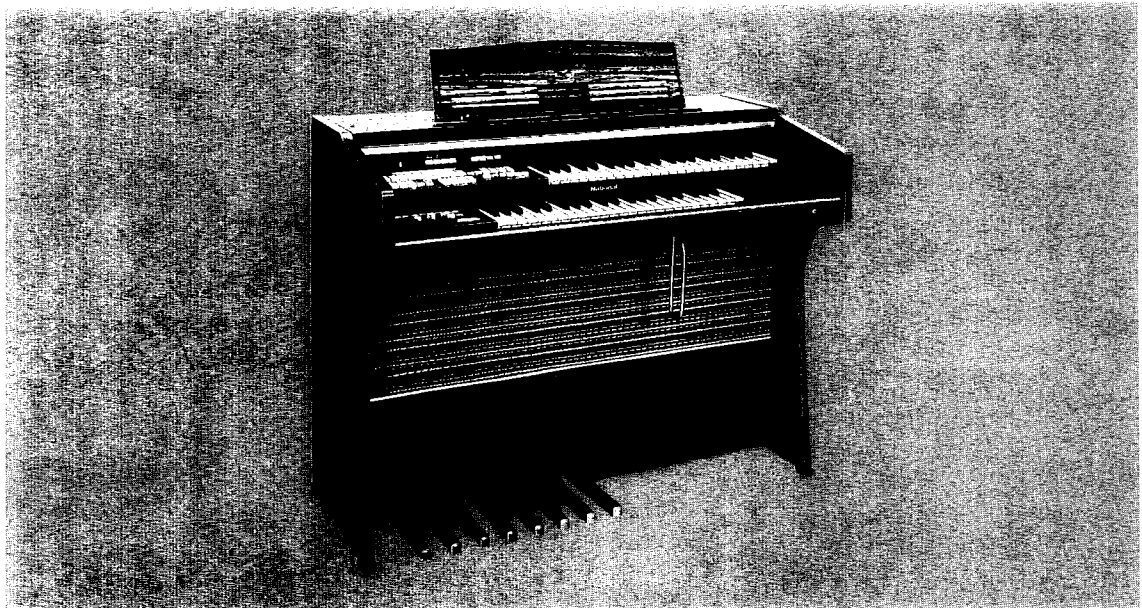


Operating Instructions

Electronic Organ
SX-4500R



 **National**

Before operating this set, please read these instructions completely.



THE NATIONAL ELECTRONIC ORGAN OPERATING INSTRUCTIONS

Thank you very much for selecting a National Electronic Organ. We are sure you will enjoy many happy hours of entertainment from this excellent musical instrument.

This organ is a unique musical instruments designed for playing performances from the simplest to the most complex music, and can be easily played by anyone, from the beginner to the most competent musician.

Read this booklet carefully to get the best results from your National Electronic Organ.

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INTRODUCTION TO THE ELECTRONIC ORGAN



The diagram on the opposite page will help you to identify the various controls of the National Electronic Organ. The controls are fully explained in the following pages, but we suggest you set them as shown. This will enable you at once to produce very many attractive musical sounds from your National Electronic Organ.

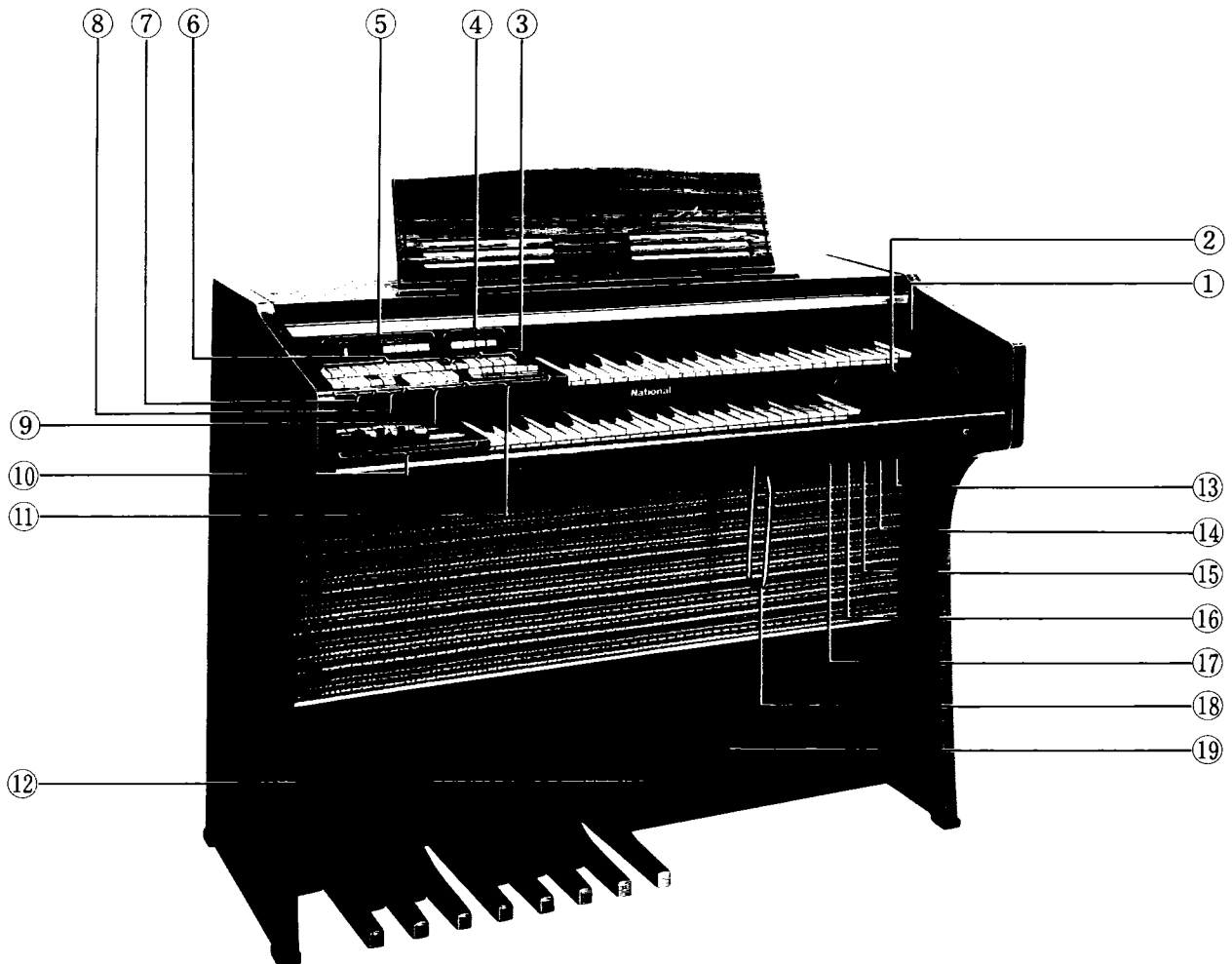
If you have any knowledge of music or can perhaps play the piano even moderately well, it will be easy for you to play the National Organ without difficulty. Even if, on the other hand, you have no musical knowledge, you will soon become a competent player after referring to the following pages which explain, step by step, how to play the National using its own special musical effects. It should be emphasised that this manual is designed to help you get the most enjoyment from your National Organ, it cannot be regarded as an organ teaching method.

