



VERSION 1.4 for Mac® osX

REFERENCE MANUAL

EDITION 1

By Tony Roe for GizMIDI

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IMPORTANT

Before you proceed, **make sure you've read the READ ME file** that came with the Harmatrix package. There you will find important information on installing, authorizing and setting up Harmatrix. You will also find the most **recent updates** as well as information about **known issues** and workarounds that you will need to be able to get the most out of Harmatrix.

Every user, including those that are well versed in music theory, **needs to read "BASIC THEORY AND DORIAN ORIGIN"**. This is to make sure that we are on the same page, so to speak, and so you'll **understand Dorian Origin**. Dorian Origin is the naming protocol that is used in Harmatrix and is slightly different than conventional naming. You will **probably become lost** if you don't familiarize yourself with it.

This manual is divided into six separate sections, each with its own table of contents. It is strongly recommended that you go through the sections in the order they are presented as each one builds on the previous ones, e.g. the Scout Manual contains important information on **INTER-APPLICATION MIDI** and the **MIDI SETUP**. The tutorials should help you put every thing together.

You will occasionally see references to **ScaleBlazer**, a standalone harmony calculator, which is available as a free download at the GizMidi website. ScaleBlazer is very similar to Scout, the calculator in Harmatrix. It has some added features for basic music theory references and Dorian Origin conversions.

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GENERAL

When you first open Harmatrix, the only visible window is the small Main Access window. This window has buttons that open all the other windows. In addition to the window buttons, there is the PANIC/RESET button, the SCN (midi scan) button and the Info menu. **The Info menu (? HARMATRIX ?) contains an abbreviated version of the manual for quick reference; refer to it for identification of the Main Access buttons.**

Almost all functions are handled in Harmatrix's windows. There are only a few items in the Main menu bar that are of any use; the rest are grayed out. The most important of these is Overdrive in the Edit menu. The first thing to do when you open Harmatrix is to **enable Overdrive**. This gives priority to the midi functions and is necessary for smooth operation and timing.

Section 1
BASIC THEORY AND DORIAN ORIGIN

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INTRODUCTION

The following is a brief introduction to music theory. Covering the whole subject could easily fill many books and is beyond the scope of these few pages. Hopefully, this short lesson will give you a basic working knowledge of intervals, scales, modes and chords and allow you to get the maximum benefit from Harmatrix.

I realize I went out on a limb using Dorian Origin in the building of Harmatrix and ScaleBlazer, and that it may alienate some of those who are well versed in conventional theory. When creating Dorian Origin, I tried to stay as close as possible to convention, and change only what was necessary to make Harmatrix work smoothly and be easy to use. I also added some features to **ScaleBlazer** to make the transition as painless as possible. Starting with ScaleBlazer is a great way to prime yourself for Harmatrix and it's a free download at the GizMIDI site. It will be referred to occasionally in this text.

The main portion of this text views things in terms of conventional theory. The last section deals with the how and why of Dorian Origin.

Note: Some of you may benefit by going through this, working with Harmatrix or ScaleBlazer for a while and then going through this again. Twice is often the charmer.

SOME IMPORTANT TERMS

These definitions may not make sense to you just yet, but should as you get further on. Refer back to them as necessary.

The **tonic** is the note that a scale starts on and gives the scale its name, e.g. *C* is the tonic of the *C Major* scale. The **root** is the starting point and gives the name of a chord or mode, i.e. *D* is the root of the *D minor* chord and the Dorian mode of the *C Major* scale.

The **starting point of a mode** is often called either the tonic or the root. **For this text, it's referred to as the root.** This is to avoid confusion with the scale tonic and because modes and chords are tightly linked. **A tonic is always the note that the scale takes its name from, whereas a root can be any one of the notes in the scale.** A **tonic chord** is the starting primary chord of a scale. In *C Major* the tonic chord is *C Major* or *C Major 7*. Likewise, the **root chord** of a mode is the starting primary chord of that mode. In the Dorian mode of *C Major* (*D minor*), the root chord is *D minor* or *D minor 7* and the tonic chord is still *C Major*.

A **primary chord** is the chord that represents a note of a scale. Each note of a scale has a primary chord associated with it. It's built using the "pick one skip one" pattern. You start on the note and then go up the scale picking every other note. Example: Key of *C Major*: *C, D, E, F, G, A, B*. Start on *C*, then skip to *E*, then to *G*, then to *B*. This is a *C Major 7*, which is the primary tonic **quadrad (4 note chord)** of the *C Major* scale.

