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Introduction

Thank you for purchasing the Revolution 7.1 by M-Audio. The Revolution is the ideal audio upgrade for any PC or Macintosh computer,* bringing ultimate surround performance to your system. The Revolution brings you up to 24-bit, 192kHz audio and the highest-quality stereo, virtual surround, and multi-channel surround sound available today.

Please take the time to read this User Guide. It will tell you how to install the Revolution on your particular computer and instruct you on how to get the most from your Revolution audio interface.

* Must meet minimum system requirements

Revolution Features

- Audiophile quality 24-bit/192kHz playback, 24-bit/96kHz recording
- Pro Audio Performance—Dynamic Range: 106 dB (typical, -60 dB input, a-weighted); Signal-to-Noise Ratio: 107 dB (typical, a-weighted); THD+N: -90 dB (typical)
- Supports Dolby Digital 5.1 (AC3)®, Dolby Pro Logic®, DTS®, and other encoded multi-channel formats
- SRS TruSurround XT™ technology delivers 5.1 virtual surround sound over stereo speakers, Deep Bass Enhancement and Dialog Enhancement™
- Advanced Circle Surround II™ technology creates true multichannel surround sound from your stereo MP3s, CDs and other audio
- Supports the following sampling frequencies, with MME drivers (kHz): 32, 44.1, 48, 88.2, 96, 176.4 & 192; all rates up to 192kHz using internal sample rate conversion with Windows XP SPI
- Supports the following output formats: 24-bit Linear PCM; 16-bit Linear PCM; 16-bit AC-3, Dolby Pro Logic, or DTS over coaxial connector
- Coaxial (RCA) S/PDIF output jack
- Analog connectors for powered speakers or stereo receiver
- One-year warranty

System Requirements

Windows® PC:

Minimum Required—

- 200 MHz Pentium with MMX
- Available PCI card slot
- 64MB RAM
- CD-ROM Drive
- Windows 2000, ME or XP

Recommended—

- 700 MHz Pentium III
- 128MB RAM
- DVD-ROM drive & player applications (for Dolby Digital playback)
- Windows 2000 or XP

Apple Macintosh®:

Minimum Required—

- Apple Macintosh® G3 or G4 with available PCI card slot
- 64MB RAM
- CD-ROM Drive
- Mac OS 9.2.2 or later, or Mac OS X version 10.1.5 or later
- CPU Accelerator cards are not supported

Recommended—

- Apple Macintosh® G3 or G4 with available PCI card slot
- 500MHz G4 processor
- 128MB RAM
- DVD-ROM Drive
- Mac OS X version 10.1.5 or later

Package Contents

Your Revolution was carefully packed at the factory, and the shipping carton was designed to protect the unit during shipping. Please retain this container in the unlikely event that you need to return your Revolution for service.

The following items are included with your Revolution:

- Revolution PCI audio card
- M-Audio driver CD (includes driver installation software)
- Additional software installation CDs
- This Product Manual
- Warranty Registration card

Hardware Installation

The Revolution is a PCI card that must be installed in your computer to be used. Every computer model is slightly different when it comes to installation, but here are some generic installation instructions:

1. Shut down your computer.
2. Open the case to expose the PCI slots.
3. Touch the metal cage surrounding the power supply. This grounds you to prevent any static electricity from accidentally damaging the computer.
4. Unscrew the metal cover adjacent to the empty PCI slot you will install the Revolution into. If you are replacing another PCI card with the Revolution, remove this card instead.
5. Press the Revolution card into the PCI card slot. When it is properly installed in the slot, you should not be able to see more than 1/16th of an inch of metal showing on the edge connector above the slot.
6. Put the case back together and start up the computer.

Your computer probably came with more specific instructions on how to install a PCI card in your specific model of computer. Review these instructions before installation to avoid possible damage to your computer.

After the PCI installation, you will need to follow the driver software installation instructions described below.

Software Installation

Your Revolution comes with driver software that allows it to communicate with your computer's operating system: Windows or Mac OS. Please skip to your computer's operating system in this section and follow those

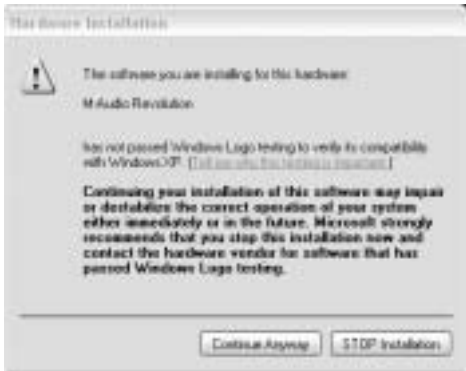
instructions. Revolution's driver software, which includes SRS Circle Surround II and TruSurround XT, will load during this installation. You will also want to install the DVD playback software provided on the additional included CDs.

Windows XP

1. After installing the Revolution PCI card, start your computer up and place the Revolution Drivers CD ROM in your computer's CD-ROM tray.
2. When the computer starts, the New Hardware Wizard will prompt that it has found a Multimedia Audio Controller. Click "Next" to continue.



3. Click "Continue Anyway" to continue.



- Windows will search the computer's CD-ROM drive and install the necessary files.



- Click "Finish" to complete the installation.



Windows 2000

1. After installing the Revolution PCI card, start your computer up and place the Revolution Drivers CD-ROM in your computer's CD-ROM tray.
2. When the computer starts, the New Hardware Wizard will appear. Click "Next" to continue.



