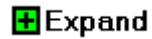


Software WaveTable Synthesizer
WinGroove Version 0.9E
Copyright(C)1996, Hiroki Nakayama

中山裕基

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Introduction

MS-Windows supports 3 kinds of sounds from version 3.1:

1. Beep
2. WAVE
3. MIDI

WinGroove is a software to play the third type of sound, MIDI, using hardware required to produce the second type of sound, WAVE. Nowadays, most personal computers come equipped with a sound card to play WAVE files and even if is not equipped, one may buy a card for below US\$200. With this investment and WinGroove, an users can enjoy listening to MIDI music without any additional hardware.

WinGroove will even produce sound when it is run on a 80386 computer, but a 80486 100MHz Pentium system or higher is highly recommended to produce high quality music. Beside cpu, music quality depends on memory speed, secondary cache size, and total personal computer performance. Additionally, Sound card and its device driver also effect music quality. I recommend Sound Blaster-16 or 32 from Creative Systems as a sound card for its high quality to price ratio. Even if WinGroove might not produce satisfactory music on your current system, please retry it when you ever install a new computer or a sound card.

WinGroove can also save performing of MIDI file to hard-drive as WAVE file.If you convert MIDI to WAVE file by this function, you always enjoy full spec sounds (44KHz,16bits,Stereo) on slowest computer.

WinGroove is not the only MIDI player. Machintosh users can play MIDI files using QuickTime and Intel is also experimenting with a software named NSP for Windows users. Nevertheless, I feel WinGroove is a better software. Comparing minimum requirements, NSP requires a computer with at least Pentium 75MHz while WinGroove will produce music even on a 80486 16MHz system. When both WinGroove and NSP are considered as "musical instruments", sound production rather than programming techniques should be the major factor in selection. As a musician, I feel that I am qualified if not better than people working on NSP at Intel.<g> In context of distribution medium, WinGroove may be classified as a computer software, but I would like it to be thought more as an "artist work" in similar manner as CD music and graphic pictures.

WinGroove is a shareware. It is priced at US\$20.00. Users will be able to test and evaluate WinGroove for 10 days to make sure that it properly runs on their system and evaluate it quality before registration. After this period, if users wishes to use WinGroove on a continous basis, users are prompted to

register WinGroove. Unregistered copy of WinGroove after 10 days will periodically display this dialog box. Save as WAVE file is limited until registration. But there are no other limitations to an unregistered copy. Quality of unregistered copy is the same as those from a registered copy. :)

Beep

Beep is a sound usually produced by personal computer to signal a warning. Almost every personal computer nowadays are capable of producing this sound without any additional hardware and software.

During MS-DOS and early Windows era, users were able to produce simple sounds by using programs that produced different pitched sounds by regulating the beep signals on and off to a particular frequency.

Programs like my SpkQQ and Spk98, Mr.IRUKA's WINPCM, Mr.John Ridges' SPEAKR, and Microsoft's SPEAKER were able to play WAVE files on Windows3.x systems based on this principle. Unfortunately, these programs demand most cpu resources while producing sound and halt any other programs (including mouse cursor). They, therefore, could not be used with WinGroove to play MIDI files on real time. However, if you tkae save as WAVE file, you will be able to hear sounds of WinGroove above SpkQQ (demand a lot of available space on hard disk drive).

WAVE

WAVE files are recorded sound file (digital sampling) like those recorded by a tape recorder replayed. A sound that you might have heard when Windows started is an example of WAVE file. Most sound audible by human ear can be recorded as a WAVE file and replayed later. Nevertheless, recording high quality sound and long sound sample produces a very large WAVE file. As an example, recording 3 minutes of CD music without dropping sound quality (ie. record at 44Khz, 16bits, and stereo) requires $44\text{KB} \times 2 \text{ byte} \times 2 \text{ track} \times 180 \text{ seconds} = 31\text{MB}$. Thus, WAVE files are mainly used only to record short sound effects instead of a complete music.

MIDI

MIDI (Musical Instruments Digital Interface) originated in 1980's by companies manufacturing electronic instruments (eg. music synthesizer) in a effort to standardize exchange of real time information between musical instruments. Instead of recording sound waves as in WAVE format, information such as "middle C key was just strongly pressed", "a key was just released", ... "change to 12th timbre" are encoded.

Later, as sequencers attaching time information to MIDI data came into popularity, it became possible to play a music from just information on how to play a music (in format similar to a musical score). This reduced size of data to less than half of those required by WAVE holding a similar musical information.

In the early days, there were differing MIDI file formats (eg. Yamaha's E-Seq, Roland's MC-500, and Come on Music's RCP formats). Of these many formats, Opcode's format became the most widely used format because of its simplicity. Format based on this Opcode's format is now called the Standard MIDI File Format and became the defacto industry standard.

Despite the fact standard MIDI file format defined notation of information passed between musical instruments, music produced on one instrument may not have produced similar music until GM specification were defined. GM (General MIDI) specification further defined how music should sound by associating instruments to each tone. (GM instrument number assignment seems to be based on Roland MT-32 tone generator.). On GM conforming equipments, music would always be played by similar sounding musical instruments. Thus, music recorded on one equipment would reproduce more faithfully on other equipment. (Roland's GS and Yamaha's XG are newer specifications with more defined musical instruments.)

MS-Windows comes with MIDI Input/Output as a real-time interface to MIDI data, and Standard MIDI File Sequencer to play MIDI data files but does not include a sequencer to record one's own music. If one is interested in recording a music, a sequencer software may be purchased from several different software companies.

Despite the fact drivers necessary to play MIDI files a computer with FM output are included with Windows and with most sound cards, quality of FM output are not much better than those produced by a beep. If one really want a high quality sound from a personal computer, one should purchase an external MIDI system conforming to GM specification. Most of these systems, costing from several hundred to thousand dollars, are manufactured by musical instrument companies and insures very high quality sounds unavailable from any other personal computer options.

Features and Limitations

Features

- 128 varieties of very high quality instrumental sounds conforming to GM (General MIDI) specification and 10 varieties of drum set each with several rhythmical sounds.
- Supports some GS messages.
- Able to play at 44kHz sample rate, 16 bits dynamic range with stereo sound with up to 32 concurrent sounds.
- Automatically adjust to best playing conditions and adjust maximum number of concurrent tones depending on computer's performance. Users are able to fine tune these settings further to produce music to their taste by setting additional parameters in WinGroove Setup.
- Support software reverb (echoing) and compressor (sound leveling).
- Able to upgrade instruments' tremble because it is define in a separate file.
- Able to play to other MIDI output besides WinGroove using included High quality MIDI file player.
- Able to play WAVE file using WinGroove's WAVE device driver by installing it as a device driver.
- Able to convert from MIDI file to WAVE file. Able to play highest quality sounds under the slowest computer.

Limitations

- Sound is produced 0.5 second after command is received. It may be difficult produce music in real-time using WinGroove with a MIDI keyboard because of this delay.
- Music may be played out of rhythm on some pc depending combination of Windows' display and sound device drivers and ROM-BIOS.

Miscellaneous

- There is no difference in sound quality between systems with and without floating pointer processor. All calculations in WinGroove are done in integer.

Necessary Hardware/Software

Personal computer Any machine capable of running Windows
CPU i486 or higher (DX4 or higher recommended)
OS MS-Windows95 / MS-Windows3.1
(Able to run on OS/2 WARP running Windows)
(There are some limitations when playing music on NT3.5/4.0)
Memory After device driver installation:6KB, When playing music: 1.5MB
Hard disk 2MB
Sound card Any sound card capable of playing WAVE files on Windows.
(Sound Blaster-16 or 32 recommended)
(Will not run with internal speaker driver such as SpkQQ)

Installation

WinGroove requires at least 2MB of free hard disk. Before starting to install, please make sure there is sufficient disk space in your system.

