Volume
Sets the master output volume of the board.

Balance
Sets the relative volume of the two stereo channels. Setting the right channel will automatically set the left channel; when you increase the right by one unit, the left channel decreases by one unit, and vice versa.

Treble
Sets the relative loudness of the high frequencies of the sound.

Bass
Sets the relative loudness of the low frequencies of the sound.

Input level
Sets the gain (input level) of the external auxiliary source and of the microphone.

Output mode
Sets the output mode of the audio source to one of four options:

- Linear: without any effect on the audio source;
- Pseudo: pseudo stereo effect that can be applied when the source is mono;
- Mono: forced mono effect that can be applied when the source is stereo;
- Spatial: light surround sound effect that can be applied when the source is stereo.

The default setting is Linear.

<F1-MSC mode/Gold mode>
Resets the Gold card so it is compatible with the original Ad Lib Music Synthesizer Card. This might be necessary in cases where a third party application that does not properly put the Gold card in its default mode for full compatibility with the original Ad Lib card.

<F2-Sub Mixer>
Opens the Sub Mixer window.

<F3-Surround>
Opens the Surround Features window (when using the add-on Surround Sound Module).

<F4-Keys>
Opens the ALT-SHIFT Keys (short cuts) window.

<OK> (↵ or Esc)
Closes the Mixer Panel main window and returns to the current application saving the changes you made in the settings.

Sub Mixer

Activating the F2 key when in the Mixer Panel main window will open the Sub Mixer control window. Sub Mixer parameters allow the output volume from the five different audio sources to be controlled:

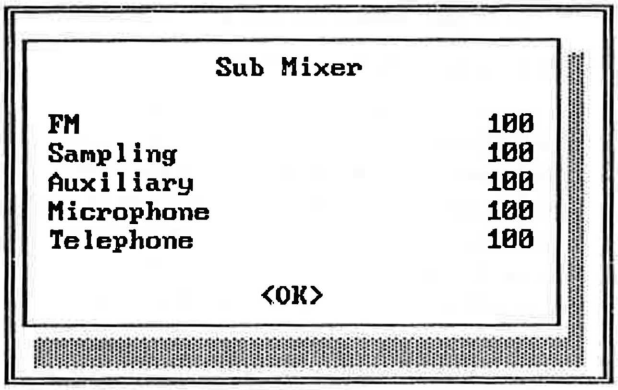


Figure 8: The Sub Mixer control window

FM
Sets the output volume of the FM source.

Sampling
Sets the output volume of the Sampling source.

Auxiliary
Sets the output volume of the auxiliary source (external or internal).

Microphone
Sets the output volume of the microphone.

Telephone
Sets the output volume of the telephone (when using the add-on Telephone Module).

<OK> (↵ or Esc)
Closes the Sub Mixer control window and returns to the main Mixer Panel window saving the changes you made in the Sub Mixer parameter settings.

Surround Features

Activating the F3 key when in the Mixer Panel main window will open the Surround Features control window.

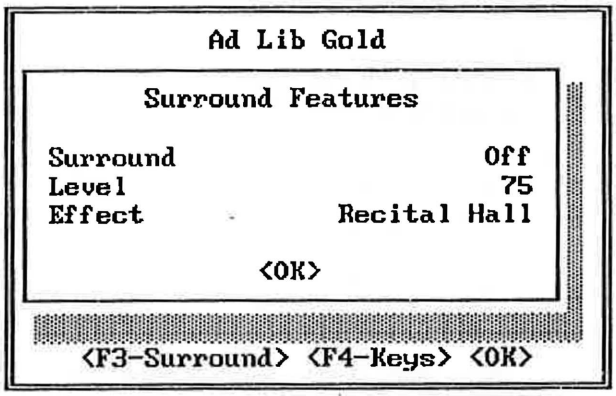


Figure 9: The Surround control window

✳ *NOTE: If the Surround Sound Module is not installed, the program will display the message "OPTION NOT INSTALLED" and the changes you make to the parameters will have no effect (Fig. 10).*

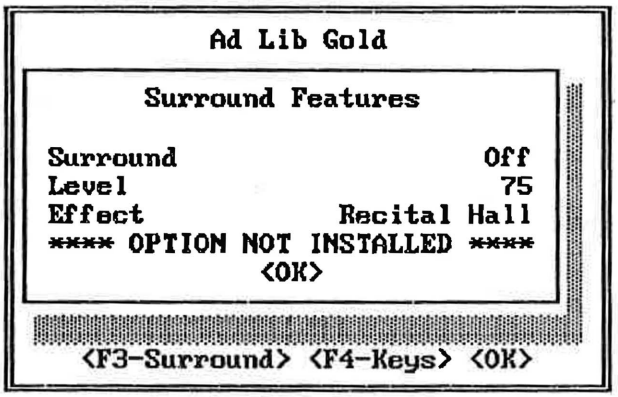


Figure 10: The Surround control window when option not installed

`Surround`
A toggle On/Off allows the Surround Sound option to be enabled or disabled. The default setting is Surround Off.

`Level`
Sets the level of the surround sound effect produced by the Surround Sound Module.

`Effect`
Sets the type of surround sound effect you want to enhance the sound ambience selected from a variety of presets.

<OK> (↵ or Esc)
Closes the Surround Features control window and returns to the main Mixer Panel window saving the changes you made in the parameter settings.

ALT-SHIFT Keys (Short Cuts)

In order to avoid conflicts with other programs, you may change the last key in the combination of keys used to activate the Mixer Panel, to set the master volume and to turn On and Off the Surround Sound. Activating the F4 key when in the Mixer Panel main window will open the Keys window.