3. The New Hardware Wizard will prompt that it has found a Multimedia Audio Controller. Select "Search for a suitable driver for my device (Recommended)," then click "Next" to continue.



4. Select CD-ROM under “Optional Search Locations,” then click “Next” to continue.



5. Windows will report that it has found the driver for this device. Click “Next” to continue.



6. On the next screen, click “Yes” to continue.



7. Click “Finish” to complete the installation.



Windows ME

1. After installing the Revolution PCI card, start your computer up and place the Revolution Drivers CD-ROM in your computer's CD-ROM tray.
2. As the computer starts up, the New Hardware Wizard will prompt that it has found a Multimedia Audio Controller. Select “Search for a suitable driver for my device (Recommended),” then click “Next” to continue.



3. The New Hardware Wizard will automatically pull the drivers from the Drivers CD-ROM.

4. Click “Finish” to complete the installation.



NOTE: If at any point you have a problem with the installation of the Windows drivers, please refer to Appendix A: Advanced Installation section for an alternate method for installing the Revolution card.

Revolution and the Windows Sound System

The Revolution’s Windows Multimedia drivers will allow you to use the Revolution as your Windows system sound device. If the Revolution is the only audio device installed in your computer, then Windows will “select” it automatically. Otherwise, you may need to tell Windows to use the Revolution. To check your Windows Audio setting and select the M-Audio Revolution:

1. Go to the Start menu, and then choose Control Panel.
2. Open “Sounds and Audio Devices,” then click the “Audio” tab.
3. Under “Sound Playback,” the default device should say “Revolution.” If it does not say “Revolution,” then drop down the list of devices and select “Revolution.”
4. Click “Apply,” then click “Okay.” Close your Control Panel—you’re done!

Mac OS 9

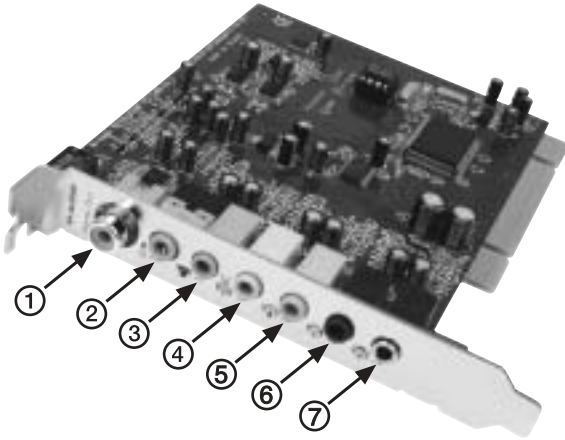
1. Insert Revolution Software CD into your CD-ROM drive. AutoRun will open the CD and allow you to view its contents.
2. Double click the “M-Audio Revolution Installer.”
3. Click “Continue” at the M-Powered Screen.
4. Read the “Instructions for using M-Audio Revolution.” Click “Continue.”
5. Select your install location, or simply choose the OS 9 boot drive (which is the default). Click “Install” to continue.
6. Installation requires a restart of the computer. Click “Continue” to restart.

7. The next prompt states a similar message. Click "Restart" to reboot the computer.
8. Plug the Revolution into your computer's USB Port.
9. Once the computer has restarted, select "Sound" in "Control Panels," then select the "Output" tab. Click on "M-Audio Revolution" to choose the Revolution as your default output device. You will also see a Control Panel named "M-Audio Revolution 7.1" that you can use to configure the Revolution card. Refer to the section titled "Control Panel Setup" for more information.
10. Mac OS 9.2.2 Installation is now complete. Proceed to the next section, "Hardware Installation."

Mac OS X

1. Insert the Revolution Software CD into your CD-ROM Drive and open the CD to view its contents.
2. Double click "M-Audio Revolution Installer.dmg" file. An Icon will appear on your desktop marked "Revolution."
3. Double click the "Revolution" icon on your desktop.
4. Now double click on the "M-Audio Revolution Installer.mpkg."
5. You will need your Administrator Password for the next step. To continue, click the lock icon in the lower left corner of the window that states, "Click The Lock To Make Changes."
6. Enter your password and click "OK."
7. The next window "Welcomes You..." to the installation process. Click "Continue."
8. Select your OS X hard drive. Click "Continue."
9. When prompted, click "Upgrade" to continue.
10. When prompted, click "Continue Installation."
11. When prompted, click "Restart" to finish the installation.
12. Go to "System Preferences" in the Apple Menu. Select the "Sound" preference panel, and click the "Output" tab. Select "M-Audio Revolution" to choose the Revolution as your default output device.
13. In your Applications folder you will find an application called "M-Audio Revolution 7.1". Use this to configure your Revolution card. Refer to the section titled "Control Panel Setup" for more information.

Physical Connections

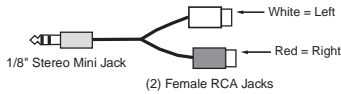


The rear panel of the Revolution has the following jacks:

1. **Digital Out** - The Digital Output jack is a S/PDIF Coaxial output. You can use an RCA cable (sold separately) to connect this to a digital recorder, mixer or surround receiver. A 50-75 Ohm digital cable is recommended.
2. **Mic In** (pink) - The mic input allows you to connect a mono microphone for recording, videophone or voice recognition applications. The jack is a 3-conductor TRS-type jack for condenser (2-conductor) and electret (3-conductor) type microphones.
3. **Line In** (blue) - This is a stereo line-level input that can be used to record into an audio recording program.
4. **Front L/R, Phones** (green) - This jack should connect to the powered Left and Right speakers, located to the left and right of your computer monitor. If you have just a two-speaker stereo setup, this is the jack to plug into. You can also plug a pair of stereo headphones into this jack.
5. **Center/Subwoofer** (orange) - This line-level output connects to powered Center and Subwoofer speakers. The Center channel speaker should be directly above or below your monitor and the subwoofer can go just about anywhere it will fit in your room.
6. **Surround L/R** (black) - This line-level output should be connected to powered Surround Left and Right speakers. These speakers should be located to your left and right sides, just behind your head.
7. **Surround Center L/R** (silver) - This line-level output connects to powered surround Center Left and Right channel speakers. These speakers should be located directly behind you as you are looking at your computer monitor.