When WinGroove archive files are extracted, there should be a WGSETUP.EXE file. Execute this file from MyComputer or Explorer or Program Manager.

After displaying explanation of WinGroove, the program calculates performance of the system. After a demo music is played, the program prompts several times to continue with an installation. Choose the OK and YES buttons at each of these prompts. If there is not enough free hard disk space, choose Cancel or No to terminate installation.

Part way through the installation, the program asks for a directory to install the program to. This directory may be the same directory as where archive files were extracted or it could be a new directory. If a new directory is specified, please delete the extracted files after completing the installation.

After copying all necessary files, WinGroove group icon and several icons in this group are created in the Start button or Program Manager. Finally, the setup programs prompts if WinGroove should be installed as a device driver. If it is installed as a driver, WinGroove may be used to play music with other applications such as multimedia players, games, and sequencers. If it is not installed as a driver, MIDI files may only be played using WinGroove's WG player. WinGroove may be installed and removed as a device driver after completing this setup procedure from WinGroove Setup dialog.

To install as a Windows95 driver

To install as a Windows3.1 driver

When using several different versions of Windows

MIDI file may be played with WG Player without installing WGSETUP.EXE. WG Player is also able to directly play MIDI file from CD-ROM. To play:

1. Execute WGPLAYER.EXE using MyComputer or Explorer or Program Manager
2. Select File from the menu bar.
3. Select Open from the pull-down menu.
4. Select MIDI file to play.

WGPLAYER will calculate computer's performance and play the selected file to best reproduce the original music.

When upgrading to a new CPU

When personal computer, CPU, or sound card is changed

Personal computer's performance changes when overdrive processor, memory, or sound card is added and when device driver is changed. In these circumstances, select Recalibrate in the WinGroove Setup window to recalibrate system performance.

Uninstallation

To uninstall WinGroove that was installed using WGSETUP.EXE:

1. WinGroove Setup dialog.
2. Uncheck device driver option if it is checked.
3. Restarted Windows to remove WinGroove as a device driver.
4. When using Windows3.1, delete icons in WinGroove group by selecting each icon and pressing [Del] key. Finally, delete the WinGroove group icon itself by selecting it from the Program Manager and pressing the [Del] key. OR When using Windows95, drag and drop WinGroove folder to the Recycle Bin.
5. Delete all files in directory specified as [Installation directory] during WGSETUP.EXE.

WARNING: \WINDOWS\WINGROOVE.INI file contains user registration information. Unless you are very certain that you will never again use WinGroove again, do not delete this file. It use only a few K bytes.

Included Files

Following files are included in the WinGroove archive file:

File Name Description

WGPLAYER.EXE	<u>WGPlayer</u> file
WGSETUP.EXE	<u>Installer</u> and <u>WinGroove Setup</u>
WINGROOV.HLP	WinGroove help file
TK_EATS.MID	Sample music 1 by Hiroki Nakayama
MHBB.MID	Sample music 2 by Hiroki Nakayama
COLDWAVE.MID	Sample music 3 by Hiroki Nakayama
WINGROOV.TPD	Trembre data file
WGMFP.DLL	WG Player DLL
WGMMDRVR.DRV	WinGroove driver 1
WINGROOV.DRV	WinGroove driver 2
MIDIMAP.CFG	MIDI mapper specification file for Win3.1

NOTE: User should only execute WGPLAYER.EXE and WGSETUP.EXE.

Append /CONFIG parameter to WGSETUP.EXE in the command line to execute WinGroove Setup. If no parameter is specified, installer is executed.

Playing MIDI Files

Standard MIDI file may be played with WG Player included in WinGroove. It may be more entertaining to watch music being played with WG Player than standard Windows' MediaPlayer because level meter and fader change as music is being played.

If WinGroove is installed as a driver, MIDI files may be played using MediaPlayer. However, I strongly recommend using WG Player instead. MediaPlayer uses Windows' MCI Sequencer to play MIDI files but the quality of this MCI Sequencer is not very good. (It is very slow and goes out of rhythm.) Furthermore, some MIDI files can not be played with MCI Sequencer.

Standard MIDI File

Obtaining Standard MIDI Files

Playing Standard MIDI File

WG Player

WG Player was developed to be play MIDI files (files with MID extensions) in real-time with interface similar to a mixing console in a recording studio. To customize a music, key(pitch) and tempo may be changed and volume of each part may be adjusted using a fader. When used just to play music, WG Player supports music selection to able multiple selected MIDI files to be played in sequence.

- Able to play WAV or AVI files since version 0.9C.
- To display help concerning items on the WG Player windows, select the item and press the F1 key.
- To toggle between displaying and hiding title bar, double-click the mouse when the mouse pointer is not on any item.
- To display a popup menu, click the right mouse button when the mouse pointer is not on any item.

WG Player:File menu

WG Player:Settings menu

WG Player:Help menu

WG Player:Titles list box

WG Player:File button

WG Player:Counter

WG Player:Play/Stop button

WG Player:Fast forward button

WG Player:Rewind button

WG Player:Skip button

WG Player:Playing position scroll bar

WG Player:Key scroll bar

WG Player:Tempo scroll bar

WG Player:Reset button

WG Player:Level meter

WG Player:On check box

WG Player:Auto check box

WG Player:Fader scroll bar

WG Player:File Menu

Open...

Open a dialog box to select MIDI file to play. If a MIDI file contains a title, it is displayed below the file name. [Several files may be selected](#) by pressing Shift or Ctrl key while dragging. MIDI files may also be dragged and dropped from the Explorer or File Manager to the WG Player.

WG Player can also play various formatted files that is supported by Windows' MCI. e.g. WAVE file (*.wav), Video file (*.AVI), ...etc. However, fader, level meter, key and tempo are worked only MIDI files.

Create WAVE file

This takes you to convert to WAVE file from MIDI file.

Exit

End WG Player.

WG Player:Create WAVE file

If your PC is too slow to play good musics on real-time, use this function. All PCs can play maximum quality (44kHz,16bits,stereo) sounds after one time of creation.

But it requires a lot of free space on hard disk.

- 1) Choose **Create WaveFile** on the File menu of WG Player.
- 2) If a MIDI file is not loaded in WG Player, "Open File" dialog box will appear. Choose a MIDI file.
- 3) Create WaveFile dialog will appear. Refer Create WaveFile dialog section to operate.

Wave file is limited less than 30 seconds until register.

WG Player:Create WAVE file Dialog

You can specify sound quality of WAVE file here.

WAVE file name

Sample rate

Stereo

16bits

Compressor

Required disk space and available disk space are shown on the bottom of dialog. Check that available space is larger than required space.

Wave file creation will be started when Start is clicked.

WG Player:Create WAVE file:WAVE file name

Specify WAVE file name that will be saved performing. It will be set the same name that MIDI file name is changed extension to WAV in default.

WG Player:Create WAVE file:Sample rate

Allow to choose sampling rate here. The size of WAVE file is proportioned this value.

If you choose larger value, high frequency sounds be recorded in the WAVE file. But more than disk space will be required.

11kHz	same as telephone voice
22kHz	same as AM radio
44kHz	same as CD quality (Able to record all sounds that can heard human ear)

WG Player:Create WAVE file:Stereo

Allow to specify Stereo or Mono. Stereo sounds use 2 times of disk space of Mono.

If you have only one speaker on your PC, uncheck this to be Mono.

WG Player:Create WAVE file:16bits

The dynamic range will be expanded to 16bits (=96db) when checked. If unchecked, it will be 8bits (=48db).