1. Power Switch & Volume Control
This is turned to the right (clockwise) and set to the required volume.
2. Effect Levers
These are set to the center point.
3. Effect Tabs
The tab marked MULTI-TREMOLO ON is depressed at the bottom. The other Tabs are left as they are.
4. Percussive Tone buttons
These are not depressed. (Instructions on the following pages will explain how to use them.)
5. Auto Arpeggio
These are left as they are. (Instructions on the following pages will explain how to use them.)
6. Upper Manual Tone Tabs
The tab marked FLUTE 8' is depressed at the bottom.
7. Pedal Keyboard Tone Tabs
The tab marked BASS is depressed at the bottom.
8. Pedal Sustain tabs
The tab marked ON is depressed at the bottom.
9. Lower Manual Tone Tabs
The tab marked FLUTE is depressed at the bottom.
10. Auto-Play-Chord & Automatic Rhythm Controls
These are left as they are. (Instructions on the following pages will explain how to use them.)
11. Upper Pre-Set Sound Buttons
These are not depressed.
12. Expression Pedal
This is depressed forward with the toe of the right foot. (Instructions on the following pages will explain how to use it.)

NAMES OF PARTS



- | | |
|--|-------------------------|
| ① POWER SWITCH & VOLUME CONTROL KNOB | ⑪ PRE-SET SOUND BUTTONS |
| ② EFFECT LEVERS | ⑫ EXPRESSION PEDAL |
| ③ EFFECT TABS | ⑬ OUTPUT TERMINAL |
| ④ PERCUSSIVE TONE BUTTONS | ⑭ HEADPHONES JACK |
| ⑤ AUTO ARPEGGIO | ⑮ INPUT JACK |
| ⑥ UPPER MANUAL TONE TABS | ⑯ MICROPHONE JACK |
| ⑦ PEDAL KEYBOARD TONE TABS | ⑰ MICROPHONE VOLUME |
| ⑧ PEDAL SUSTAIN TABS | ⑱ SUSTAIN KNEE LEVER |
| ⑨ LOWER MANUAL TONE TABS | ⑲ GLIDE CONTROL SWITCH |
| ⑩ AUTO-PLAY-CHORD
& AUTOMATIC RHYTHM CONTROLS | |



MAIN FEATURES



Auto Arpeggio

A completely new performance feature—"Auto Arpeggio"—has been added to National Electronic Organs. By simply playing the chord on the lower keyboard, the dispersed chords from bass to treble are lightly repeated automatically in the same pattern as the tempo of the rhythm. By using this technique, even beginners can easily play advanced dispersed chords. And, because it is interlocked with the tempo of the automatic rhythm and the Auto-Play-Chord, the performance can be made in the same tempo as the selected rhythm. This, then, makes the "Auto Arpeggio" a pleasure to use in accompaniment with any tune.

Electronic Multi-Tremolo Effect

National engineers have ingeniously used their skills to provide a beautiful multi-speed tremolo effect. The realism is created by using stereophonic amplifiers to cause the sound to flow from one speaker system to the other. The advantages of the National system over other mechanical types are that the National system cannot wear out because there are no moving parts—it is noiseless in operation, and the tremolo can be heard through headphones when silent practice is required. Finally, the Organ sounds can be recorded direct to a tape recorder without the need for microphones, and the quality of the sound is therefore perfect because the tremolo can also be recorded on to tape. In addition, the speed and depth of sound can be set to suit your own taste.

There is also an "Electronic Chorus" effect in addition to the "Multi-Tremolo" effect. This effect creates a rotational effect in slower sounds and is very useful for church music and special effects for light music.

Auto-Play-Chord

The Auto-Play-Chord is a function which makes the rhythm accompaniment played by the left hand and left foot easy and fully automatic. The organist plays the melody on the upper manual and the rhythm accompaniment can be automatically played with a selected rhythm, such as Rumba or Rock, by simply pressing the accompanying chord on the lower manual and the correct key on the pedal board. When the organist becomes proficient, he can have automatic play using either the lower manual or the pedal keyboard.

Regarding the pedal keyboard, the bass accompaniment produced by the depressed pedal can be automatically played or if preferred an alternating bass can be obtained, for example, the tone G and root C can be automatically played without moving your foot from the root position.

Furthermore, because this National Electronic Organ includes a button for piano accompaniment with the percussion effect as well as a button for guitar accompaniment in the Auto-Play-Chord, an even wider range of performance possibilities can be enjoyed.

Automatic Rhythm

The Automatic Rhythm offers several types of rhythm, such as Rock and Bossa Nova with the sounds of many percussion instruments, such as cymbals and maracas. Eight types of rhythm can be selected, and by using two or more rhythm buttons or by using the rhythm balance knob, many more rhythms can be created.

The Auto-Play-Chord and the automatic rhythm can be used together if desired and, in addition, the "Auto Arpeggio" can also be used with them. Either the synchronous start or the touch start can be used for an exciting playing experience full of new varieties.

Upper Pre-set Sounds

Upper Pre-set Sounds are the unique tone buttons with which you can freely obtain the characteristic sounds of the accordion, wah trumpet, piano, harpsichord or vibraphone – tones which are said to be difficult to produce by using only a combination of the fundamental tone tablets; such exciting and sensual sounds as the enthusiasm of the accordion, the special "Wah" of the trumpet, rich reverberation of the piano, the delicate transparency of the harpsichord and the sweet sound of the vibraphone can be enjoyed even by a beginner with the one-touch operation. When a Pre-set button is pressed during a performance, all of the other upper keyboard tones will be cancelled, and the pre-set sound that you like can be obtained on a preferential basis. Because of it, effective contrasts can be added to the music to produce a rich performance.

Upper Manual Sustain Effect

Sustain is an effect of gradually reducing the volume automatically of the voice selected after the key has been released. The SX-4500R is designed to give the sustain effect to all of the 16', 8' and 4 tones. You will soon realize how attractive this effect is and find many uses for it.

Glide Control Effect

With a switch inside the expression pedal, the tone of the keyboard glides down a half-tone. And when the switch is turned off, portamento is added and the sound is returned to normal. This effect produces an effect like a steel guitar and the portamento produces an effect like a trombone.

KEYBOARDS & COMPASS CHART



Keyboards

There are three keyboards—UPPER MANUAL, LOWER MANUAL and PEDAL KEYBOARD.

The UPPER MANUAL is played usually with the fingers of the right hand for melodies; the LOWER MANUAL (with the left hand) mainly for accompaniment; and the PEDAL (with the toe of the left foot) for bass.

