dealing with possible problems. If you are still not able to find the answer you are looking for, please feel free to contact M-Audio technical support for further assistance.

Problem 1:

The sound card selector drop down menu does not list my sound card.

Solution 1: Key Rig requires a sound card running ASIO drivers.

Problem 2:

When I press a key, there is a noticeable delay before I hear any sound.

Solution 2: This delay is known as latency. Latency is determined by the buffer setting, the speed of your computer, and the audio drivers you are using. The goal is to set your sound card's buffer size as low as possible without experiencing artifacts in the audio. Faster computers generally allow for smaller buffer size settings, and thus less latency.

Some third party applications may install an "ASIO wrapper" on your system that allows loading a WDM driver within an ASIO application. This is done by "wrapping" the WDM driver into a generic ASIO shell. In other words, the WDM driver is disguised as an ASIO driver. This method does not resolve latency problems. An example of how such an ASIO wrapper may appear in your system is "ASIO Multimedia Driver." . Sound cards with true ASIO driver support are strongly recommended for use with Key Rig and usually have brand or product-specific information in the driver name (e.g. M-Audio USB ASIO).

Problem 3:

I hear pops and clicks in the audio when using the Key Rig Virtual Instrument

Solution 3: Try increasing your sound card's buffer size until there are no artifacts in the audio. See the documentation associated with your sound card for more information on this.

Contacting M-Audio

We at M-Audio have worked diligently to ensure that the Key Rig is an excellent piece of software for your studio. However, due to the wide variety of host computers and configurations, you may encounter unexpected behavior from your software. If you feel that Key Rig is not working properly, you can contact M-Audio Technical Support for assistance.

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Appendices

Appendix A - Key Rig Patches

These files are FXBs (Key Rig presets) and contain all patch and setup info for the whole Key Rig.

01 Oceania	07 Ghostly
02 Big Pad	08 Bubbly Pad
03 Electromagnetic Combi	09 Piano + Soft Strings
04 Belly Stack	10 Fuzzy Chords
05 Rotary Club	11 Nylon Pad
06 Swell Tines	Default

Appendix B - SP-1 Patches

01 Natural Grand	20 Upright Piano	39 Wurli Chorus
02 Natural Grand + Pad	21 Honky Tonk Piano	40 Wurli Phaser
03 Natural Grand + EP 1	22 Electric Piano 1	41 Wurli Tremolo
04 Natural Grand + EP 2	23 E Piano 1 Chorus	42 Wurli Autopan
05 Ambient Grand 1	24 E Piano 1 Phaser	43 Wurli + Pad
06 Bright Grand	25 E Piano 1 Tremolo	44 FM E Piano
07 Bright Grand + Pad	26 E Piano 1 Autopan	45 FM Piano Chorus
08 Bright Grand + FM	27 E Piano 1 + Pad	46 FM Piano Phaser
09 Bright Grand + Wurli	28 E Piano 1 + FM	47 FM Piano Tremolo
10 Soft Grand	29 E Piano 1 + Wurli	48 FM Piano Autopan
11 Soft Grand + Pad	30 Electric Piano 2	49 FM Piano + Pad
12 Soft Grand + EP1	31 E Piano 2 Chorus	50 FM Rotary Piano
13 Soft Grand + EP2	32 E Piano 2 Phaser	
14 Soft Grand + FM	33 E Piano 2 Tremolo	
15 Hard Grand	34 E Piano 2 Autopan	
16 Hard Grand + Pad	35 E Piano 2 + Pad	
17 Hard Grand + Wurli	36 E Piano 2 + E Piano 1	
18 Concert Grand	37 E Piano 2 + Wurli	
19 Concert Grand + FM	38 Wurli	