The size of 16bits WAVE file is 2 times of 8bits.

If you uncheck this, you will hear small noises when listen by large volume or by head phone.

WG Player:Create WAVE file:compressor

It prevent distortions when level will be suddenly increased.

WG Player:Create WAVE file:Start

It will start creation. Two bar graphs are shown while WAVE file being created. One indicates progress, and other indicates remains of disk space.

When **Sound monitor** was checked, you can hear the creating part. If PC has enough speed, the music will be played same as real-time. If PC doesn't have enough speed, the music will maybe not heard continuity, but music is correctly recorded on the WAVE file.

Allow to click **Pause** to pause creation.

If **Cancel** was clicked, you will be asked to save or delete the imcomplete WAVE file. If choose **Yes**, the imcomplete file will be saved on disk. If **No** is chosen the WAVE file will be deleted. If choose **Cancel**, it means "Cancel for Cancel" is continue to create.

WG Player:Create WAVE file:Cancel

If **Cancel** was clicked, you will be asked to save or delete the incomplete WAVE file. If choose **Yes**, the incomplete file will be saved on disk. If **No** is chosen the WAVE file will be deleted. If choose **Cancel**, it means "Cancel for Cancel" is continue to create.

WG Player:Settings menu

WinGroove Settings...

Open WinGroove Setup dialog box, where WinGroove settings may be changed.

High Priority

When checked, WG Player running in an active window is given higher priority than applications running in other windows. Mouse cursor is replaced with an animation cursor when in this mode. Mouse response may become slow because most cpu resources are being used to play a music. If other window is made active, high priority mode is exited. Check this option when Windows is frequently accessing hard disk to swap files and disrupting music. Make sure cursor is showing animation to show that WinGroove is given a higher priority.

Display TXT File

When checked, WG player displays content of a file with the same name as the currently playing MIDI file with either DOC or TXT extension. You can choose a font to view documents from system menu of document window.

Repeat

When checked, selected music is repeated. When several files are selected, the first file in the list is replayed after playing the last file in the list. When only one file is selected, that file is replayed.

No title bar

When checked, WG Player title and menu bars are hidden. Click the right mouse button to bring up the popup menu to select a command in this circumstance. If a mouse is double-clicked when a mouse pointer is not on any items, title and menu bars toggle between hide and display modes.

MIDI-Out...

Lists MIDI devices installed in Windows. In normal operation, please check **WinGrooveDirect**. MIDI device may be changed while a music is being played to compare the quality of devices.

WG Player:Help Menu

Contents

Displays WinGroove Help table of contents.

Search in help topic

Open search dialog box to search for specific topic in WinGroove Help.

About WinGroove...

Displays WinGroove version and user registration information. User registration is also performed from this dialog box.

WG Player:File button

Same as selecting File Open....

Open a dialog box to select MIDI file to play. If a MIDI file contains a title, it is displayed below the file name. **Several files may be selected** by pressing Shift or Ctrl key while dragging. MIDI files may also be dragged and dropped from the Explorer or File Manager to the WG Player. WG Player can also play various formatted files that is supported by Windows' MCI. e.g. WAVE file (*.wav), Video file (*.AVI), ...etc. However, fader, level meter, key and tempo are worked only MIDI files.


WG Player:Titles list box


When several MIDI files are selected to be played, current music may be selected by using up and down cursor keys to move the selection up and down the list or by selecting a title using a mouse. A list is displayed by pressing the F4 key. File name of currently playing music is displayed in normal condition.

WG Player:Counter

Displays time elapsed since the current music started in minutes and seconds. Displays --'-- when music is not being played.

WG Player:Play/Stop buttons

When music is not being played,  mark is shown on the button face. To play a music, choose this Play button.

While music is being played, mark is shown on the button face. To stop the music, choose this button.

These buttons are only selectable when a MIDI file is opened.

WG Player:Fast Forward button

Music is played at 8 times the normal speed when mouse button is pressed while mouse cursor is over the [>>] button or while space bar is pressed down.

WG Player:Rewind button

To move back to the start of the current music, choose the [|<<] button. If several MIDI files are selected, choosing the button again will move back to the start of the music before.

WG Player:Skip button

When several MIDI files are selected, choose the [>>|] button to move to the start of the next music.

WG Player:Playing position scroll bar

It indicates currently playing position.
Able to control scroll bar to locate to any positions.

WG Player:Key scroll bar

Key (=pitch) of the music currently being played may be changed up/down to 1 octave by halftone(=semitone) intervals. Key controls functions in a similar manner as a "karaoke machine".

Only changeable when playing music in WinGrooveDirect mode.

WG Player:Tempo scroll bar

Tempo of music in quarter note per minute.

WG Player:Reset button

Reset volume and timbre of all parts. Choosing this button sends GM System On message to WinGroove or MIDI drives.

WG Player:Level meter

Display volume for each part or entire music in decibel (db). It not very accurate, sorry.

WG Player:Auto check box

When checked, volume control data(#7 of control change) specified in the MIDI file is used as the volume of the part. Fader will move to correspond to the data.(like the compu-mix)

If a fader is moved with a mouse or from a keyboard, Auto option will become unchecked.

When not checked, the volume of the part is set to value specified by the fader. Volume define by the volume data in the MIDI file is overridden.

WG Player:Fader scroll bar

Volume of each part or entire music may be specified using this volume fader. Parts 1 through 16 will automatically move when Auto check box is unchecked. Volume of a part may be changed by moving the fader with a mouse or from a keyboard. Fader to the left with [L R] label is the master volume fader to control all 16 parts volume.

WG Player:On check box

This is a mute switch. If unchecked, that part will become mute. Mute switch to the left with [L R] label is the master mute switch to control all 16 parts.

WinGroove setup

WinGroove was developed to play music with quality comparable to CD (44kHz, 16 bits, stereo) on a recommended hardware configuration. It functions a music synthesizer without necessitating any additional hardware. All computations are done by a CPU. Generally, quantity of a sound is directly relational to number of computations performed. I, however, have decided not to lock the CPU to use it solely to produce sound while WinGroove is playing music, but to provide some CPU time to other applications that might concurrently be running. How much CPU resource WinGroove should use is adjusted by setting Quality and Load in the WinGroove setup.

Choose the [Calibrate] button to calibrate computer performance and set Quality and Load based on this value. However, calibration is based on raw personal computer performance. User is further urged to adjust settings based on these calibration to reflect how music is to be listened. For example, an user may want to listen to music while working with some other application or an user may just want to just listen to music. WinGroove setup may be adjusted to produce best sounding music depending on how an user is to listen to a music.

Number of simultaneous tones and their quality are another parameters that may be adjusted to user's liking. These parameters, unfortunately, are inversely proportional - to obtain high quality sound, number of simultaneous tones must be reduced to increase number of voices that may be produced simultaneously, quality of sound must be reduced. To increase both, it is necessary to upgrade to a faster cpu (486DX4 100Mhz or higher is recommended), upgrade to a better quality sound card (Sound Blaster 16 is recommended), or change to a better speaker.

If you do not know to which value to assign to these settings, choose the Fidelity button and BGM button to set them to a default settings based on computer performance.

To open a help window on selected object in the WinGroove Setup dialog box, press the F1 key or Alt+H keys.