Primary chords can also be referred to by their associated modes i.e. the Dorian chord or the Aeolian chord etc.

Each note of a scale has a **mode** associated with it. If you center your harmonic structure on that note and its associated chord, you are in that note's **mode** of the scale.

INTERVALS

An interval is the spacing between any two notes. In the 12-tone system, the smallest interval is one half step, e.g. *B* to *C*. Two half steps is a whole step, e.g. *C* to *D*. Intervals can be referred to by how many steps they contain. They have also been given a fancier

set of names and some have more than one name. The following is a chart of all the intervals and their names.

Figure 1

HALF STEPS	NAME ONE	NAME TWO	NAME THREE	NAME FOUR
1	b 2 nd	b 9 th	minor 9 th	
2	2 nd	9 th		
3	minor 3 rd	# 9 th		
4	Major 3 rd	b 4 th		
5	perfect 4 th	11 th		
6	# 4 th	# 11 th	b 5 th	
7	perfect 5 th			
8	aug 5 th	# 5 th	b 6 th	b 13 th
9	6 th	13 th	dim 7 th	
10	7 th	minor 7 th	Dom 7 th	
11	Major 7 th			

Abbreviations: aug = augmented, dim = diminished, Dom = Dominant, (b) = flat, (#) = sharp.

Why is one step a 2nd and 7 steps a 5th etc.? The names are derived from seven note scales. The most widely used scales such as the Major, Harmonic and Melodic have seven notes. There are other scales that have only five or six notes but these scales are actually chords that are used as scales. In scales with eight notes, with the exception of the diminished, the eighth note is considered an extra or passing tone. The **Chromatic** scale is all 12 notes of the system.

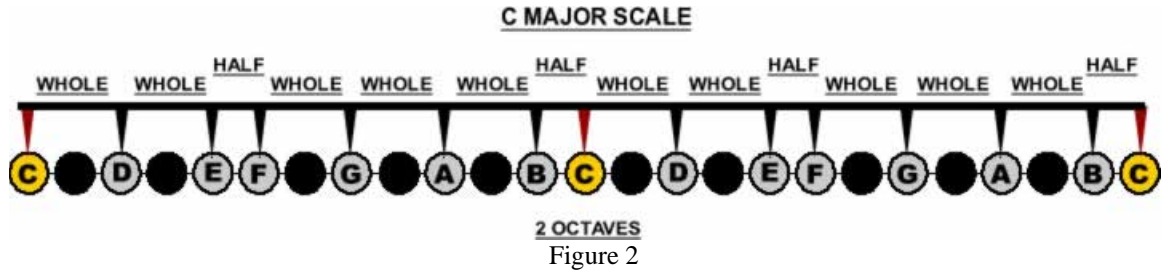
The interval name comes from the position of a note in a seven-note scale. A minor 3rd is the third note of the scale; a Major 7th is the 7th note etc. The names with numbers larger than 7 are used in reference to chords. The higher numbers indicate that the note should be played in a higher octave to spread the chord out and make it sound better.

Even though the interval names are derived from scale note positions, they are used from any starting point. Example: In the key of C, E is the third note of the scale and the interval between C and E is a Major 3rd. If you're on E and go up a minor 3rd, you land on G. G is not the third note in the C Major scale; it's simply a minor 3rd up from E.

SCALES

A scale is a one-octave pattern of intervals that is repeated in all octaves. A scale is also a container, in that the music is generally confined to the notes of the scale, whereas a chord is a portion of the scale notes. When a note is used that is not in the scale it's called an **accidental, grace note or passing tone**. Notes that are within the scale are called **diatonic**. For this lesson we will be dealing with three scales that meet a certain criteria. The scales have seven notes. They have no intervals over a minor 3rd; and no clusters (groups) of more than two consecutive notes, e.g. C, C#, D is a three-note cluster and is no good. There are six scales that meet these criteria. The ones we will be dealing with in this lesson are the Major, Harmonic minor and Melodic minor. The other three are built from the Harmonic and Melodic minors. You'll get to know them later on when you start working with Harmatrix and/or ScaleBlazer.

In figure 2 are two octaves of the *C Major* scale. The black circles represent the sharps and flats as on a piano. Notice the pattern of intervals. In each octave the pattern is two whole steps, one half step, three whole steps and one half step. This is the Major scale interval pattern, “two whole, half, three whole, half”. Say it to your self a few times. The tonic note is the starting point of a scale and gives the scale half of its name. When you combine a tonic note (in this case *C*) with a scale interval pattern (in this case Major), you get the complete scale, *C Major*.