Appendix C - MS-2 Patches

01 Ambivalence	41 Sweeper Pad	81 Crushed Square Bass
02 Tek Chords	42 Synth Strings	82 Simple Sine Pad
03 Saw Lead	43 Woodpecker	83 Fat Poly 1
04 Standard Bass	44 Sub Bass	84 Spooky Lead
05 Velo Digi Bells	45 Harmony Bells 1	85 Kino Bass
06 Uni Brass	46 Synth Horns	86 Complex Pad
07 Ambient Synth Strings	47 Hollow Pad	87 Syncerator
08 Schreikind	48 Hybrid Poly	88 Fat Octave Lead
09 Perky Noise	49 Tek Lead	89 Fuzza Fizzle 1
10 Metal Zap	50 Tune Out Pad	90 Tune In Pad
11 Swirly Bell Pad	51 Simple Poly	91 Ana Sweep Bells
12 Syncopated	52 Ambient Square Lead	92 5th Pulse Lead
13 Simple Square Lead	53 Fuzz Bass 2	93 Rubber Bass
14 Jupiter Bass	54 Bright Bells	94 Big Octa Sweep
15 Soft Bells	55 Soft Swell Horns	95 Basic Organ
16 Soft Horns	56 Glassy Bells	96 Ambient Saw Lead
17 Rich Sweep	57 FM Shiver	97 Buzz Bass
18 Perc + Sweep	58 Analog Bass	98 Simple Pulse Lead
19 Nasty Lead	59 Noise Perc	94 Big Octa Sweep
20 Rich Pad	60 Hi Mod Strings	95 Basic Organ
21 Pulsator	61 Digi 2,3	96 Ambient Saw Lead
22 Fat Poly 2	62 State Lead	97 Buzz Bass
23 Ghost Lead	63 Fuzz Bass	98 Simple Pulse Lead
24 Thumper Bass	64 Harmony Bells2	99 Dirty Bass 1
25 Analog Vibrabells	65 Synth Brass	
26 Brass Section	66 Soft Paddy Bell	
27 Random Bells Pad	67 Basic Poly	
28 Organish	68 Ultra Lead	
29 Mallet Bell	69 Noise Wind	
30 Pulsing Bells	70 Rich Sweeper	
31 Perky Pitched Noise	71 Belly Pol	
32 Fat Steam	72 Fat 5th Lead	
33 Sync Lead	73 Organ Bass	
34 Ultramoog Bass	74 Hollow Pad	
35 Metallic	75 Steely Pulse	
36 Ober It Brass	76 50s Lead	
37 Belly Pad	77 Thick Square Bass	
38 Fat + Fuzzy	78 Bright Pulse Sweep	
39 Meta Perk	79 Swoosh Pad	
40 Zap Metal	80 Uni Lead	

Appendix D - MS-2 Oscillator Presets

Rich Pad	Drive Sweeper
Standard Pad	UltraMoog Lead
Hollow Pad	Nasty Lead
Bell Sweep	State Lead
Sine Pad	Spooky Lead
Octa Pad	Fat Oct Lead
Rich Octa Pad	50s Lead
Tri Pad	Fat 5th
Pulse Pad	5th Pulse
Noise Pad	Sync Lead
Bell Pad	Bumper Bass
Combi Octa Pad	Jupiter Thump
Tinkle Pad	Rubber Bass
Sparkle Pad	Pulse Bass
Tune In/Out	Buzz Bass
PWM String Pad	Dirty Bass 1
Rich Poly	Dirty Bass 2
Hybrid Poly	Fuzz Bass
PWM Poly	FuzzaFizz Bass
Square Poly	Fuzzy Bass
Fat Sync Poly	SH Bass
Belly Poly	OrgaThump Bass
Organ Selector	Square Bass
PWM Strings	Thump Bass
Puff Poly	Sub Bass
Digi Menu	UltraMoog Bass
Variable Pulse	Cinema Bass
Organish	Synth Horns
Octave Poly	Synth Brass
Hi Octave Poly	Unison Bend
Variable Metal	Oberhype Brass
Fat Noise	Brass Section
Bell Buzz	Soft Brass 1
Simple Poly	Soft Brass 2
Digi Aah	Soft Bells
Square Sync	Bright Bells
Sine Plus	Harmonic Bells
Noizy Poly	Analog Chimes
Saw Solo	Hard Metal
Square Lead	Harmony Bell
Pulse Lead	Noise Perc
Sine Solo	Noise
Trance Lead	

Appendix E - MS-2 Filter Presets

Soft Pad	Hi Pass Lead
Bright Pad	HP Sweep Lead
Gentle Sweep	Thump Bass
Heavy Sweep	Reso Bass
Reso Sweep 1	Basic Bass
Reso Sweep 2	Buzz Bass
Simple Hi Pass	Reso Wow Bass
Hi Pass Sweep	Fuzz Bass
Bright Poly	Ultra Bass
Soft Poly	HP Reso Bass
Perc Poly	Wow Brass
Prc Sweep Poly	Gentle Brass
Attack + Swell	Bright Brass
Attack + Swell	Soft Brass 1
Sweeper Poly	Soft Brass 2
Reso Sweeper	Bright Bells
Extreme Velo	Soft Bells
Hi Pass Poly	HP Bells
HP Zap Poly	Glassy Bells
Bright Lead	Paddy Bells
Soft Lead	Perc Bells
Reso Lead	Noise-Perc
Sweep Lead	Noise-Wind
Perc Lead	

