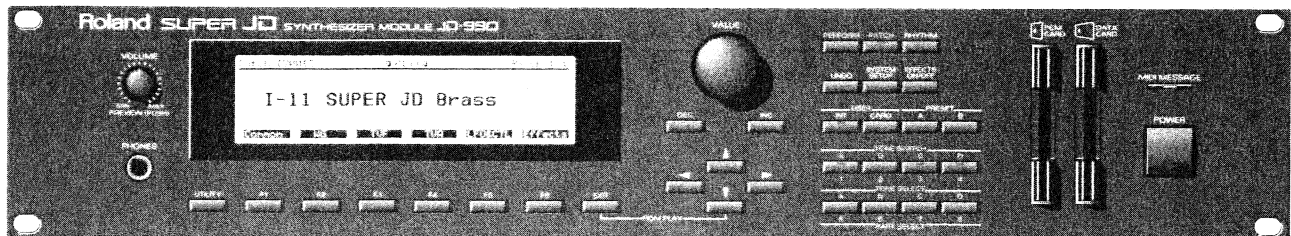


 Roland

SUPER JD SYNTHESIZER MODULE

JD-990

Owner's Manual I (USER'S GUIDE)



Roland SUPER JD

Synthesizer Module JD-990

Owner's Manual I

User's Guide

Before You Begin...

We'd like to take this opportunity to thank you for purchasing the Roland JD-990 Synthesizer Module. In addition to its selection of high - quality digital sounds — in the JD-800 tradition — the JD-990 also contains new circuitry which simulates analog synthesizer functions; Ring Modulator, Oscillator Sync, and so on.

We've put all the basic functions and procedures for sound creation into this User's Guide, to help you get started right away. We hope the JD-990 will become a trusted "sound tool" that follows you wherever you go — be it stage, studio, or just at home.

Copyright © 1993 ROLAND CORPORATION

All rights reserved. No part of this publication may be reproduced in any form without the written permission of ROLAND CORPORATION.

IMPORTANT NOTES

In addition to the items listed under Safety Precautions inside the front cover, please read and adhere to the following:

[Power Supply]

- When making any connections with other devices, always turn off the power to all equipment first; this will help prevent damage or malfunction.
- Do not use this unit on the same power circuit with any device that will generate line noise, such as a motor or variable lighting system.

[Placement]

- Using the unit near power amplifiers (or other equipment containing large transformers) may induce hum.
- This unit may interfere with radio and television reception. Do not use this unit in the vicinity of such receivers.

[Maintenance]

- For everyday cleaning wipe the unit with a soft, dry cloth (or one that has been slightly dampened with water). To remove stubborn dirt, use a mild neutral detergent. Afterwards, be sure to wipe the unit thoroughly with a soft, dry cloth.
- Never use benzene, thinners, alcohol or solvents of any kind, to avoid the risk of discoloration and/or deformation.

[Additional Precautions]

- Protect the unit from strong impact.
- Do not allow objects or liquids of any kind to penetrate the unit. In the event of such an occurrence, discontinue use immediately. Contact qualified service personnel as soon as possible.
- Never strike or apply strong pressure to the display.

- A small amount of heat will radiate from the unit, and thus should be considered normal.
- Before using the unit in a foreign country, consult with qualified service personnel.
- A small amount of noise may be heard from the display, and thus should be considered normal.

[Memory Backup]

- The unit contains a battery which maintains the contents of memory while the main power is off. The expected life of this battery is 5 years or more. However, to avoid the unexpected loss of memory data, it is strongly recommended that you change the battery every 5 years.
Please be aware that the actual life of the battery will depend on the physical environment (especially temperature) in which the unit is used. When it is time to change the battery, consult with qualified service personnel.
- When the battery becomes weak, the following message will appear in the display: "Internal Battery Low". Please change the battery as soon as possible to avoid the loss of memory data.
- Please be aware that the contents of memory may at times be lost; when the unit is sent for repairs or when by some chance a malfunction has occurred. Important data should be stored on a RAM card or in another MIDI device (eg. a sequencer), or panel settings written down on paper. During repairs, due care is taken to avoid the loss of data. However, in certain cases, (such as when circuitry related to memory itself is out of order) we regret that it may be impossible to restore the data.

Table of Contents

Before you begin	3
IMPORTANT NOTES	4
[1] Preparations	6
Making the Connections	6
Turning On the Power	8
Matching MIDI Channels	11
[2] Listening to the Demo Songs	12
[3] Selecting a Patch	14
[4] Editing Patches	16
[5] Saving Patches	30
[6] Using Rhythm Sets	32
[7] The Performance Feature	36
[8] Miscellaneous Functions	44
Appendix: The Fundamentals of Sound	46

Accessories

Ensure that the following are included with your JD-990:

- ◇ AC Cord (1)
- ◇ Owner's Manual : User's Guide (1)
 - Reference (1)
 - Patch List (1)
- ◇ MIDI cable (1)

* If anything is missing, contact your retailer or the nearest Roland Service Station.

[1] Preparations

Making the Connections

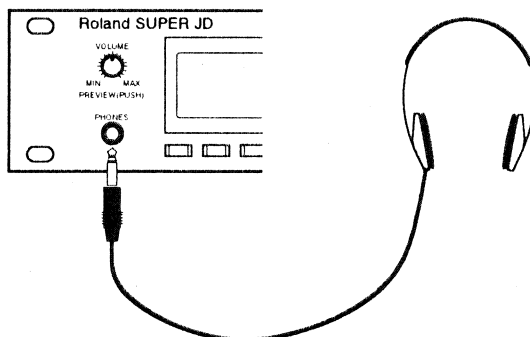
The JD - 990 has no amp or speakers of its own, so you'll have to provide a radio - cassette player, stereo or keyboard amp to play through.

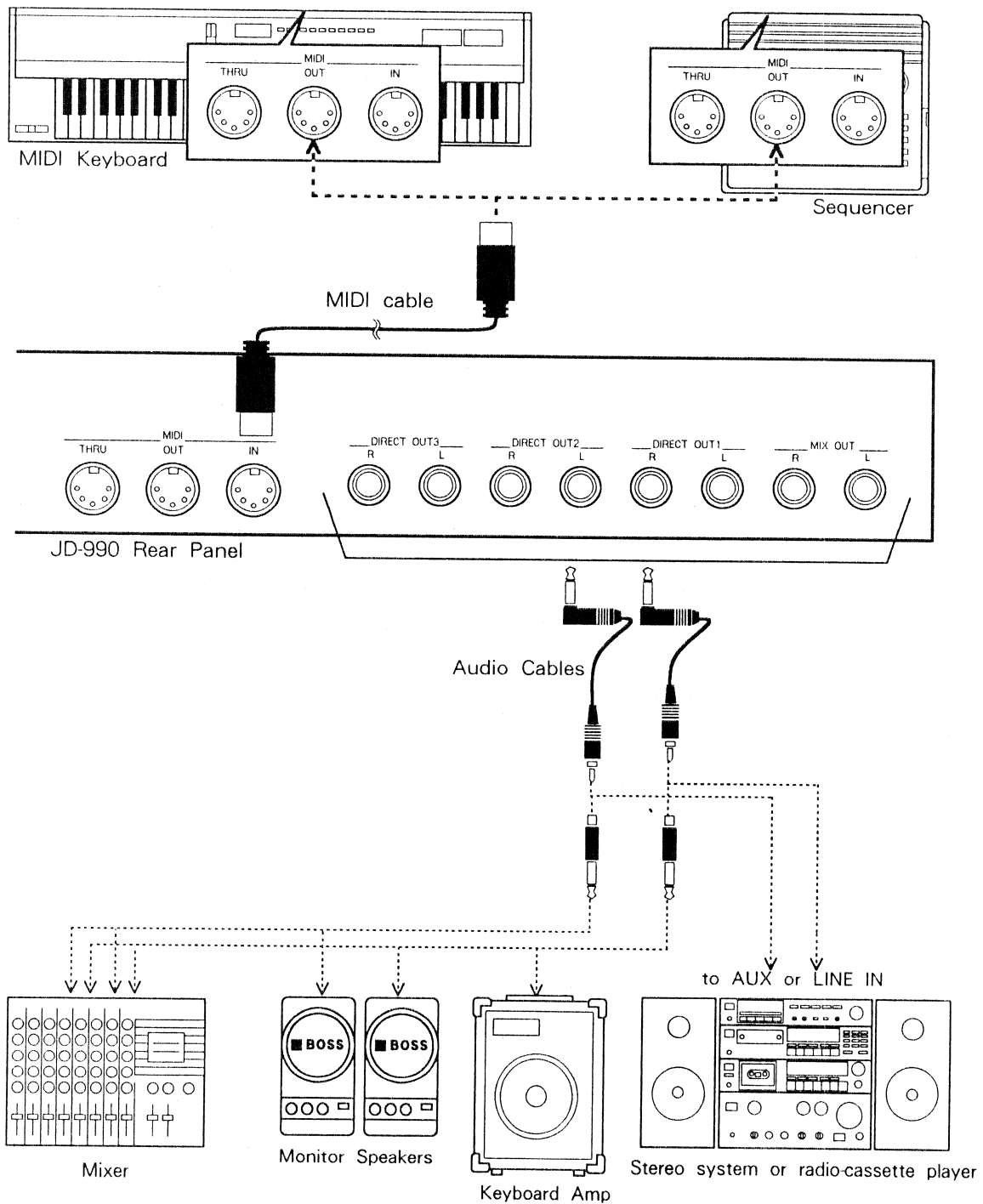
1. Turn all devices off and set all volume controls to zero.
This will help prevent damage or malfunction during connection.
2. Plug in the AC cord.
Plug the included AC cord into the back of the JD - 990 first, then into a wall outlet.

3. Hook up the other devices.
As shown in the figure to the right, connect the playback equipment (amp and speakers) to the JD - 990 with audio cables (use one cable for mono). Connect the MIDI OUT of your controller (or sequencer) to the MIDI IN of the JD - 990 with the MIDI cable.

Headphones

The PHONES jack is located on the left - hand side of the unit. Using headphones allows you to hear the unit when the external speakers have been turned off. (Plugging in headphones does not cut off the speakers.) Stereo headphones of 8 to 150 ohms should be used.



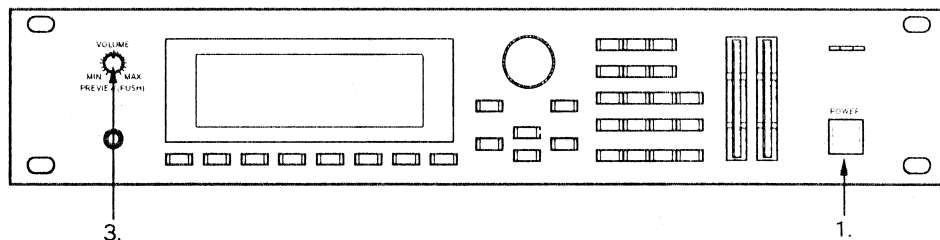


- * Plug into either the MIX OUT L or R jack for monaural playback.
- * The factory default settings specify no output from the DIRECT OUT jacks. You can, of course, change this if you wish.

Turning On the Power

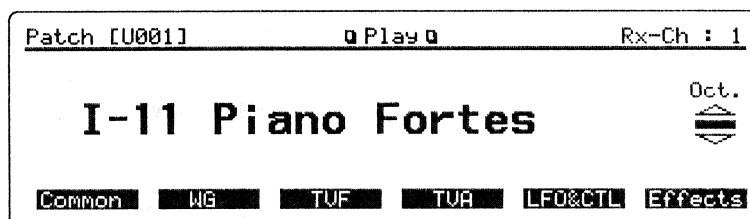
Check the following:

- Have you made all the necessary connections?
- Is the volume on the JD - 990 and connected units set to zero?