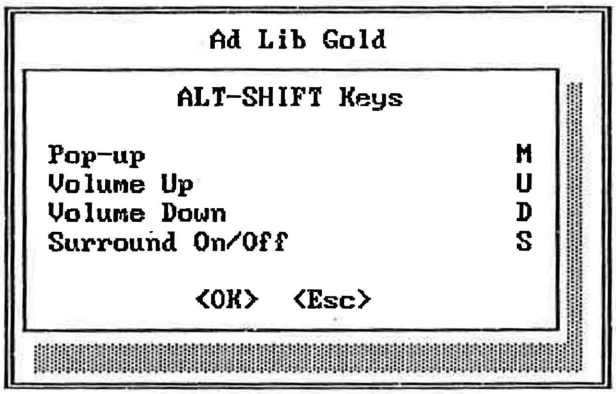


Figure 11: The ALT-SHIFT Keys window

`Pop-up`
Sets the key combination used to activate the main Mixer Panel window. The default combination is Alt-⇧-M.

`Volume Up`
Sets the key combination used to increase the master volume one unit at a time. The default combination is Alt-⇧-U.

`Volume Down`
Sets the key combination used to decrease the master volume one unit at a time. The default combination is Alt-⇧-D.

`Surround On/Off`
Sets the key combination used to enable and disable the surround sound effect. The default combination is Alt-⇧-S.

`<OK>` (↵)
Closes the Keys window and returns to the main Mixer Panel window saving the changes you made in the control keys.

`<Esc>` (Esc)
Closes the Keys window and returns to the main Mixer Panel window canceling the changes you made in the control keys.

Closing the Mixer Panel

When in the main window of the Mixer Panel, press the ↵ or Esc key to leave the program and return to where you were when the Mixer Panel was activated.

Removing the Mixer Panel TSR

When the Mixer Panel TSR is already installed but you do not wish to use it, you can unload the program with the option "`/r`". This option removes the Mixer Panel TSR from the computer's memory. To remove the Mixer Panel TSR, go to the appropriate directory and type the following command:

```
mixer /r
```

Once this command is entered, the program will display a message indicating that the Mixer Panel has been removed.

4.4 Juke Box Gold Music Playback Program

Juke Box Gold is a music playback program specially designed to demonstrate the sound capabilities of the Ad Lib Gold card itself. It enables you to play pre-programmed songs, or those you create yourself using the Visual Composer Gold music composition program (sold separately). Selected songs can also be played at any time while other applications are running, with the use of the ROL2 Playback TSR commands.

Loading Juke Box Gold

To load Juke Box Gold, set the current directory to the one in which you placed Juke Box Gold at installation and type:

```
jukegold
```

Once the program is loaded, the main Juke Box Gold window will appear as shown in Figure 12.

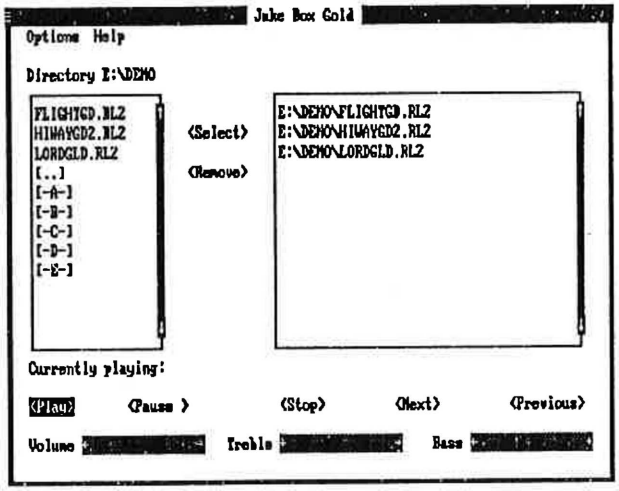


Figure 12: The main Juke Box Gold window

This window displays the various menu titles and command buttons (see Figure 12). Other possible options are contained in the menus. To activate a menu, use one of the following methods:

1. Using the Tab key: Scroll and choose the command you want with the Tab key.
2. Using the keyboard shortcuts: To activate the menu or command you want, press the Alt key and the letter highlighted in its name. To activate a command in an open menu, press the highlighted letter.

3. Using a mouse: To activate the menu or command you want, click on the menu or button command with the mouse.

Selecting Songs

Creating a Selection of Songs

The main Juke Box Gold window contains two large boxes for song selection. The box located at the left of the screen displays the contents of the current directory. This is a list of files, subdirectories and drives through which you can navigate by selecting a name and pressing the ↵ key, or by double clicking with the mouse. The name of the current directory is displayed above the box. When the program is loaded, the default directory is the directory where you placed Juke Box Gold.

To create a selection of songs, go to any directory containing ROL2 files, highlight the file and activate the Select command, or press ↵, or double click with the mouse, for each song you wish to add to the selection. As each song is selected, its DOS file name will be displayed in the Selection box at the right of the screen in its order of selection. You may select as many songs as you wish (depending on memory capacity), but only from a single directory.

To Remove Songs from the Selection

The box at the right of the screen displays the list of songs contained in the selection you have made. To remove a song from the selection, highlight its name and activate the Remove command.

Playing Music

To Play Songs

To play your selection of songs, activate the Play command. Each song in the list will be played in order.

Once the music begins playing, the name of the song currently playing is displayed at the bottom of the window.

To Stop Music Playback

To stop music playback, activate the Stop command.

To Pause and Resume Music Playback

To pause music playback, activate the Pause command. When the music pauses, the Pause button toggles to Resume.