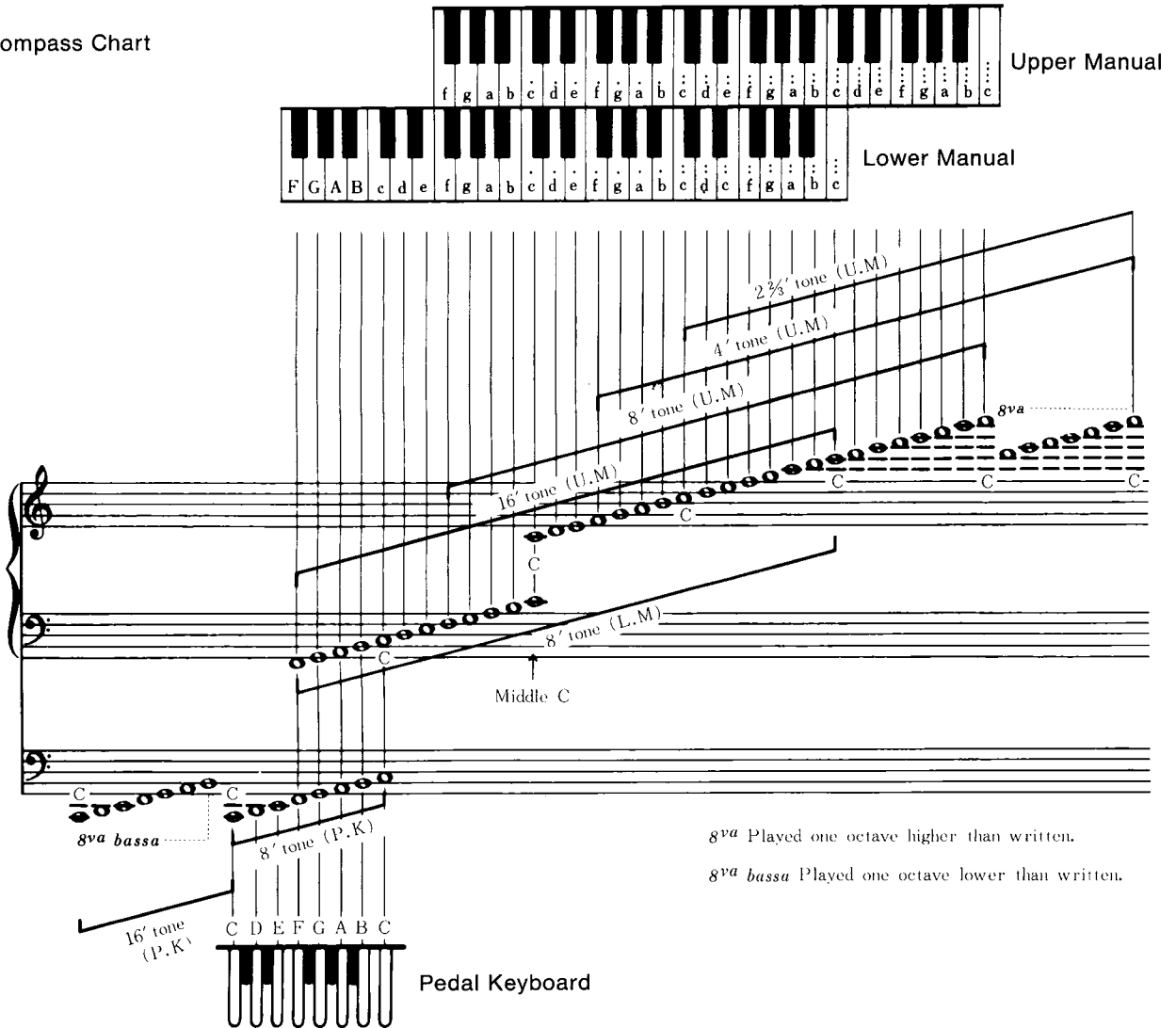
Range

- UPPER MANUAL Extends from f to ċ 44 keys, 3½ octaves
- LOWER MANUAL Extends from F to ċ 44 keys, 3½ octaves
- PEDAL KEYBOARD Extends from C to c 13 keys, 1 octave

Touch

Unlike the piano, the touch on the Electronic Organ keys do not change the volume or quality of sounds produced. It is not necessary to change your touch nor learn a new finger technique, for you may play the keys with the minimum of pressure.

Compass Chart



TONE TABS

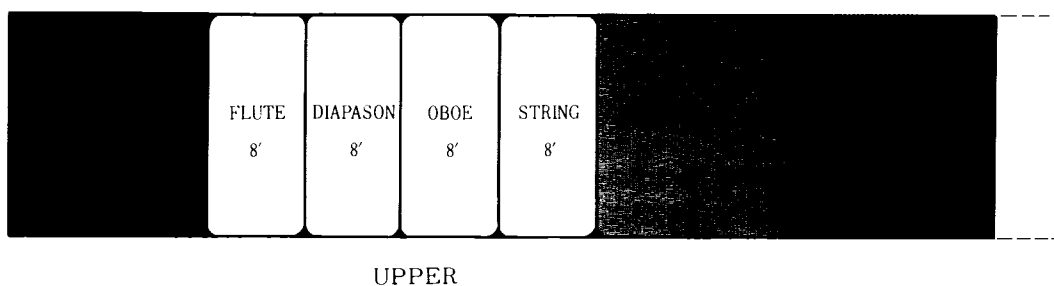


Before we start explaining the Organ in detail, it is important to examine the make-up of an organ in order that you may fully understand what is meant by Tones, Manuals, Footages, etc.

First, an organ obtains its 'big sound' from the various pitch levels, which can be produced by depressing one key. For example, when you depress a note, say middle C, on a piano, the sound produced in musical terms is one note only in one pitch. If you depress the same note on an organ and select for example, a 16', 8' and 4' tone tab, the sound produced by that one key is in fact three octaves or three C notes.

On the SX-4500R, you can reproduce four pitch levels: 16', 8', 4' and $2\frac{2}{3}$ '. The footage classification, by the way, stems from the pipe organ; i.e., the length of pipe required to produce a particular frequency or note. A 16' pipe would produce the sound an octave lower than an 8' pipe, simply because it is twice the length, and so on. Each tone tab on a National Organ has a corresponding pitch level.

Upper Manual Tone Tabs



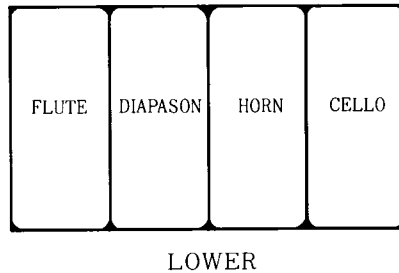
The upper manual provides two 16' tones, four 8' tones, two 4' tones, one $2\frac{2}{3}$ ' tone and one special effect tone: FLUTE 16', CLARINET 16', FLUTE 8', DIAPASON 8', OBOE 8', STRING 8', FLUTE 4', STRING 4', FLUTE $2\frac{2}{3}$ ' and MANDOLIN.

Tones on the organ are not necessarily designed to imitate the instruments of the orchestra. They are there to indicate to you the player what sound you are likely to hear when depressing the various tone tabs. There are three basic families of tones: Flute, Oboe and String. There is a fourth, Diapason, which is a combination of all three families of tone having some Flute, a little Oboe and a little String in its harmonic make-up.

The 16', 8' and 4' tones can be used as solo voices or in any combination. All these tones can be used effectively with sustain.

This organ has one $2\frac{2}{3}$ ' pitch tone which is described as a harmonic voice and this, added to the aforementioned three pitch levels, will add even greater body to the sound produced, so pitch level is, put in a different way, octaves or harmonic couplers. This tone will not sustain.

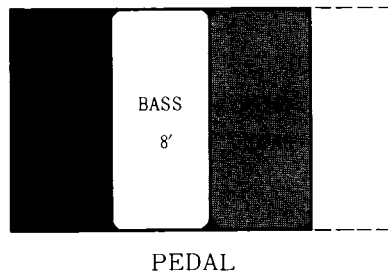
The Mandolin tone is a repeated percussive voice that can be used solo or with other tones. It produces an attractive solo voice with sustain added.



Lower Manual Tone Tabs

The lower manual provides four 8' tones: FLUTE, DIAPASON, HORN and CELLO.

These tones can be played as solo voices, but are usually combined to provide suitable accompaniment to upper manual voices. These tones do not sustain.



Pedal Keyboard Tone Tabs

The pedal keyboard provides one 16' tone, one 8' tone and one special effect tone: BASS 16', BASS 8' and BASS GUITAR.

The Bass 8' with sustain is similar to that of a string bass.

