

YAMAHA

Macrotoning



DIGITAL PROGRAMMABLE ALGORITHM SYNTHESIZER

SUPPLEMENTAL BOOKLET

Welcome

This booklet presents the concepts and several examples of a process called macro-tuning, and reviews the process by which tunings are saved. This is a rather unusual and very interesting application of the microtuning capability of the DX7 II. The booklet is divided into two sections.

Section 1 provides an introduction to the concept of macro-tuning.

Section 2 outlines some of the basic applications of macro-tuning and includes an example of each.

For continuing information concerning the DX7 II FD/D, consult AfterTouch, the official publication of the Yamaha Users Group. Many advanced functions will be discussed in its pages in the coming months. There will also be information regarding the availability of other materials concerning more advanced applications. To receive a free copy of AfterTouch every month, send your request to AfterTouch, P.O. Box 7938, Northridge, CA 91327-7938. On your letter or postcard, be sure to indicate that you are the owner of a DX7 II FD/D.

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Introduction

Macrotuning is the process whereby the keys on the DX7 II keyboard are reassigned to entirely different notes. Unlike microtuning, macrotuning generally retains twelve tone equal temperament as its basic scale. However, the microtuning editor is used in the normal manner to implement macrotunings. This section presents the basic concept of macrotuning and reviews the use of the microtuning editor.

Basic Concept

The basic concept behind macro tuning is actually quite simple. The keys on the keyboard are reassigned to different notes in the twelve tone equal tempered scale. This provides unexpected and useful results as the keys are played. For example, you could reassign the keys C3, D3, and E3 on the keyboard to produce the notes C3, E3, and G3 respectively. The first three keys in the C major scale would thus produce a C major triad.

Macro tuning can be used in a variety of musical situations. Difficult passages and chords can be rendered trivial to play by reassigning the notes in question to easily played keys. New compositional and playing techniques can be devised. These and other applications of macro tuning are described in the next section of this booklet.

Microtuning Editor

Editing Tuning Data

The microtuning editor is used to create macro tunings on the DX7 II. Its use in this regard is identical to the process by which microtunings are created. The procedures for using the microtuning editor are described below.

The Equal Temperament preset microtuning is normally edited to create new macro tunings. The tuning data is edited in the following manner.

1. Press the PERFORMANCE button.
2. Select a patch with which to play various notes and intervals while modifying the equal temperament preset. The Grand Harpsichord performance patch (ROM Cartridge Bank 1 #18) works well.
3. Press the EDIT button.
4. Press the MICRO TUNE button (#29) to access the Control Mode LCD display. Depending on what you have done before entering this mode, you may need to press the MICRO TUNE button a number of times until the words "Micro tuning" appear in the LCD display.
5. Use the +1/-1 buttons or the data entry slider to select the Equal Temperament preset.
6. Position the cursor using the cursor keys and make sure that the A and B parameters are ON using the +1/-1 keys. Otherwise, editing will have no effect.
7. Press the TUNE button (#14) to access the Edit mode LCD display. Depending on what you have done before entering this mode, you may need to press the TUNE button a number of times until the words "Micro tuning" appear in the LCD display.

8. The note (and consequently, the key on the keyboard) available for editing is displayed in the >>>>> <<<<< section of the display. The notes immediately above and below the selected note are displayed to the right and left respectively. The note selected for editing is displayed with its coarse and fine tuning parameter values and the absolute number of tuning units which represent the note. These values will be explained shortly.
9. There are two ways to select a note for editing.
 - a. Use the INTERNAL and CARTRIDGE buttons as left and right cursor controls to select adjacent notes for editing.
 - b. Hold the key corresponding to the note you wish to edit and press either the INTERNAL or CARTRIDGE key. The note you held will be displayed in the >>>>> <<<<< section of the display.
10. Use the cursor keys to select the coarse or fine tuning parameter.
11. Use the data entry slider or the +1/-1 buttons to adjust the coarse or fine tuning parameters to the desired value.

Coarse Tuning

The coarse tuning parameter allows you to assign any note in the equal tempered chromatic scale to the selected key on the keyboard. You could go so far as to assign all the keys on the DX7 II to the same note!

In more practical applications, the coarse tuning parameter provides the ability to reassign the keys to play different notes. For example, the C3 key can be assigned to play C2, G5, or any other note in the range of the DX7 II.

The coarse tuning parameter is controlled by using the cursor keys to position the cursor next to the word "Coarse." The +1/-1 keys are used to specify the equal tempered pitch assigned to the key you wish to edit. Try changing the coarse tuning parameter while playing the note on the keyboard after each unit is added. You will hear the pitch played by that key change by equal semitones.

Fine Tuning

The fine tuning parameter provides highly accurate control over the frequency of each note. It allows the addition or subtraction of one tuning unit from the number representing the note being edited. This tuning unit, which represents a very small frequency increment, will be discussed in depth shortly.