Appendix F - MS-2 Amp Presets

Velo Pad	No Velo Bass
Non Velo Pad	Perc Bass
Ambient Pad	Very Perc Bass
Short Poly	Simple Brass 1
Perc Poly	Simple Brass 2
Very Perc Poly	Hard Brass
Release Poly	Soft Brass
Attack + Swell	Velo Bells
Decay Poly	No Velo Bells
No Velo Lead	Paddy Bells
Velo Lead	Very Perc Bells
Attack + Swell	Noise-Perc
Very Perc Lead	Noise-Wind
Velo Bass	

Appendix G - MS-2 Modulation Presets

Vibrato	- LFO sine wave - pitch modulation
Filter Sweep	- LFO sine wave - cutoff
Reso Sweep	- LFO sine wave - resonance
Autopan	- LFO sine wave - panning
Tremolo	- LFO sine wave - amplitude
Stereo Tremolo	- LFO sine wave - amplitude and panning
Autowah	- LFO sine wave - cutoff
Bend Up	- Pitch bend up to note
Bend Down	- Pitch bend down to note
Bend Up + Down	- Pitch bend up then down to note
Wave Mod 1	- LFO sine wave-oscillator 1 "Wave" parameter
Wave Mod 2	- LFO sine wave-oscillator 2 "Wave" parameter
Wave Mod 1 + 2	- LFO sine wave-oscillator 1 + 2 'Wave' parameter
Wave Env 1	- Envelope- oscillator 1 "Wave" parameter
Wave Env 2	- Envelope- oscillator 2 "Wave" parameter
Wave Env 1 + 2	- Envelope- oscillator 1 + 2 "Wave" parameter
Volume Gater	- LFO square wave - amplitude
Random Gater	- LFO S + H wave - amplitude
Autotrigger	- LFO sawtooth wave - amplitude
Repeater	- LFO sawtooth wave - cutoff
Filter Gater	- LFO square wave - cutoff
Random Filter	- LFO S + H wave - cutoff
Speed Up+Down	- LFO speed up then slow down- cutoff
Triller	- LFO square wave - pitch
Laser Gun	- LFO sawtooth wave - pitch
Sci Fi	- LFO S + H wave - pitch
Melodic	- LFO repeating S + H wave - pitch

Appendix H - MB-3 Patches

01 Perc Organ	26 Bright Blues
02 Classic B	27 Gimme Some Lovin'
03 Quite Righty So	28 Steve Winwood
04 Bright and Silky	29 Back To The Sixties
05 Smokey Blues	30 Full On Scream
06 Rock Solo	31 Gospel Organ
07 Child In Time	32 Capt'n Jack
08 Thick Bars	33 Jazz Leader
09 Jimmy Smith	34 Nice Organ
10 60s Solo Organ	35 Farfisa Flute
11 Jamaican Groove	36 Silky Rock
12 Deep Peep	37 JoeyDeF1
13 Oblivion Express	38 JoeyDeF2
14 Ballsy B	39 Screamy Silk
15 Gospel Standard	40 This Is Percussion!
16 Killer Bee	41 Sunday Morning
17 Blues Standard	42 Warm Tube
18 Bright Vibrations	43 Whistling 1
19 Fundamental Jazz	44 Very Pleasant
20 Fundamental Rock	45 Bagpipe Solo
21 Emerson's Knife	46 Vibraphone
22 Nifty Solo	47 Template Stereo
23 THE Cat	48 Template Mono
24 Funky Percussion	49 Bombarde 16' A
25 Whiter Shade Of Pale	50 Full Great with 16'