To continue music playback at the exact place where it stopped, activate the Resume command. Once the music starts up again, the Resume button switches back to Pause.

To Scan Songs

To skip to the next song during playback, activate the Next command. This will immediately start the next song if there are any left in the song selection list.

To return to the previous song during playback, activate the Previous command. This will immediately start the previous song.

Adjusting the Sound

The Ad Lib Gold card has an on-board analog mixer that allows volume and tone controls to be adjusted. These features can be accessed from any application by using the Mixer Panel TSR program (see the section "Mixer Panel TSR"). But you can also adjust the sound directly inside the Juke Box Gold program. Three sliders located along the bottom of the window allow you to adjust volume, bass and treble controls while listening to Juke Box songs.

To Adjust the Volume, Bass or Treble

To adjust one of these three parameters, activate the slider you want and use the left and right arrow keys (← and →) to raise or lower the value of the chosen parameter. You can also scroll the indicator inside a slider with a mouse.

To Set the Stereo/Mono Option

The Gold card output can be set either to stereo sound (distinctive signals for the left and right channels) or mono sound (identical signals from both channels). To change from one to the other, choose the Stereo or the Mono option from the Options menu.

Asking for Help

When you choose the Help command, a window opens up on the screen containing summarized information on how to operate Juke Box Gold and how to use the various features.

Exiting the Program

To leave the program and return to DOS, use one of the following methods:

- Activate the Exit command from the Options menu.

  OR

- Click on the System menu box at the upper left corner of the window and activate the Close command.

Using the ROL2 Playback TSR

The music files played by Juke Box Gold are called ROL files (.ROL or .RL2). In order to play these music files, the application uses a TSR driver, which we refer to as ROL2 Playback TSR.

Since TSRs stay in memory while we use other programs, the ROL2 Playback TSR allows you to play the songs previously selected in Juke Box Gold, while using other applications.

For details on the loading options of the ROL2 Playback TSR, see the section 4.9 "ROL2 Playback TSR".

The playback commands of this TSR can be used at any time by the following key combinations:

Alt-⇧-P	Plays the selected songs.
Alt-⇧-A	Pauses and resumes the music playback.
Alt-⇧-T	Stops the music playback.
Alt-⇧-N	Skips to the next song from the selection.
Alt-⇧-V	Returns to the previous song from the selection.

In order to avoid conflicts with other programs, you may change the last key in the combination of keys used to activate the above commands by using the Setup program.

> ! ***WARNING: Do not use the ROL2 Playback TSR while running other music applications, as this will cause conflicts with the ROL2 Playback driver.***

Loading Instrument Maker Gold

To load Instrument Maker Gold, type the following command at the DOS prompt:

INSGOLD

OR

ED /BBANKNAME.BNK

Where "BANKNAME" is the name of the bank.

Using Menu Commands

F5 File

New
Opens a new empty sound patch.

Open...
Opens an existing sound patch.

Close
Closes the current sound patch.

Save
Automatically saves changes made to sound patch.

Save As...
Saves the current sound patch under a new name (maximum of 11 characters).

Delete...
Deletes an existing sound patch.

Read "opl3.txt"
Save "opl3.txt"
Debug...
You do not have to use these commands. They were implemented for development and will be removed for the final version of Instrument Maker Gold.

Quit
Closes all opened sound patches, quits the Instrument Maker Gold application and returns to DOS.

F6 Options

Note Select
You do not have to use this option. It was implemented for development and will be removed for the final version of Instrument Maker Gold.

AM Depth
Amplitude Modulation Depth: When this option is checked, it increases the LFO volume modulation (tremolo).

PM Depth
Pitch Modulation Depth: when this option is checked, it increases the LFO frequency modulation (vibrato).

Octave Up
This command makes the screen keyboard and computer keyboard play an octave higher.

Octave Down
This command makes the screen keyboard and computer keyboard play an octave lower.

F7 Document

This menu gives you a fast way to switch between open sound patch documents. It lists all the sound patch documents you have open, to a maximum of ten (including the untitled document). The checkmarked document is the active one on which you can work. An asterisk (*) placed beside a document name indicates that the document has been modified.

Editing FM Instrument Sounds

To select a parameter:

1. Click on the chosen parameter with the mouse.
2. Use the arrows to navigate between the different parameters.

To modify a parameter:

1. Use the Space Bar to increase the value of the chosen parameter one unit at a time.
2. Use Shift- Space Bar to decrease the value of the chosen parameter one unit at a time.
3. Use the Plus Key on the numeric keyboard to increase the value of the chosen parameter one unit at a time.
4. Use the Minus Key on the numeric keyboard to decrease the value of the chosen parameter one unit at a time.

To mute operators:

- The Mute function allows you to disable (turn off) any instrument sound operator, thus making it possible to work on individual operators and listen separately to each as you change the parameters. Use the F1, F2, F3, and F4 keys to mute operators 1, 2, 3, and 4 respectively.

NOTE: In the supplied sound bank, the two-operator sound names begin with a capital letter and end with a "#", while four-operator sound names begin with a lower case letter.

Loading Sample Maker

To load Sample Maker, go to the appropriate directory and type the following command at the DOS prompt:

SAMPL

Using Menu Commands

F5 File

New
Opens a new empty sampled sound.

Open from Bank...
Opens an existing sampled sound in ADPCM format from the bank.

Save to Bank As...
Saves the current sampled sound in ADPCM format under a new name in the bank.

Delete from Bank...
Deletes an existing sampled sound in ADPCM format from the bank.