1. Press the [POWER] switch.

After a few seconds, you'll see the following display:



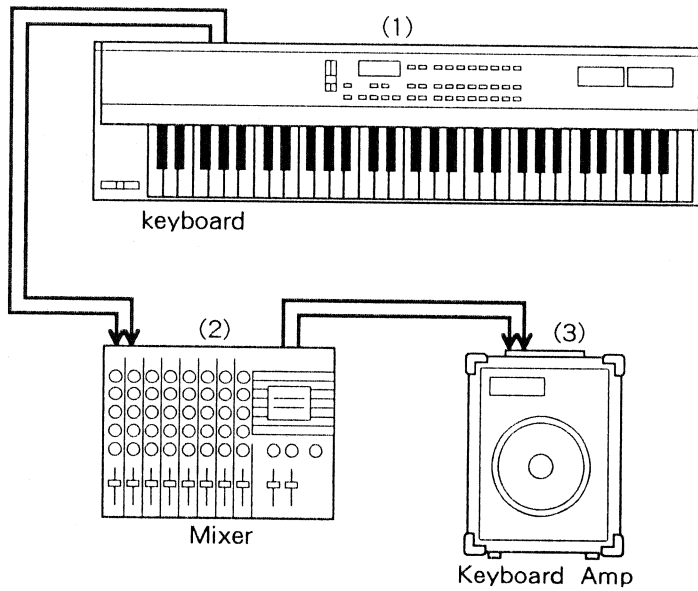
* The actual appearance of the Display (such as Patch Name) may differ from that shown in manuals.

2. Now turn on the connected amp.
3. Set the volume control on each unit to the appropriate level.
4. Power down in reverse order: first the amp, then the JD - 990.

*The JD - 990's protection circuitry mutes the output for a few seconds after power-up.

For Your Information

After you have hooked up your system, turn on the devices that are farthest away from the speakers first. For example, if you are using a keyboard, mixer, and amp, turn them on in that order. By doing so, the 'pop' or voltage spike generated by turning on the keyboard will not reach the speakers because the mixer is still off.



Turn everything off in reverse order.

Play a Test Note on the JD - 990

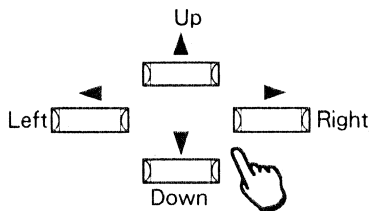
You don't necessarily need a keyboard hooked up just to hear the JD - 990's sounds. Just press the [VOLUME] knob to hear a single "test note" of the currently selected sound (A2, A3, A4 and A5 in turn).



This is convenient for checking the currently selected Tone. See the Reference section for more information on how to change the note that sounds ("Parameter Reference/System Setup" on page Sys - 12).

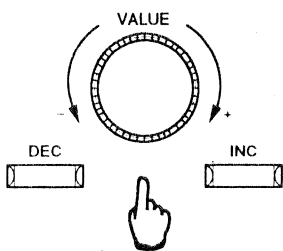
Moving the Cursor

You can move the cursor (the highlighted area in the editing screen) by pressing the CURSOR buttons: [◀], [▶], [▲], and [▼].



Changing Values

Move the cursor to the parameter you wish to change, then change it with the [VALUE] knob or the [INC] and [DEC] buttons.



With the [VALUE] knob,
 one click to the right increases the number by one (or moves you to the next value);
 one click to the left decreases the number by one (or moves you to the previous value).
 Pressing the [VALUE] knob while turning it speeds up the rate of change.

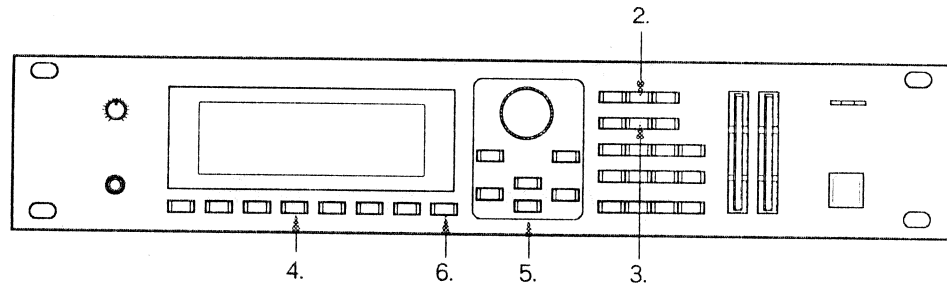
Press the [INC] button once to increase the number by one (or move to the next value);
 press the [DEC] button once to decrease the number by one (or move to the previous value).

These buttons have an "auto-scroll" feature that causes the values to change faster if you press and hold the button down. You can also speed up the scrolling in one direction by holding that button down and pressing the button for the other direction.

Matching MIDI Channels

The JD - 990 has no keyboard of its own so you'll have to connect some kind of controller — usually a MIDI keyboard — to play the unit's sounds. To have the external keyboard and the JD - 990 work together properly, you'll have to set the transmit channel (on the keyboard) to match the receive channel (on the JD - 990).

Procedure



1. Set the transmit channel of the MIDI controller to "1." (See the controller's manual if you're not sure how to do this.)
2. Press the [PATCH] button on the JD - 990 (the button indicator should light).
3. Press the [SYSTEM SETUP] button.
4. Press the [F3] (MIDI) button.
5. Move the cursor to the Patch Rx-Ch entry and change the value to "1."
The JD - 990 is now set to MIDI channel 1 and is ready to play.
6. Press [EXIT]. You'll be returned to the Patch mode.

* For a more detailed explanation of MIDI, see "Parameter Reference/System Setup," page Sys - 7.

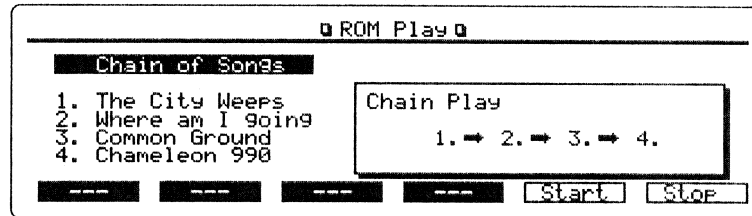
[2] Listening to the Demo Songs

The JD - 990 has four demo songs stored in ROM (Read Only Memory). These demo songs highlight the capabilities of the module.

Procedure

1. Select the ROM Play mode.
While holding down the [EXIT] button, press CURSOR [▼].

You'll see the following display:



2. Select the song you wish to hear.
Use the CURSOR [▲] and [▼] buttons to select the song. When "Chain of Songs" is selected, the JD - 990 plays songs consecutively starting with Song 1.
3. Start the demo song playback.
Press [F5] (Start) to start playback.
4. Stop the demo song.
Press [F6] (Stop) to stop playback.
5. Exit the ROM Play mode.
Press the [EXIT] button to return to the previously selected mode.

* You won't be able to play notes via received MIDI messages during ROM play.

* No data is sent from MIDI OUT during ROM play.

The Demo Songs

Song Titles, Composers	Profiles of Composers
<p>The City Weeps Music by Eric Persing Copyright © 1993, Big Green Music</p>	<p>Eric Persing Eric Persing is one of the most in - demand session players and programmers in the Los Angeles area. Eric began working for Roland as a product specialist, first doing clinics and support, then gradually became more involved in product and sound design. Eric has worked with such artists as Michael Jackson, Chaka Khan, Larry Carlton, Marcus Miller, and Bon Jovi. His music and sounds can also be heard on many TV shows and commercials. Actively involved in film music, he has worked with top composers including Michel Colombier, Danny Elfman, and Bill Conti.</p>
<p>Where am I going Music by Tatsuya Nishiwaki Copyright © 1993, Roland</p>	<p>Tatsuya Nishiwaki Debuted in 1987 as a member of "PAZZ" for CBS/Sony records. After the group's dissolution in '88, he was involved in the production of numerous albums (composing, arranging and playing the keyboards). His work, and his individualistic style of playing, have won him wide acclaim. His particular musical sensibility results in emotional, exciting keyboard playing, combined with arrangements which deftly support his style.</p>
<p>Common Ground Music by Marvin Sanders Copyright © 1993, Marvin Sanders</p>	<p>Marvin Sanders Marvin Sanders is a somewhat wacky Los Angeles composer whose work can be heard on projects for Toyota, Acura, Max Factor, Alpine, Thomas Brothers, Theater for Young Audiences, and Michael Jackson. He has also worked extensively with Roland, conducting clinics and writing music for numerous product videos and demos including ROM - plays in the SC - 155 and JV - 880.</p>
<p>Chameleon 990 Music by Adrian Scott Copyright © 1993, Adrian Scott</p>	<p>Adrian Scott Adrian Scott formerly handled the vocals and keyboards for the popular group from Australia, "Air Supply". Since following the solo path, he in 1984 won the Silver Prize at the "World Song Festival Tokyo '84". Currently, he is involved as a producer of commercial music and music for films. In addition, as a session player, he has performed along with a number of Australia's top musicians, including John Farnham and Kylie Minogue. He lives in Melbourne, Australia.</p>

***These demo songs are intended for personal enjoyment/demonstration use only. Any other use (public performance, broadcast, sampling, duplication, transcription etc.) is strictly prohibited and would constitute a violation of applicable copyright laws.**

[3] Selecting a Patch

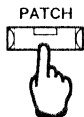
The basic unit of sound in the JD - 990 is called a "Patch." The Patches stored in the module can be selected using the following procedure.

Procedure

1. Select the Patch Mode

Press the [PATCH] button.

The button indicator will light to indicate that you're in the Patch mode.



2. Select a Patch Group

The Patches in the JD - 990 are organized into 4 groups: INTERNAL, CARD, PRESET A, and PRESET B.

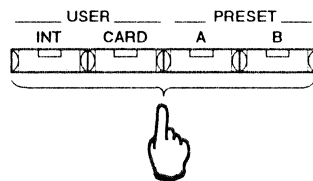
INTERNAL : This is where you'll store the sounds you create. (The factory Patches stored here are different from the presets.)

CARD : This is where you'll call up Patches stored on DATA cards (sold separately).

PRESET A : These are the ROM (Read Only Memory) Patches that cannot be erased or overwritten.

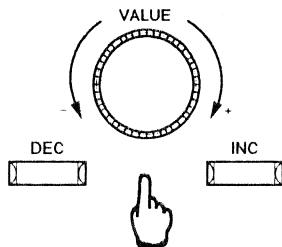
PRESET B : These are the ROM (Read Only Memory) Patches that cannot be erased or overwritten.

Press the [INT], [CARD], [PRESET A] or [PRESET B] button for whichever Patch group you require.

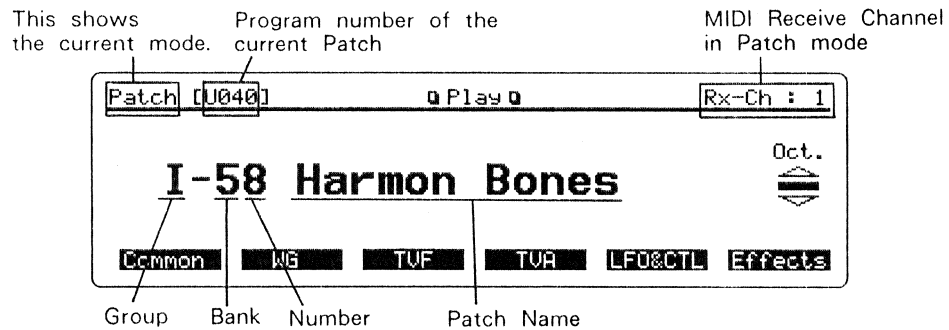


3. Select a Patch

A Patch is identified by a combination of a Bank ([1] — [8]) and a Number ([1] — [8]). You can move through the Patch numbers by rotating the [VALUE] knob. Or, if you wish to step through them one at a time, press the [INC] or [DEC] button.

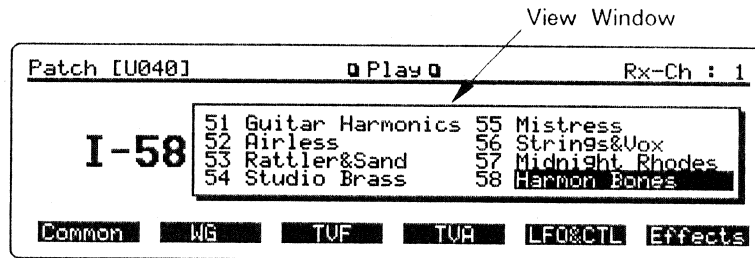


For example, if you wanted to select Patch I - 58, you'd press [INT] then rotate the [VALUE] knob until you came to number 58.



You can also select a Patch using the "View Window" that lets you see the eight Patches in a Bank.