WinGroove Setup:Max.Voices gauge

WinGroove Setup:Load gauge

WinGroove Setup:Max.Load Control scroll bar

WinGroove Setup:Sample rate radio box

WinGroove Setup:Stereo check box

WinGroove Setup:16 bits check box

WinGroove Setup:Anti-aliasing check box

WinGroove Setup:Reverb check box

WinGroove Setup:Compressor check box

WinGroove Setup:Instrument window check box
WinGroove Setup:Driver installation check box
WinGroove Setup:Always Activate check box
WinGroove Setup:Wave-out device list box
WinGroove Setup:Wave volume scroll bar
WinGroove Setup:Synchronize timers
WinGroove Setup:Call default settings:Fidelity button
WinGroove Setup:Call default settings:BGM button
WinGroove Setup:Call default settings:Re-calibrate button
WinGroove Setup:OK button
WinGroove Setup:Cancel button
WinGroove Setup:Help button
WinGroove Setup:Registration button

WinGroove Setup:List of Options

WinGroove Setup:Max.Voices gauge

Max.Voices gauge shows **maximum** number of tones that may simultaneously be produced.This is **not same as number of current tones**.Max.Voices gauge is updated in real-time based on CPU load.

NOTES:

1. Number of voices is directly proportional to Max.Load - when Maximum load is low, tones gauge is low and when Maximum load is high, tones gauge is high.
2. When playing band music, it is recommended to set Number of voices to value between 16 and 20 to hold long tones.
3. Number of voices may only be changed when music is being played.

WinGroove Setup:Load gauge

Load gauge shows percentage of CPU resource being used by WinGroove while playing a music. Values will all be below those set in Max. load which is a maximum percentage of CPU resource that WinGroove may use.

WinGroove Setup:Max. Load Control scroll bar

Maximum load is a maximum percentage of CPU resource that may be used by WinGroove.

NOTES:

1. Number of voices is directly proportional to Max.Load - when Max. load is low, tones gauge is low and when Max. load is high, tones gauge is high.
2. To just listen to music on a personal computer, a value between 80 to 90 is recommended. If Max. Load is set to value near 100%, other applications including WAVE driver will come to a halt.
3. To concurrently work on some other application while playing music in the background, a value between 40 to 50 is recommended. In this circumstance, reduce the sampling rate to maintain number of simultaneous tones at a constant level.

WinGroove Setup:Sample Rate radio button

Sample rate is one of the important parameter determining quality of sound. Increasing sampling rate increases sound quality. However, sampling rate is also directly proportional to CPU load. A computer without a powerful CPU may not be able to play music properly when sampling rate is increased over computer's CPU power.

Sample rate of sounds at different frequencies

Rate	Comparable Sound Quality
11kHz	telephone
22kHz	AM radio
33kHz	FM radio and TV
44kHz	CD music

Performance of a sound board and quality of speakers also influence quality of sound. Nevertheless, most music are listenable when played at 33kHz and even music with high pitched sounds such as metallic sounds (as those produced by cymbals) are listenable when played at 44kHz.

Recommended frequency corresponding to CPU

Rate	CPU
11kHz	80386 ~ 80486 below 33MHz
22kHz	80486 33 ~ 66MHz
33kHz	80486 ~ 100MHz, Pentium 60~90MHz
44kHz	Pentium 100MHz or higher

Choose the Re-Calibrates button to set to a default value based on computer's performance.

WinGroove Setup:Stereo Check Box

When checked, music is produced in stereo (different sound may be outputted from left and right speaker). When not checked, music is played in mono.

Music played in stereo produces spatial sounding music enriching it. Playing in stereo, however, uses more CPU resource than playing music in mono and decreases number of simultaneous tones. Obviously, if only one speaker attached to the sound card, stereo sound will not be produced. Furthermore, some sound cards do not support stereo (warning is displayed when music tried to be played in stereo). In this circumstances, it is recommended to uncheck Stereo Check Box option to lessen the CPU load.

WinGroove Setup:16bit Check Box

When checked, dynamic range is raised to 16 bits (96db) and quality of sound is increased. If unchecked, it is set to 8 bits (48db) and there would be some noise.

If you are using Sound Blaster 16 ,32 or complete 16 bits sound cards, It is recommended to check this option. CPU load (number of simultaneous tones) does not change when this option is checked.

If you are using Sound Blaster Pro or compatible sound cards (include all ESS sound chips), It is **STRONGLY** recommended to Uncheck this. These can play 16 bits audio, but 16 bits audio data transfer is occurred many load for computer. These sound cards use only 8 bits bus and DMA.

WinGroove Setup: Anti-alias check box

When this option is unchecked, several sound production routines are skipped to decrease system load. Quality of the sound produced by each instrument does decrease but number of simultaneous tones will increase when this option is unchecked. Try checking and unchecking to find which mode produces better music for you.

WinGroove Setup:Reverb check box

When checked, an echo is added to all sounds. It might not be too enriching, but music sounds considerably different when this option is checked. Whether to have reverb or not ultimately depends on user's taste. Select the setting which you prefer.

When reverb option is checked, CPU load increases and number of simultaneous tones decreases.

WinGroove Setup:Compressor check box

When checked, volume of loud sounds are reduced to avoid clipping. It is recommended that this option be checked when many different MIDI files are to be played because volume of musics may differ considerably.

This option does not effect CPU load nor number of simultaneous tones.

WinGroove Setup:Instruments Window check box

When checked, **WinGroove Instruments** window is displayed while music is being played. Instrument currently being used to play the music is displayed and updated every 16 parts. Instrument may also be manually changed to while the music is being played.

WinGroove Setup:Driver Installation check box

Driver Installation check box is checked when WinGroove is properly installed as a Windows' device driver.

If it is selected, a dialog box to confirm removal of WinGroove as a driver will appear. Choose the OK button to remove or Cancel button to terminate without removing the WinGroove. When OK button is chosen, the driver will be removed the next time Windows is started.

When this option is selected when it is unchecked, a dialog box confirming to if you want to install the driver will appear. Choose the OK button to install WinGroove as a driver or Cancel button to terminate without installing WinGroove. When OK button is chosen, the driver will be installed the next time Windows is started.

When WinGroove is installed as a driver, it becomes the MIDI-Out device and may be used from other MIDI application to play music. A WAVE sound file may simultaneously be played while a music is being played with WinGroove if the application calls WinGroove's WAVE-Out instead of sound card's WAVE-out.

If you run an application that uses both WAVE(sound effect) and MIDI(BGM), Check the Always Activate before start the application.

WinGroove Setup:Always Activate check box

The WinGroove's MIDI performing is output to speaker from WAVE device. When WinGroove is installed such as driver, Other application can play MIDI performings by WinGroove. But WAVE device is already allocated when play MIDI, WinGroove can not start MIDI performings. In other case, WinGroove allocates WAVE device before application allocates, WinGroove offers a more WAVE device itself. The application can play both WAVE and MIDI in this case.

If check this option, WinGroove immediately allocates WAVE device. Applications will be always able to play both WAVE and MIDI.

You can also copy "**Always Activate**" icon on the WinGroove group/folder to the "StartUp" group/folder to effect this option when Windows was started.

If uncheck this option. WinGroove releases WAVE device.

WinGroove Setup:WaveOut Device list box

WAVE-Out that is to be used by WinGroove is specified. If there are several WAVE-Out devices installed in Windows, select the one that seems to produce the best sound.

WARNINGS:

1. To produce a high quality music, do not select Wave Mapper included with Windows as a driver. Wave Mapper does not assign the best WAVE-Out devices.
2. Do not select wave drivers that stops other programs (eg. SpkQQ) while producing sound.
3. Do not select WinGroove WaveOut itself as WinGroove driver.

Setup:Wave Volume scroll bar

Volume of WAVE-Out device used by WinGroove may be adjusted to a valued between 0 and 100%. Volume set here is only effective while a music is playing. It is reset to the default value set by the volume control applications when the music is finished.