Because notes are repeated in every octave, we can think of them in a circle. Figure 3 shows the same *C Major* scale in a circle with the inner ring showing the interval pattern. The orange triangle is the start point of the Major scale interval pattern and is pointing at the tonic; *C*. The outer ring indicates the direction when moving up through the scale. The red triangle will be explained shortly. By rotating the Interval Ring we can move (transpose) the scale to any other tonic note.

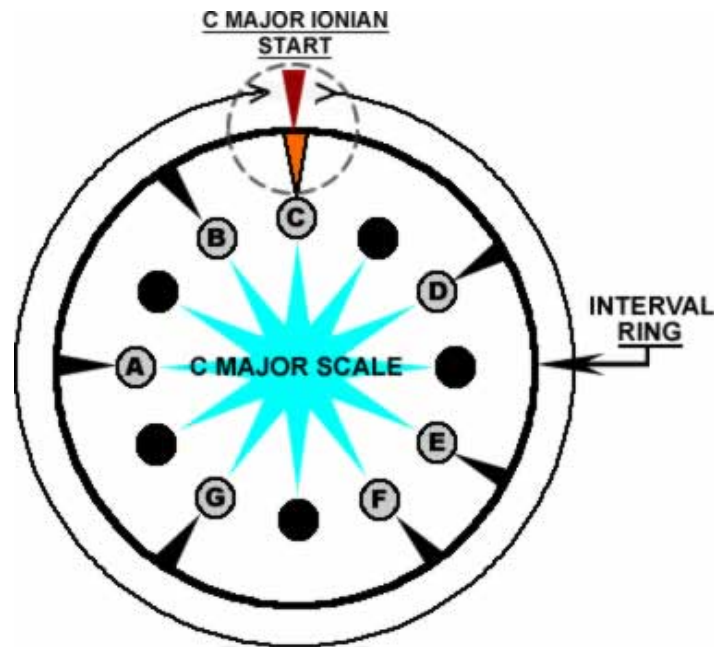


Figure 4 shows the Interval Ring rotated so that the tonic is *D*, giving us the *D Major* scale. Moving the pattern gives us a new set of notes. Some of the notes are the same as in the *C Major* scale and some are different. There's now a *C#* and *F#* instead of *C* and *F*.