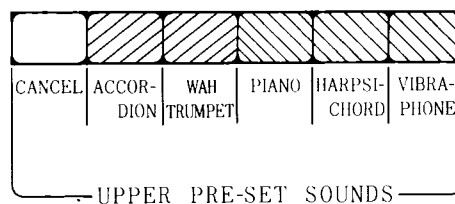
The Bass 16' tone is particularly attractive when used for playing Theater, Classical and Church Organ music.

The Bass Guitar tone with initial attack resembles the modern bass guitar in character when used with sustain. Without sustain, the combination of all pedal tones produces a brass bass sound which is heard in a military or brass band.

PRE-SET SOUNDS



Pre-set sound means that the tone has been determined in advance. When the Pre-set button is pressed, the tones of the upper keyboard are cancelled, and the selected Pre-set sound will be produced as you play. To change back to the tones of the upper keyboard during a performance, simply press the Cancel button at the extreme right; the changeover will be automatic. If two Pre-set buttons are pressed at the same time, only the one on the right will take effect. Multi-Tremolo, Chorus, Vibrato, Reverberation, and Glide Control can be added, but Sustain is already set at its best.



ACCORDION

This tone color successfully reproduces the soft sound characteristic of an accordion as it begins to play and, at the same time, has the sound feature of the double reed. This sound is especially effective when used for such tunes as tangos, chansons, etc. If the multi-tremolo effect is used together with this accordion sound, an even more wonderful expression of the accordion can be produced.

WAH TRUMPET

One of the pre-set tones which can be used to produce the effect of a muted trumpet which is often used in jazz. A humorous effect can be obtained by playing staccato, but the muted tone is not produced when played at legato.

PIANO

This attractive sound is a very useful effect. It should not be used with Vibrato or Tremolo, although some players may prefer to use the Piano with the Chorus effect on. The operation includes an automatic sustain when the keys are released, and therefore the best effect will be created by playing the Piano voice in staccato form.

HARPSICHORD

Although voiced differently from the Piano, the operation of this voice is similar to the piano and the same technique is therefore suggested to achieve best results.

VIBRAPHONE

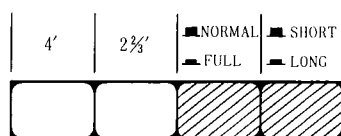
National Engineers have not only voiced this feature beautifully, but have also included an automatic tremolo (independent of the multi-tremolo) and sustain, which makes this stop most authentic. Here again, it is suggested that the Vibraphone sound be used either straight or with the Chorus effect, and not with Vibrato or Tremolo.

CANCEL

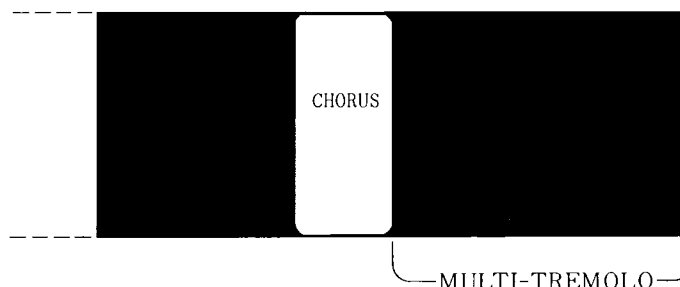
This button is used when changing over to the normal tones of the upper keyboard from the Pre-set sound. Upon pushing this button, the Pre-set sound will be switched off and the sound will change back to the sound set by the tone tablet.

Once one has become accustomed to the instrument, it is a simple matter to create wonderfully varied sounds at the touch of a button. For example, if you have selected say, 16', 8' Flute with $2\frac{2}{3}$ ' percussive tone in the organ tone tab section and wish to change in the space of a quaver rest to a vibraphone or piano (pre-sets) this will present little difficulty and will add great dimension to your organ playing.

EFFECT TABS



PERCUSSIVE TONE



Upper Sustain Tab

The UPPER SUSTAIN tab gives the sustain effect to all 16', 8' and 4' tones on the upper manual, as mentioned previously. You may try to play your favorite piano score with the Flute tone sustained moderately in a staccato touch on the upper manual.

Percussive Tone Buttons

The Percussive Tone is the effect, when the upper manual keys are pressed, of gradually diminishing. It is generally used with the fundamental tone tabs. It is particularly effective to obtain strikingly clear beginning sounds, or a performance which is very clear and crisp.

PERCUSSIVE TONE 4'

When ON, a percussive tone which is 4' is added to the upper manual. If this effect is not to be used, the top of the tab should be depressed to turn it off.

PERCUSSIVE TONE 2 $\frac{2}{3}$ '

When ON, a percussive tone which is 2 $\frac{2}{3}$ ' is added to the upper manual. This button can, of course, be used with the Percussive Tone 4'.

PERCUSSIVE TONE NORMAL-FULL

This button is for varying the strength of the percussive tone. This button can be depressed to obtain a strong tone, "FULL", and a weaker tone can be obtained by depressing it once again, "NORMAL". Neither this button nor the Percussive Short-Long button described next will operate unless either the Percussive Tone 4' or Percussive Tone 2 $\frac{2}{3}$ ' is depressed.

PERCUSSIVE TONE SHORT-LONG

This button can be depressed to obtain a prolonged decreasing percussive tone, "LONG", and can be depressed once again to obtain a shorter decreasing percussive tone, "SHORT". Note that the percussive tone is obtained while the key is depressed, and disappears when released, even while decreasing a feature very convenient when playing in legato because it is applied only to the beginning sound.

Vibrato Tab

The Vibrato has a different character than the Tremolo: Vibrato changes the pitch of the note—sharp and flat in quick succession. By using Vibrato with solo Oboe, String or Flute tones, the sound produced will be very similar in character to an orchestral instrument. To change the degree of vibrato speed, use the Slow-Fast tab of the Multi-Tremolo.

Electronic Multi-Tremolo Tabs

The three Multi-Tremolo tabs give a new tremolo effect and change the depth and speed of tremolo. Because of the principal of operation, the beautiful phase shift effect can be reproduced by combining Vibrato with the Multi-Tremolo in it's fast or slow position. The Multi-Tremolo can be used with the Tremolo Vibrato feature, thus adding even greater dimensions to the sound and quality of your playing.

MULTI-TREMOLO ON-OFF

The MULTI-TREMOLO ON-OFF tab gives tremolo to the music when depressed at the bottom, and eliminates it when depressed at the top. The other two tabs (Light-Heavy & Slow-Fast) can change the degree of tremolo.

MULTI-TREMOLO LIGHT-HEAVY

The MULTI-TREMOLO LIGHT-HEAVY tab can change the depth of tremolo by making tremolo heavier or lighter. Note that Multi-Tremolo Light-Heavy & Slow-Fast tabs operate only when the Multi-Tremolo On-Off tab is in the "On" position.

MULTI-TREMOLO SLOW-FAST

The MULTI-TREMOLO SLOW-FAST tab can change the speed of tremolo by making tremolo faster or slower. If a throbbing, Theatre Organ tremulant is desired, this effect can be achieved by adding Vibrato to the Multi-Tremolo which is switched to the fast/heavy position.

Electronic Chorus Tab

The excellent chorale effect achieved by the CHORUS is achieved on the same principal as the aforementioned multi-tremolo, except that the Chorus sound flows at a much slower rate from one speaker to the other. The stereophonically reproduced chorale will add warmth and presence to your playing, particularly when performing Church/Classical music. It can also be used very effectively when playing Jazz or Swing music.