WARNING: All sampled sounds saved to bank are temporarily limited to 64 K. Furthermore, the format of sampled sounds saved to bank will change in the next development versions. For these reasons, we recommend that you do not use the commands related to a bank.

Compact Bank
You do not have to use this command. It was implemented for development and will be removed for the final version of Sample Maker.

Open File...
Opens an existing sampled sound in PCM format (.SMP file) from the current directory.

Save File As...
Saves the current sampled sound in PCM format (as .SMP file) in the current directory.

Open Sample Vision File...
Open Lyre File...
You do not have to use these commands. They were implemented for development and will be removed for the final version of Sample Maker.

Quit
Closes the displayed sampled sound, quits the Sample Maker application and returns to DOS.

F6 Edit

Copy
Copies the selected section of the sampled sound and puts it into a memory buffer.

Cut
Deletes the selected section from the sampled sound and puts it into a memory buffer.

Paste
Inserts a copy of the buffer's contents at the point where the cursor is positioned in the displayed sampled sound.

Clear
Deletes the selected section from the sampled sound, but, unlike the command Cut, does not put it into the buffer.

Clear All
Deletes the entire sampled sound from the screen.

F7 Sampling

Record
This command enables any audio signals mixed with the Gold card to be recorded and sampled with Sample Maker. The sampling process will follow the sampling parameters defined within the Sampling Params... dialog.

Play
This command lets you listen to the opened sample sound. When a section of the sampled sound is selected, you will only hear that section played.

Sampling Params...
Use this command to determine the value of the various parameters related to the sampled sound you are working on.

F8 Options

Scope Mode
This command makes Sample Maker's screen display the sampled signal received at the input as a scope.

NOTE: When in Scope Mode, only the sampling frequency (in PCM) is an effective parameter in the "Sampling Params..." dialog.

Scale Up
Each time you use this command, Sample Maker zooms the displayed sampled sound out horizontally by a ratio of 1 to 1/2.

Scale Down
Each time you use this command, Sample Maker zooms the displayed sampled sound in horizontally by a ratio of 1 to 2.

Scale Reset
Resets a zoomed out sampled sound to the original 1 to 1 scale.

ADPCM File Format
This command is grayed out because you do not have to use it. The PCM to ADPCM file format converter is not completely implemented at this time.

Gen. Example
This command automatically generates a sampled sin wave and pastes it onto the screen. You should not use this command. It was implemented for development and will be removed for the final version of Sample Maker.

Important Warnings for this Development Version of Sample Maker

Sampling Rate Limitations

1. Due to a limitation of the sampling chip, the sampling rate of 5.5125 kHz does not work in 4-bit PCM format. Do not choose this option, because Sample Maker will then set another sampling rate, which will give unexpected results.
2. Due to a limitation of the sampling chip, the sampling rate of 44.1 kHz does not work in 4-bit ADPCM format. Do not choose this option, because Sample Maker will then set another sampling rate, which will give unexpected results.

❑ See "Digital Input and Output".

Sampling Length Limitation

- Sampled sounds are limited to 256 K. If a recording goes over 256 K, it will clip at 256 K.

Scope Mode

- When in Scope Mode, choosing the Record command will make the program lock up.

Graphic Display In Different PCM Format

- Even though every PCM format makes Sample Maker record and play correctly, only PCM 8-bit format is displayed correctly on screen.

Ad Lib Surround Sound Editor

Ad Lib is providing a special application program, the Surround Sound Editor, which allows you to program your own presets for the Surround Sound Module. This program is included within a special version of Juke Box Gold so that you may play back Juke Box songs and listen to changes you make while working in the editor.

Technical Features

The underlying technology of the Surround Sound Module is a circuit designed as a general-purpose digital processing element. The board's main component is an LSI chip which has quality digital surround sound capabilities made possible through Yamaha's digital audio technology. Each of its eight digital delay lines may provide a delay time of up to 100 milliseconds, and combining delay line signals for two-channel output assures a wide range of applications.

Opening the Surround Sound Editor

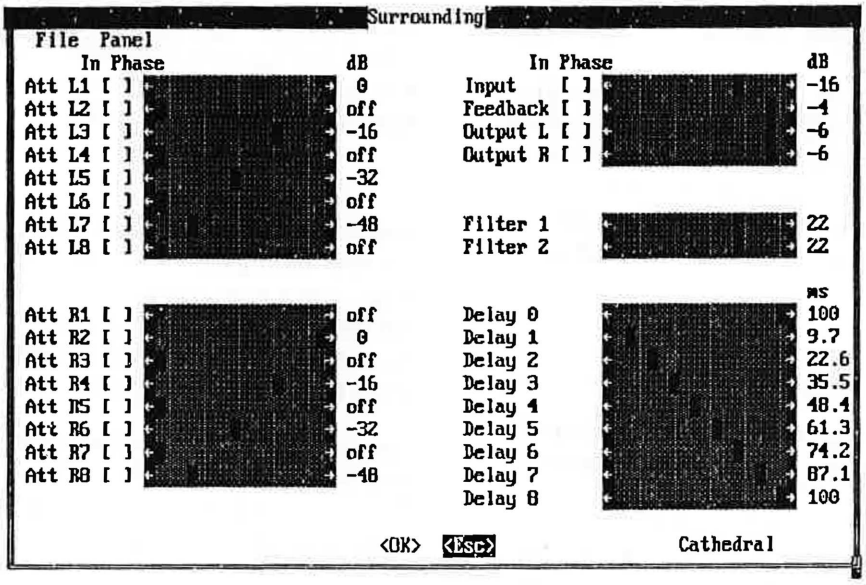
As stated above, the Surround Sound Editor is at this moment included within a special version of Juke Box Gold. So, to open the editor, you first have to load Juke Box Gold.