Pressing the [VALUE] knob opens up this window. Pressing the [VALUE] knob thereafter will change Bank numbers.



You can change the Patch with either the [VALUE] knob and [INC][DEC] buttons or the CURSOR [▲], [▼], [◀] and [▶] buttons while the window is opened.

Press [EXIT] to close the View Window.

There are 64 Patches in each group for a total of 256 sounds from which to choose (assuming you have a DATA card inserted into the DATA CARD slot). You can select a Patch in following order: I11 → I12 → I13 → ... I18 → I21 → ... I88 → (C11 → ... → C88) → A11 → ... → A88 → B11 → ... B88. Refer to the "Patch List" and try selecting a few different Patches.

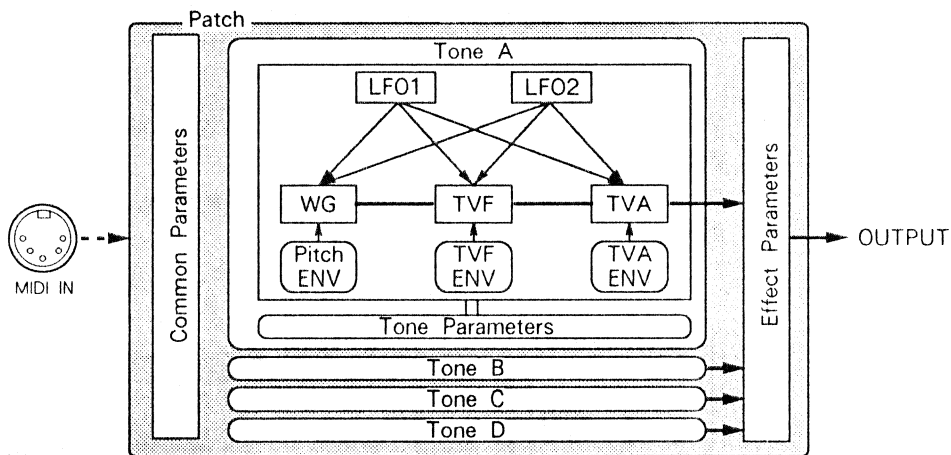
[4] Editing Patches

You can subtly alter an existing sound or create an entirely new sound, simply by changing some of the various parameters that make up a Patch. This is called "Patch editing."

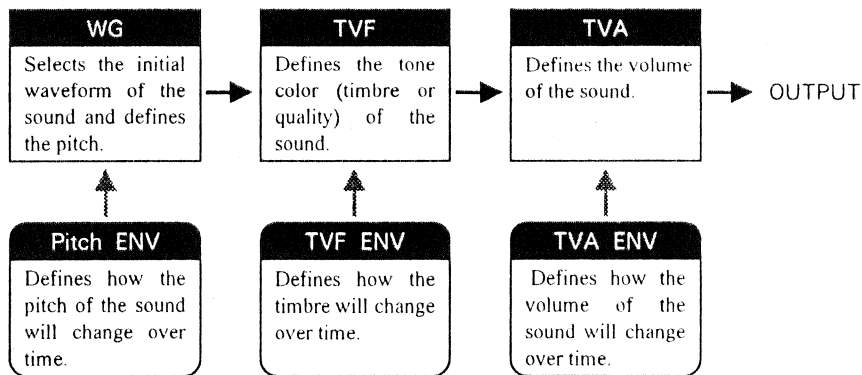
When you have finished changing the parameters of a sound and you wish to keep the result, the Write operation (described on page 30) will store the sound in Internal memory or on a DATA card.

1) Construction of a Patch

A Patch is a combination of up to four different sounds, which we will call "Tones."



The sound of each Tone is shaped by three basic "building blocks": a Wave Generator (WG), a Time Variant Filter (TVF), and a Time Variant Amplifier (TVA).



In addition, an LFO (Low Frequency Oscillator) can be applied to create an 'undulating' or vibrato effect.

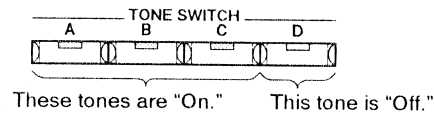
*** You can also create a Patch using two "Structures." A Structure consists of two Tones. For more on this, see the section called "Parameter Reference/Patch" in the Reference manual, page Ptch - 17.**

2) Editing

In a moment we'll describe how to go about editing, that is, making your own Patches. But first, we'll describe the functions of the [TONE SWITCH] and [TONE SELECT] buttons that you will use often during editing.

Selecting/Checking a Tone

You can determine which Tones are contained in the currently selected Patch by pressing the [TONE SWITCH] buttons.



If a [TONE SWITCH] button is ON (its indicator is lit), the corresponding Tone is currently being heard within the selected Patch. If a button indicator is OFF, that Tone is muted and will not be heard.

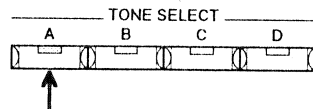
(If you press a lit button, the indicator will go off and that Tone will be muted.)

You can monitor a single Tone within a Patch simply by muting the remaining Tones.

Selecting/Changing Tone to Edit

The [TONE SELECT] buttons determine which Tone will be edited.

The parameter value of the selected Tone will appear in the Edit screen. The [TONE SELECT] buttons only work during editing; they have no effect in the Play mode.

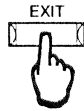


This LED indicates that the Parameters of Tone A are shown in the Display. If you press any of the other buttons (TONE SELECT [B], [C] or [D]), the corresponding parameters will also appear in the Display.

Returning to the Previous or Initial Screen

To exit the screen you are in, press the [EXIT] button.

Each press of the button takes you back one screen. The menus are displayed along the bottom of the screen; you begin the editing procedure from there.



For Your Information

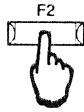
There's a trick to using the [TONE SWITCH] and [TONE SELECT] buttons during editing.

The [TONE SWITCH] buttons control which Tone(s) will sound, and the [TONE SELECT] buttons control which Tone(s) you will be editing. So, for example, if you press [TONE SELECT A] to select Tone A, but have not turned Tone A on with the corresponding [TONE SWITCH] button, you will be able to edit the Tone but not hear it.

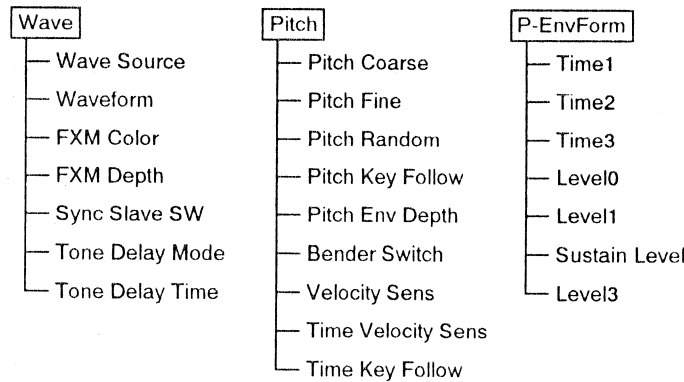
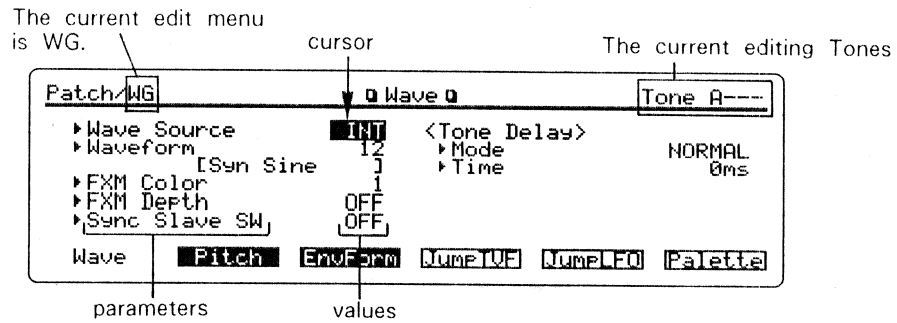
Now we'll explain the actual sequence of editing operations when creating your own sounds. After checking to see that you are currently in the Patch mode, select your favorite Patch. Mute all the Tones in the Patch except for one Tone which you selected. From here on, we will be editing one Tone only.

Selecting a Waveform

1. Press [F2] (WG)



When you press this button, a menu of WG items is displayed at the bottom of the screen. Each of these items corresponds to the function button just below it. The screen will show the parameter and its value for one of the menu items (the highlighted function).

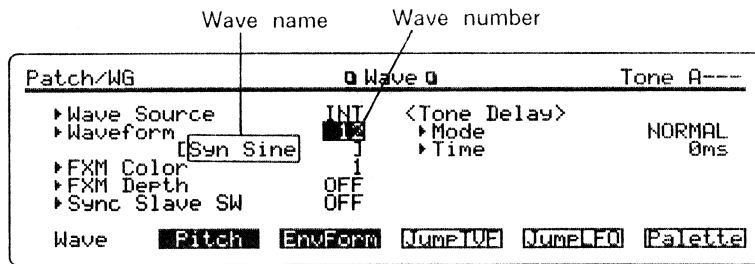
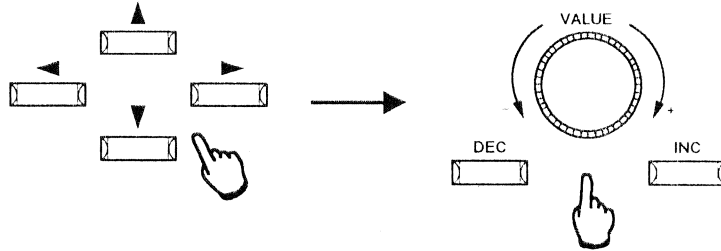


2. Parameters associated with the waveform itself are found under “Wave”.
If you are not currently in the Wave screen, press [F1] (Wave). Seven parameters and their values will appear in the screen.



- The waveform itself can be changed with the Waveform parameter. Move the cursor to "Waveform" with the CURSOR [◀][▶][▲][▼] buttons and select a waveform with the [VALUE] knob or the [INC] and [DEC] buttons.

You can hear the selected waveform by playing a connected MIDI keyboard.



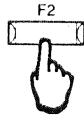
Try selecting organ Waveform 40, "Full Organ," for the selected Tone.

***The JD - 990 contains 195 waveforms. For a summary of all the waveforms, see page App. - 36 of the Reference manual.**

Changing the Pitch

1. The parameters that control the pitch of the sound are found under "Pitch" in WG.

Press [F2] (Pitch).



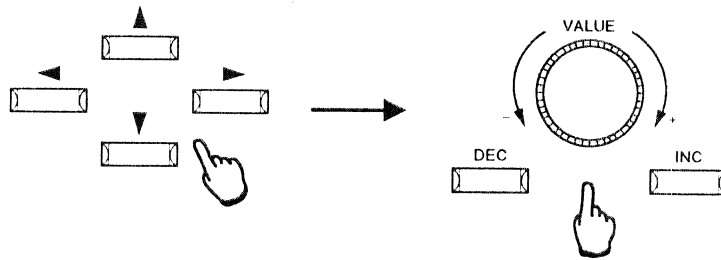
Patch/WG	Pitch	Tone A---
▶Pitch Coarse	+12	<Pitch Env Control>
▶Pitch Fine	+10	▶Velocity Sens
▶Pitch Random	27	▶Time Velocity Sens
▶Pitch Key Follow	+100	▶Time Key Follow
▶Pitch Env Depth	+12	
▶Bender Switch	ON	

Wave Pitch EnvForm NUMPVE NUMLFO Palette

2. You can change the pitch of the sound with the Pitch Coarse parameter. Move the cursor to "Pitch Coarse" with the CURSOR [◀][▶][▲][▼] buttons and adjust the pitch with the [VALUE] knob or the [INC] and [DEC] buttons.

You can hear the pitch you've selected by playing a connected MIDI keyboard.

Increasing the Pitch Coarse value by one raises the pitch by one semi - tone. That means +12 raises the pitch by an octave and -12 lowers the pitch by an octave.