Speaker Output Jacks

The rear panel of your Revolution has four 1/8" stereo output jacks which can be connected to powered speakers or to the inputs on a surround sound receiver. These jacks are designed to combine two speaker outputs into one jack, saving on space and simplifying installation (for example, the Center/Subwoofer output is actually the output for both the Center and Subwoofer channels). Most multimedia speakers use 1/8" stereo input jacks. If your speaker or receiver jacks are of the RCA type, instead, you can purchase a converter like the one depicted following, at a local electronics store, such as Radio Shack, etc..

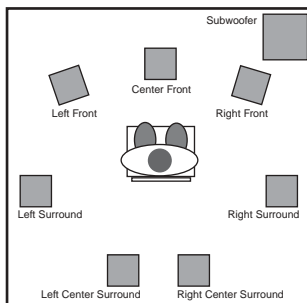


The white RCA jacks connect to the first listed channel, while the red jacks connect to the second. For example, with the Front L/R jack, the white jack connects to the Left speaker and the Red jack connects to the Right speaker.

Note that the Revolution outputs produce a Line Level signal and can therefore be connected directly to powered speaker inputs. However, if your speakers are not self-powered, you will need to connect the Revolution's outputs to the inputs of a power amplifier or surround receiver and its outputs to the speaker inputs.

Use the diagram below as a guide for placing the speakers around your computer. Make the following speaker connections:

- Connect the Front L/R to the Left and Right speakers.
- Connect the Center/Subwoofer jack to the Center and Subwoofer (LFE) speakers.
- Connect the Surround L/R jack to the Left and Right Surround speakers.
- Connect the Surround Center L/R jack to the two Surround Center speakers.



Make sure that the speakers that you use near a CRT Computer Monitor are shielded speakers. If your monitor begins to become discolored in one of the corners, or if the image appears warped, move the speaker further away to avoid damage to your monitor.

Line and Mic Inputs

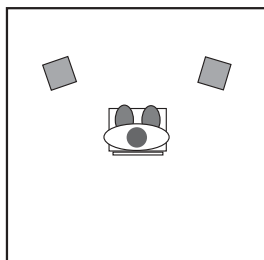
The Revolution has a stereo line input. This input allows you to record CDs, videos, instruments or virtually anything else with audiophile-quality 96kHz/24-bit sampling. It also has a microphone input. This input is mono (one channel) and has a gain and impedance designed to accommodate the output of a microphone. It can accept a small mono condenser microphone and it also provides power for common electret multimedia microphones. You can connect a small microphone for recording sound effects, voice-recognition and videoconference applications. Or you can connect a more professional microphone with the proper adaptors for digital recording.

You can set the Input level of the Line and Mic inputs on the Input/Other tab of the Revolution control panel. See the Control Panel section for more details.

Explanation of Surround Formats

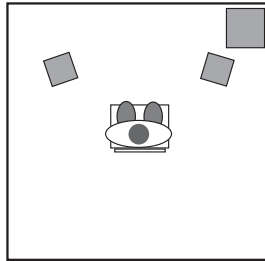
You run into a variety of surround formats when playing DVDs, some of which include 2.0, 4.1, 5.1, 6.1 and 7.1. This section is meant to provide a quick explanation of some of these formats.

2.0 - This is a stereo soundtrack. This soundtrack can be expanded up to 7.1 channel playback with a Dolby Pro Logic® or SRS Circle Surround II decoder. It will play out of the left and right speakers without decoding. Headphones are generally stereo or 2.0 devices.



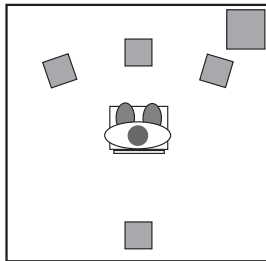
2.1 - This is a stereo soundtrack with a separate subwoofer. Sometimes this soundtrack can be expanded to surround playback with a Dolby Pro

Logic® or Circle Surround II decoder. It will play out of the left, right and subwoofer speakers.



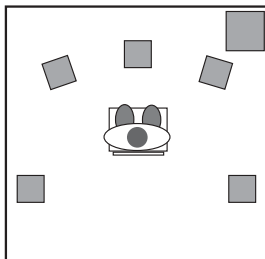
4.0 - This signal is the same as 4.1 (description following), only without the subwoofer channel.

4.1 - This is how most feature films from 1970-1980 were mixed. It will play back from the left, center and right speakers with a mono signal going to all of the surrounds. An additional “point one” signal gets sent to the subwoofer in all of the following formats, called .1 because it only uses up 1/10th of the data of the other channels.

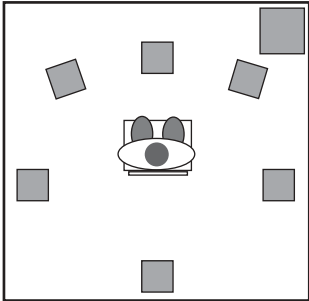


5.0 - This signal is the same as 5.1 (description following), only without the subwoofer channel.