To load Juke Box Gold with the Surround Sound Editor, set the current directory to the one in which you placed Juke Box Gold during installation and type the following command:

```
surround
```

Once the program is loaded, the main Juke Box Gold window will appear. You can then select and play back songs as you wish. For complete information on using Juke Box Gold, refer to the "Juke Box Gold Music Playback Program" section of *Ad Lib Gold Pre-Release Evaluation Kit.*

When ready, open the Surround Sound Editor by choosing Surround from the Options menu. Upon opening, the Surround Sound Editor window will appear as shown in the following figure.



The Surround Sound Editor window

This window displays the various parameters used to construct a surround sound effect.

Using the Surround Sound Editor

The Surround Sound Editor window contains five main parts:

- The left channel line attenuation section, located at the upper left corner of the screen.
- The right channel line attenuation section, located at the lower left corner of the screen.
- The global level and feedback parameter section, located at the upper right corner of the screen.
- The filter parameter section, located in the middle of the right side of the screen.

- The global delay line parameter section, located at the lower right corner of the screen.

Channel Line Attenuation Sections

These two sections display the two delay line attenuation parameters related to left and right channels.

In Phase
When this check box is checked off, means that the delay line output signal is in phase with the input signal. When this check box is not checked off, means that the delay line output signal is phase reversed with the input signal.

dB
Displays the attenuation value setting of the delay line, which ranges from –60 decibels to 0 decibels, in steps of 2 dB. A delay line can also be turned off (–∞).

Global Level and Feedback Parameter Section

This section displays the two global attenuation parameters related to global signal input, feedback output, and left and right channel global outputs.

In Phase
When this check box is checked off, means that the output signal is in phase with the input signal. When this check box is not checked off, means that the output signal is phase reversed with the input signal.

dB
Displays the attenuation value setting of the signal, which ranges from –60 decibels to 0 decibels, in steps of 2 dB. A signal can also be turned off (–∞).

Filter Parameter Section

This section displays the value setting of the two low pass filters for the feedback loop, which ranges from 0 to 31 units, in steps of 1 unit.

Global Delay Line Parameter Section

ms
Displays the time value setting for each of the 8 delay lines (`Delay 1` to `Delay 8`) and the feedback loop delay line (`Delay 0`), which range from 0 to 100 milliseconds, in steps of approximately 3.2 milliseconds.

Editing Surround Sound Presets

To modify a parameter, use one of the following methods:

1. Click on the slide bar indicator of the chosen parameter with the mouse and drag it to the desired value.
2. Click on the gray zone of a slide bar to move the indicator and to decrease or increase the value of the chosen parameter several steps at a time.
3. Click on the left or right arrows at the end of a slide bar to decrease or increase the value of the chosen parameter one step at a time.
4. Click on a check box to turn it On or Off.

Using Menu Commands

To activate menu commands, use one of the following methods:

1. Using a mouse: To activate a menu command, click on the menu with the mouse, drag to the command you want and release the mouse button.
2. Using the keyboard shortcuts: To activate a menu command, press the letter highlighted in the menu's name and the Alt key at the same time. Then, activate the command you want by pressing the letter highlighted in its name.

File Menu

New
Opens a new empty surround sound preset with no name.

Open
Opens an existing surround sound preset from the bank entitled STANDARD.SRD.

Save
Opens a dialog box which allows the current surround sound preset to be saved under a chosen name (maximum of 8 characters) in the bank entitled STANDARD.SRD.

Text
This command will save the current preset in text form, in both C and Assembler formats, in the file PRESET.TXT. If PRESET.TXT exists, the text will be appended

Delete
Deletes an existing surround sound preset from the bank entitled STANDARD.SRD.

Panel Menu

Open
Opens an existing surround sound preset from the Control Panel executable file (CONTROL.EXE).

Save
Saves the current surround sound preset in the Control Panel executable file (CONTROL.EXE).

NOTE: This command does not allow the name of the current surround sound preset to be changed.

Closing the Surround Sound Editor

<OK> (↵)
Closes the Surround Sound Editor window and returns to Juke Box Gold, temporarily keeping the changes you have just made to the current preset for a further work session.

<Esc> (Esc)
Closes the Surround Sound Editor window and returns to Juke Box Gold, without keeping the changes you have just made to the current preset.

ROL2 Playback Utility

The ROL2 Playback utility is a small program that allows the user to play RL2 music files from the DOS command line or from a batch file.

The format of the command running the ROL2 Playback utility is the following:

```
playrl2  fileName  [/Q]
```

Where ***fileName*** is the name of the ROL2 music file (.RL2) to be played.

The optional "**/Q**" parameter can be used to start the playback of the RL2 song file and immediately returns control to DOS. The playback of the song will be taken in charge by the ROL2 Playback memory resident driver.

If you enter "**playrl2**" alone or with the option "**/?**" ("**playrl2 /?**"), the program displays help lines giving summarized information on program parameters.

The ROL2 Playback utility uses the following five drivers, which have to be loaded before running it:

- Control driver (CTRLDRV.EXE)
- FM driver (FMDRV.EXE)
- Wave driver WAVEDRV.EXE)
- Timer driver (TIMERDRV.EXE)
- ROL2 Playback driver (RL2DRV.EXE)

Digitized Sound Playback Utility

The Digitized Sound Playback utility is a small program that allows to play back digitized sound files (recorded in the .SMP format) from the DOS command line or from a batch file.