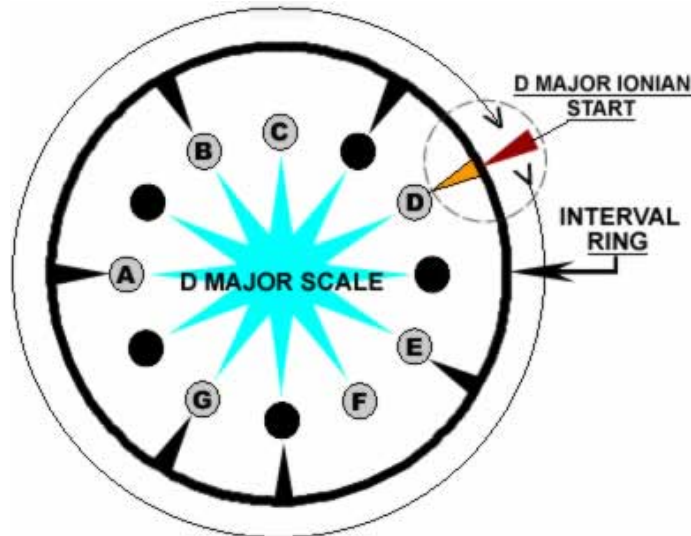


Figure 4

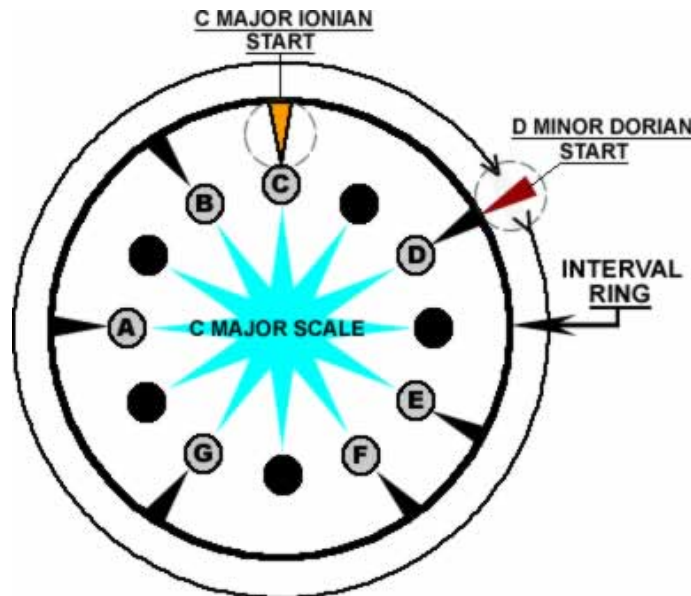


Figure 5

MODES

In figure 5 we rotate the Interval Ring back to the *C Major* scale but we left the red pointer on *D*. This puts us in the Dorian mode of *C Major*. The red pointer indicates the mode root (modal start position). The tonic triangle is still on *C* and all the notes are in the *C Major* scale. All that's done to change the mode is to select a different starting point.

Figure 6 shows all the modes of the *C Major* scale. By rotating the ring you can select any Major scale and all its respective modes.

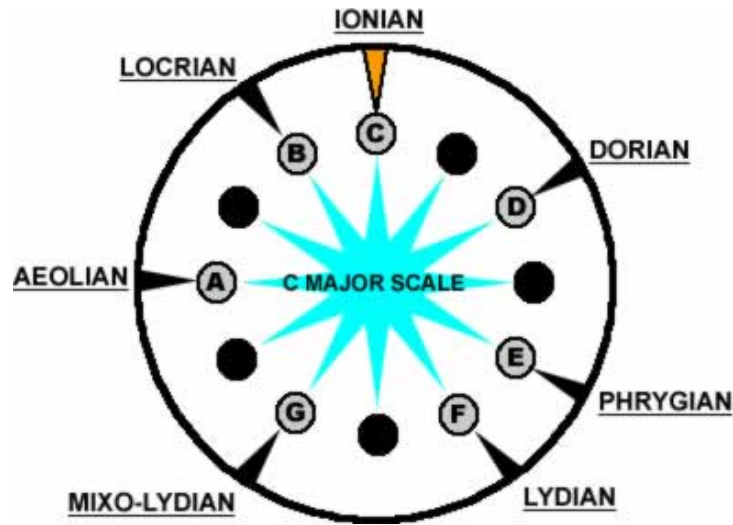


Figure 6

STARTING POINT ?

The starting point or mode origin, is the note and associated chord that the music is based around. The music doesn't necessarily have to start on that note or chord. Here are some examples of chord progressions.

C Maj: F Maj: C Maj: G 7: F Maj: C Maj. This is the common 1, 4, 1, 5, 4, 1 (I, IV, I, V, IV, I) progression, often called the 1, 4, 5. *C* is the first chord of the scale; *F* is the fourth and *G* is the fifth. It starts and ends on *C* and, when you hear it it's obvious that the *C Major* chord is home base. This would be an Ionian progression in the key of *C Major*.

Another Ionian progression in *C* is: *F Maj: C Maj: F Maj: C Maj: G 7: C Maj.* It starts on *F* but when you listen to it, the home chord is still *C*.

Here's a Dorian progression. *D min: G7: D min: A min: G7: D min.* This progression is in the key of *C Major* but it is based in *D minor*. Notice the similarity between it and the first progression. It follows the same 1, 4, 1, 5, 4, 1 pattern from a Dorian viewpoint although, technically it's a 2, 5, 2, 6, 5, 2 progression. **Chord numbering stays with the scale not the mode.**

Each mode has a chord and chord number associated with it. Below is a chart of the modes, chords and chord numbers of the Major scale. These chords are **the primary quadrads** (4 note chords) of the Major scale and will be explained later.