Appendix I - GM 4 Patches

001 Grand Piano	044 Contrabass	087 Fifth Lead
002 Bright Piano	045 Tremolo Strings	088 Bass + Lead
003 Electric Grand	046 Pizzicato Strings	089 Pad 1 New Age
004 Honky-tonk Piano	047 Harp	090 Pad 2 Warm
005 Electric Piano 1	048 Timpani	091 Pad 3 Polysynth
006 Electric Piano 2	049 Strings Ensemble 1	092 Pad 4 Choir
007 Harpsichord	050 Strings Ensemble 2	093 Pad 5 Bowed Glass
008 Clavinet	051 Synth Strings 1	094 Pad 6 Metallic
009 Celesta	052 Synth Strings 2	095 Pad 7 Halo
010 Glockenspiel	053 Choir Aahs	096 Pad 8 Sweep
011 Music Box	054 Choir Oohs	097 FX 1 Rain
012 Vibraphone	055 Synth Vox	098 FX 2 Soundtrack
013 Marimba	056 Orchestra Hit	099 FX 3 Crystal
014 Xylophone	057 Trumpet	100 FX 4 Atmosphere
015 Tubular Bells	058 Trombone	101 FX 5 Brightness
016 Dulcimer	059 Tuba	102 FX 6 Goblins
017 Drawbar Organ	060 Muted Trumpet	103 FX 7 Echoes
018 Percussive Organ	061 French Horns	104 FX 8 Sci Fi
019 Rock Organ	062 Brass 1	105 Sitar
020 Church Organ	063 Synth Brass 1	106 Banjo
021 Reed Organ	064 Synth Brass 2	107 Shamisen
022 Accordion	065 Soprano Sax	108 Koto
023 Harmonica	066 Alto Sax	109 Kalimba
024 Tango Accordion	067 Tenor Sax	110 Bagpipes
025 Nylon Ac Guitar	068 Baritone Sax	111 Fiddle
026 Steel StringAc Guitar	069 Oboe	112 Shanai
027 Electric Jazz Guitar	070 English Horn	113 Tinkle Bell
028 Clean Electric Guitar	071 Bassoon	114 Agogo
029 Muted Electric Guitar	072 Clarinet	115 Steel Drums
030 Overdriven Guitar	073 Piccolo	116 Woodblock
031 Distorted Guitar	074 Flute	117 Taiko
032 Guitar Harmonics	075 Recorder	118 Melodic Tom
033 Acoustic Bass	076 Pan Flute	119 Synth Drum
034 Finger Bass	077 Bottle Blow	120 Reverse Cymbal
035 Pick Bass	078 Shakuhachi	121 Guitar Fret Noise
036 Fretless Bass	079 Whistle	122 Breath Noise
037 Slap Bass 1	080 Ocarina	123 Seashore
038 Slap Bass 2	081 Square Lead	124 Bird Tweet
039 Synth Bass 1	082 Sawtooth Lead	125 Telephone
040 Synth Bass 2	083 Calliope Lead	126 Helicopter
041 Violin	084 Chiff Lead	127 Applause
042 Viola	085 Charang	128 Gunshot
043 Cello	086 Solo Voice	GM Drums MIDI (channel 10)

Appendix J - Effects Presets

The following effects are available for the MFx (master FX).

Reverb		Parameter 1	Parameter 2
	Chorus Reverb	Chorus Depth	Rev Time
	Room Reverb 1	Size	Damping
	Room Reverb 2	Size	Pre-Del
	Hall Reverb 1	Size	Damping
	Hall Reverb 2	Size	Pre-Del
	Plate Reverb	Size	EQ
	Gate Reverb	Size	EQ
	Early Reflections	Size	EQ
Delay		Parameter 1	Parameter 2
	Delay	Delay	Feedback
	Lofi Delay	Delay	Feedback
	Stereo Delay	Delay	Feedback
	Lofi Stereo Delay	Delay	Feedback
	Ping Pong	Delay	Feedback
	Lofi Ping Pong	Delay	Feedback
	Gallop Echo	Delay	Feedback
	Vox Tape Echo	Delay	Feedback
Chorus		Parameter 1	Parameter 2
	Chorus	Rate	Depth
	Rich Chorus	Rate	Depth
	Ensemble	Rate	Depth
	Space Chorus	Rate	Depth
	Quad Chorus	Rate	Depth
	Stereo Width	Width	Delay
Tremolo		Parameter 1	Parameter 2
	Tremolo	Rate	Shape
	Autopan	Rate	Shape
	Rotary Speaker	Slow/Fast	Rate

Flanger		Parameter 1	Parameter 2
	Flanger	Rate	Depth
	Deep Flanger	Rate	Depth
	Death Flanger	Rate	Depth
Phaser		Parameter 1	Parameter 2
	Phaser	Rate	Depth
	Deep Phaser	Rate	Depth
Wah Wah		Parameter 1	Parameter 2
	Auto Wah	Depth	Frequency
	Mod Wah	Rate	Depth
	Talkbox	Rate	Vowel
Pitch Shift		Parameter 1	Parameter 2
	Detune	Detune	Delay
	Stereo Pitch	Left	Right
EQ		Parameter 1	Parameter 2
	2 Band EQ 1	Low Gain	Hi Gain
	2 Band EQ 2	Low Gain	Hi Mid Gain
	Sweep EQ Wide	Gain	Frequency
	Sweep EQ Sharp	Gain	Frequency
	Enhancer	Hi Tune	Lo Depth
	Distortion	Drive	Tone
	Amp Simulator	Drive	Amp Model
	Feedback Amp	Drive	Amp Model
	Overdrive	Drive	Shape
	Bit Crusher 1	Bit Depth	Rate
	Bit Crusher 2	Bit Depth	Rate
Dynamics		Parameter 1	Parameter 2
	Attack Compressor	Drive	Ratio
	Squash Compressor	Drive	Ratio
	Limiter	Drive	Attack