The format of the command running the Digitized Sound Playback utility is the following:

```
playdigi  fileName  [/p]  [/n]
```

Where ***fileName*** is the name of the digitized sound file (.SMP) to be played.

Where "*p*" in the option "*/p*", may be "**C**" (center), "**R**" (right), or "**L**" (left), indicating the stereo position you want for the playback of the digitized sound file.

Where "*n*" in the option "*/n*", may be a number from 0 to 100, indicating the volume you want for the playback of the digitized sound file.

If you enter "**playdigi**" alone or with the option "**/?**" ("**playdigi /?**"), the program displays help lines giving summarized information on program parameters.

The Digitized Sound Playback utility uses the following two drivers, which have to be loaded before running it:

- Control driver (CTRLDRV.EXE)
- Wave driver (WAVEDRV.EXE)

Using the ROL2 Playback TSR

The music files played by Juke Box Gold are called ROL files (.ROL or .RL2). In order to play these music files, the application uses a TSR driver, which we refer to as ROL2 Playback TSR .

The ROL2 Playback TSR is used by various applications to control the playback of Ad Lib music files. It is a powerful utility that uses the services of the other underlying drivers to simplify the task of integrating music and digitized sound to applications. (See below for the options supported with this driver.)

Since TSRs stay in memory while we use other programs, the ROL2 Playback TSR allows you to play the songs previously selected in Juke Box Gold, while using other applications.

The playback commands of the ROL2 Playback TSR can be used at any time by the following key combinations:

Alt-⇧-P	Plays the selected songs.
Alt-⇧-A	Pauses and resumes the music playback.
Alt-⇧-T	Stops the music playback.
Alt-⇧-N	Skips to the next song from the selection.
Alt-⇧-V	Returns to the previous song from the selection.

In order to avoid conflicts with other programs, you may change the last key in the combination of keys used to activate the above commands by using the Setup program.

> ! ***WARNING: Do not use the ROL2 Playback TSR while running other music applications, as this will cause conflicts with the ROL2 Playback driver.***

ROL2 Playback TSR Data Files

The ROL2 Playback TSR uses the a number of data files. All the data files must be in the same directory. Unless the path for these files is specified as a command line argument, the directory containing those files must be the current directory when RL2DRV.EXE is loaded. The data files used by the ROL2 Playback TSR are:

- SAMPLES.BNK and OPL3.BNK: instrument description files (for digitized and FM sounds, respectively).
- SAMPLBNK.EQU: Digitized sounds name translation table.
- *.SMP: Digitized sound files used in the songs.

ROL2 Playback TSR Options

The following command-line options can be used with the ROL2 Playback TSR:

`rl2drv /r`
This option removes the ROL2 Playback TSR from the computer's memory when it is installed but you do not wish to use it. Once this command is entered, the program will display a message indicating that the ROL2 Playback TSR has been removed and is no longer loaded.

`rl2drv`
Loads the ROL2 Playback TSR into the computer's memory (RAM).

`rl2drv /v`*`n`*
This option disables the specified sampling voice "*n*", which can be "`1`" or "`2`". Use two options consecutively, "`/v1 /v2`", to disable the two sampling voices.

The playback of sampled voices consumes a lot of computer resources. On slower PCs, or when the ROL2 Playback TSR is used in conjunction with more demanding applications, this option can be used to ensure a proper functioning of all parts involved.

`rl2drv /`*`spath`*
This option is used to specify a path for the data files used by ROL2 Playback TSR, if the data files are not in the default directory.

`drivers`
This batch file command loads all Ad Lib Gold drivers.

Chapter 5 - DOS Software Drivers

Ad Lib supplies memory-resident drivers as part of its end-user software packages. Developers should, when possible, use the services provided by those drivers. There are a number of advantages to using memory-resident drivers:

• A lot of the applications supplied for the Gold Card are TSR applications. Memory-resident drivers provide applications with a common software core for managing shared resources. Digital playback and recording, MIDI input and output and the timers available on the card, for instance, share a same interrupt request line.

• Memory-resident drivers can easily be maintained and updated, independently of the application code.

The method used by applications to interface with the Ad Lib Gold memory-resident drivers minimizes the overhead in calling the driver services. For most applications, calling the drivers services will not introduce a noticeable overhead.

The following drivers are available as part of the developer toolkit.

DOS Control Features Driver

The DOS Control Features driver supports the mixer features defined in Gold Sound Standard architecture

It also controls the configuration options of the Gold card, such as interrupt line selection, DMA channel allocation and address relocation.

Finally, it acts as a main management layer for all other drivers. It manages interrupt redirection to other drivers and keeps track of the location of the drivers.

For this reason, the Control features driver should always be the first one loaded.

DOS FM Driver

The DOS FM driver gives access to the FM sound generation features of the YMF262 chip.

DOS Wave Driver

The DOS Wave Driver supports the digitized sound playback and recording features of the YMZ263 chip.

DOS Timer Driver

The DOS Timer driver supplies routines to control the hardware timers on both the YMF262 and the YMZ263 chips. The timers can be used for high-precision synchronization of events.

DOS MIDI Driver

The DOS MIDI driver offers services to input and output data through the YMZ263 MIDI FIFO buffers.

5.1 Interfacing DOS Drivers with Applications

Drivers load themselves in memory and hook themselves to the DOS multiplex interrupt 2FH. Once a driver is loaded in memory, it registers itself to the Control features driver. It transmits to the Control features driver the address for an entry point to be used by applications, and an address for an entry point to a routine that will handle interrupts from the Gold card.

There are two ways an application can interface with a driver. By issuing commands through int 2FH, or by directly calling the driver entry-point function, used for command dispatching. The second method is much more efficient.