The fine tuning parameter is primarily used in macrotuning to shift the pitch of all notes in an octave by the same amount. It is controlled by using the cursor keys to position the cursor next to the word "Fine." The +1/-1 keys are used to add or subtract one tuning unit from the absolute number of tuning units representing the note you wish to edit.

Try playing a note, releasing it, adding one tuning unit to the TU value, and playing the note again. Repeat this procedure several times. Can you hear a difference in pitch as each tuning unit is added to the note? The ability to perceive such small changes in pitch varies from person to person. It also depends on the range in which the edited pitch is found. The perception of small changes in pitch is more difficult for low notes than it is for high notes. This concept is discussed in the Supplemental Booklet entitled "The Psychoacoustics of Microtuning."

Tuning Units

The DX7 II divides the octave into 1024 fine tuning units (abbreviated TU). As you may have read in the microtuning series of Supplemental Booklets, there are 1200 cents per octave (or 100 cents per equal tempered semitone). This means that each TU represents 1.17 cents ($1200 \div 1024 = 1.17$).

Any coarse tuning parameter value can be adjusted by as much as ± 42 TU. This means that an equal tempered semitone is equal to 85 TU (including the +0 fine tune value). To put it precisely, $85 \text{ TU} = 99.61 \text{ cents}$. The fact that TU do not correspond exactly with cents means that four of the equal tempered semitones must be assigned 86 TU in order to maintain perfect octaves. The C#, E, G, and A# coarse tune parameters can therefore be adjusted by as much as + 42/- 43 TU.

As you can see in the Edit mode LCD display, each note in the DX7 II is represented by an absolute number of tuning units. This number appears in parentheses next to the fine tuning parameter value. The corresponding absolute number of tuning units also appears under the notes adjacent to the note selected for editing. The range of values for these tuning units is 0 (C-2, 13.75 Hz) to 10794 (one quarter tone higher than G8, 12515.56 Hz).

Saving Tuning Data

Once you have created a macro tuning, you will probably wish to save it for future use or modification. Tunings can be saved in the internal memory, a RAM cartridge, or on floppy disk (in the case of the DX7 II ^{FD}).

Internal Memory

The internal memory has two locations in which your tunings may be saved. These locations are called User 1 and User 2. The procedure for storing a tuning in one of these locations is outlined below.

1. Since you are already in Edit mode, the tuning data is probably displayed in the LCD.
2. Press the TUNE button (#14) several times until the Master tuning/Memory protect display appears.
3. Move the cursor to the INT Memory protect parameter and press the -1/NO button to turn the internal memory protection OFF.
4. Press the TUNE button (#14) to display the tuning data again.
5. Press and hold the STORE button. The LCD display will indicate in which part of the memory the data will be stored.
6. Press the INTERNAL button while continuing to hold the STORE button.
7. Press either the 1 or 2 number button to specify the desired user tuning memory location while continuing to hold the STORE button.
8. Press the +1/YES button while continuing to hold the STORE button.

Your tuning data has now been stored in the selected internal memory location.

Cartridge

Up to 63 macro tunings can be stored in a Yamaha RAM4 Data Cartridge. The cartridge must first be formatted to store this type of data. The formatting procedure is outlined below.

Formatting a Cartridge

1. Make sure that the cartridge Memory Protect switch is turned OFF.
2. Press the EDIT button.
3. Press the TUNE button (#14) to access the Master tuning/Memory protect LCD display.

4. Move the cursor to the CRT Memory protect parameter and press the -1/NO button to turn the cartridge memory protection OFF.
5. Press the CARTRIDGE button (#15) several times until the "Micro tuning" display appears.
6. Press the right cursor button (>) to move the cursor to the format parameter.
7. Press the +1/YES button. The message "Are you sure?" will appear in the LCD display.
8. Press the +1/YES button once again to confirm your action.

The cartridge is now formatted to store macrotuning data.

Saving Data on a Cartridge

Each macrotuning that you create is saved in the cartridge individually. The procedure for storing this data is outlined below.

1. Make sure that the cartridge Memory Protect switch is turned OFF.
2. Since you are already in Edit mode, the tuning data is probably displayed in the LCD.
3. Press the TUNE button (#14) several times until the Master tuning/Memory protect display appears.
4. Move the cursor to the CRT Memory protect parameter and press the -1/NO button to turn the cartridge memory protection OFF.
5. Press the TUNE button (#14) to display the tuning data again.
6. Press and hold the STORE button. The LCD display will indicate the part of memory last specified for storage.
7. Press the CARTRIDGE button while continuing to hold the STORE button.
8. Press any of the number buttons (and the 1-32/33-64 button if necessary) to specify the desired cartridge memory location while continuing to hold the STORE button.
9. Press the +1/YES button while continuing to hold the STORE button.