MODE	Ionian	Dorian	Phrygian	Lydian	Mixo-lydian	Aeolian	Locrian
CHORD	Maj7	min7	min7	Maj7	Dom7	min7	min7b5
NUM	1 (I)	2 (II)	3 (III)	4 (IV)	5 (V)	6 (VI)	7 (VII)

Figure 7

MODAL CONFUSION

Many people have a hard time with modes. Often the difficulty comes from thinking of modal as a melodic quality, when in fact it's a harmonic quality. In order for a melody to take on a modal quality, it must have a harmonic foundation to work from. You can solo (play single notes) in any position of a scale and, unless you actually spell out chords (arpeggiate) with the melody, there will be no modal quality to the music. As soon as you add a backing harmony, i.e. bass or chord, the mode will become apparent. The scale and the chord, not the position of the melody, determine the mode. If you play a melody in *C Major* over a **predominating** *C Major* chord, no matter what starting point or position you use, the music will be in the Ionian mode. If you change the predominant chord to *E minor*, then you will be in the Phrygian mode. *Note: this same principle will also work over a single note or arpeggiated bass-line.* This is easy to demonstrate. Take a simple melody like "Mary had a Little Lamb" and play it in the key of *C Major* over a *C Major* chord. What you hear will be distinctly Ionian. Change the chord to *D minor*, *E minor*, *F Major* etc. and you will hear the mode change even though the melody is the same.

In order to change the mode with the melody, you have to **modulate** (change key). If you are playing in *C Major* over a *C* base (Ionian mode), and you want to shift to the Lydian mode over the same *C* base, you have to move to the key of *G Major*. *C* is the IV (Lydian) chord/mode of *G Major*.

Modes are really very simple once you understand the basic concept. The trick is, not to make them more complicated than they really are. I hope I haven't done that for you.

CHORDS

Any combination of three to six notes is a chord. Scout and ScaleBlazer have every one of them. Combinations of seven or more notes can be used as chords but are considered scales. For this lesson we will focus on two chord types, the primary triad (3 notes) and the primary quadrad (4 notes). A primary chord is the representative chord for a mode/note of the scale it's in.

THE PRIMARY TRIAD

To build a primary triad, you first need a scale. We'll use *C Major* again. You then need a root. Again we'll use *C*. From *C* (1) you go up two scale tones to *E* (3) and then two more to *G* (5). This is the *C Major* triad. It is made up of two intervals, a Major 3rd (*C* to *E*) and a minor 3rd (*E* to *G*). All primary triads are 1-3-5 and are built using the "pick one skip one" method*¹.

Now let's start on *D*. From *D* (1) go up two to *F* (3) and then two more to *A* (5). This is the *D minor* triad. It has the same two intervals as the *C Major* but in reverse order; minor 3rd (*D* to *F*) and Major 3rd (*F* to *A*).

Now let's start on *B*. From *B* (1) go up two to *D* (3), then two more to *F* (5). This is the *B diminished* (minor b5) triad. Both intervals in the diminished triad are a minor 3rd.

These are the three primary triad types of the Major scale. The Ionian, Lydian and Mixolydian have Major triads; the Dorian, Phrygian and Aeolian have minor triads; and the Locrian has the diminished triad.

*¹This rule has exceptions in some of the more complex or abstract scales in which the interval configuration doesn't allow for a 1-3-5 or the "pick one skip one" method, in certain positions.

To some it may seem as if I left one out. There is another triad that is almost primary. The Lydian (IV) chord has a #4 (#11) which is also a b5 (see figure 1). Using the #4 in place of the 5th gives us a Maj b5 triad built with a Maj 3rd and a 2nd. While this is a 1, 3, 5 triad, it is not built with the *pick one skip one* method, and therefore not primary but secondary.

THE PRIMARY QUADRAD

The primary quadrad is built off the triad by adding one more note, the 7th. In the Major scale, there are four primary quadrads. Figure 8 shows them and the intervals that make them. Refer back to figure 7 to see the associated modes. Note the minor 7b5 quadrad. We took a diminished triad (two minor 3rds) and added a Major 3rd interval to the end, making it a half-diminished quadrad. If we had added a minor 3rd interval to it, we would have the full-diminished quadrad, which you'll find in the Harmonic minor scale coming up.

QUADRAD	MAJOR 7	DOMINANT 7	MINOR 7	MINOR 7 b5 1/2 DIMINISHED
INTERVALS	Maj3, min3, Maj3	Maj3, min3, min3	min3, Maj3, min3	min3, min3, Maj3

Figure 8

EXTENDED CHORDS

In figure 1, you were shown intervals with the numbers 9, 11 and 13. Now we'll see what that is all about.