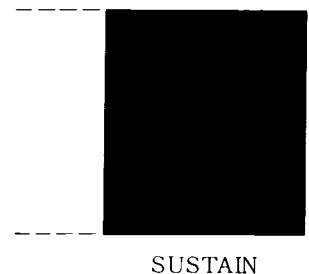
Pedal Sustain Tabs

PEDAL SUSTAIN ON-OFF

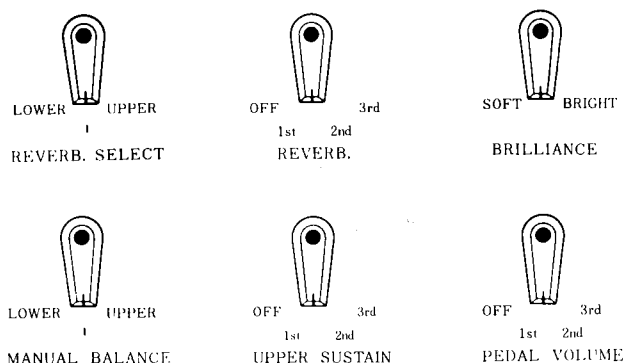
The PEDAL SUSTAIN ON-OFF tab gives sustain to the pedal notes. Pedal sustain means that a bass tone produced by the pedal keyboard decays gradually after the pedal is released.

PEDAL SUSTAIN SHORT-LONG

The PEDAL SUSTAIN SHORT-LONG tab can change the duration of the sustained bass notes. By operating this tab you can select long or short pedal sustain, to suit the music being played.



EFFECT LEVERS



Reverberation Lever

The REVERBERATION lever can change the length of the reverberation effect, giving spaciousness and warmth to your music. By changing the degree of reverberation you can bring various special effects to the music, particularly when the Reverberation select lever is used.

Reverberation Select Lever

The REVERBERATION SELECT LEVER can select the reverberation ratio of either the upper manual or the lower manual. When you set this lever to the centre point, the reverberation length of both manuals becomes equal. When this lever is turned to the UPPER position, the reverberation to the Upper Manual exceeds that of the Lower, and vice versa with the lever turned to the LOWER position.

Brilliance Lever

The BRILLIANCE lever is similar to the brilliance knob or the tone control knob on a good high fidelity amplifier system. It controls the upper harmonics of tones from SOFT to BRIGHT, and its normal position is the centre point. When turned to the BRIGHT position the brilliance of tones of the manual keyboards is emphasized, and when turned to the SOFT position, the brilliance is reduced. This lever is particularly effective in making the String tone and the Oboe tone more brilliant and creates on the other hand a soft warm sound to flute voices when in the soft position.

Manual Balance Lever

The MANUAL BALANCE lever controls the volume balance between the Upper Manual and the lower Manual at the discretion of the player. When this lever is set to the centre point, the volume of both manuals becomes nearly equal. The lever set to the Upper position causes the volume of the Upper Manual to exceed that of the Lower Manual and vice versa with the lever set to the Lower position. This feature enables the player to use, if desired the voices on the Lower Manual for melodies thus adding greater variety to the sounds available.

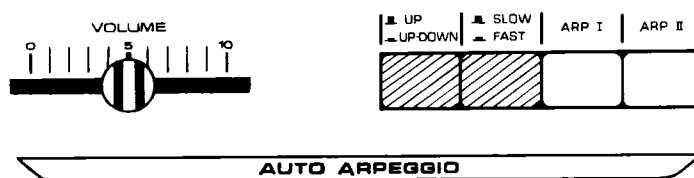
Pedal Volume Lever

The PEDAL VOLUME lever controls the volume of the Pedal Keyboard. Set the Pedal Volume lever to the proper position to balance the sound volume of the Pedal Keyboard with those of the Upper and Lower Manuals.

Upper Sustain Lever

The UPPER SUSTAIN lever controls the length of sustain heard after the key or chord has been released. This feature controls all 16', 8' and 4' tones but it does not affect the Pre-set sounds. By setting this lever to the proper position and the Sustain On-Off tab to "ON", you can obtain the sustain effect throughout the music. When the Sustain On-Off tab is set to "OFF", you can temporarily give the sustain effect to the music by operating the Sustain On-Off Knee lever.

AUTO ARPEGGIO



Arpeggios are technically difficult to play, requiring a great deal of practice to master correctly, however, National engineers now make this attractive musical exercise extremely easy to play requiring little technical ability. Basically, auto-arpeggio enables the player to enjoy the thrill of playing rolling chords over a range of several octaves by simply depressing a simple chord with the left hand. Auto-arpeggio is connected to the automatic rhythm system and thus ensures that the tempo of the arpeggio is in time with the rhythm of the piece of music played. If a chord of C major is played with the left hand, a C pedal is depressed and the automatic rhythm is selected to the Rumba rhythm, the following musical effect is created:-

- 1) Alternating pedal bass notes from C to G.
- 2) Left hand chord of C rhythmically playing.
- 3) Auto-arpeggio sounding the C chord in time with the rhythm rolling the chord over a range of two octaves, up or up-down.

It will be seen therefore that the combination of the rhythm auto-features enhance the sound and enjoyment of your playing.

The auto-arpeggio feature is a very versatile one and to explain its function please note the following operations:-

Auto-Arpeggio volume

Increase volume by moving the control to the right. Note: this control only effects the volume of the arpeggio, but is effected by the main organ volume control and expression pedal.

Auto Arpeggio tone-colour push button <ARP I>

This is a push on, push off control and when in the on position creates a soft harplike sound.

Auto-Arpeggio tone-colour push button <ARP II>

Also a push on, push off control and when in the on position produces a harder string sound.

Auto-Arpeggio <UP/UP-DOWN>

This control allows the player to set the arpeggio to either ascend the chord (↗↗↗) or ascend and descend (↗↗↗↘). Because the auto-arpeggio is linked to the automatic-rhythm unit the raising of the left hand from the keyboard will not adversely effect the function of the auto-arpeggio feature. When the hand is placed again on the lower keyboard the arpeggio will continue to function in the correct order of notes.

Auto-Arpeggio <SLOW/FAST>

This control is a push fast, push slow control and can be selected to suit the tune being played. The effect is as follows:- If for example, the control is set to the fast speed and the organ is being played, the effect created is that the arpeggio will run at 16 beats to the bar (when the rhythm is set to a 2/4 or 4/4 tempo) but when switched to the slow speed the arpeggio will run at half the fast speed i.e. 8 beats to the bar. When playing rhythm in 3 or 6 beats to the bar the arpeggio will sound respectively 12 and 6 beats to the bar.

These tone-color switches and effect switches can be used individually when needed according to the tune, and can also be freely selected for use in combination with each other, thus producing wonderfully abundant variations of the dispersed chord effect. Note that the arpeggio sound cannot be produced unless one of the "Auto Arpeggio" tone color buttons, <ARP I> or <ARP II>, is on and the rhythm is performed by touch start or synchro start.

In addition, the same "height" of "Auto Arpeggio" can be obtained no matter which sound area of the lower keyboard is played. When, for example, *so . . . do . . . mi* (G—C—E) are played from the left, the initial sound begins with *do*, becoming *do-mi-so*, *do-mi-so . . .*

Next, we would like to show the types of variations of the rhythm of waltz and slow rock, and rhythms other than these two, which can be produced by using the up/up-down switch and the slow/fast switch in combination when *do-mi-so* (C—E—G) of the lower keyboard are played.

When the *do-mi-so* (C—E—G) keys are played (bossa nova, cha-cha, rumba, swing, fox-trot).