Your macrotuning data has now been stored in the selected cartridge memory location. As you can repeat this procedure for as many as 63 different macrotunings, you may wish to keep a log of their names and numerical locations in the cartridge.

Disk

The DX7 II FD includes a 3.5 inch floppy disk drive which can also be used to store macrotuning data. A disk must first be formatted before it can accept this data. The procedure is outlined below.

Formatting a Disk

1. Press the EDIT button.
2. Press the DISK button (#16) to access the Disk format LCD display.
3. Make sure that the memory protect tab covers the small square hole in the upper right corner of the 3.5 inch disk you intend to use.
4. Insert the 3.5 inch disk into the disk drive slot on the left side of the instrument.
5. Press the +1/YES button. The LCD display will ask "Are you sure?" This will remind you that formatting a disk will erase any data already stored on it.
6. Press the +1/YES button again. The formatting process will take about 70 seconds.

Saving Data on a Disk

As you may recall from the DX7 II Owner's Manual, a formatted floppy disk can be used to save the entire contents of the internal or cartridge memory. The Memory Layout diagram found on page 62 of that manual indicates that tuning data can only be saved on a disk from a cartridge. This is known as a "bulk dump" because all of the tuning data in the cartridge is saved on the disk at once. The procedure for performing a tuning data "bulk dump" from cartridge to disk is outlined below.

1. Press the EDIT button.
2. Press the DISK button (#16) to access the Disk CRT LCD display.
3. Make sure that the memory protect tab covers the small square hole in the upper right corner of the 3.5 inch disk you intend to use.
4. Insert the 3.5 inch disk into the disk drive slot on the left side of the instrument.
5. Press the +1/YES button. Then use the +1/-1 buttons to access a blank file location.
6. Press the right cursor button (>) once.
7. Press and hold the EDIT/CHARACTER button, and type in a name for the file you wish to save on the disk.

8. Press the +1/YES button again. The display will ask "Are you sure?"
9. Press the +1/YES button once again to confirm your action.

Loading Data from a Disk

In order to use or edit macrotunings, they must be located in a cartridge or internal memory. If the macrotunings you wish to use are saved on a disk but not on a cartridge, they must first be transferred to a cartridge. This procedure is outlined below.

1. Insert the cartridge to which the macrotuning data will be loaded. Make sure that the memory protect switch is OFF.
2. Press the EDIT button.
3. Press the TUNE button (#14) to access the Master tuning/Memory protect LCD display.
4. Move the cursor to the CRT Memory protect parameter and press the -1/NO button to turn the cartridge memory protection OFF.
5. Press the DISK button (#16) to access the Disk CRT LCD display.
6. Insert the disk containing the microtuning file you wish to load into the disk drive slot on the left side of the instrument.
7. Press the +1/YES button.
8. Use the +1/-1 buttons to select the file you wish to load.
9. Press the right cursor button (>) twice.
10. Press the +1/YES button. The display will show the format of the RAM cartridge currently in the cartridge port and ask "ok?"
11. Press the +1/YES button again. The display will ask "Are you sure?"
12. Press the +1/YES button once again to confirm your action. The selected file of macrotunings will be loaded into the cartridge from the disk.

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Applications & Examples

Macrotuning can be applied in an almost infinite variety of ways. The effects achieved with macrotuning can be used to render a difficult passage trivial or create new compositional techniques. The application of macrotuning is limited only by your imagination.

This section presents several example applications of macrotuning. Each application is accompanied by an illustration of the DX7 II keyboard and the pitches assigned to each key. Hopefully, these examples will inspire you to create new macrotunings and discover new applications for them.

Reassigning Keys

This is one of the basic techniques of macrotuning. Many of the keys on the keyboard are assigned to notes other than those to which they normally correspond. This allows you to play descending scales with ascending fingering, triads with consecutive keys, and a host of other effects. Most of the examples in this section are based on this technique.

Octave Displacement

In this application, each key plays the expected note, except for the fact that each note is displaced by one or more octaves. An impossibly wide melodic range is easily achieved by playing the keys within one or two octaves. Any inversion is available by playing chords in root position on the keyboard.

This keyboard map is only one of the multitude of possibilities available using this application.

C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#				C# D#			F# G# A#			
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Octave Reversal

Like octave displacement, the keys on the keyboard play the expected notes in this application. In this case, however, the order of the pitch octaves is reversed on the keyboard. Keys C1 to B1 play the notes C5 to B5, keys C2 to B2 play the notes C4 to B4, and so on. The higher pitched octaves are played by the lower keyboard octaves and vice versa. This macrotuning provides some striking effects when familiar music is played on the keyboard.