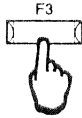


Changing the Timbre

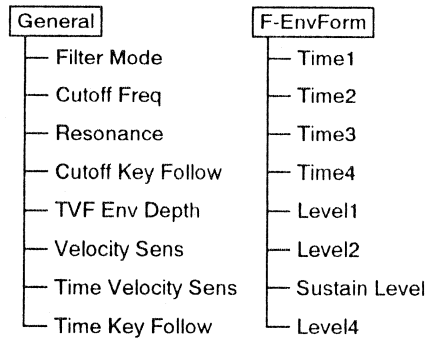
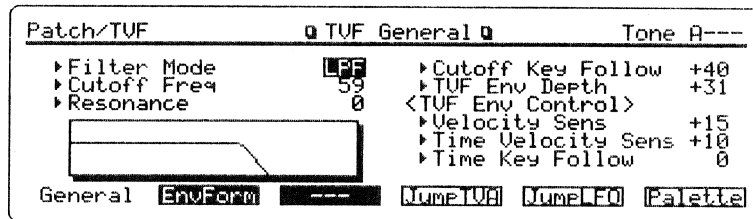
1. Press [F3] (TVF).

Press this button to display the TVF menu at the bottom of the screen.

If [F3] is not TVF, press [EXIT]. After the screen returns, carry out this operation.

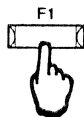


Each menu item corresponds to the function button just below it.



2. The parameters for changing the timbre tone (quality) of the sound are found under the heading "General".

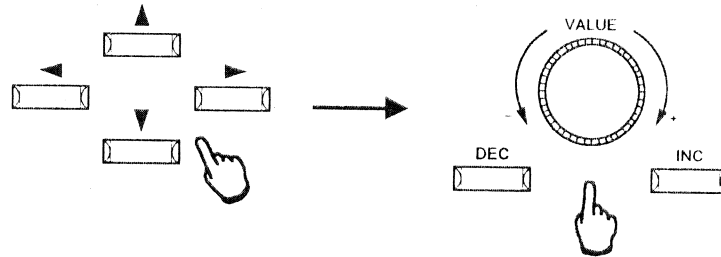
If you don't see the "General" menu, press [F1] (General).



3. Now you can change the timbre with parameters such as Filter Mode, Cutoff Frequency, and Resonance.

Select a parameter with the CURSOR [◀][▶][▲][▼] buttons and adjust the value with the [VALUE] knob or the [INC] and [DEC] buttons.

You can make the sound brighter by setting the Filter Mode to LPF (Low Pass Filter) and the Cutoff Frequency to a higher value. Conversely, lower values will give you a mellow, more rounded sound. Higher values for the Resonance parameter create a more 'synthetic' sound.



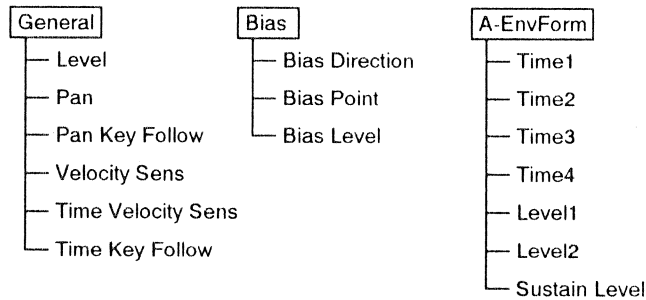
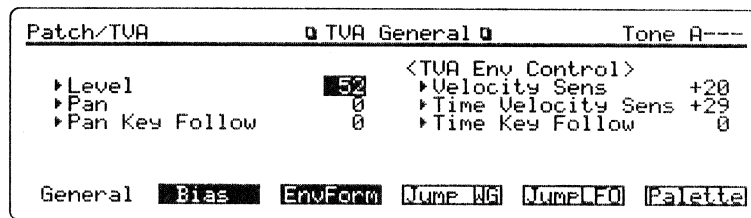
You can create your own sounds by setting the Filter Mode, Cutoff Frequency and Resonance as you like.

Changing the Volume

1. Press [F4] (TVA)

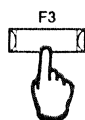
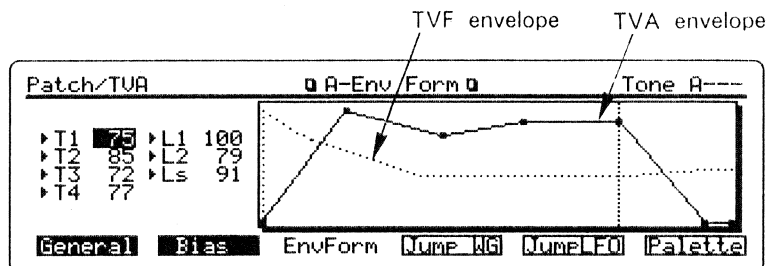
Pressing this button displays the TVA menu at the bottom of the screen.

If [F4] is not TVA, press [EXIT]. After the screen returns, follow through with this operation.

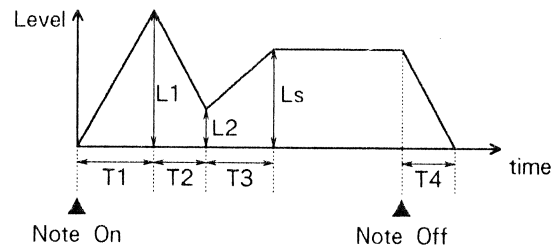


2. The parameters for changing the volume of the sound are found under the heading "EnvForm".

Press [F3] (EnvForm).



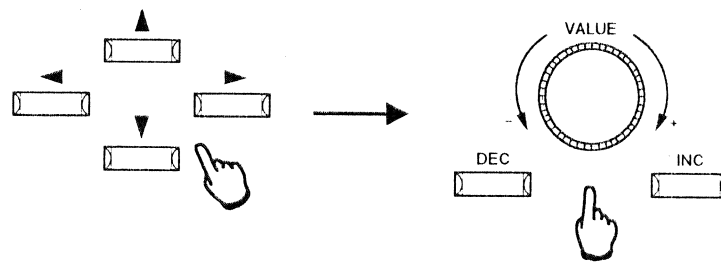
3. Changing the volume of the sound over time is done with something called a "TVA envelope."



The TVA envelope is determined by seven parameters: T1, T2, T3, T4, L1, L2 and Ls.

Select a parameter with the CURSOR [◀][▶][▲][▼] buttons and adjust the value with the [VALUE] knob or the [INC] and [DEC] buttons.

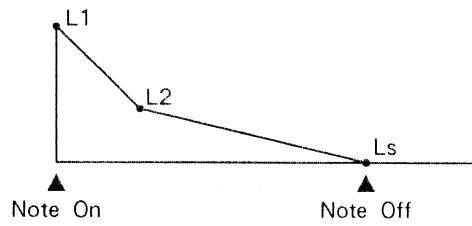
Larger values of T (Time) increase the time, and larger values of L (Level) increase the volume level.



* There are two lines in the display. The solid line shows the TVA envelope and the dotted line shows the TVF envelope form. With two envelopes, you can make the sound vary with respect to time.

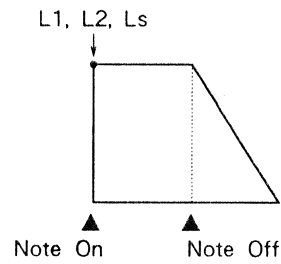
Here are three different types of TVA envelopes you can try.

Emphasized Attack Envelope



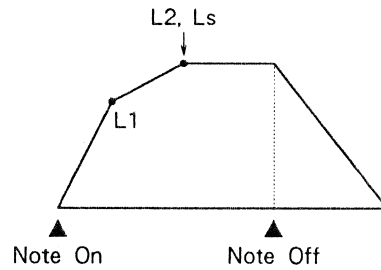
T1=0	L1=100
T2=60	L2=10
T3=70	Ls=0
T4=50	

Sustained Sound Envelope



T1=0	L1=100
T2=0	L2=100
T3=0	Ls=100
T4=40	

“Wah” Envelope



T1=50	L1=85
T2=30	L2=100
T3=0	Ls=100
T4=60	

Tone Editing Summary

Waveform, pitch, timbre and volume are the most basic parameters you can edit. In addition, however, there are other parameters that can make an extraordinary difference in the sound.

You can edit all parameters on the JD-990 with roughly the same procedure:

1. Press the function button corresponding to the desired edit menu.
2. Select a parameter with the cursor buttons.
3. Set the value with the [VALUE] knob or the [INC] and [DEC] buttons.

Repeat steps 1. through 3.

4. When you come up with a Patch you like, save it in Internal memory or on a DATA card (using the Write operation).

For a more detailed description of the parameters, see the "Parameter Reference" on page Ptch - 1 of the Reference manual.

- * On the JD - 990, an Undo function and Jump function are provided for easier and quicker editing. For more information, refer to Reference : P. Base - 21.

3) Edit Palette

The Edit Palette is a screen in which you can simultaneously see the values of a particular parameter for all four Tones of a Patch.

Normally you edit one Tone at a time, so it's difficult to know how the changes you make will affect the balance with the other Tones. You can overcome this problem by editing one parameter for four Tones at once using the Edit Palette.

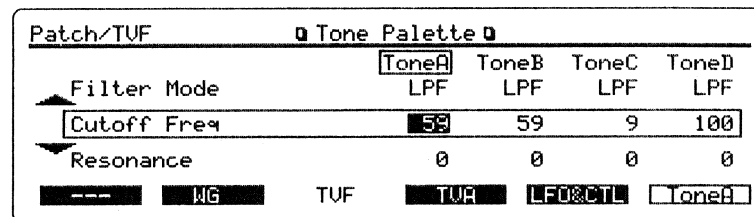
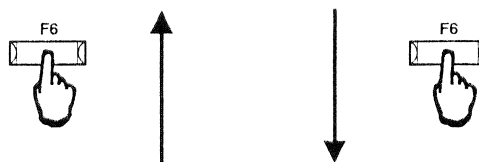
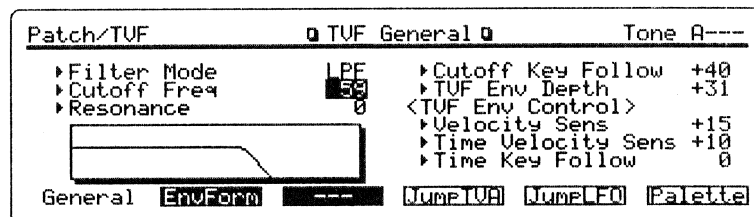
Tone Editing	Edit Palette
<p>Several parameters are displayed for a single Tone.</p> <p>Here you can see several parameter settings at once, making this the best place to edit or drastically alter the timbre.</p>	<p>This screen shows how the same parameter is set for all four Tones.</p> <p>All four Tones are displayed at once, making this the best place to edit while monitoring the balance among the Tones.</p>

Procedure

1. Select the Edit Palette Screen

When you select WG, TVF, TVA or LFO&CTL, press the [F6] (Palette) button to open up the Palette screen for the parameter currently highlighted.

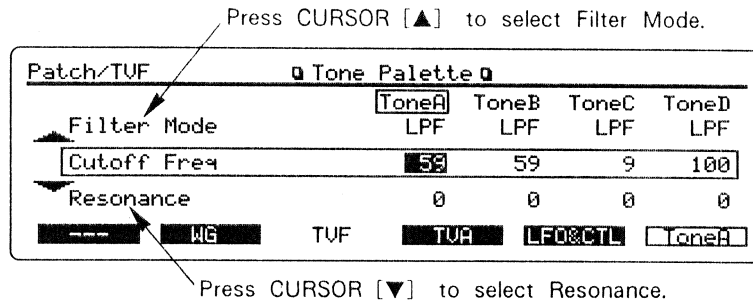
(Example) TVF/General: Cutoff Freq is selected.



* You can switch between Tone Editing and the Edit Palette by pressing the [F6] button.

2. Select a Parameter

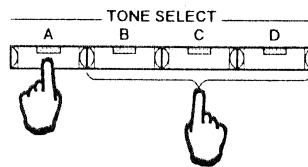
Using the CURSOR [▲][▼] buttons, select the parameter you wish to edit. The next parameters will be displayed above and below the currently selected one. Press [▲] to move to the upper parameter, and [▼] to move to the lower one.



3. Select the Tone you Wish to Edit

Press the [TONE SELECT] button for the desired Tone.

On the JD - 990, you can edit more than one Tone simultaneously. For example, if you wish to select all four Tones, press and hold TONE SELECT [A] and then press TONE SELECT [B], [C] and [D]. All four buttons should be lit.