WARNING:

To produce high quality music, set Wave Volume to 100% while decreasing volume of amplifier and speakers. In most sound cards, volume of WAVE-Out device is controlled by digital circuits. Unfortunately, digital wave form distorts at low volume. Therefore, it is better to play digitally at high volume and reduce amplitude of an analog wave to reduce the outputted volume of music.

If volume is set in opposite order, distorted wave is played at loud volume.

Synchronize timers

Synchronize timers is used to keep different timers from disrupting WinGroove keep track of time.

Sound is fluctuation of air pressure. Different pitch is produced by changing the rate of this fluctuation. Music is produced by controlling time which is a major factor of this rate.

Time is regulated in a personal computer by a master LSI which contains a crystal that resonates at a fixed frequency. Sound cards also have their own crystal and keep track of their own time. In most circumstances, time kept by these two crystals do not go off by too much to create a noticeable disruption. Windows, however, uses Windows timer driver, sound card driver, and ROM-BIOS which interprets time in different manner suitable for their purposes. Windows timer driver, especially, does not return a very accurate time. If an application uses this time to play a music, it goes out of rhythm and there is a constant noise.

No correction radio button

Directly use time reported by Windows timer driver and sound card timer. WinGroove will play properly when No correction option is selected if it is running in enhanced mode on Windows 95 / 3.1 and Sound Blaster-16 / 32 sound card. However, WinGroove will not play properly when it is running on Windows 3.1 in standard mode.

Synchronous mode 1 radio button

Correct time used by WinGroove if there is a large deviation between time reported by different timers.

Synchronous mode 2 radio button

Always watch for any timer deviation and correct time used by WinGroove.

Use 9821 timer check box

Some computers have a different timer, a 9821 timer, which is different from those mentioned above. When Use 9821 timer option is checked, WinGroove uses this timer instead of Windows' timer driver. If a music is being played out of rhythm, try checking and unchecking this option. If you are not absolutely sure if your personal computer contains a 9821 timer, do not check this option. Music will not be played when this option is checked on a computer without a 9821 timer.

DO NOT CHECK this option when PC/AT compatible machine.

WARNING:

If the quality of the sound card and its driver is low, music will be played out of sequence and there will be some noise no matter which option is selected.

WinGroove Setup:Call default setting:Fidelity button

When test is done, WinGroove calibrates the performance of the system and assigns system default values to sample rate, Stereo, 16 bits, anti-aliasing, and reverb based on system performance.

If you are not sure which values to assign to optional parameters, they may be set on default values by choosing **Fidelity** and BGM.

re-calibrate calibrates machine's .

WinGroove Setup:Call default setting: BGM button

This button choose a setting that is light load for CPU. Sound quality is decreased.

When test is done, WinGroove calibrates the performance of the system and assigns system default values to sample rate, Stereo, 16 bits, anti-aliasing, and reverb based on system performance.

If you are not sure which values to assign to optional parameters, they may be set oa default values by choosing Fidelity and **BGM**.

re-calibrate calibtates machine's .

WinGroove Setup:Call default setting:Recalibrate button

When chosen, WinGroove recalibrates the performance of the system and assigns default values based on system performance. These parameters may be changed later from Fidelity and BGM.

Recalibrate can not be chosen when WinGroove is playing a music.

WinGroove Setup:Registration Button

To use WinGroove on a continuous basis, it is necessary to register your copy. Upon registration, user will receive a password and user id to stop registration prompts from popping up.

Registration button is used to open a dialog box to enter this password and user id.

Registration button become greyed out after user registration.

WinGroove Setup:OK button

Save current settings to \WINDOWS\WINGROOV.INI file and end WinGroove setup.

WinGroove Setup:Cancel Button

End WinGroove setup without saving nor making the entered setting effective.

WinGroove Setup:Help Button

Opens WinGroove Help window. If an object (eg. button) is selected, information concerning the object is displayed.

WinGroove Help window may also be opened by pressing F1 or ALT+H keys.

WinGroove Setup:List Options

Function	Effect on Sound	Effect on Number of voices and Load
<u>LoadControl</u>	None	Yes
<u>SampleRate</u>	Higher value creates higher quality sound	Yes
<u>Stereo</u>	If checked, add dimension to sound	Yes
<u>16bits</u>	If checked,reduce noise	None
<u>Anti-aliasing</u>	If checked,reduce noise	Yes
<u>Reverb</u>	If checked,add fullness to sound	Yes
<u>Compressor</u>	If checked,prevent distortion	None
<u>Instruments Window</u>	None	None
<u>InstallDriver</u>	None	None
<u>WaveOutDevice</u>	Yes	None

Sync.Timers

None

None

Any sound cards (e.g. Sound Blaster Pro) occurs load for CPU if 16bits is checked.

User Registration

WinGroove is a SHAREWARE. Registration fee is US\$20. If you like the sounds of WinGroove, please pay to the author.

You can use VISA card, MASTER card, AmericanExpress card, a network-money called FirstVirstual, checks, money-orders, and some country's cashes to pay.

Payment will be processed by a shareware agent that called "KAGI" in the USA.

If you have an e-mail address and have a credit card, it takes only few days (except Saturday, Sunday, and Holyday) to finish the registration. In other case, it will takes a few weeks. It depend on distance for JAPAN and USA from you and circumstances of your country's post office.

Outline of the registration.

- 1) You pay \$20 to KAGI.
 - 2) KAGI notify the payment to WinGroove's author by e-mail when the payment was processed.
 - 3) The author send you PASSWORD and USER-ID.
 - 4) You enter the PASSWORD and USER-ID into your copy of WinGroove.
- If you want to know more about our payment system, read <http://www.kagi.com>

How to register

- 1) Run "WG Player"
- 2) Click "Help" menu to choose "About WinGroove"
- 3) The "About" dialog will appear. Click "Register" button.
- 4) A more dialog will appear. Choose "You have not paid to WinGroove yet", and Click "OK".
- 5) You will be asked that "Would you like to run KAGI's registration program now?". Click "Yes".
- 6) The Register program will be appear. Fill out the form.
notes:
Write your name into "Register To" box. Don't use your country's local character. Use only alphabets as possible.
If you have e-mail address, the postal address is not necessary.
If you don't have e-mail address, write your postal address certainly by alphabets and numbers. If you use your country's local character, I can't read or print it on my Windows. Don't forget your country name and ZIP code

(postal-code). I recommend to check the "Paper Receipt" option. This option adds US\$1 of cost, but you will be able to know circumstances of the payment.

If you personally use WinGroove, enter "1" into the "Quantity" box.

7) Click "Next" button after fill form. "Register Output" dialog will appear.

8) If you chose credit card or First virtual, you can send form by e-mail. It's most quick way. If you worry to send card's number in the internet, choose "PRINT" to send by fax .

9) Click "OK" to send or print the order form.

After a few days (or weeks if you don't have e-mail or you send cashes or checks by postal mail)....

An e-mail (or a post card) will be arrived from the author. There is a PASSWORD and a USER-ID in the mail. Enter these numbers into copy of your WinGroove. Details are described in the mail.

If you have never received PASSWORD from the author and you already received "Thanks for your registration" from KAGI, please contact to the author.

Hiroki Nakayama e-mail: sgt02603@niftyserve.or.jp

If you have never received "Thanks for your registration" from KAGI, contact to KAGI to confirm your payment.

KAGI

address: 1442-A Walnut Street #392 Berkeley, California 94709-1405, USA

telephone: +1-510-420-5858

e-mail: support@kagi.com

Now preparing

Now preparing

Now preparing

Now preparing

Now preparing

Now preparing

Support

WinGroove is supported by www page and e-mail.

First, look <http://www.cc.rim.or.jp/~hiroki/english> by NetScape or Internet Explorer.