UP	(■)	
SLOW	(■)	
UP	(■)	
FAST	(■)	
UP-DOWN	(■)	
SLOW	(■)	
UP-DOWN	(■)	
FAST	(■)	

When the *do-mi-so* (C – E – G) keys are played (waltz).

UP	(■)	
SLOW	(■)	
UP	(■)	
FAST	(■)	
UP-DOWN	(■)	
SLOW	(■)	
UP-DOWN	(■)	
FAST	(■)	

For slow rock, the variation of sounds is the same as scored above, but it is in 4/4 time and consists of triplet or sextuplet. In other words, two measures become one.

Shown below is one example of the use "Auto Arpeggio." This is, however, simply one typical example; using it as a reference, we urge you to discover many others and enjoy your performances much more.

(Auto Arpeggio)	(Auto-Play-Chord)	(Automatic Rhythm)
ARP I ON	LOWER : TONE TAB ON	RUMBA ON
UP-DOWN (■)	PIANO ON	
FAST (■)	PEDAL : ON	
VOLUME 7	1 / 1 · 5 ON	

UPPER : FLUTE 16' FLUTE 8'
FLUTE 4'

LOWER : FLUTE

PEDAL : BASS 8'
SUSTAIN On-Short

CHORUS ON

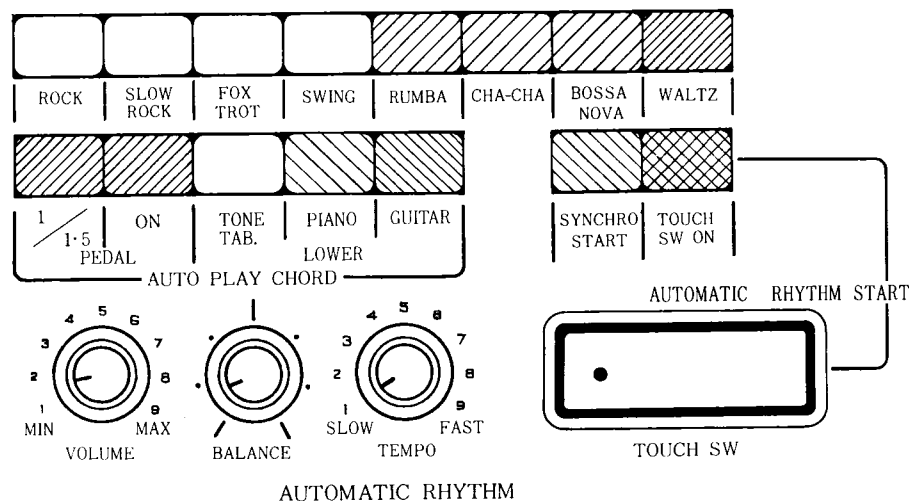
Moderato

MELODY IN F

AUTOMATIC RHYTHM CONTROLS



The automatic rhythm section has three rhythm control knobs, eight rhythm selector buttons, two rhythm start switches, one tempo lamp and touch start switch.



Rhythm Selection Buttons

This rhythm section has eight rhythm selectors. They are Rock, Slow Rock, Fox Trot, Swing, Rumba, Cha Cha, Bosa Nova and Waltz. Select your favorite and push the corresponding button.

This button switch turns on the rhythm when you push it. These are interlocking switches, so that when you push a rhythm selection, the previous rhythm turns off automatically.

If you push two or more rhythm selection buttons at the same time many interesting rhythm patterns can be created.

Rhythm Volume Knob

When the RHYTHM VOLUME knob is turned to the right (Clockwise) the volume of the rhythm increases. Adjust the volume of the rhythm according to the volume of the keyboard sounds.

It should be noted that the main volume and expression pedal of the organ effects the volume of the rhythm.

Rhythm Balance Knob

If the knob is turned clockwise, the percussion instrument sound of the cymbals and the maracas become louder, while the sound of the other percussion instruments is reduced. If the knob is turned counterclockwise, the sound of the claves, the cowbell and the drums become louder and the sound of the cymbals and the maracas decreases. If this knob is turned fully clockwise it can be used as a cancel effect, and in this way various additional rhythms can be created.

Tempo Control Knob

If you turn the TEMPO CONTROL knob clockwise, the tempo of the rhythm increases. Set the tempo of the rhythm to suit the music you are playing.

The Tempo Lamp in the touch start switch is designed to illuminate on the first beat. You can easily preset the tempo by watching the tempo lamp if the synchronous start switch is depressed to the ON position. In this position the tempo lamp indicates a beat interval even though the rhythm is not sounding.

Rhythm Start Switches

There are two starting methods for the rhythm as shown below. In each case the rhythm begins always on the first beat.

SYNCHRONOUS START BUTTON

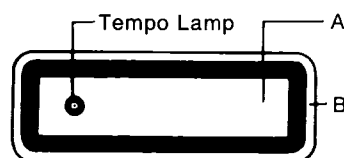
If the SYNCHRONOUS START button is pushed beforehand (in the condition where the button is depressed), the rhythm will start when either the lower manual or the pedal keyboard is played. By using the Touch Start switch, you can stop the rhythm.

If the performance is conducted without using the synchronous start button, this button should be pressed again to set it to the OFF position. The rhythm will stop by pushing this button during a performance.

TOUCH START SWITCH

This TOUCH START switch is especially convenient because on-off control of the rhythm can be quickly accomplished by simply touching it (when the Touch Switch button is set to the ON position). Note that, even when the Synchronous Start button is ON, that the Touch Start switch can be used to control on-off operation.

When using the Touch Start switch, be sure to touch the inside of the switch, part (A) and the outside, part (B), at the same time. Parts (A) and (B) are designed to be touched simultaneously and, if only one part is touched, the start switch will not always operate. Therefore, care should be exercised.



TOUCH SWITCH ON-OFF BUTTON

This button is to prevent mistaken operation of the Touch Start Switch, located on the control panel. When not using the rhythm, it should be set to the OFF position (upper position). When so set, the rhythm cannot be started even if the Touch Start switch is accidentally touched. To use the rhythm, press this button to the lower position and use the touch start switch. The touch start switch can, however, be used to stop the rhythm no matter to which position this button (ON or OFF) is set.

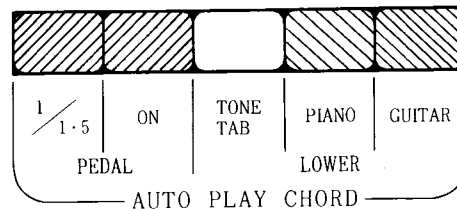
AUTO-PLAY-CHORD CONTROLS



The Auto-Play-Chord is a function which makes the rhythm accompaniment (lower manual and pedal) fully automatic. The organist can play the melody on the upper manual in the normal way and the rhythm accompaniment will be automatically played with a selected rhythm, such as Rumba or Rock, by simply playing an accompanying chord on the lower manual and a bass note on the pedal keyboard. Accordingly, even those who are just beginners can play the organ easily and effectively within a short space of time.

Because this Auto-Play-Chord is connected to the automatic rhythm, if one of the rhythm selection buttons is not pushed, the automatic accompaniment will not be obtained, in another word, only when the automatic rhythm is operating does the Auto-Play-Chord function. When you don't require the percussion instrument tones of the automatic rhythm, turn the 'Rhythm Volume' knob completely counterclockwise (min.) and only the lower manual and pedal tones will play the rhythm. Control the speed with the 'Tempo' knob. The starting function of the Auto-Play-Chord is the same as that for the automatic rhythm.