To directly call the driver entry-point function, an application that wants to use the services of a driver first needs to issue an interrupt 2FH with register AH equal to ADLIB_MULTIPLEX_DRIVER_ID and register AL equal to the GET_ALL_ENTRY command (defined in ctrldrv.h). This will return a table containing the entry points for all Gold drivers present in memory.

The application can then communicate with a specific driver just by issuing a FAR call to a specific driver. This call will take as an argument a far pointer to an argument-passing structure which is specific to each driver.

The Developer Toolkit supplies a set of linkable modules that are used to ease the interfacing to the drivers, using the second method of interfacing. The Link modules hide all the complexity of interfacing to the drivers. The application just needs to call the drivers functions as if they were part of a linkable library.

The modules can use the second method of communicating with the drivers. In order to do this, they have to call an initialization function, *InitxxxLink()*. These functions will build up a table of function pointer to accelerate the calling of driver routines.

Driver link module	Description	Link Initialization routine
CTRLLNK	Control Features Driver	InitCtrlLink()
FMLNK	FM Synthesis Driver	InitFMLink()
WAVELNK	Wave Driver	InitWaveLink()
TIMERLNK	Timer Driver	InitTimerLink()
MIDILNK	MIDI Driver	InitMidiLink()

Once the *InitxxxLink()* function is called, applications just need to call the routines described in the following sections.

The source code for the Link modules has been supplied as part of the Developer Toolkit. Developers can use this source to customize Link modules to their version of the C compiler. The source code can also be used as a reference in debugging environments.

Initialization Sequence

Developers using the Gold drivers should use the following initialization steps in order to insure that their applications do not try to access drivers that are not loaded in memory.

Applications should first check for the presence of the Gold card. They should then make sure that the driver is present by calling the appropriate function.

Once the application has made verified that the driver is loaded in memory, it can call the appropriate *InitxxxLink()* function.

Driver or service	Detection function	Returns
Gold Card Presence	CtGetGoldCardPresence()	0 if the Gold card is not found. 1 If the Gold card is found
Control Features Driver	CtGetDriverPresence()	0 if the driver is not present. 1 if the driver is loaded
FM Synthesis Driver	GetFMDriverStatus()	0xFF if the driver is present
WAVELNK	GetWaveDriverStatus()	0xFF if the driver is present
TIMERLNK	GetTimerDriverStatus()	0xFF if the driver is present
MIDILNK	GetMIDIDriverStatus()	0xFF if the driver is present

SetControlRegister

Syntax

int SetControlRegister(int reg, WORD val)

Sets register 'reg' of Ad Lib Control Chip to 'val'.

Parameters

int reg

Which register to write to.

WORD val

Which value to write in register.

Return value

If no error 0, otherwise 1.

Comments

This low-level routine handles the details related to accessing the Control Chip, like interrupt disabling and reenabling. It also verifies that no access is made while the Control Chip's RB & SB bits are set.

CtStoreConfigInPermMem

Syntax

WORD CtStoreConfigInPermMem()

This causes all control chip registers, in their current state, to be written to permanent memory.

Parameters

None

Return value

1 if ok. 0 if a problem occured.

Comments

None

CtRestoreConfigFromPermMem

Syntax

WORD CtRestoreConfigFromPermMem()

Restores the Gold crd configuration from permanent memory.

Parameters

None

Return value

1 if ok. 0 if a poblem occured

Comments

None

CtSetChannel0SampGain

CtSetChannel1SampGain
CtGetChannel0SampGain
CtGetChannel1SampGain

Syntax

WORD **CtSetChannel0SampGain**(WORD value)
WORD **CtSetChannel1SampGain**(WORD value)
WORD **CtGetChannel0SampGain**(WORD value)
WORD **CtGetChannel1SampGain**(WORD value)

Sets the gain of sampling channels.

Parameters

WORD value

Gain value from 0 to 255.

256 different values possible giving a range from approximately 0.04 to 10 times the input value. The exact gain is given by the equation:

Gain = (registerValue * 10) / 256 Linear gain.

Return value

1 if ok.

Comments

None

CtSetChannelFilter0Mode

CtSetChannel1FilterMode

Syntax

WORD **CtSetChannel0FilterMode**(WORD value)
WORD **CtSetChannel1FilterMode**(WORD value)

Sets the antialiasing filters in the proper mode for the channel.

Parameters

WORD value

0 = playback mode, 1 = sample mode

Return Value

1 if ok.

Comments

This filter MUST be set in sample mode before sampling.

This filter MUST be set in playback mode before playback.

The Ad Lib Gold card uses the same antialiasing filters during sampling and playback. The appropriate filter mode must be set before any sampling or playback operation.

CtGetChannelFilter0Mode

CtGetChannel1FilterMode

Syntax

WORD **CtGetChannel0FilterMode**(void)
WORD **CtGetChannel1FilterMode**(void)

Returns the current antialisaing filter mode for the channel.

Parameters

None

Return Value

0: playback mode. 1: Sampling mode

Comments

None

CtStereoMonoAuxSamp

Syntax

WORD **CtStereoMonoAuxSamp**(WORD value)

Forces auxiliary inputs to work monophonically or sterophonically.

Parameters

WORD value

0 = auxiliary input is stereo, 1 = auxiliary input is mono

Return Value

1 if ok.

Comments

The microphone and telephone inputs are monophonic sources and can only be sampled monophonically on channel 0. However, the auxiliary inputs are normally sampled in stereo on both channel 0 and 1 at the same time. This stereo audio input can be turned monophonic and sampled on channel 0 using this function.