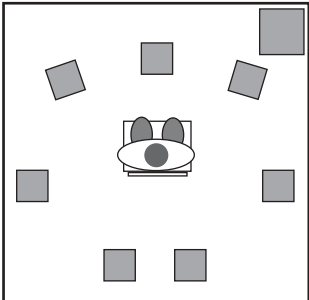
5.1 - This is how most current DVDs are released. Dolby Digital® and DTS® soundtracks can have up to 5.1 channels. This signal plays back from the left, center, and right speakers, plus two surrounds, left and right.



6.1 - This signal sends three channels to the front: left, center and right. There are also two surround channels, left and right, which get decoded into three surround channels: left surround, center surround and right surround. This is the format used by Dolby Digital EX® and DTS ES®.



7.1 - This is a further refinement of the 6.1 system described above, where the surround center channel is played back on two center surround speakers in order to provide better diffusion of the center surround audio. Some technologies, such as Microsoft's Windows Media 9, also provide the possibility of playing back content encoded with 7.1 discrete channels of audio.



You need specialized software to play back surround audio formats above two channels. Much of this software is included in the drivers or the software bundle for Revolution. See the installation CD that came with your Revolution for more information, or check the M-Audio website.

Revolution Control Panel

Once the setup has been completed, you will be able to control most aspects of the Revolution via its Control Panel, which can be launched in the following manner:

Windows - Following the driver software installation in Windows ME, 2000, and XP, you will find an M-Audio logo “M” installed on the right side of your Windows taskbar. Double click on this logo to launch the M-Audio Revolution Control Panel.

Mac OS 9 - After the restart at the end of the Mac OS 9 driver software installation, the Revolution Control Panel will be placed in your Apple Control Panels folder. Open your Applications folder and select “M-Audio Revolution Settings” to launch the M-Audio Revolution Control Panel.

Mac OS X - Follow the driver software installation for Mac OS X and restart. Open your Applications folder and double-click “M-Audio Revolution” to launch the M-Audio Revolution Preference Panel.

When you launch the control panel, you will notice the Speaker Set pull-down menu, and five tabs at the top of the screen.



The Current Speaker Set pull-down menu includes presets for many popular speaker models. Click and hold on this menu to see if your speaker models are included in the list for the recommended settings for your speakers.

The Current Speaker Set pull-down menu also allows you to set the number of output channels (e.g. stereo, 5.1, 6.1, 7.1, etc.). It's important that this control reflects the actual number of speakers you are using so that the drivers aren't sending audio to non-existent speakers. For example, if you select 5.1 and you only have two speakers connected, you won't hear any of the dialog when you play a DVD movie. You can also make these settings by using the “Quick Set” buttons at the top of the panel.

The Master Volume slider at the bottom of the panel controls the overall volume of the Revolution's outputs, while the Mute button mutes the signal to all of the outputs. This can be handy for things like answering the phone or pretending that you are hard at work.

The tabs near the top of the control panel allow you to change the size, volume and surround settings of the Revolution's outputs. From left to right, the tabs are: Speaker Setup, Output Mixer, Surround Sound, Input/Other and About. Use the Speaker Setup tab to set the size and distance of your speakers and the Output Mixer tab to balance the volumes of each speaker output. The Surround Sound tab controls aspects of SRS Circle Surround II or TruSurround XT, depending on whether you have a stereo or multi-channel speaker set. Input/Other controls the input and sample rate settings and the About tab gives you information on the software version of your Revolution drivers.

The next section explains the settings on each of these tabs, in greater detail.

Speaker Setup Tab

This tab sets the size and volume of the main speakers. First, check the Speaker Set menu to see if your speakers are included in the manufacturer's presets. If not, the settings in this tab will ensure the best performance from your speaker system.

Speaker Bass Management - This function enables Bass Management for the Revolution control panel. The Revolution control panel uses Bass Management to get the best sonic performance from your speakers. What this means is that if you have large speakers, it will send the full-range signal to those speakers. If you have small cube speakers, they probably can't reproduce the strong bass found in many DVD soundtracks, so the Revolution control panel automatically routes the bass to the subwoofer.

Front Speaker Size - This setting tells the driver software what size your speakers are. Select the speaker size that best describes your left and right speakers: Large (5" or larger woofer), Medium (3"-5" woofer), or Small (woofer smaller than 3"). There are also settings for Cube or Flat Panel speakers.

Link Stereo Output Levels - This links the left and right output level controls, so that if you change one, the other follows.

Left and Right Levels - These controls change the volumes of the left and right speaker outputs independent of the other speakers. Move it to the right towards 0dB for more volume or down towards -60dB for less volume.

Distance - This control sets the distance from your head to the left and right speakers, from 1 to 30 feet. Revolution's software can intelligently compensate for differences in speaker placement using this setting, and can make your room sound much better.

Solo - By pressing this button, you will only send sound to the selected channel. The Solo function is useful if you think the left and right speakers are reversed, for example. You can solo more than one channel at a time, if you wish.

Mute - Use this button to stop audio from going to this speaker.

Test - This button sends a test tone to the selected speaker. It is useful for determining where the speaker is located and how loud the volume is, relative to other speakers.

NOTE: DirectX 8.1 is required for the test tone function to work. DirectX 8.1 is supplied on the Applications CD included with your Revolution. In the DirectX folder on the Applications CD, simply double-click dxsetup.exe to install DirectX 8.1.