I will support unregistered users on setting up WinGroove on their system. If you are having trouble playing music with WinGroove, please contact me before you register. If you have any questions, opinions, suggestions, or any other comments, please send an e-mail to:

Hiroki Nakayama sgt02603@niftyserve.or.jp

I try to reply to all inquires as quickly as possible, but due to amount of mail we receive, it might take several days.

Use easy English! :-)

New Releases

All new releases of WinGroove will be uploaded to:

<http://www.cc.rim.or.jp/~hiroki/english>

I will notify to registered uses by e-mail when new versions release.

Copyright and Liability

Copyright:

WinGroove and files contained with WinGroove are copyrighted by Hiroki Nakayama. No part of this program or data may be reproduced, in any form or by any means, without written permission from Hiroki Nakayama.

Copyright of all musical data that may be played using WinGroove is copyrighted to their respective composer. Contact the appropriate composer to obtain permission to copy, distribute, modify, and for any other permission concerning these data.

Microsoft is a registered trademark and Windows is a trademark of Microsoft Corporation in the United States of America and other countries. Other brand and product names are trademarks or registered trademarks of their respective holders.

Liability:

The author and the developer of this software will not take responsibility for any legal problems and for any damage that may result from the use of this software. The files are distributed "as is" and without any expressed and implied warranties. The user, regardless of whether they are registered or not, assumes the entire risk of using the software.

Distribution

WinGroove may be freely distributed if the following conditions are obeyed:

1. Files can only be distributed only in the ORIGINAL archived WGxxxxx.EXE formatted file. Do not change this file or any files within. DO NOT DISTRIBUTE FILES THAT WERE EXTRACTED AND REARCHIVED.
2. Please make it apparent that WinGroove is SHAREWARE. It is necessary to state this in the program description.
3. If it is to be distributed with a publication, please contact the developer to make sure that it is the most recent release of the software.
4. If WinGroove is to be bundled with other software or with a hardware, please contact the developer. We are willing to discuss licensing WinGroove.

The developer is willing to discuss other means of distribution and is also willing to modify the programs to fit users' need better. Please send an e-mail to address written in the Support section.

Instruments supported by WinGroove

WinGroove support 128 instruments conforming to GM specification.
Instruments are assigned to program numbers as follows:

- 0 Grand Piano
- 1 Bright Piano
- 2 CP-80
- 3 Honky-Tonk Piano
- 4 E.Pf.1
- 5 E.Pf.2
- 6 Harpsichord
- 7 Clav
- 8 Celesta
- 9 Glockenspiel
- 10 Music Box
- 11 Vibraphone
- 12 Marimba
- 13 Xylophone
- 14 Tubular bells
- 15 Santur
- 16 Organ 1
- 17 Organ 2
- 18 Rotary Organ 3
- 19 Church Org 1
- 20 Reed Organ
- 21 Accordion
- 22 Harmonica
- 23 Badoneon
- 24 Nylon Str Gt.
- 25 Steel Str Gt.
- 26 FullAco.E.Gt.
- 27 Clean E.Gt.
- 28 Muted E.Gt.
- 29 Overdrive E.Gt.
- 30 Distortion E.Gt.
- 31 E.Gt. Harmonics
- 32 Acoustic Bass
- 33 Fingerd Bass
- 34 Picked Bass
- 35 Fretless Bass
- 36 Slap Bass 1
- 37 Slap Bass 2
- 38 Moog Bass
- 39 Monster Bass
- 40 Violin

41 Viola
42 Cello
43 Contrabass
44 Tremolo Strings
45 Pizzicato Strtigs
46 Harp
47 Timpani
48 Strings
49 Slow Strings
50 Syn Strings1
51 Syn Strings2
52 Choir Aahs
53 Voice Oohs
54 Synth Voice
55 Orchestra Hit
56 Trumpet
57 Trombone
58 Tuba
59 Muted Trumpet
60 French Horns
61 Brass Section
62 Synth Brass1
63 Synth Brass2
64 Soprano Sax
65 Alto Sax
66 Tenor Sax
67 Baritonoe Sax
68 Oboe
69 English Horn
70 Bassoon
71 Clarinet
72 Piccolo
73 Flute
74 Recorder
75 Pan Flute
76 Bottle
77 Shakuhachi
78 Whistle
79 Ocarina
80 Square Lead
81 Saw Lead
82 Syn Calliope
83 Chiffer Lead
84 Charang
85 Solo Vox
86 5th Saw Wave

87 Bass and Lead
88 Fantasy Pad
89 Warm Pad
90 Polysynth
91 Space Voice
92 Bowed Glass
93 Metal Pad
94 Halo Pad
95 Sweep Pad
96 Ice Rain
97 Soundtrack
98 Crystal
99 Atmosphere
100 Brightness
101 Goblin
102 Echo Drops
103 Star Theme
104 Sitar
105 Banjo
106 Shamisen
107 Koto
108 Kalimba
109 Bagpipe
110 Fiddle
111 Shanai
112 Tinkle Bell
113 Agogo
114 Steel Drums
115 Woodblock
116 Taiko
117 Melo Tom
118 Synth Drum
119 Reverse Cym
120 Gt Fret Noise
121 Breath Noise
122 Seashore
123 Bird
124 Telephone
125 Helicopter
126 Applause
127 Gun Shot

Rhythm supported by WinGroove

Part set to rhythm mode may use the following drum kits:

- 0 Drs.Standard Kit 1
- 1 Drs.Standard Kit 2
- 8 Drs.Room Kit
- 16 Drs.Power Kit
- 24 Drs. Electric Kit
- 25 Drs. 808 Kit
- 26 Drs. Dance Kit
- 32 Drs. JAZZ Kit
- 40 Drs. Brush Kit
- 48 Drs. Orchestra Kit

If program not listed above is specified, WinGroove will not change the rhythm.

Note number and drum kit instruments assignment conform to GM and GS specifications.

Trouble Shooting

There is no sound

Sound becomes funny after playing for a period of time

Music goes out of rhythm

There is constant noise

I can play music with WG player but I can't play any using other music playing application

Wave files do not play properly when I installed WinGroove as a driver

Not enough memory error occurs even when there is some free memory

Can I use WinGroove on Windows NT Workstation 3.51/4.0?

WinGroove was installed as driver. But There is no music with some games

Floppy disk error occurs while playing WinGroove

WinGroove does'nt play some times with the IBM's Mwave sound

No sound comes out

Raise WAVE-Out device master volume used by WinGroove. Most WAVE-Out, also, have volume control utility.

Furthermore, raise the amplifier and speaker volume connected to the sound card.

Off the 9821timer

Sound becomes funny after playing for a period of time

Press a any key when sound becomes funny. If sound returns to normal, personal computer's power management utility is effecting the sound. Power management utility is an utility to reduce energy consumption when the personal computer is inactive for a specific period of time. In some computers, CPU speed is reduced resulting in sound change.

Turn this power management OFF. In some computers, it can be changed by pressing some key when the computer is turned on. In others, it can be turned off from an utility.

Music goes out of rhythm

If you are running WinGroove on Japanese NEC 98 series or its compatible machine, choose the Use 9821 timer button. DO NOT check this option if your PC is PC/AT compatible.

If this does not fix the problem or if the personal computer is not Japanese NEC 98 series or its compatible, play some music from WinGroove. While playing, open WinGroove Setup and reduce load to less than 30% by Max.Load Control scroll bar. The music may not sound correctly because number of simultaneous tones are also reduced but pay attention only to the rhythm. If rhythm now seems not to go out of rhythm, reduce the load setting a little bit less than the original setting. If number of simultaneous tones are reduced too much, reduce sample rate or uncheck anti-aliasing, reverb, or stereo options.