C# D#		F# G# A#				C# D#		F# G# A#				C# D#		F# G# A#				C# D#		F# G# A#				C# D#		F# G# A#							
5 5		5 5 5				4 4		4 4 4				3 3		3 3 3				2 2		2 2 2				1 1		1 1 1							
C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C					
5	5	5	5	5	5	5	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	1	1	1	1	0

Keyboard Reversal

In this macrotoning, the entire pitch map of the keyboard is reversed. As ascending keys are played on the keyboard, descending pitches are heard. This application also produces some very striking results.

B 5		A 5		F# 5			E 5		D 5		B 4		A 4		F# 4			E 4		D 4		B 3		A 3		F# 3			E 3		D 3		B 2		A 2		F# 2			E 2		D 2		B 1		A 1		F# 1			E 1		D 1				
C 5	A# 5	G# 5	G 5	F 5	D# 5	C# 5	C 4	A# 4	G# 4	G 4	F 4	D# 4	C# 4	C 3	A# 3	G# 3	G 3	F 3	D# 3	C# 3	C 2	A# 2	G# 2	G 2	F 2	D# 2	C# 2	C 1	A# 1	G# 1	G 1	F 1	D# 1	C# 1	C 0																						

Repeating Octaves

By repeating a pitch octave in several keyboard octaves, passages with many notes in the same range can be played more easily. The right and left hands don't get in each other's way. For example, chord clusters with more than six or seven notes are difficult to play on a standard keyboard. With the same notes available in two keyboard octaves, such clusters become easy to play. Simultaneous melodic passages in the same range can also be greatly enhanced if two or more keyboard octaves are assigned to repeating octaves.

In this example, the pitch octaves from C3 to B4 are repeated in the keyboard octaves from C1 to B2.

C# D# 3 3		F# G# A# 3 3 3			C# D# 4 4		F# G# A# 4 4 4			C# D# 3 3		F# G# A# 3 3 3			C# D# 4 4		F# G# A# 4 4 4			C# D# 5 5		F# G# A# 5 5 5													
C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C							
3	3	3	3	3	3	3	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	5	5	5	5	5	5	6

Repeating Octaves with Quarter Tones

This variation of repeating octaves duplicates the two pitch octaves from C3 to B4 in the keyboard octaves from C1 to B2. In addition, the pitches assigned to these two lowest keyboard octaves are tuned upward by a quarter step. This provides a two octave quartertone scale in which consecutive notes appear in different keyboard octaves. This is useful for performing music such as the piano duets by Charles Ives in which each instrument is tuned a quarter step apart.

This example is a modification of the repeating octaves above, raising the lowest two keyboard octaves by a quarter step.

C# D#			F# G# A#			C# D#			F# G# A#			C# D#			F# G# A#			C# D#			F# G# A#											
3	3		3	3	3	4	4		4	4	4	3	3		3	3	3	4	4		4	4	4	5	5		5	5	5			
C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C				
3	3	3	3	3	3	3	4	4	4	4	4	4	4	3	3	3	3	3	3	3	4	4	4	4	4	4	4	5	5	5	5	6

shift these up 1/4 step (+42 TU)

Wilson Mode

This macrotuning was created by Steve Wilson, a music educator at Cabrillo College in Santa Cruz, California. Each keyboard octave is shifted up by a half-step with respect to the preceding one. This allows you to hear polytonal music by playing in a single key on the keyboard. Each keyboard octave plays a different chromatic scale.

C#	D#					F#	G#	A#					D	E					G	A	B					D#	F					G#	A#	C					E	F#					A	B	C#					F	G					A#	C	D				
1	1					1	1	1					2	2					2	2	2					3	3					3	3	3					4	4					4	4	4					5	5					5	5	5				
C	D	E	F	G	A	B	C#	D#	F	F#	G#	A#	C	D	E	F#	G	A	B	C#	D#	F	G	G#	A#	C	D	E	F#	G#	A	B	C#	D#	F																													
1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	6																											

Altered Fingerings

Sequential White/Black Key Tunes

Macro-tuning can be used to modify the fingering and playing technique required for any melodic passage. This is accomplished in two steps. First, determine the desired fingering pattern. In many cases, a major scale works very well. Then, reassign the keys in the selected fingering pattern to the notes of the passage you wish to play. The rhythmic value of each note is, of course, determined by the length of time each key is held down.

By assigning the notes of a song to the white keys, the song can be played with these keys alone. This technique can be used by non-musicians, allowing them to play music by simply running their finger along the white keys.

The example below allows you to hear the melody from “Greensleeves” by playing the white keys sequentially from C1 upward. Think of the tune as you play and hold each key for the duration of its note in the melody. The very last note of the melody can be heard by playing the C1 key again at the end.

[illegible]

Refinger Difficult Passages

Even accomplished musicians sometimes have trouble playing a difficult passage. This technique can also be used to refinger such passages. Choose a comfortable fingering pattern and assign the notes in the passage to the appropriate keys. Any melodic passage can thus be played with ease.

Notes