Output Mixer Tab

This tab provides level controls for each of the speaker outputs on the Revolution. Use these controls to change the balance between speakers in your system.



Level - Move the level fader up or down to change the volume of any of the eight speaker outputs. For proper DVD playback, each of the surround speakers should play back at the same volume, but you may need to adjust them for distance or to taste. Each level control has a level meter next to it, so you can see how much signal is going to each of the outputs.

Solo - By pressing this button, you will only send sound to the selected channel. The Solo function is useful if you think the left and right speakers are reversed, for example. You can solo more than one channel at a time, if you wish.

Mute - Use this button to stop audio from going to this speaker.

Surround Sound Tab

This tab controls the surround sound features of the Revolution. There are two SRS Labs technologies included with the control panel, TruSurround XT and Circle Surround II. TruSurround XT takes a multi-channel source and plays it through two speakers in a way that makes it sound like you're playing it back through multiple speakers. Circle Surround II takes a stereo source and processes it so that it plays through multiple speakers.

Here's a suggested guide to playing surround sources through your Revolution:

- If you're playing a 5.1 DVD with WinDVD 4 (Windows only), and you have multiple speakers attached, Circle Surround II should be unchecked.
- If you're playing a 5.1 DVD and you only have two speakers connected, turn on TruSurround XT.
- If you're playing a stereo MP3, CD, or DVD and want to hear it through multiple surround channels, turn on Circle Surround II.

The TruSurround XT settings only appear if your Current Speaker Set is Stereo or Stereo with Subwoofer. The Circle Surround II settings only appear if your Current Speaker Set is set to three or more channels.

SRS TruSurround XT Enable - This control turns on the TruSurround XT feature. TruSurround XT "virtually" places individual surround channels where they are supposed to be, as though you have speakers all around you. Use this feature to turn 5.1 or 6.1 multi-channel sources, such as Dolby Digital or DTS encoded DVDs, into "virtual" surround from your stereo speakers. To use this function select 6 channel or 8 channel playback from within your DVD program's audio output selection menu.

NOTE: Circle Surround II has an output frequency of 48kHz, the frequency selection on the control panel for higher frequencies will be grayed out. (See next section, "Input/Other.")

SRS Circle Surround II Enable - This control turns on the Circle Surround II feature. Circle Surround II is a patented SRS technology that solves the problem of playing 5.1 multi-channel content from a two channel source. It delivers a compelling surround sound experience through any multi-channel playback system. It is fully compatible with all multi-channel formats up to 6.1 channels. Use this feature to turn stereo sources such as CDs, MP3s or Dolby Pro Logic encoded DVDs into 6.1 multi-channel surround. You'll want to turn this feature off if you're listening to a source that's already playing back in 5.1 or 6.1, such as Windows Media or a DVD movie.

SRS TruSurround XT/Circle Surround II Mode - There are three modes to the Circle Surround II and TruSurround XT feature. Use Cinema

when watching films or television programs. Select Music to listen to stereo music sources in surround. Choose Mono to spread out a mono source like an old movie or some internet radio stations.

SRS Dialog Enhancement™ - This feature is designed to make dialog more intelligible. Click the Enable checkbox to enable this feature, and use the Level slider to control the amount of enhancement applied to the dialog.

SRS TruBass® - This feature takes the low bass from big-theater soundtracks and turns it into frequencies that home speakers can reproduce. When you use this feature, you don't need to worry about missing out on the big bass rumbles of submarine missile launches or spacecraft flybys just because you're using small computer speakers. Click the Enable checkbox to turn on the TruBass feature, and use the Level slider to add more bass.



are trademarks of SRS Labs, Inc.—Circle Surround II and TruSurround XT are incorporated under license from SRS Labs, Inc.

Input/Other Tab

The Input/Other tab controls the input levels and sampling frequency of the Revolution. You don't need to worry about the settings on this page unless you're recording audio with the Revolution.

Link Stereo Input Levels - When you check this box, the left and right input levels will always follow each other.

Left/Right Input Level - These controls set the input level for the Revolution's inputs. Watch the meters above these level controls to set the input level. For the best sound quality, you usually want to record at the highest level you can without distorting.

At the end of each of the meter stripes is a Clip indicator. The purpose of this indicator is to inform you that an incoming signal is too loud, thereby producing distortion. The Clip indicator will turn red when the input is too loud. Adjust your audio source to reduce the input level so it is into the yellow region yet not into the red. To reset the Clip indicators, click on each one with your mouse to reset the indicators to their normal state.

Sample Rate - This control selects the sample rate of the audio to be recorded. This is a bit like the "SP/EP" control on a VCR. A higher sample rate will sound better, but will take up more memory. 44100 Hz is the standard CD sampling rate and is usually your best choice. Higher sampling rates such as 96000 Hz will cause certain features to be disabled, such as Circle Surround II.

DMA Buffer Size - This control is automatically set by the installer to compensate for processor speed. It introduces a delay, usually less than 1/60th of a second, to make sure that audio is played properly. If you encounter problems during recording and/or playback, such as stuttering audio, you can try raising this value to see if the problem goes away.

About Tab

This tab provides information about the software version of the control panel and driver software. This information can be useful to customer support personnel when troubleshooting problems with your Revolution.

Revolution Applications

Now that we've finished connecting speakers and setting levels, you're probably interested in getting started. This chapter should help you through some typical uses of the Revolution.