If rhythm still goes off, check if the hard disk is being accessed while music is being played. There is usually a lamp on the system unit which lights up when the disk is being accessed. Some computers do not permit interrupts while hard disk is being accessed. If it is being accessed, check High priority and use WG Player to play a music. Moving a mouse may still result in accessing the hard disk so please just relax and try not to touch it.

After trying all the above, the music still goes out of rhythm, performance of the sound card and device driver is not high enough to play music with WinGroove. [WinGroove is able to produce sound on most computers regardless of system performance by reducing the load.](#) Factors that might influence rhythm are hard disk BIOS (described above) and display device driver. If all else fails, ask the manufacture of the display to check any new driver is available.

There is constant clicking noise

If after playing for some time, there is a constant clicking noise sounds every few seconds:

1. Open WinGroove Setup
2. Select Synchronize timers
3. Switch between No correction, Synchronous mode 1, Synchronous mode 2.

This noise enters the music when performance of sound card or performance of device driver is not sufficient for WinGroove. If the noise persists, it is recommended to change the sound card to Sound Blaster-16. (Sound Blaster-Pro is or all ESS chips are NOT good.)

I can play music with WG player but I can't play any using other music playing application

1. First, check if WinGroove is installed as a driver. Install as driver option in WinGroove setup should be checked.
2. If it is checked and there still is no sound:
 - a. Open WG Player
 - b. Choose Setting
 - c. Confirm that there are both **WinGrooveDirect** and **WinGroove** options in the MIDI-Out... menu.
3. Open WG Player and play some music. While music is being played, switch between **WinGrooveDirect**, **WinGroove**, and **MIDI Mapper**. If music is played in all three options, WinGroove is properly installed as a driver. Please check MIDI-Out setting in the other application.
4. If music is not played when **MIDI Mapper** is selected:
 - Win3.1:
 - a. Copy MIDIMAP.CFG file in the directory where WinGroove is installed to \WINDOWS\SYSTEM directory. And reboot the Windows.
 - OR
 - b. Set all MIDI Channels in the MIDI Mapper (in Control Panel) to WinGroove.
- Win95:
 - a. Open **Control Panel**.
 - b. Double Click **MultiMedia** icon.
 - c. Click **MIDI** tab.
 - d. Click **Single instrument**
 - e. Choose **WinGroove** in list
 - f. Click **OK**.

WARNING:

WinGroove may not be installed as a driver in WinNT. WG Player must be used to play music.

Wave files do not play properly when I WinGroove is installed as a drive

Stop WinGroove from providing WAVE-Out device:

1. Open a text editor
2. Open \WINDOWS\SYSTEM.INI file
3. Search [drivers] section
4. Change **Wave?=?:\??????\WGMMDRVR.DRV**
to **;Wave?=?:\??????\WGMMDRVR.DRV**
ie. insert a semicolon before the setting
5. Save the change and restart Windows to make the change effective

When WinGroove is installed as a MIDI-Out device driver, a new WAVE-Out device is made possible by WinGroove. When it is playing a music, WAVE-Out device is locked, but WAVE file may be played by sending commands to WinGroove's WAVE-Out device instead. (WAVE files are played 0.5 second after WAVE-Out device receives a command.) In most applications, Windows will automatically re-direct WAVE file to WinGroove's WAVE-Out device, but some application only support one WAVE-Out device and would not re-direct the command.

WinGroove was installed as driver. But There is no music with some games

Check Always Activate in WinGroove Setup. You will may almost listen to the BGMs and SEs.

But only Microsoft's 3D PinBall (included MS-Plus!) does not play both BGM and SE under the WinGroove! Exclusively Check "Sounds" and "Music" in PinBall's menu.

***Not enough memory* error occurs even when there is some free memory**

Terminate other running applications or try using a memory management utility.

Windows 3.1, still carrying some MS-DOS limitations, will report not enough memory error even when there is some remaining free memory if there is not enough conventional memory (640KB).

Floppy disk error occurs while playing WinGroove

This is BUG of the PC's hardware. I know that some PC's DMA circuit was NOT considered for concurrent using sound and floppy. (NEC's 9821 series)

HID_N0103

WinGroove does'nt play some times with the IBM's Mwave sound

Some Aptiva, ThinkPad have a DSP that is called Mwave. This is very interested technology. But there are too many BUGs in Mwave's driver. A one of the major bug is all Mwave's funtions die beforer resuming of suspend. Today(16 Nov 96)'s new version of Mwave driver is version 2.22. This version was fixed for some bugs.

HID_N0105

Can I use WinGroove on Windows NT?

WinGroove will only play music with WG Player on Windows NT. You can not check driver installation option.

And

Get current version of your sound card's driver. There are almost elder version that was included Windows NT packge. Sound Blaster's new driver is always registerd in <http://www.creaf.com> .

Technical Information

To play music, WinGroove uses timeSetEvent() to create interrupts every 10 ms and uses time returned by timeGetTime() function. Time precision is set to 1 ms so it will interrupt the CPU every 1ms. If a driver or BIOS interrupts the CPU for more than this 1ms, Windows timer will go off.

If Windows3.1 is in Standard mode, timeGetTime() function does not return a proper value. This is really a Windows3.1 TIMER.DRV bug and on some systems.

When WinGroove starts to play a music, it will create a new task. If there is not enough conventional memory, "Not enough memory" error will occur. WinGroove tries to optimize memory usage but it can be turned off by setting:

AvoidDOSmem=0

option in [WinGrooveSetup] in the \WINDOWS\WINGROOV.INI file.

If memory allocated by GlobalAlloc() is passed to midiOutPrepareHeader(), address sometimes becomes unlocked. As a result, when memory is swapped, an interput procedure tries to access this memory and hangs up. This is a MMSYSTEM.DLL bug and occurs with other music playing applications as well. This problem will not occurs as long as WG Player, which doesn't use MMSYSTEM.DLL, is used to play a music.

MIDI Implementation chart

	Tx	Rx	
Basic Channel		x	1-16
Mode		x	Mode3,OmniOff,Poly
Note Number		x	0-127
Velocity			
Note On		x	o
Note Off		x	x
After Touch			
Key		x	x
Channel		x	x
Pitch Bend		x	o
Control Change			
1		x	o Modulation
6,38		x	o Data entry MSB,LSB
7		x	o Volume
10		x	o Panpot
11		x	o Expression
64		x	o Hold
98,99		x	o NRPN
100,101		x	o RPN LSB,MSB
Program Change	x	o	
Valid range			0-127
Exclusive		x	o
Common		x	x
Real time		x	o
Others			
All sound off		x	o (120)
Reset all controlers	x	o	(121)
All note off	x	o	(123)

RPN (Registered Parameter Number)

After specifying parameter to change with RPN(100,101), set data by

MSB(6). LSB is valid only when specifying fine tuning settings.

RPN

mm 11

00-00 Bend range 00 through 18 sets bend range (0 through 24)

00-01 fine tuning 00-00 through 7F7F sets (-100 through +100)

00-02 coarse tuning 28 through 58 sets (+-24)

Other values Reset RPN

*RPN is reset when NRPN (non registered parameter number is received)

NOTES:

1. All number as in hexidecimal unless otherwise specified
2. (number) expressed in decimal

Example: To set bend range to +-12, send

Bx 65 00

Bx 64 00

Bx 06 0C

where x is MIDI channel=part number

Received System Exclusive

Number is expressed in hexidecimal notation. F0 prefix, F7 suffix, and check sum of GS messages are omitted. xx are not checked.

-WG Player Message(GS)

41 xx 45 12 10 00 00 TEXT...