Appendix K - Standard MIDI Controller Numbers (MIDI CC's)

01 Modulation	46 Controller 46	91 Reverb Depth
02 Breath Control	47 Controller 47	92 Tremelo Depth
03 Controller 3	48 Gen Purpose 1 LSB	93 Chorus Depth
04 Foot Control	49 Gen Purpose 2 LSB	94 Celeste (De- tune)
05 Porta Time	50 Gen Purpose 3 LSB	95 Phaser Depth
06 Data Entry	51 Gen Purpose 4 LSB	96 Data Increment
07 Channel Volume	52 Controller 52	97 Data Decrement
08 Balance	53 Controller 53	98 Non- Reg Param LSB
09 Controller 9	54 Controller 54	99 Non- Reg Param MSB
10 Pan	55 Controller 55	100 Reg Param LSB
11 Expression	56 Controller 56	101 Reg Param MSB
12 Effects Controller 1	57 Controller 57	102 Controller 102
13 Effects Controller 2	58 Controller 58	103 Controller 103
14 Controller 14	59 Controller 59	104 Controller 104
15 Controller 15	60 Controller 60	105 Controller 105
16 Gen Purpose 1	61 Controller 61	106 Controller 106
17 Gen Purpose 2	62 Controller 62	107 Controller 107
18 Gen Purpose 3	63 Controller 63	108 Controller 108
19 Gen Purpose 4	64 Sustain Pedal	109 Controller 109
20 Controller 20	65 Portamento	110 Controller 110
21 Controller 21	66 Sostenuto	111 Controller 111
22 Controller 22	67 Soft Pedal	112 Controller 112
23 Controller 23	68 Legato Pedal	113 Controller 113
24 Controller 24	69 Hold 2	114 Controller 114
25 Controller 25	70 Sound Variation	115 Controller 115
26 Controller 26	71 Resonance	116 Controller 116
27 Controller 27	72 Release Time	117 Controller 117
28 Controller 28	73 Attack Time	118 Controller 118
29 Controller 29	74 Cut- off Frequency	119 Controller 119
30 Controller 30	75 Controller 75	
31 Controller 31	76 Controller 76	Channel Mode Messages:
32 Bank Select LSB	77 Controller 77	120 All Sound off
33 Modulation LSB	78 Controller 78	121 Reset all Controllers
34 Breath Control LSB	79 Controller 79	122 Local Control
35 Controller 35	80 Gen Purpose 5	123 All Notes Off
36 Foot Control LSB	81 Gen Purpose 6	124 Omni Off
37 Porta Time LSB	82 Gen Purpose 7	125 Omni On
38 Data Entry LSB	83 Gen Purpose 8	126 Mono On (Poly Off)
39 Channel Volume LSB	84 Portamento Control	127 Poly On (Mono Off)
40 Balance LSB	85 Controller 85	
41 Controller 41	86 Controller 86	Extra RPN Messages:
42 Pan LSB	87 Controller 87	128 Pitch Bend sensitivity
43 Expression LSB	88 Controller 88	129 Fine Tune
44 Controller 44	89 Controller 89	130 Coarse Tune
45 Controller 45	90 Controller 90	131 Channel Pressure

Appendix L - Channel 10 Drum Map

Key#	Drum Sound	Key#	Drum Sound
35	Acoustic Bass Drum	59	Ride Cymbal 2
36	Bass Drum 1	60	Hi Bongo
37	Side Stick	61	Low Bongo
38	Acoustic Snare	62	Mute Hi Conga
39	Hand Clap	63	Open Hi Conga
40	Electric Snare	64	Low Conga
41	Low Floor Tom	65	High Timbale
42	Closed Hi Hat	66	Low Timbale
43	High Floor Tom	67	High Agogo
44	Pedal Hi-Hat	68	Low Agogo
45	Low Tom	69	Cabasa
46	Open Hi-Hat	70	Maracas
47	Low-Mid Tom	71	Short Whistle
48	Hi-Mid Tom	72	Long Whistle
49	Crash Cymbal 1	73	Short Guiro
50	High Tom	74	Long Guiro
51	Ride Cymbal 1	75	Claves
52	Chinese Cymbal	76	Hi Wood Block
53	Ride Bell	77	Low Wood Block
54	Tambourine	78	Mute Cuica
55	Splash Cymbal	79	Open Cuica
56	Cowbell	80	Mute Triangle
57	Crash Cymbal 2	81	Open Triangle
58	Vibraslap		