DVD Playback

The Revolution ships with WinDVD 4, which can be found on the Applications CD that came with your Revolution. WinDVD 4 plays back audio decoded with Dolby Digital or DTS signal. Use this supplied WinDVD version to fully take advantage of the surround sound features of your Revolution under the Windows operating system (Macintosh DVD player software may not support Dolby Digital or DTS playback, so check the documentation that came with the player for more information).

Installation of WinDVD 4 onto your Windows system is done by double-clicking on the Application icon on the included Applications CD (refer to the Appendix B of this manual for more detailed instructions on installation).

To set up Win DVD 4 for Windows, click on the "Subpanel" button (this button looks like an arrow pointing right) from within the Win DVD 4 application. Then choose "Audio Mode" and click on the "Setup" button (the Setup button looks like a wrench). Now click on the "Audio" tab, and select the desired output format (6-channel, etc.). For additional information, again see Appendix B.

The Revolution will work with any software DVD player. The type of audio signal that your DVD player sends to the Revolution depends on the setting in your DVD player software. Generally, DVD player software

provides a series of audio setup options or preferences. The exact location of these audio options may vary, so check your DVD player's documentation for more information. It is from these setup options that you will be able to change or direct the audio output of the DVD player.

Stereo - When the Revolution is chosen as your computer's audio device (see the previous chapter, "Software Setup"), this setting will send a stereo signal to the Revolution's outputs. You may want to turn on the Circle Surround II feature when playing a stereo movie (see the previous section for details).

Digital Out - When you have the Revolution's digital output connected to the digital input of a surround sound receiver, choose this setting to send the encoded surround signal (Dolby Digital, DTS) to the receiver. This selection is called "Use S/PDIF" in WinDVD 4.

Note for Macintosh Users: There is currently no DVD player for Mac OS 9 or X that supports software decode of Dolby Digital or DTS, but Revolution's CircleSurround II technology does a remarkable job of generating a real surround soundtrack from the Apple DVD Player application.

5.1 or 6.1 - If your DVD player (like WinDVD 4) is capable of decoding a surround sound signal, such as Dolby Digital and DTS, select this option. If you have only stereo speakers connected, you may want to turn on TruSurround XT to provide the best surround sound simulation from stereo speakers. If you have multi-channel speakers connected, make sure to turn off Circle Surround II.

Music Playback

The Revolution can expand listening to stereo music CDs and MP3 files into a surround sound room-filling experience. For surround playback of stereo music, open the Revolution control panel, select the Surround Sound tab and turn on SRS Circle Surround II. Also, select the Music mode appropriate for best playback (see the previous section). With proper playback software, the Revolution is even capable of playing back DVD-Audio discs.

Windows Media Player Setup

Microsoft's Windows Media Player (9 and later) will allow you to play 5.1 or 7.1 music and movies through the Revolution. As long as the Revolution is selected as your default audio device, Media Player will play surround recordings through the Revolution's outputs.

Gaming

The Revolution brings gameplay to life through Sensaura surround sound playback. Sensaura uses an exclusive suite of algorithms, based on the physics of spatial hearing, to mimic the acoustic processes that are involved in replicating a 3D sound space in computer software. The result is a realistic simulation of the effect of hearing any particular sound at a chosen position in three-dimensional space around the listener.

If your game supports Sensaura technology (Windows Only), open the Revolution Control Panel, select the Input/Other tab and check the “Sensaura/Game Mode” box. This mode disables Circle Surround II, and the sampling rate is automatically changed to 48kHz.

If you find that your game slows down when Sensaura is turned on, you may want to turn off some of the graphic details or reduce screen resolution, in order to speed things up.

Recording

The Revolution includes a pair of audio inputs for recording. You can set the input level of the inputs by launching the Revolution control panel, selecting the Input/Other tab, and changing the level on that screen. If your recording application doesn't see audio from the Revolution's inputs, check that program's audio preferences, check your cable connections, or review the Software Setup chapter for potential problems. Go to the Windows Control panel and open Sounds and Multimedia icon. The Revolution features both Line and Mic inputs for the best performance with your input source. The Revolution records at sampling rates up to and including 96kHz.

The Revolution ships with M-Audio's ASIO drivers for multitrack recording and playback with recording applications that are ASIO-compliant. The buffer for ASIO can be adjusted in the DMA buffer drop down selection in the Input/Other tab of the Revolution control. Some applications allow the access of this feature through its own audio setup menu.

Appendix A: Advanced Install Setup for Windows

This section discusses installation for advanced Windows users who wish to install the software before installing the Revolution PCI hardware, or for Windows users who have already installed the card but are experiencing difficulties in driver installation.

Windows XP Setup

1. Place the Revolution Software CD in your CD-ROM Drive.
2. Launch the Revolution Installer.exe installation program.
3. The Revolution install screen will appear. Click “Next” to continue.



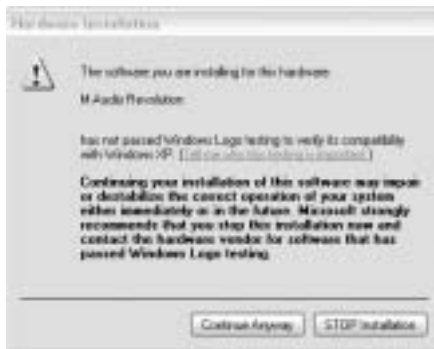
4. Click “Continue Anyway,” then Click “Next.”



- The installation program will now shut down your computer to allow you to install your Revolution card. Click “Exit” to continue.



- Please refer to the Hardware Installation section in this manual for steps on installing the Revolution card into your computer.
- After the Revolution card is installed, restart your computer.
- Click “Next” and then “Continue Anyway” to continue.