TEXT is composed of ASCII code with maximum of 32 characters

- Normal mode, Drum mode toggle (GS)

41 xx 42 12 40 1p 15 mm

p=part number 0 - F (1-16 decimal)

mm=0 normal mode

mm!=0 rhythm mode

- Bend range(GS)

41 xx 42 12 40 2p 10 bb

p=part number 0 through F (1-16 decimal)

bb=40 through 58 specifies bend range 0-24 in decimal

- Master volume(GS)

41 xx 42 12 40 00 04 vv

vv=master volume(0 - 127 in decimal)

- System mode set(GS)

41 xx 42 12 00 00 7F xx

Initialize all parts

- GS-RESET(GS)

41 xx 42 12 40 00 7F xx

Initialize all parts

- GM-ON(Universal)

7E 7F 09 01

Initialize all parts

- Master volume(Universal)

7F 7F 04 01 11 mm

Master volume (0-16383 in decimal)

11=lower 7 bits

mm=upper 7 bits

Acknowledgements

Firstly I must thank you for Hitoshi. I couldn't release this version without your help.

Imako, thank you for sending me test MIDI file! Please don't forget to return my Rock'n Jam when you have some time.

Shoda.T, thank you for provide me technical assistance with SpkQQ and continuing to provide assistance with WinGroove.

RC, I'm very sorry that I made you remove all TRS. Thank you very much for providing many reports.

Micco, miri, Niiyama, Kubota, Machibu, and Sky & Water, thank you for all your reports. I would not have been able to produce all these events without them.

Lastly, I want to thank Mick. Without WINDOWS FORUM, I would not have been able to complete WinGroove. Please continue with its operation. I'll try to make WG Player look better.

After Thought

Thinking back now, as I was spending day and night in front of a slot machine heaven (hell?) in Nevada, a feeling that I am now possible to develop software synthesizer came over me.

Ever since junior high, when I bought my first synthesizer, I dreamed of making my own. Finally, performance of personal computer performance increased to make my dream possible (even though 15 years has pasted). (^_^)

After coming back to Japan, I immediately went to work on it. After 1 to 2 days, prototype of the main routine, DSP routine, was finished. Timing it on DX4-100 machine, it was faster than I thought. I originally thought it would be enough if it would produce 16 poly 22kHz sound, a little bit better than FM sound. However, as I worked on it, I began to think that it wouldn't be enough without 44kHz stereo sound with reverb. After 1 to 2 months, during which time I was troubled with Windows 3.1 bugs, I finally finished the driver. Making instrumental sounds consumed the most time.

To fully support GM (General MIDI), several hundred instruments must be defined. It is not very difficult to find sound produced by an instrument and get a sample, but it is not too simple to reduce file size while maintaining the fullness of the sound it produces. After transferring a sample to my personal computer, harmonics are added, other instruments' attack are mixed, dynamics are added and deleted all to find and create a repetitious pattern.

Wearing a headphone, and repeatedly listening to these sample sounds all day long for months and months, it became difficult to distinguish between the actual sound and those from my ringing ears. (After purchasing Sound Forge version3, it became much easier.) Only god knows how many wave forms I've actually created - still I'm still not satisfied. My goal was to reduce file size to within 1 MB. If I've set it to 2 or 3MB, better sounds could have been produced. Depending on you, the users, I always flexible to change them in my next version.

This is a product of 15 years of planning and 8 months of development. Please listen to the sound produced by my masterpiece and let its sound vibrate within your soul. (^_^)(^_^)

August 31, 1995
At Jiyugaoka apartment
Hiroki Nakayama (AZARASHI)

I've recommended Sound Blaster-16 pretty much throughout this help file. It, however, has a major problem - it includes too much noise when I tried to record with it.

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Performance of a Sound Card

Raising Sampling rate and applying anti-aliasing lead to production of high quality sound at a cost of CPU usage. Nevertheless, if the quality of sound card or speakers are not very good, sound output will not be very good.

As an example, my sound card in my Japanese NEC PC-486MU is compatible to Sound Blaster, but the quality is not even near it. Listening to its sound using a headphone, there is not much difference between 8 bits and 16 bits and between 22kHz and 44kHz sound. To top it off, quality of the device driver is not very well either, and it often adds a clicking sound.

I personally recommend Sound Blaster-16 from Creative Laboratory. They are very reliable compared to compatible boards.

Number of Simultaneous Voices

Let take a situation when playing a MIDI band music with 5 members - drum, bass, guitar, piano, melody. It first appears that 5 simultaneous tones are sufficient to play music produced by this band, but it actually requires more.

Take a drummer. A drummer uses two sticks and may use both feet to step on a pedal. In all, a drummer alone is capable of producing 4 different sound at once. Thinking further, drum membrane continues to vibrate after it is struck and continues to resonate. If a drummer strikes another drum before this resonance dies off, there are more than 4 simultaneous sounds. In fact, a typical drummer creates 6-7 simultaneous tones.

A bass has 4 strings. A player could play 2 strings at once and there are some resonance sounds, but a typical bass only requires 1-2 simultaneous sounds.

A guitar has 6 strings. Like a bass, 1-2 simultaneous sounds are sufficient when playing a solo, but 4-5 sounds are required when played in a group.

Piano is played with 10 fingers so at least 10 simultaneous sounds are necessary. Additionally, like a drum, there are some resonance sounds. Without this resonance sounds, a music will sound very choppy. Number of voices depends on a music but it is better to at least have 10 simultaneous sounds.

Melody normally requires only 1 sound. Even when resonance is accounted for, 2-3 sounds are sufficient.

It all depends on what kind of music one is playing, but in most cases, at least 16 simultaneous sounds are needed. GM-system-level-1 specification also specifies at least 16 sounds.

If more than specified number of simultaneous tones are needed, WinGroove stops the oldest sound to play the new. WinGroove adjusts number of simultaneous tones while music is being played based on CPU load. To current number is displayed by number of simultaneous tones gauge in WinGroove setup.

Standard MIDI File

Standard MIDI files contain instructions on how to play a music. These instructions are entered using MIDI keyboard, MIDI guitar, and computer programs. MIDI files contain numerical values in a similar fashion as a musical score. Sound itself is not kept in the file. (It is possible to keep sound data directly in the file using Universal Dump format. The size of the file, however, get rather large, and it is seldom used.)

In recent years, standard MIDI file has become known as a standard musical format to record and play music on Windows and Macintosh personal computers, music synthesizers, automatic pianos, and karaoke. MIDI files are suffixed with **MID** extensions in Windows and DOS.

HID_N0074

HID_N0075

HID_N0081

1. Select Control Panel
2. Select Multimedia
3. Select MIDI
4. Select WinGroove as a Single instrument

This will enable WinGroove to be used with other application to play music.

\WINDOWS\SYSTEM\MIDIMAP.CFG file is overwritten to able WinGroove to be useable from MIDI Mapper when WinGroove is installed as a driver in Windows3.1. The old file is renamed as MIDIMAP.WG in the same directory. Do not delete this file. When WinGroove is uninstalled, this file is copied back as MIDIMAP.CFG file.

When using multiple versions of Windows (eg. MS-Windows 3.1 and MS-Windows95), WinGroove may be installed on each Windows by specifying the directory where WinGroove was initially installed. All specified settings and user registration will then be copied to the new environment.

Sound Blaster Pro , SB-Pro compatible sound cards and sound card that install ESS-xxxxx chip.

The above sound cards use single channel of DMA.

Uncheck the 16bits option if your sound card is in above.

Computer's performance depend on not only CPU speed
Memory speed, memory size, bus size, bus speed, 2nd cache spec, or
various elements are concerned.

For example...

"My PC that installed Pentium 133MHz is slower than friend's PC that has
Pentium120MHz!"

This is often the truth.