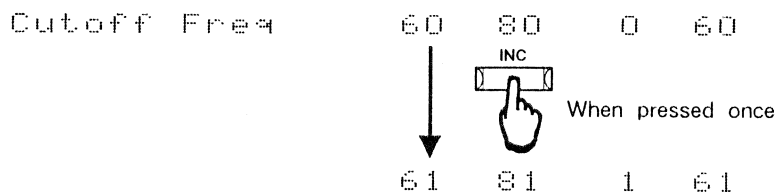
You can change the values of Tones A—D simultaneously.

When ON, the selected Tone(s) are highlighted so you know which one(s) you are editing. Multiple Tones can be selected in the Tone Edit display as well. For more information, refer to Reference : P. Base - 18.

4. Change the Value

Modify the value(s) using the [VALUE] knob or the [INC] and [DEC] buttons. When editing several Tones at once, these values will change simultaneously, as shown below.

(Example) All of the [TONE SELECT] buttons are ON.



Each increases by1.

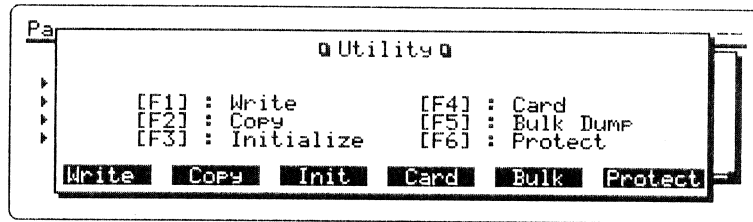
- * If you wish to go straight to the Play mode, press [EXIT].
- * Pressing CURSOR [▲][▼] selects only the parameters which are included in the currently selected menu (the highlighted function). When you wish to select a different menu (containing different parameters), press the function button ([F2] — [F5]) which corresponds to the desired menu.

[5] Saving Patches

By now you have probably created a killer Patch you want to keep. That Patch will be lost, however, if you turn off the JD - 990 or select a different Patch. To preserve your creation you must save it in Internal memory or on a DATA card.

Save Procedure

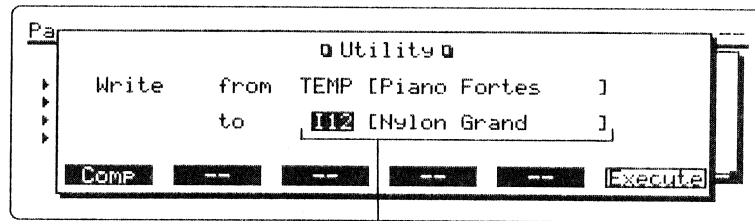
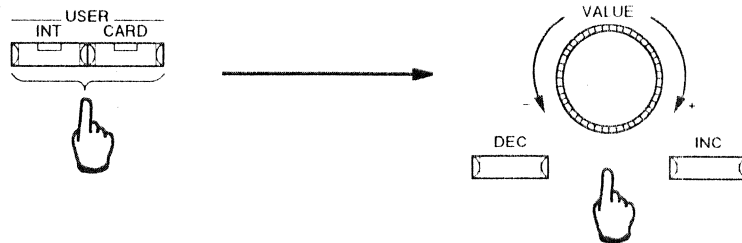
1. Open the Utility Window
Press [UTILITY].
It's called the "Utility Window" because you can open it at any time.



2. Select the Write screen.
Press [F1] (Write).



3. Specify the Write destination.



Write destination

If you wish the Write destination to be in a different Group, Bank and/or Number, specify Internal memory or DATA card by pressing [INT] or [CARD] (respectively), then selecting a number with the [VALUE] knob or the [INC] and [DEC] buttons.

4. Check the Write Destination with the Compare Function

If you press the [F1](Comp) button in Step 3., you'll be able to hear the Patch currently stored at the Write destination. This is so you don't accidentally overwrite and delete an important Patch. Press [F1](Write) once more to return to the Write mode.

You can hear the Patch stored at the Write destination by playing a connected MIDI keyboard.

5. Execute the Write Function

Press [F6] (Execute) to execute the Write function.

Cancel the Write operation at any point by pressing [EXIT].

If you specify Internal memory as the Write destination and Write Protect is ON (Like a "safety" switch that prevents writing to memory), press [F6](Execute) and the Write Protect screen will appear. Set it "OFF," and then press [EXIT]. It will return to the display for the Write operation.

Press [F6](Execute) again, and the Write operation will be executed.

6. Exit the Write Screen

When you're finished with the Write operation, the display will read "Completed," and you'll be returned to the previous screen. If you now press [EXIT], you'll be returned to the Utility Menu.

7. Close the Utility Window

Press the [EXIT] button again to close the Utility Window.

When you perform the Write operation, your data is stored in the JD - 990's Internal memory or on a DATA card. Your data is retained even if you turn the JD - 990 off.

The Memory Protect Function

The Memory Protect function prevents you (or anyone else) from accidentally overwriting data in Internal memory or on a DATA card. Protect On means Write operations are not possible, and Protect Off enables the procedure.

For more details, see the section on page Util - 4, 21 of the Reference manual called "Parameter Reference/Utility."

[6] Using Rhythm Sets

The JD - 990 has a Rhythm Set mode in which each key on a connected MIDI keyboard can play a different percussion sound. Call up a Rhythm Set and try out a few of its sounds.

Select a Rhythm Set

1. Select the Rhythm Set Mode

Press the [RHYTHM] button.

The light will come on indicating that you are in the Rhythm Set mode.



2. Select a Rhythm Set

The Rhythm Sets on the JD - 990 are organized into 4 sets: INTERNAL, CARD, PRESET A, and PRESET B

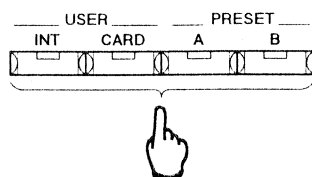
INTERNAL : This is where you'll store the Rhythm Sets you create. (The factory sounds stored here are different from the presets.)

CARD : This is where you'll select Rhythm Sets that are stored on DATA cards (not included with the JD - 990).

PRESET A : These are ROM (Read Only Memory) Rhythm Sets that cannot be erased or overwritten.

PRESET B : These are ROM (Read Only Memory) Rhythm Sets that cannot be erased or overwritten.

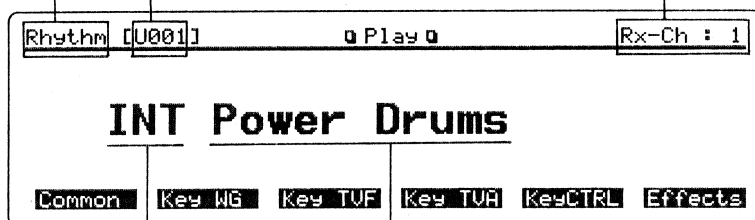
Press the [INT], [CARD], [PRESET A] or [PRESET B] button for whichever Rhythm Set you require.



This shows the current mode.

Program number of the current Rhythm Set

MIDI Receive Channel in Rhythm Set mode.



Group

Rhythm Set name

You can play a connected MIDI keyboard to determine which percussion instrument is assigned to each key.

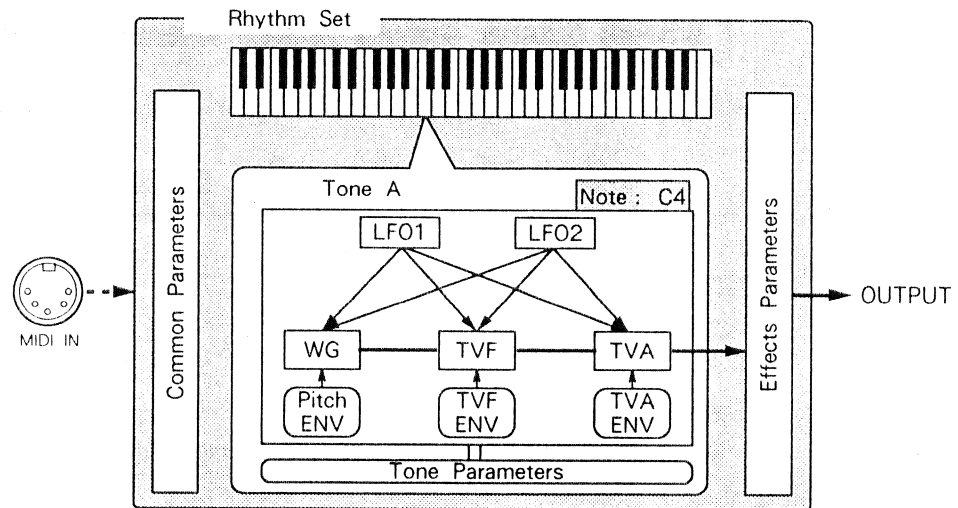
* The percussion sounds are assigned to note numbers C2(36) to C7(108).

Rhythm Set Editing

In a Rhythm Set you can edit the sound that is assigned to a particular note. Here are a few of the things you can change.

Creating a Rhythm Set

A Rhythm Set is set up a little differently than a Patch in that each note plays only one Tone (instead of up to four).

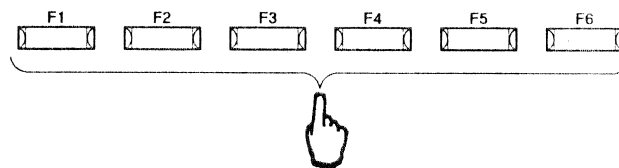
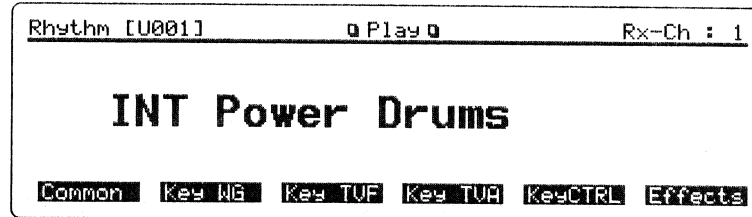


Each Rhythm Set Tone, just like a Patch Tone, is made up of WG, TVF, and TVA blocks, and each can have LFO modulation applied to it.

Editing Procedure

1. Select an Edit menu.

Select an Edit menu with the [F1] — [F6] function buttons.



2. Select a parameter.

Select the parameter you wish to edit with the CURSOR [◀][▶][▲][▼] buttons.

3. Set the values.

Set the values using the [VALUE] knob or the [INC] and [DEC] buttons.

4. Repeat Steps 1. through 3. until you achieve the sound you desire.

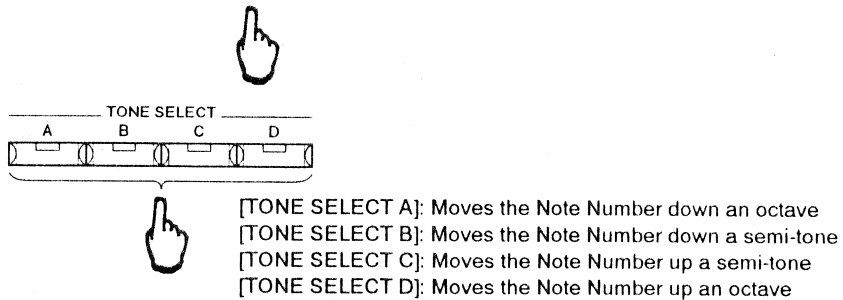
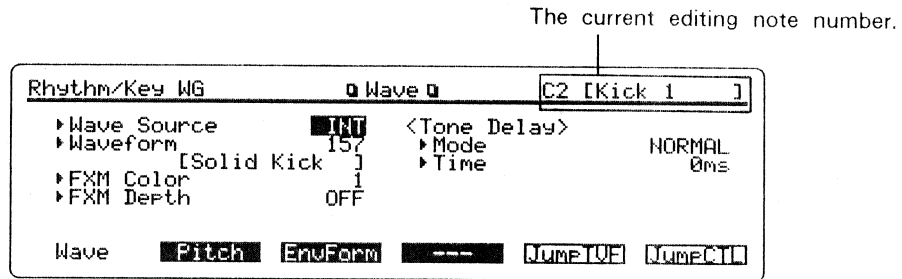
5. Perform a Write operation.

When you've created a Rhythm Set you like, save it in Internal memory or on a DATA card using the Write operation (see page 30).

Now, referring back to the Patch editing operations described on page 19, try editing each note.