Also, with this Auto-Play-Chord, automatic accompaniment using only the lower manual, or only the pedal keyboard, or using both the lower manual and the pedal can be obtained. Accordingly, it is very convenient when practicing the lower manual and the pedal keyboard.



Auto-Play-Chord Lower Tone Tab button <TONE TAB>

When this button is pushed and a chord is played on the lower keyboard, automatic performance of the tone color selected among the lower keyboard tone-color tablets are possible. The sound produced is a clear and crisp accompaniment, like the intermittent sounds which are produced when the keyboard is pressed and released when a normal chord accompaniment is played on the lower keyboard. When the lower keyboard tone-color tablet is not being used, be sure to push this button once again to the "off" position. Note that, when the piano or guitar button is used, the sustained sound of a lower keyboard tone-color tablet which is pushed will be superimposed as it is produced, which is very convenient.

Auto-Play-Chord piano button <PIANO>

By pushing this button and playing a chord on the lower keyboard, an automatic accompaniment can be produced which has the tone color effect of a muted piano. When this button is not being used, be sure to push it to the "off" position. Note that all lower keyboard tablets should be "off" when this button is used only for piano tone color.

Auto-Play-Chord guitar button <GUITAR>

By pushing this button and playing a chord on the lower keyboard, an automatic accompaniment can be produced which has the tone color effect of a muted guitar. When this button is not being used, be sure to push it to the "off" position. Note that all lower keyboard tablets should be "off" when this button is used only for guitar tone color.

These three Auto-Play-Chord lower keyboard tone-color effect buttons can be used both individually when needed as well as used in combination with each other. By using these tone color effect buttons frequently, a richer sound variation can be produced, and a wider range of variable tone color combinations will become possible. Note that the lower keyboard will convert to the Auto-Play-Chord mode whenever any one of these three buttons is depressed, and that the Auto-Play-Chord mode will be discontinued when all three are "off".

Auto-Play-Chord Pedal On-Off Button

Push this button to the ON position (lower position), push the root note of the chord, which is played on the lower manual (C, if the chord is C, E, and G), on the pedal keyboard, and the bass sound at the selected rhythm will be automatically obtained.

When not using this feature, be sure to set the button to the OFF position (upper position)

Auto-Play-Chord Pedal 1/1•5 Button

Alternating bass notes can be accomplished by pressing just one pedal key when this button is set to the "1•5" position (lower position) the musical effect created is the root and fifth (G tone when the C key is pressed) and when played automatically will alternate between these two notes without moving the foot from the root pedal key.

This effect is applicable to "Fox Trot", "Rumba", "Cha-Cha" and "Waltz". It does not operate on other rhythms, although by selecting a combination of two or more rhythm patterns many interesting chord and bass effects can be created. When selecting the button "1" (upper position) only the root bass note is sounded.

When you select the Rumba rhythm for example with the Auto-Play-Chord, the sound from the lower manual and pedal is as follows:

The diagram shows two musical staves in 4/4 time. The upper staff, labeled "Lower Manual Sound", contains a sequence of notes: a quarter rest, a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, and a quarter note. The lower staff, labeled "Pedal Sound", contains a sequence of notes: a quarter note, a quarter rest, a quarter note, a quarter rest, a quarter note, a quarter rest, and a quarter note. This illustrates the alternating bass notes between the root and fifth.

The accompaniment is repeated according to the following rhythm pattern, when another rhythm is selected, by the same method.

[Rock]

Musical notation for Rock rhythm in 4/4 time, showing a sequence of notes: a quarter rest, a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, and a quarter note.

[Slow Rock]

Musical notation for Slow Rock rhythm in 4/4 time, showing a sequence of notes with triplets: a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, and a quarter note.

[Fox Trot]

Musical notation for Fox Trot rhythm in 4/4 time, showing a sequence of notes: a quarter rest, a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, and a quarter note.

[Swing]

Musical notation for Swing rhythm in 4/4 time, showing a sequence of notes: a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, and a quarter note.

[Rumba]

Musical notation for Rumba rhythm in 4/4 time, showing a sequence of notes: a quarter rest, a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, and a quarter note.

[Cha-Cha]

Musical notation for Cha-Cha rhythm in 4/4 time, showing a sequence of notes: a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, and a quarter note.

[Bossa Nova]

Musical notation for Bossa Nova rhythm in 4/4 time, showing a sequence of notes: a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, a quarter note, and a quarter note.

[Waltz]

Musical notation for Waltz rhythm in 3/4 time, showing a sequence of notes: a quarter rest, a quarter note, a quarter note, and a quarter note.

SOME TYPICAL REGISTRATIONS



Here are some examples of registrations which will help you find effective tones to enhance your performance. These registrations are only typical ones. You will be able to find many attractive variations apart from the examples, shown below.

Flute

AU CLAIR DE LUNE

Upper : FLUTE 8'	CHORUS On			
Lower : HORN				
Pedal : BASS 8'				

Andantino con grazia

Oboe

SCENE (The Swan Lake, ballet suite)

Upper : OBOE 8'	CHORUS On. VIB. On			
Lower : CELLO				
Pedal : BASS 8' SUSTAIN On-Short				

Moderato ed espressivo

Violin

ZIGEUNERWEISEN

Upper : STRING 8'	CHORUS On. VIB. On			
Lower : FLUTE				
Pedal : BASS 8' SUSTAIN On-Long				

Lento

Cello

Upper : FLUTE 8'	MULTI-TREMOLO On
Lower : CELLO	SUSTAIN On, VIB. On
Pedal : BASS 8'	
SUSTAIN On-Long	

GREEN SLEEVES

Andante con moto

Mandolin

Upper : MANDOLIN	CHORUS On
Lower : DIAPASON	
Pedal : BASS 8'	
SUSTAIN On-Long	

SANTA LUCIA

Andantino

Sleigh Bells

Upper : DIAPASON 8' OBOE 8'	VIB. On-Fast
Lower : FLUTE	SUSTAIN On
Pedal :	

TROIKA

Allegro

Light Music Tone

Upper : FLUTE 16', FLUTE 8'	MULTI-TREMOLO On-Heavy
FLUTE 2 2/3'	PERCUSSIVE 2 2/3' Full-Long
Lower : FLUTE, HORN	
Pedal : BASS GUITAR, BASS 16'	
SUSTAIN On-Long	

WHEN THE SAINTS GO MARCHING IN

Brightly
No Chord

OTHER CONTROLS



Sustain On-Off Knee Lever

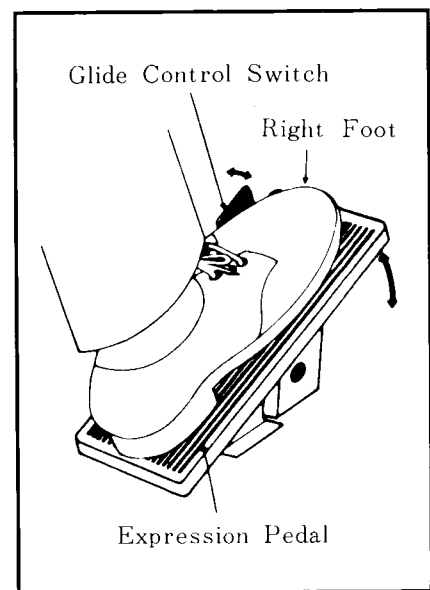
The knee-operated SUSTAIN KNEE lever is released by moving the control downward and to the right. You will find this feature extremely useful to bring in a sustain effect quickly and without the need to remove your hands from the keyboards. The Knee Lever works independently of the sustain tad, and therefore can be operated at will to bring in or cut out sustain as you wish.