- Click “Finish” to complete the installation.



Windows 2000 Setup

1. Place the Revolution Software CD in your CD-ROM Drive.
2. Launch the Revolution Installer.exe program.
3. The Revolution install screen will appear. Click “Next” to continue.



4. Click “Yes” to continue.



5. Click “Next” twice.



6. The installation program will now shut down your computer to allow you to install your Revolution card. Click “Exit” to continue.



7. Please refer to the Hardware Installation section in this manual for steps on installing the Revolution card into your computer.
8. When the computer restarts, you will be prompted with a note about Digital Signature not found. Click “Yes” to continue.



9. The card is now installed in your operating system.

Windows ME Setup

1. Place the Revolution Software CD in your CD-ROM Drive.
2. Launch the Revolution Installer.exe program.
3. The Revolution install screen will appear. Click “Next” to continue.



4. A screen appears that displays DMA and Digital Music Playback functions checked. Click “Next” to continue.



5. The computer will now need to be shut down to install the Revolution card. Click “Yes” and then “Exit” to continue shutting your machine down.



6. If you uncheck “Yes, power my computer down now”, you will be prompted with another screen to shut your machine down. This is because the DMA mode has been enabled.



7. Please refer to the Hardware Installation section in this manual for steps on installing the Revolution card into your computer.
8. Restart the computer.
9. Revolution card is now correctly installed.

Appendix B: WinDVD v4 Installation

The enclosed WinDVD, Version 4 gives you the multi-channel support needed to play encoded surround sound material such as Dolby Digital 5.1 or Dolby Digital EX (6.1). With the proper settings, WinDVD will decode that material and send it to the multi-channel outputs of your Revolution.

To use WinDVD, you must have DirectX 8.1 installed in your System. If you have an older version of DirectX, WinDVD will prompt you that, "The setup program has detected that you have an older version of Microsoft's DirectX." Click "Yes" to install DirectX 8.1. If your System prompts you to restart your computer after installing DirectX, then do so. Otherwise, proceed with the WinDVD installation.

To install WinDVD v4:

1. Insert the "Applications" CD into your CD drive and locate the "WinDVD" folder. Run the setup application by double clicking the "Setup" icon.
2. The "Welcome to WinDVD Setup" window will pop up. Click the "Next" button.
3. A "License Agreement" box will pop up. Assuming that you agree with the terms, click the "Yes" button on the bottom right hand corner.
4. WinDVD will ask you for User Information such as Name, Company (optional) and Serial Number. Your serial number is located on the Applications CD sleeve. After entering this information, click the "Next" button.
5. The "Choose Destination Location" dialog box will pop up, asking you to choose where you want to install WinDVD. Usually the default locations are a good choice (if you want to choose another location, then "Browse" to the desired location). Click "Next."
6. The "Select Program Folder" box appears. WinDVD will create a folder for you named "InterVideo WinDVD 4." Click "Next."
7. The "Setup Status" box informs you that it is installing the program to your hard drive.
8. The "File Types Association" window will pop up. If you want DVD video to autoplay, or movie files such as mpegs (files with the .mpeg extension) to be played on WinDVD, then leave these boxes checked and click "Next."
9. The "Third Party Application Setup" window will pop up. If you want WinDVD to use Microsoft HTML Help, check the box and then click "Next."
10. Now the Setup is complete. Select, "Yes, I want to restart my computer now," remove the Applications CD from the drive, and hit the "Finish" button.

(Appendix B continued on next page)

Setting Up the Revolution in WinDVD:

1. Double click the Intervideo WinDVD 4 icon that is now located on the Desktop.
2. Look at the transport bar, then click on the SubPanel “arrow” found just to the right of the InterVideo logo. Select “Audio Mode” from the list.
3. Click on the tool button (it looks like a little wrench), located in the lower right hand corner. The “Audio” page of the Setup box will then pop up, next to the transport.
4. Select the Audio Output. If you are listening to speakers attached to the Revolution’s line outputs, then select “Analog.” If you have the digital output connected to a home theater digital input, then select “S/PDIF.”
5. Audio Speaker Configuration. You should set this according to how many speakers you are connecting to the Revolution outputs. Click “OK.”
6. Now the setup is complete. Place a DVD video in your DVD drive and hit Play.

NOTE: Within WinDVD, 7 channel and 8 channel selections may not be available to Windows 2000 and ME users.

In order to achieve 6.1 Surround, 7 channel playback:

1. Select 7 Channels in the WinDVD Audio Mode menu.
2. Open the Revolution Control Panel.
3. Select the 6.1 Surround Speaker Setup.
4. Select Virtual 6.1.

To achieve 7.1 Surround, 8 channel playback:

1. Select 8 Channels in the WinDVD Audio Mode menu.
2. Open the Revolution Control Panel.
3. Select the 7.1 Surround Speaker Setup.
4. Select Virtual 7.1

Appendix C: Troubleshooting & Contact Information

M-Audio's website, which is found at www.m-audio.com, contains the most up-to-date troubleshooting information. This should be your first stop for all the latest drivers, FAQ files and extensive how-to guides, as well as additional information on contacting M-Audio technical support.