CtGetStereoMonoAuxSamp

Syntax

WORD **CtGetStereoMonoAuxSamp**(void)

Returns whether the auxiliary inputs are used for monophonic sampling or stereophonic sampling.

Parameters

None

Return Value

0 = auxiliary input is stereo, 1 = auxiliary input is mono

Comments

None

CtEnabDisabMicroOutput

Syntax

WORD **CtEnabDisabMicroOutput**(WORD value)

Enables/disables microphone output.

Parameters

WORD value

0 = Microphone output enabled, 1 = Microphone output disabled

Return Value

1 if ok.

Comments

When using the microphone input and the normal loudspeaker outputs of the audio card, audio feedback could result. In normal mode, microphone output is enabledd When disabled, the microphone signal is cut from the output of the card but sent to the telephone output, eliminating possible causes of feedback.

CtGetEnabDisabMicroOutput

Syntax

WORD CtGetEnabDisabMicroOutput()

When using the microphone input and the normal loudspeaker outputs of the audio card, audio feedback could result. In normal mode, this bit is set to 0. When set to 1, the microphone signal is cut from the output of the card and only sent to the telephone output, eliminating possible causes of feedback.

Parameters

None

Return Value

0 = Microphone output enabled, 1 = Microphone output disabled

Comments

See CtEnabDisabMicroOutput()

CtEnabDisabInternPcSpeak

Syntax

WORD **CtEnabDisabInternPcSpeak**(WORD value)

Enables/Disables redirection of the PC internal speaker output to to the Gold mixer.output

Parameters

WORD value

0 = Disconnect internal PC speaker,

1 = Connect internal PC speaker

Return Value

1 if ok.

Comments

This can enable the PC internal speaker signal to be mixed with the audio signals of a Gold card (directly, without any mixer volume control).

CtGetEnabDisabInternPcSpeaker

Syntax

WORD CtGetEnabDisabInternPcSpeaker()

Returns the state of redirection of the PC speaker.

Parameters

None

Return Value

0 = Internal PC speaker not redirected.

1 = Internal PC speaker redirected

Comments

None

CtSelectInterruptLineNbr

Syntax

WORD **CtSelectInterruptLineNbr**(WORD value)

Selects the interrupt request line used by the audio portion of the Gold hardware.

Parameters

WORD value

0 = IRQ3, 1 = IRQ4, 2 = IRQ5, 3 = IRQ7

4 = IRQ10, 5 = IRQ11, 6 = IRQ12, 7 = IRQ15

Return Value

1 if ok.

Comments

The interrupt line is used by OPL3, MMA and telephone hardware. Valid interrupt lines on an XT are IRQ3, IRQ4, IRQ5 and IRQ7. Valid interrupt lines on an AT are IRQ3, IRQ4, IRQ5, IRQ7, IRQ10, IRQ11, IRQ12 and IRQ15.

CtGetInterruptLineNbr

Syntax

WORD CtGetInterruptLineNbr()

Returns a number indicating the interrupt line used by the audio portion of the Gold hardware..

Parameters

None

Return Value

0 = IRQ3, 1 = IRQ4, 2 = IRQ5, 3 = IRQ7

4 = IRQ10, 5 = IRQ11, 6 = IRQ12, 7 = IRQ15

Comments

None

CtSelectDMA0ChannelSampChan

CtSelectDMA1ChannelSampChan

Syntax

WORD **CtSelectDMA0ChannelSampChan**(WORD value)
WORD **CtSelectDMA1ChannelSampChan**(WORD value)

Allocates DMA channel for the specified MMA sampling channel.

Parameters

WORD value

0 = DMA 0
1 = DMA 1
2 = DMA 2
3 = DMA 3

Return Value

1 if ok.

Comments

Only DMA channels 1, 2 and 3 are available on model Gold 1000. All listed DMA channels are available on the Gold 2000 and 2000MC.

CtGetDMA0ChannelSampChan

CtGetDMA1ChannelSampChan

Syntax

WORD CtGetDMA0ChannelSampChan()
WORD CtGetDMA1ChannelSampChan()

Returns a number indicating the DMA channel used by the specified sampling channel.

Parameters

None

Return Value

The sampling channel used.

0 = DMA 0
1 = DMA 1
2 = DMA 2
3 = DMA 3

Comments

None

CtEnabDisabDMA0SampChan

CtEnabDisabDMA1SampChan

Syntax

WORD **CtEnabDisabDMA0SampChan**(WORD value)
WORD **CtEnabDisabDMA1SampChan**(WORD value)

Disables or enables use of DMA channel for sampling channel.

Parameters

WORD value

0 = disable, 1 = enable

Return Value

1 if ok.

Comments

None

CtGetEnabDisabDMA0SampChan

CtGetEnabDisabDMA1SampChan

Syntax

WORD CtGetEnabDisabDMA0SampChan()
WORD CtGetEnabDisabDMA1SampChan()

Tells if the DMA channel is disabled or enabled for the specified sampling channel.

Parameters

None

Return Value

0 = disabled, 1 = enabled

Comments

None

CtSetRelocationAddress

Syntax

WORD **CtSetRelocationAddress**(value)

Set s the base ports address for MMA, OPL3 and control chip.

Parameters

WORD value

New I/O address, divided by 8.
Range is from 0 to 127

Return Value

1 if ok.

Comments

None

CtGetRelocationAddress

Syntax

WORD CtGetRelocationAddress()

Returns the base port addresses for MMA, OPL3 and control chip.

Parameters

None

Return Value

New base I/O address, divided by 8.
Range is from 0 to 127

Comments

None