Glide Control Switch

Used wisely, the Glide can be a wonderful asset to the sound quality of your playing, Very effective Hawaiian guitar sounds may be reproduced by using the glide to "bend" the melody line. In addition, the gliding sound is a feature used fairly frequently by trombone sections, violinists and a host of other instrumentalists. The important point to remember about the glide is to use it for effect, which means only when you feel the type of tune that you are playing can be enhanced by using the Glide Control.

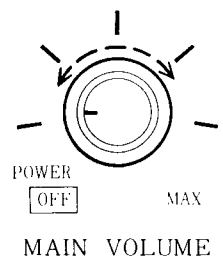
Expression Pedal

The volume pedal operated by the right foot is above all, what the feature implies, i.e., an expression control. In other words, it is there to enable the player to express a feeling for the music by controlling the volume of the organ. Remember not to beat time with your right foot on the Expression Pedal because to do so will have a detrimental effect on your performance.

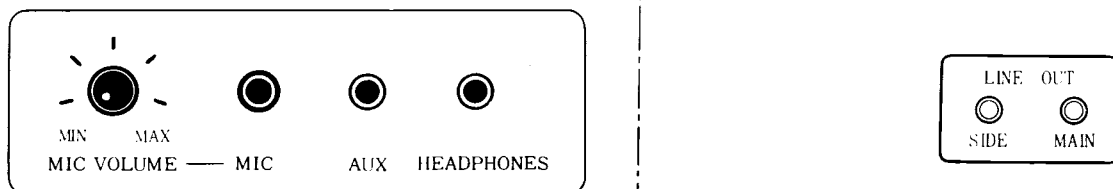


Power Switch & Volume Control Knob

You will have found that, by turning the knob to the right, the organ is switched on and, by continuing to turn the control, the volume of the organ increases. It was mentioned earlier that the expression pedal also acts as a volume control. However, the main purpose of the Main volume control is to allow you to preset the maximum volume of the organ to suit the room in which the organ is being played, or the conditions under which the organ is used. The advantage of this control is that it enables the player to control the maximum volume desired, but yet still allowing him to use the expression pedal effectively. After playing the organ, the Volume Control is turned counterclockwise to a position at which the power is switched off.



OTHER FACILITIES



(Under the Right side of the Keyboard)

Headphones Jack

All National organs have a facility for using headphones for silent practice. When plugged in, the organ speaker system is automatically cut off: the only sound heard in these conditions is through the headphones.

Because this organ is a stereophonic organ, it is essential that only stereophonic headphones be used. You can hear the Multi-Tremolo effect through the headphones.

Output Terminals (MAIN, SIDE) <LINE OUT>

The organ is designed to enable the player to use it most successfully for professional work if required. By plugging into a high-power stereophonic amplifier via the Output Terminals, the complete organ sound, including microphone and auxiliary instruments, can be reproduced at a very high volume level. In addition, you can channel the sound of the organ into your Hi-Fi, Stereo or Quadraphonic system for home use to very good effect. Furthermore, the sound of this organ can be tape recorded most successfully by using this method of connection. The output terminals are located under the right side of the keyboard (output level 360mV 600 Ω).

Input Terminal <AUX>

If the organ is to be used for professional purposes or in conjunction with other electronic equipment, the Auxiliary Input Terminal will be a useful advantage. Among the many items which can be connected to this are Tape/Disc pre-amps, portable synthesizers and electric guitars. It is suggested that bass guitars not be used.

Because the input impedances of some guitars vary, better results may be achieved by plugging into the microphone terminal (input level 25mV, 20k Ω).

Microphone Terminal <MIC.>

The input impedance of this Terminal is 20k ohms at 5mV and is therefore ideal for use with dynamic microphones of the uni-directional type. There is a volume control included at the microphone terminal in order to balance the voice with organ volume. Increase the volume of the microphone by turning the control to the right (clockwise).

MAINTENANCE & SPECIFICATIONS



Maintenance

The National Organ is a very high quality product and built to a standard to ensure good performance, long life and reliability. Nevertheless, even the finest merchandise requires service occasionally. In the unlikely event of failure, please insist, when contacting your National Organ Dealer, that genuine National replacement parts are used in order to satisfy yourself that your instrument will continue to give you many years of trouble-free pleasure.

However, the following do's and don't's will assist you in keeping the organ in top condition:

- Be sure to switch the instrument off after use, and do not switch the organ on and off in quick succession, as this places an undue load on the electronic components.
- Do not, under any circumstances, remove the back from the organ and tamper with the electronic circuitry. If a fault does develop, switch the organ off, unplug it from the electrical outlet and contact your nearest National Organ Dealer. To assist your Dealer, please explain the nature of the fault.
- To keep the lustre of the keys and tabs, simply use a damp cloth to clean and finish with a soft duster. Polish may be used but do not use thinners or petrol chemical based polishes.
- The cabinet may be polished with a wax polish, although you will find that a rub with a soft cloth will normally suffice.

Specifications

Keyboards:	Upper Manual	44 keys	f-c	(3 $\frac{1}{2}$ ' octaves)
	Lower Manual	44 keys	F-c	(3 $\frac{1}{2}$ ' octaves)
	Pedal Keyboard	13 keys	C-c	(1 octave)
Tones:	Upper Manual..... Flute 16', Clarinet 16', Flute 8', Diapason 8', oboe 8', String 8', Flute 4', String 4', Flute 2 $\frac{2}{3}$ ', Mandolin			
	Pre-Set SoundAccordion, Wah Trumpet, Piano, Harpsichord, Vibraphone, Cancel			
	Lower Manual.....Flute , Diapason , Horn , Cello			
	Pedal.....Bass 16', Bass 8', Bass Guitar,			
Effects:	Multi-Tremolo (On-Off, Light-Heavy, Slow-Fast), Chorus, Vibrato, Percussive Tone (4', 2 $\frac{2}{3}$ ', Normal-Full, Short-Long), Pedal Sustain (On-Off, Short-Long), Upper Sustain (On-Off, Length), Manual Balance, Reverberation, Reverberation Select, Brilliance, Pedal Volume, Glide Control,			
Automatic Rhythm:	Rhythm Selectors.....Rock, Slow Rock, Fox Trot, Swing, Rumba, Cha-Cha, Bossa Nova, Waltz, Rhythm Volume, Rhythm Balance, Tempo, Synchronous Start, Touch Start, Touch Switch On-Off, Tempo Lamp.			
Auto-Play-Chord	Auto-Play-Chord Lower (Tone Tab. Piano, Guitar) Auto-Play-Chord Pedal (1/1 •5, ON)			
Auto Arpeggio	Pattern (up/up-Down), Tempo (Slow/Fast), Tone (Arpeggio I, Arpeggio II), Volume			
Others:	Power Switch & Volume Control, Expression Pedal, Headphone Jack, Input jack Microphone Terminal (with Volume), Output Terminals (Main, Side), Pilot Lamp, Sustain Knee Lever			
Output:	50W (Peak power)			
Speakers:	25cm (10") x 1, 20cm (8") x 2, 8cm (3") x 1			
L.S.I.:	1			
IC's:	25	Transistors:	418 (FET 11)	
Diodes:	238	Power Requirement:	80W AC 100/120/220/240V 50-60 Hz	
Cabinet:	Simulated Rosewood: 114cm (45.1") (W) x 94cm (37.2") (H) x 59cm (23.3") (D)			
Net Weight:	76 kg. (166 lbs.)			



Matsushita Electric Trading Co., Ltd.

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