If you are having problems with your Revolution, you may wish to try the following quick troubleshooting tricks:

- When things don't seem to be working properly, try restarting the computer. This solves the majority of computer problems.
- If you haven't been able to get your revolution to work at all, or if it worked for awhile and then stopped working altogether, uninstall then reinstall the driver software.
- When launching an ASIO application, make sure that game mode is disabled, in the Input/Other tab of the Revolution control panel.
- If the unit stopped working after you installed a new program or system software update, check the M-Audio website for more recently updated drivers. If a major system software update that has been recently released, you may need to search for beta version software drivers which provide increased support for the new software.
- A few features do not function when a 192kHz or 96kHz sampling rate is selected. If a feature isn't working properly, try opening the control panel, selecting Input/Other, and setting the sampling rate to 48kHz.
- Test Tones do not work on any speaker setting in Windows 2000 or Windows ME, and result in the Windows Error: "Unable to create test tone. This operation is not allowed when in digital output mode." To fix this, install Direct X 8.1, or WinDVD 4, both of which are located on the Applications CD. (Installing WinDVD 4 will also install DirectX 8.1, if it is not already installed in your system.)

For additional help, you may contact M-Audio Technical Support by phone (626-445-7556, 9-5 PST M-F), fax (626-445-8407) or e-mail (techsupt@m-audio.com).

Technical Specifications

Hardware Features:

Provides 8 Analog Channel Line Outputs (through 4 stereo 1/8" Mini jacks)
S/PDIF Digital Coaxial Output (RCA)
S/PDIF Out can transmit either Linear PCM or AC-3
Stereo 1/8" Mini Analog Line Input
Mono 1/8" Mini Analog Microphone Input with electret mic power

Audio Performance:

Line Outs:

Dynamic Range	106 dB (typical, -60 dB input, a-weighted)
Signal-to-Noise Ratio	107 dB (typical, a-weighted)
THD	0.003% (i.e., -90dB)
Max. Line Output Level	1.26 Vrms (+2 dBV)
Frequency Response	+0.8/-0.0 dB, 20 Hz to 20 kHz +0.8/-3.0 dB, 20 Hz to 80 kHz
Crosstalk	-120dB

Mic In:

Dynamic Range	90 dB (a-weighted)
Signal-to-Noise Ratio	90 dB (a-weighted)
THD+N	0.003% (i.e., -90dB)
Frequency Response	+0.0/-3.0, 80Hz to 17kHz

Line In:

Dynamic Range	105 dB (a-weighted)
Signal-to-Noise Ratio	100 dB (a-weighted)
THD+N	0.003% (i.e., -90 dB)
Maximum Input Level	1.45 Vrms (+3.2 dBV)

Sampling Frequencies (Hz):

No sample rate conversion	32000, 44100, 48000, 88200, 96000, 172400, 192000
With MME rate conversion	All sample rates up to 200kHz

Driver Features:

USB Audio playback using the following input/output formats:

- 24-bit Linear PCM
- 16-bit Linear PCM
- 16-bit AC-3 output over S/PDIF (not available in Mac OS 9)

SRS Circle Surround II processing
SRS TruSurround XT processing
Sensaura (for 3D gaming)

PC & Macintosh
PC & Macintosh
PC (only)

Minimum System Requirements:

With SRS Circle Surround II disabled:

- Pentium II 400 MHz with 128 MB RAM, running Windows 98SE, Windows ME, Windows 2000, or Windows XP
- or
- Mac with native USB support & 128 MB RAM, running Mac OS 9.1 or OS X

With SRS Circle Surround II enabled:

- Pentium III 800 MHz with 256 MB RAM running Windows 98SE, Windows ME, Windows 2000, or Windows XP
- or
- Mac G4 800 MHz with native USB support and 256 MB RAM, running Mac OS 9.1 or OS X

Warranty Information

M-AUDIO warrants this product, under normal use, to be free of defects in materials and workmanship for a period of One (1) Year from date of purchase, so long as: the product is owned by the original purchaser, with proof of purchase from an authorized M-AUDIO dealer and, the product has been registered to the original purchaser, the purchaser having returned to M-AUDIO the completed product warranty card. This warranty explicitly excludes power supplies and included cables which may become defective as a result of normal wear and tear.

In the event that M-AUDIO receives, from an original purchaser and within the warranty coverage period, written notice of defects in materials or workmanship, M-AUDIO will either replace the product, repair the product, or refund the purchase price at its option. In the event repair is required, shipment to and from M-AUDIO and possible nominal handling charges shall be borne by the purchaser. In the event that repair is required, a Return Authorization number must be obtained from M-AUDIO. After this number is obtained, the unit should be shipped back to M-AUDIO in a protective package with a description of the problem and the Return Authorization clearly written on the package.

In the event that M-AUDIO determines that the product requires repair because of user misuse or regular wear, it will assess a fair repair or replacement fee. The customer will have the option to pay this fee and have the unit repaired and returned, or not pay this fee and have the unit returned un-repaired.

The remedy for breach of this limited warranty shall not include any other damages. M-AUDIO will not be liable for consequential, special, indirect, or similar damages or claims including loss of profit or any other commercial damage, even if its agents have been advised of the possibility of such damages, and in no event will M-AUDIO's liability for any damages to the purchaser or any other person exceed the price paid for the product, regardless of any form of the claim. M-AUDIO specifically disclaims all other warranties, expressed or implied. Specifically, M-AUDIO makes no warranty that the product is fit for any particular purpose.

This warranty shall be construed, interpreted, and governed by the laws of the state of California. If any provision of this warranty is found void, invalid or unenforceable, it will not affect the validity of the balance of the warranty, which shall remain valid and enforceable according to its terms. In the event any remedy hereunder is determined to have failed of its essential purpose, all limitations of liability and exclusion of damages set forth herein shall remain in full force and effect.