Specifying the Note Number

The currently selected Note Number is displayed in the upper right corner of the screen. You can select the Rhythm Set Tone you want to edit by either playing the appropriate Note on your MIDI keyboard, or by using the [TONE SELECT] buttons.

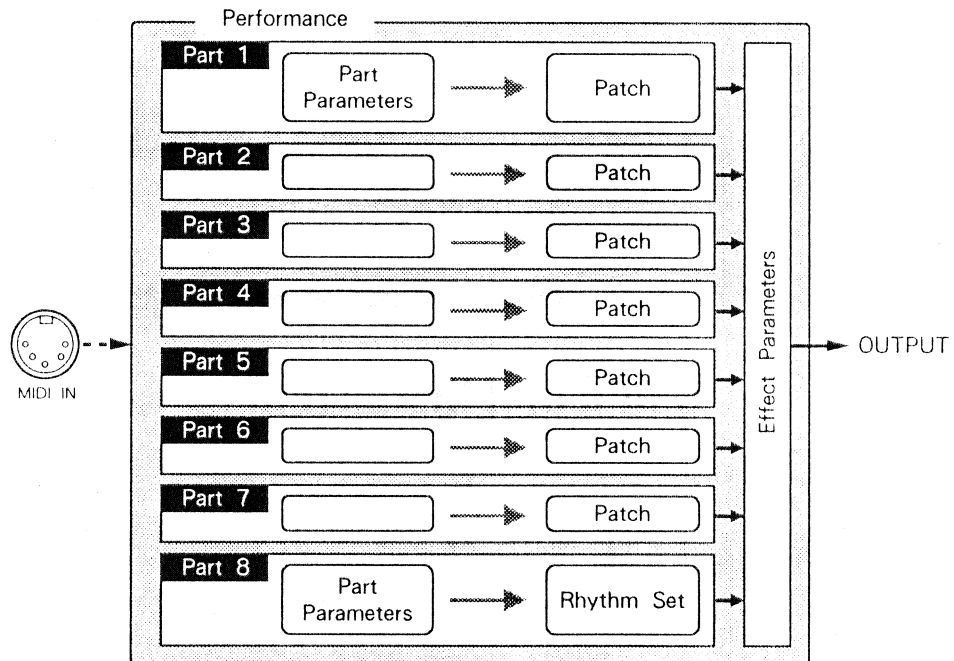


* There is no Edit Palette screen for editing Rhythm Sets as you don't have to balance four Tones as you did with a Patch.

* For a more detailed explanation of the parameters, see the "Parameter Reference" summary in the Reference manual.

[7] The Performance Feature

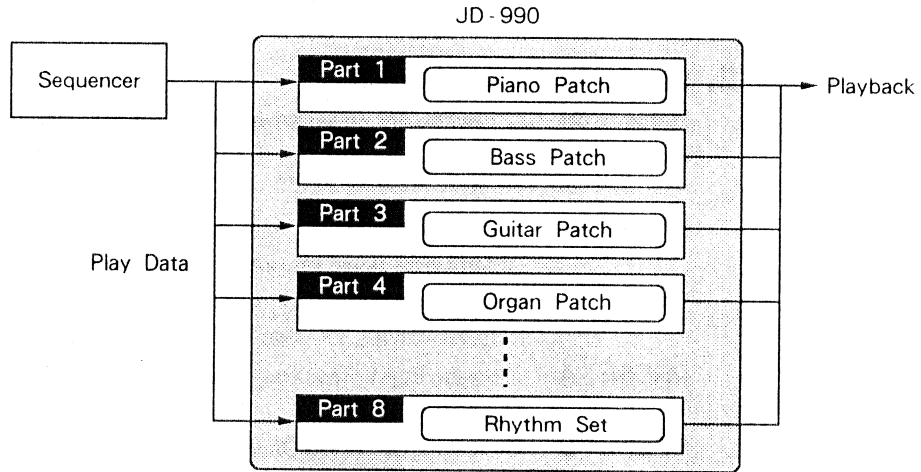
On the JD - 990, you can make up an ensemble, called a "Performance," which is a combination of up to seven Patches and a Rhythm Set. A Performance is broken down into eight "Parts": one Patch is assigned to each Part (1—7), and a Rhythm Set is assigned to Part 8.



There are a variety of ways you can use a Performance, depending on the settings. Here's just one example.

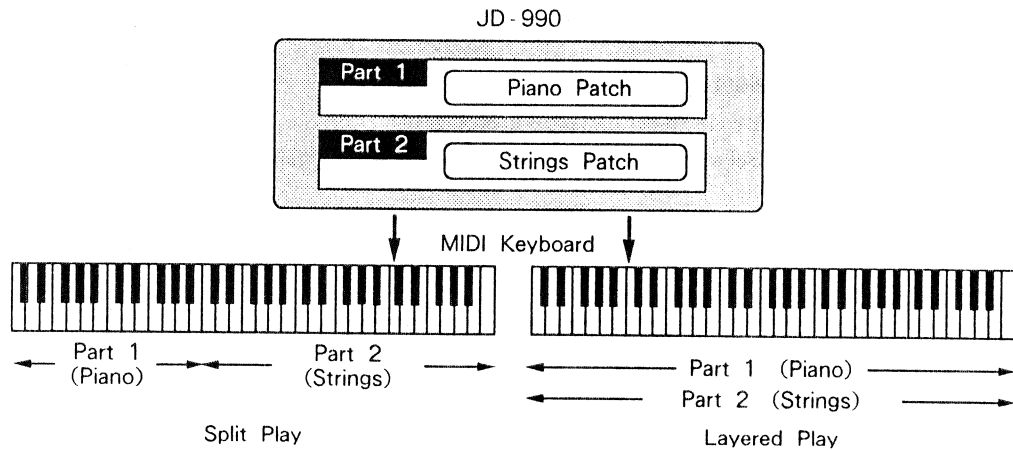
Automatic Play when Combined with a Sequencer

Make up a Performance with selected rhythm, bass, piano, guitar, etc. for each Part, and then write songs with these instruments in mind. These songs can then be played automatically when using a sequencer. It's like each Part on the JD - 990 is a member of an instrumental ensemble, and the sequencer plays the role of conductor.



Layering Patches

Depending on the settings of your MIDI keyboard, you can 'layer' two or more Patches together, or assign a different Patch to each key. For example, if you wish to layer the Patches in Part 1 and Part 2, set the same MIDI receive channel for both those Parts. Or, depending on your MIDI keyboard, you can divide it into several different zones and assign Part 1 to one zone, Part 2 to the next zone, and so on.

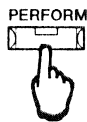


Selecting a Performance

1. Select the Performance mode.

Press the [PERFORM] button.

The light will come on to indicate that you're in the Performance mode.



2. Select a Performance Group

Performances, like Patches, are organized into 4 groups: INTERNAL, CARD, PRESET A, and PRESET B.

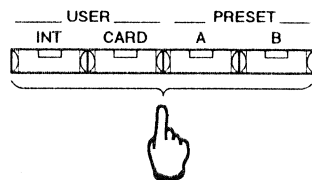
INTERNAL : This is where you'll store the Performances you create. (The factory Performances stored here are different from the presets.)

CARD : This is where you'll select Performances that are stored on DATA cards (not included with the JD - 990).

PRESET A : These are ROM (Read Only Memory) Performances that cannot be erased or overwritten.

PRESET B : These are ROM (Read Only Memory) Performances that cannot be erased or overwritten.

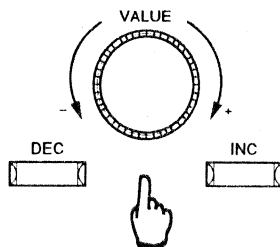
Press the [INT], [CARD], [PRESET A] or [PRESET B] button for the desired Performance group.

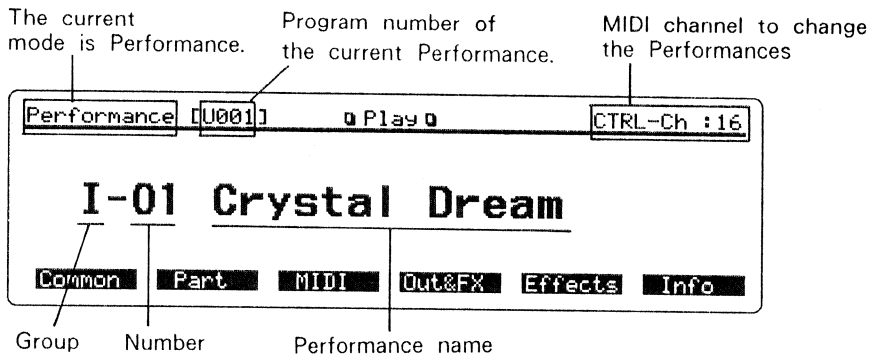


3. Select a Performance

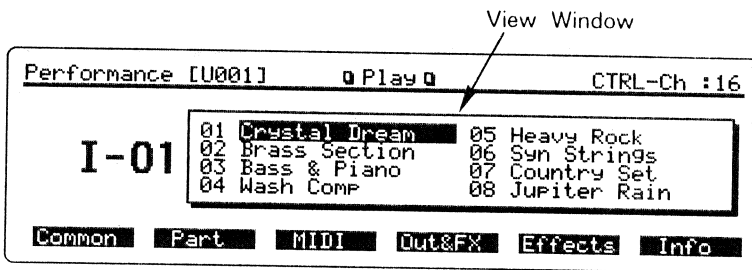
There are 16 Performances in each group.

Select a Performance number with the [VALUE] knob or the [INC] and [DEC] buttons.





Pressing the [VALUE] knob opens up the "View Window" that lets you see eight Performances in the window at once. Pressing the [VALUE] knob thereafter will change the eight Performances in order.



You can change the Performance with either the [VALUE] knob and [INC][DEC] buttons or the CURSOR[▲], [▼], [◀] and [▶] buttons while the window is opened.

Press [EXIT] to close the View Window.

There are 16 Performances in each Group. That is to say, there are 64 Performances in total. And you can select a Performance in the following order: I01 → I02 → I03 → → I16 → (C01 → → C16) → A01 → → A16 → B01 → → B16.

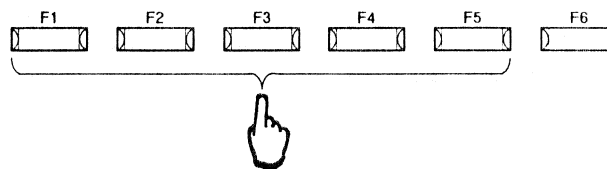
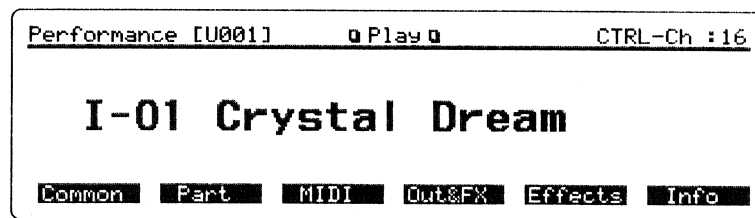
Editing a Performance

Performance editing involves setting the level and pan, the channel over which MIDI messages are received, and effects for each Part.

Editing Procedure

1. Select an Edit Menu

Use the function buttons [F1] — [F5] to select an Edit menu.



2. Select a Parameter

Use the CURSOR [◀], [▶], [▲] and [▼] buttons to select the parameter you wish to edit.

3. Set the Values

Set the values with the [VALUE] knob or the [INC] and [DEC] buttons.

4. Repeat steps 1. through 3. until you have made all the settings you require.

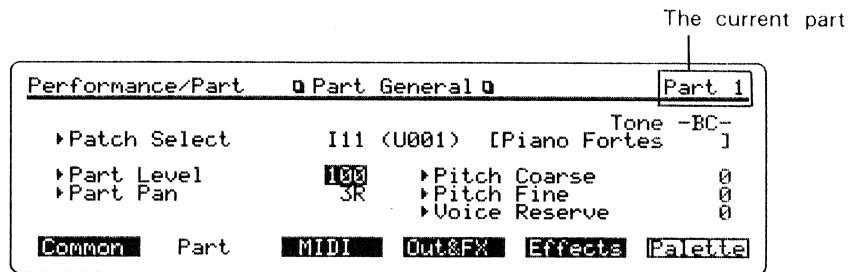
5. Perform the Write Operation

When you have created a Performance you like, use the Write operation to save it in Internal memory or on a DATA card.

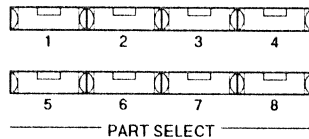
***For Information on the [F6](Info) button, “Monitoring the MIDI Data Stream” on page App. - 3 of the Reference manual.**

Selecting a Part for Editing

The currently selected Part Number is indicated in the upper right corner of the screen.



Select the Part (1 — 8) you wish to edit using the [PART SELECT] buttons.



Press the button for the Part number you wish to edit.

- * In the Play screen, the [PART SELECT] buttons act as MIDI receive switches. When a button is ON (the LED is lit), MIDI messages are received and the Patch assigned to that Part is played. When OFF, MIDI messages are not received and you will not be able to play the Patch assigned to that Part.
- * For a more detailed explanation of the Parts, see "Parameter Reference" in the Reference manual, page Pform - 1.

Using the Edit Palette

You can use the Edit Palette to edit Performances. Level and pan are displayed for up to eight Parts at once, which makes it very easy to set the balance.

Part Edit	Edit Palette
Here you can see how a variety of parameters are set in relation to a certain Part. Since many parameters are displayed at the same time, this is the best place for detailed editing of one Part.	This screen shows how the same parameter is set for all 8 Parts. Since you can make settings for all 8 Parts at once, this is very convenient for making edits and yet still be able to see how they will affect the overall balance.

Procedure

The procedure described here is identical to that for the Edit Palette screen of a Patch.

1. Select the Edit Palette Screen

Press the [F6] (Palette) button (when you're in a Part Edit screen) to open up the Palette screen for the parameter currently highlighted.

***You can switch between Part Editing and Edit Palette with each press of the [F6] button.**

2. Select a Parameter

Select the parameter you wish to edit using the CURSOR [▲][▼] buttons.

The next parameters will be displayed above and below the currently selected one.

Press [▲] to move to the upper parameter, and [▼] to move to the lower one.

The Patch selected in the current Part

Performance/Part	Part Palette	[Piano Fortes]
	1 2 3 4 5 6 7 8	
▲ Patch Select	I11 I54 I33 I18 I27 I25 I75 INT	
Part Level	100 80 70 85 93 50 50 80	
▼ Part Pan	3R L7 L12 30R 30R L24 L24 0	
Common	Part	MIDI Out&FX Effects Part

3. Select the Part you Wish to Edit

Press the [PART SELECT] button for the Part you wish to edit.

The selected value will be highlighted.

4. Change the Value

Modify the values using the [VALUE] knob or the [INC] and [DEC] buttons.

*** If you wish to move straight to the Play mode, press [EXIT].**

*** When you wish to select a different menu (with different parameters) from the Play screen itself, press the function button ([F1] — [F5]) corresponding to the menu you require.**

[8] Miscellaneous Functions

There are so many editing functions and useful features on the JD - 990 that we have only scratched the surface of the things you can do when creating your own sounds. Below is a brief introduction to these many features. (For more detailed information about the parameters themselves, look up the appropriate procedure in the Topical Index in the Reference manual)

Patch

Function	Parameter	Procedure	Reference: Refer to
Changing the Patch name	Patch Name	[F1](Common) → [F1](General)	P. Ptch - 8
Changing Patch volume	Patch Level	[F1](Common) → [F1](General)	P. Ptch - 9
Changing the Patch pan	Patch Pan	[F1](Common) → [F1](General)	P. Ptch - 9
Changing the sound with the equalizer	Patch EQ	[F1](Common) → [F6](EQ)	P. Ptch - 26
Modify the pitch of the Tone over time	Pitch Envelope	[F2](WG) → [F3](EnvForm)	P. Ptch - 39
Modify the timbre of the Tone over time	TVF Envelope	[F3](TVF) → [F2](EnvForm)	P. Ptch - 49
Change the volume and pan for each Tone	Level, Pan	[F4](TVA) → [F1](General)	P. Ptch - 51
Add a vibrato effect to the Tone	LFO	[F5](LFO&CTL) → [F2](LFO1) /[F3](LFO2)	P. Ptch - 62
Make effects settings	Effects	[F6](Effects)	P. Ptch - 68

Rhythm Set

Function	Parameter	Procedure	Reference: Refer to
Changing the Rhythm Set name	Rhythm Set Name	[F1](Common) → [F1](General)	P. Ryth - 7
Changing Rhythm Set volume	Rhythm Set Level	[F1](Common) → [F1](General)	P. Ryth - 8
Changing the Rhythm Set pan	Rhythm Set Pan	[F1](Common) → [F1](General)	P. Ryth - 8
Changing the sound with the equalizer	Rhythm Set EQ	[F1](Common) → [F2](EQ)	P. Ryth - 9
Change the waveform for each note	Waveform	[F2](Key WG) → [F1](Wave)	P. Ryth - 10
Change the pitch for each note	Pitch	[F2](Key WG) → [F2](Pitch)	P. Ryth - 10
Change the timbre for each note	Filter Mode Cutoff Frequency Resonance	[F3](Key TVF) → [F1](General)	P. Ryth - 10
Change the volume and pan for each note	Level, Pan	[F4](Key TVA) → [F1](General)	P. Ryth - 10
Make effects settings	Effects	[F6](Effects)	P. Ryth - 14

Performance

Function	Parameter	Procedure	Reference: Refer to
Changing the Performance name	Performance Name	[F1](Common)	P. PfoM - 4
Select a Patch to assign to a Part	Patch Select	[F2](Part)	P. PfoM - 5
Changing the volume of a Part	Part Level	[F2](Part)	P. PfoM - 5
Changing the pan of a Part	Part Pan	[F2](Part)	P. PfoM - 5
Set Voice Reserve	Voice Reserve	[F2](Part)	P. PfoM - 6
Make effects settings	Effects	[F5](Effects)	P. PfoM - 10

System Setup

Function	Parameter	Procedure	Reference: Refer to
Tuning	Master Tune	[SYSTEM] → [F1](Tune)	P. Sys - 4
Adjusting the LCD screen contrast	LCD Contrast	[SYSTEM] → [F1](Tune)	P. Sys - 4
Hear a sound by pressing the [VOLUME] knob	Preview	[SYSTEM] → [F6](Preview)	P. Sys - 12

Effects On/Off

Function	Parameter	Procedure	Reference: Refer to
Turn effects on and off during playback		[EFFECTS ON/OFF]	P. FX - 2

Utility

Function	Parameter	Procedure	Reference: Refer to
Copy a Tone to a different Tone	Patch Copy/Tone	[UTILITY] → [F2](Copy) → [F1](Tone)	P. Util - 9
Copy a Part to a different Part	Performance Copy/Part	[UTILITY] → [F2](Copy) → [F1](Part)	P. Util - 6
Copy a note to a different note	Rhythm Set Copy/Tone	[UTILITY] → [F2](Copy) → [F1](Tone)	P. Util - 12
Return Patches to factory settings	Initialize/ Factory Data	[UTILITY] → [F3](Init) → [F2](Factory)	P. Util - 15
Return Performances to factory settings	Initialize/ Factory Data	[UTILITY] → [F3](Init) → [F2](Factory)	P. Util - 15
Return Rhythm Sets to factory settings	Initialize/ Factory Data	[UTILITY] → [F3](Init) → [F2](Factory)	P. Util - 15
Format a DATA Card	Card/Format	[UTILITY] → [F4](Card) → [F4](Format)	P. Util - 17
Turn Write Protect on and off	Write Protect	[UTILITY] → [F6](Protect)	P. Util - 21

Appendix: The Fundamentals of Sound

By now you should have a pretty good idea of how the JD - 990 works. So now, give your fingers a break and exercise your mind with a little general background information about sound and the structure of synthesizers.

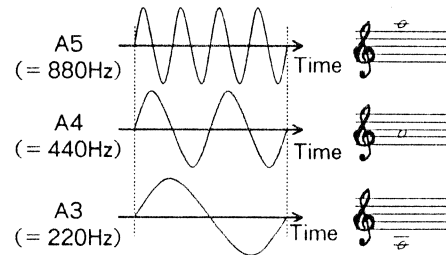
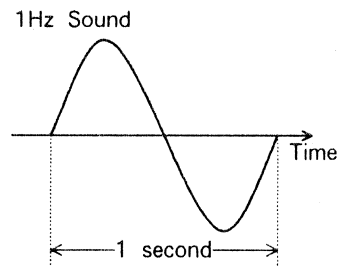
What is Sound?

When a wave - like oscillation of air pressure reaches the inner ear, it is interpreted and recognized by our brains as "sound." This wave - like nature becomes apparent when you look at a sound using a measuring instrument such as an oscilloscope.

Sound is characterized by three basic components: pitch, timbre, and volume.

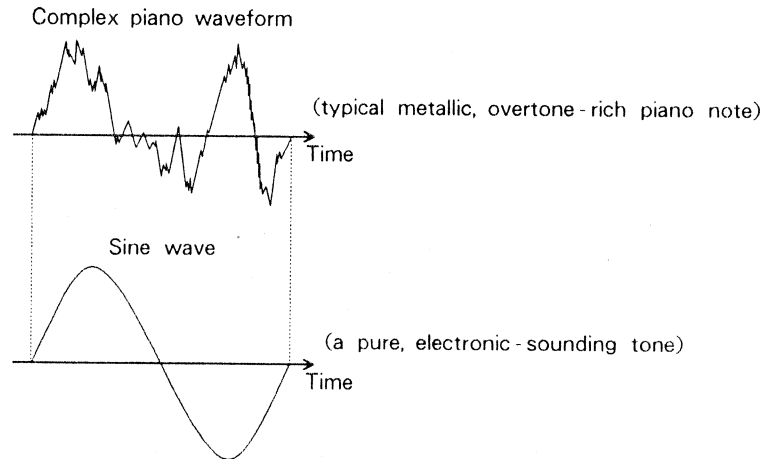
Pitch

Pitch is how rapidly the sound wave repeats its pattern during oscillation. It is measured in units of 'cycles per second' or Hertz (Hz), so a sound that repeats its wave pattern 5 times every second is said to have a frequency of 5 Hz. Higher frequencies mean higher pitched sounds and lower frequencies are lower sounds. For example, standard concert pitch is defined as A4=440.0Hz (440 oscillations per second). An octave up from this is A5, with a frequency that is exactly doubled (A5=880.0Hz), and an octave down is A3 with a frequency that is exactly half that of A4 (A3=220.0Hz).



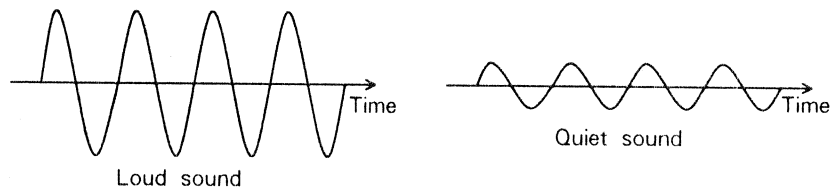
Timbre

The timbre (tone quality or tone color) of a sound is determined by its waveform. Comparing a piano waveform to a sine wave, as in the diagram below, you can see that the piano waveform is much more complex. Our ears detect and recognize this difference between the waveforms as a difference in timbre.



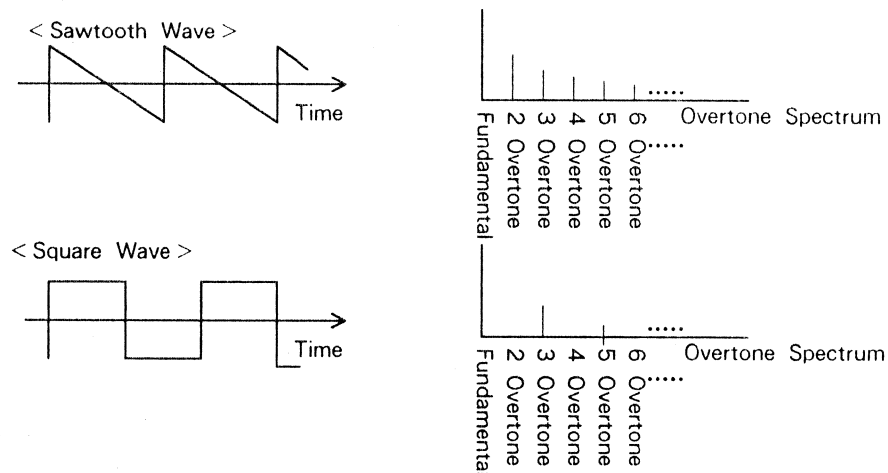
Volume

The volume of a sound is simply the 'amplitude' or intensity of the wave - like changes in air pressure. Loud sounds have greater differences in air pressure; soft sounds less so.

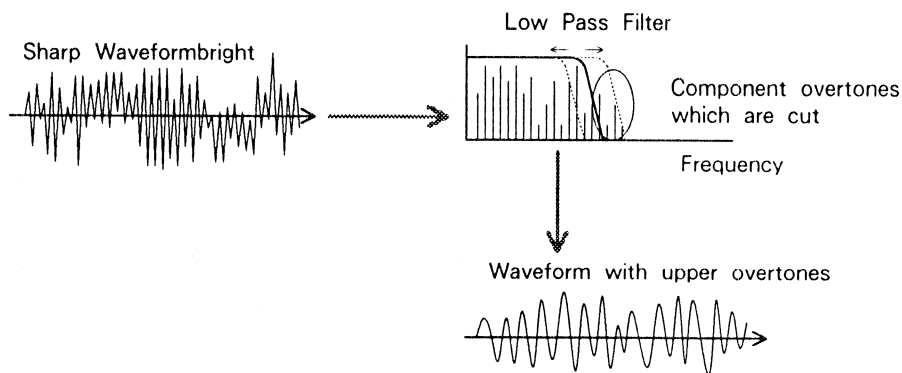


Overtone

The fundamental component of all waveforms is the sine wave. Even very complex waveforms are no more than a lot of sine waves of different frequencies that have been added together. For example, a sawtooth wave is a combination of a sine wave (the “fundamental”) and other sine waves whose frequencies are exact integer multiples of the fundamental (i.e., exactly twice the frequency, exactly three times the frequency, etc.). These higher-pitched sine waves are called the “overtone” or “harmonic overtones” of the sound. Any sound in the world can be recreated by the proper combination of sine waves in this way. And overtones don’t have to be exact integer multiples of the fundamental, it just works out that way for the sawtooth waveform. Other sounds might contain overtones that are non-integer multiples of the fundamental frequency.



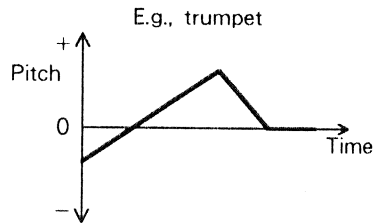
One very typical way to process sound on the JD - 990 involves the “subtractive synthesis” method. Here the timbre (waveform) is changed by cutting (removing) all component overtones above a certain frequency, as shown below.



Modifying a Waveform Over Time (Envelopes)

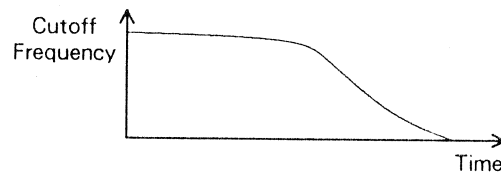
The volume, timbre, and sometimes the pitch of the sound produced by a real instrument will vary over time, from the start of the sound to when it completely dies away. This variation over time is called the “envelope” of the sound.

Pitch Envelope



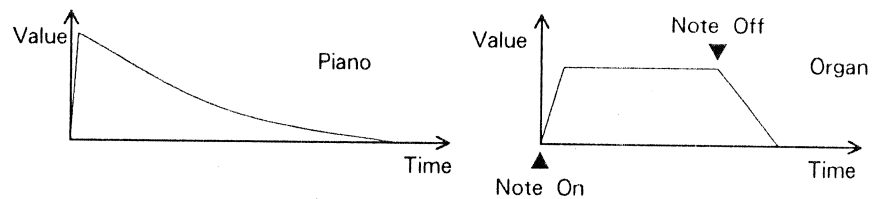
Wind instruments like a trumpet have a very slight but characteristic “scoop” in the pitch at the moment the player starts to blow. This fluctuation in pitch with respect to time can be simulated with a “pitch envelope.”

TVF Envelope



The sound of a piano is characterized by an attack period, where the sound is bright and contains a lot of upper overtones, followed by a gradual fading of the overtones as the sound decays, leading to a more rounded sound. This variation in timbre over time can be simulated with a TVF (Time Variant Filter) Envelope.

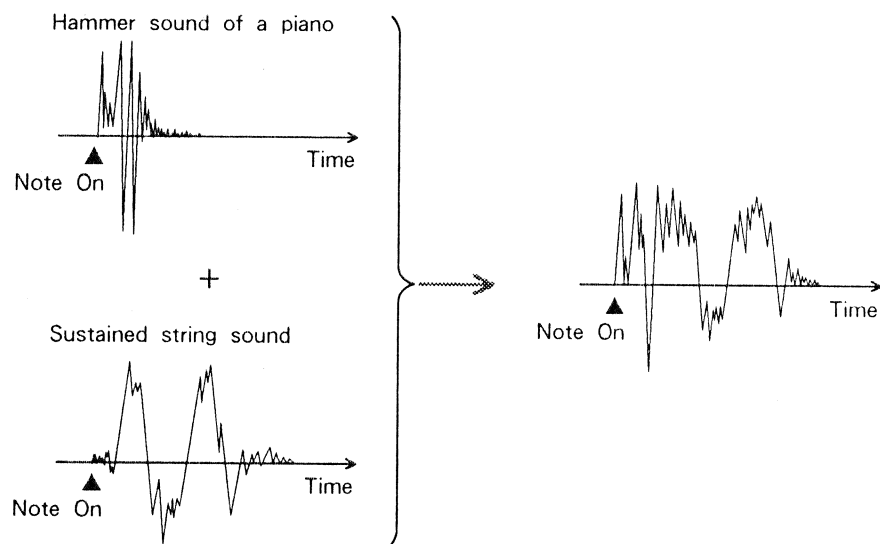
TVA Envelope



A piano sounds almost as soon as you strike a key, and begins to decay in volume even as you hold the note down. Contrast this with an organ sound, which takes a while to build up, but sustains at the same volume for as long as you continue to hold the note. This variation in volume over time is simulated with a TVA (Time Variant Amplifier) Envelope.

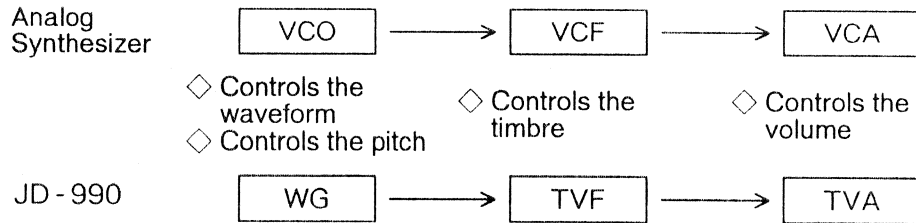
Combining Sounds

The sounds made by instruments in the real world are in fact combinations of sounds that are really quite different and depend on how they are produced in that instrument. For example, one can break down a piano note into an initial “attack” sound in which the hammer first strikes the string, and the lingering, sustained tone that follows it. A flute, on the other hand, has a characteristic “breath noise” when the player starts to blow, changing to a sustained sound as the pitch is established inside the air chamber of the flute. Combining these very different sounds gives a more realistic and life-like character to sounds that you create.



The JD - 990 as a Sound Generator

Typical analog synthesizers used a VCO → VCF → VCA routing scheme, where VC stands for Voltage Controlled (i.e., analog), and O for oscillator, F for filter, and A for amplifier. The basic waveform is generated by the VCO, the timbre is controlled by the action of the VCF, and the volume modulations with respect to time are controlled by the VCA. This is the “subtractive synthesis” method we mentioned during the discussion of overtones.



The JD - 990 is like an analog synthesizer in that it uses an identical routing scheme. Or more precisely, where the analog uses VCO → VCF → VCA, the JD - 990 uses instead Tone WG → TVF → TVA.

However, the number of waveforms that an analog VCO can generate with its circuitry is limited: basically just sine waves, sawtooths, square waves, and a few more. The WG on the JD - 990, on the other hand, gets its waveforms from the hundreds of sampled PCM waveforms stored in its memory.

Also, all sound processing is done digitally, ensuring high quality sounds without the characteristic additive noise of analog systems.

Making Your Own Sounds

We will present here just a very simple summary of the basic methods of creating (editing) your own sounds. Try reading through this before you decide that synthesizing your own sounds is going to be “too difficult.” (It’s not, really!)

The “Modify an Existing Patch” Method

In this method, you’d select a Tone from the JD - 990’s memory which is at least close to the sound you’re looking for, and then create your own Tone from it with simple editing commands.

1. Select a sound that’s close to what you’re looking for.
2. Use the various parameters (in the Edit menus) to edit the sound to make it closer to what you have in mind.
3. When you’re finished editing and the Patch is complete, save it in Internal memory or on a DATA card using the Write operation (page 30).

At first, try to use the sounds that are close to what you have in mind as guidelines only. Then try a different approach. For example, first select an envelope which is close to the sound in your mind, and then change the waveform. Try anything you can think of!

The “Starting from Scratch” Method

With this method, you’ll initialize all the parameters and proceed from there to make a completely new Tone.

1. Perform an Initialize operation from the Utility screen (Reference manual: page Util - 15).
2. Select a Wave, then specify the filter, TVA envelope, etc., to sketch out the basic waveform.
3. Polish it up by changing some of the other parameters to complete the Tone.
4. Make more Tones in the same way, then mix them together.
5. Add effects and create it into a Patch.
6. If the result is close to the sound you’re looking for, save it in Internal memory or on a DATA card using the Write operation.

Index

[Item]

● Procedure

Play a test note on the JD - 990	10
Moving the cursor	10
Changing Values	10
Operating the [VALUE] knob	10
Returning to the previous or initial screen	18
Check the Write destination	31
The memory protect function	31

● Patch

Operating the View Window	15
Construction of a Patch	16
Selecting/Checking a Tone (Using the Tone Switch buttons)	17
Selecting /Changing a editing Tone (Using the Tone Select buttons)	17
Muting a Tone	17
Selecting a Waveform	19
Changing the Pitch	21
Changing the timbre	22
Changing the volume	24
Tone editing summary	27
Operating in the Edit Palette screen	28
Changing the values of multi Tones simultaneously	29

● Rhythm Set

Selecting a Rhythm Set	32
Creating a Rhythm Set	33
Rhythm Set editing	34
Specifying the note number (Selecting a percussion sound)	35

● Performance

Creating a Performance	36
How to use a Performance	37
Selecting a Performance	38

Operating the View Window	39
Editing a Performance	40
Selecting a editing Part	41
Using the Edit Palette	42

● Information

What is sound?	46
Overtones	48
Modifying a Waveform over time (Envelopes)	49
Combining sounds	50
The JD - 990 as a sound generator	51
Making your own sounds	52

[Term]	Monaural	7
	Mute	17
[A]	[N]	
AC Cord	Note number	35
	Number(Patch)	14
[B]	Number(Performance)	38
Bank		
	[O]	
[C]	Overtones	48
Card(Patch)		
Card(Performance)	[P]	
Card(Rhythm Set)	Part Editing	42
Compare	Pitch Coarse	21
Cutoff Frequency	Preset A(Patch)	14
	Preset A(Performance)	38
[D]	Preset A(Rhythm Set)	32
DATA Card	Preset B(Patch)	14
	Preset B(Performance)	38
[E]	Preset B(Rhythm Set)	32
Edit Palette		
Envelope	[R]	
	Resonance	23
[F]	ROM Play	12
Filter Mode		
	[T]	
[G]	Tone	16
Group(Patch)	Tone Editing	27
Group(Performance)	Tone Select buttons	17
Group(Rhythm Set)	Tone Switch buttons	17
[H]	[U]	
Headphones	Utility Window	30
[I]	[V]	
Internal(Patch)	View Window(Patch)	15
Internal(Performance)	View Window(Performance)	39
Internal(Rhythm Set)		
	[W]	
[M]	Waveform	20
MIDI channel	Write	30
	Write Protect	31

Roland®

26055662

UPC

26055662



10981



JO-990