A primary quadrad uses four notes out of the scale (1, 3, 5 and 7), leaving three more (2, 4 and 6). If we continue with the same procedure we used to build the quadrad, we go up two from 7 to 9, two more to 11 and two more to 13. The 9, 11 and 13 are the same as the 2, 4, and 6, only one octave up. When dealing with chords, one usually wants to spread them out, as mentioned before. This is why we have two octaves to work with instead of one when referring to scales. We don't need to worry about any of the other numbers in the second octave, as they are repeats of the notes already in the quadrad. The 8, 10, 12 and 14 are the root, 3, 5 and 7, all up an octave. The only time you'll see the 2, 4 or 6 in a chord name, is when one or more of the primary notes is/are missing. Some examples: the suspended 4 chord, where the 3rd is replaced with the 4th: the suspended 2 chord, where the 3rd is replaced by the 2nd: the minor 6 chord, where the 7th is replaced by the 6th.

When you play a chord with all its extensions, you are in essence playing the entire scale as a chord. That means that all the primary chords of a scale fully extended are essentially the same. The only difference is that they are viewed from a different starting point or root. A *C Major 7 9 11 13* is the same chord as a *G 7 9 11 13*. The *C* is the Ionian mode of the *C Major* scale and the *G* is the Mixolydian. In ScaleBlazer's CHARTS window are three pull-down menus that show all the mode/primary chord extensions for the Major (Base^{*1}), Harmonic (Darmonic*1) minor and Melodic minor scales.

Point to remember: Primary triads, quadrads and full chord extensions, are built in 3rds^{*2}. Each fully extended chord in a scale is unique to its position in the scale and

^{*1} Dorian Origin Name, explained later.

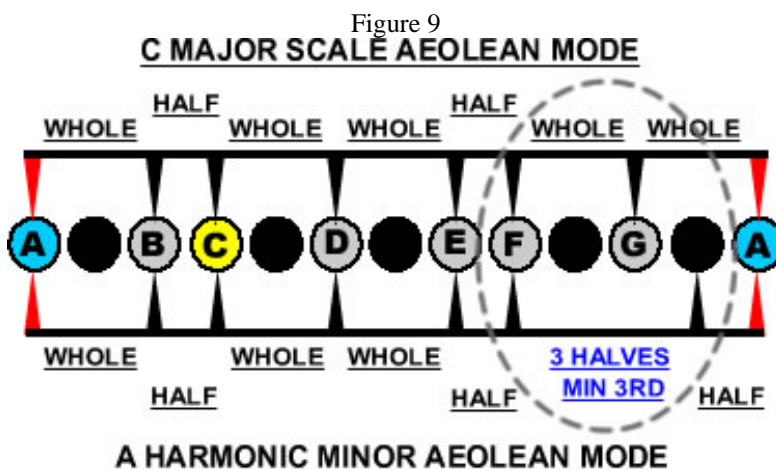
^{*2} This rule has exceptions in some of the more complex or abstract scales.

defines that position's mode of the scale. This is true for all non-symmetrical scales. A symmetrical scale has two or more starting points with identical interval patterns, e.g. the diminished or whole tone scales. In Harmatrix and ScaleBlazer any scale labeled “ALT tonic(s)” is symmetrical.

THE HARMONIC MINOR SCALE

We'll first look at the Harmonic minor as it relates to the Major scale. A little later, we'll view it next to the Base scale in Dorian Origin.

The Harmonic minor is akin to the Aeolian mode of the Major scale. The only difference is the 7th. The Major Aeolian has a minor 7th; the Harmonic has a Major 7th. Figure 9 shows the two together.



The subtle change used to make the Harmonic Minor has a profound effect on the Harmonic content (chord structure) of the scale. Perhaps this is why it's called the Harmonic minor. It changes the Phrygian to a Dom7, adds three new chords not in the Major scale and also adds a number of “secondary” chords. Figure 10 shows the primary quadrads and their intervals plus the secondary quadrads for each of the Harmonic minor modes. Note that the interval names are shortened to fit the chart. M = Major 3rd and m = minor 3rd.

Figure 10. **HARMONIC PRIMARY AND SECONDARY QUADRADS**

MODE	Ionian	Dorian	Phrygian	Lydian	Mixo-lydian	Aeolian	Locrian
P QDRDS	augM7	min7	Dom7	Maj7	dim	mM7	min7b5
INTRVLS	MMm	mMm	Mmm	MmM	mmm	mMM	mmM
S QDRDS		min7b5	aug7	mM7 M7b5 mM7b5			

New chord names: mM7 = minor Major 7, augM7 = augmented (#5) Major 7, dim = diminished (full diminished), aug7 = augmented dominant 7th, M7b5 = Major 7 flat 5th, mM7b5 = minor Major 7 flat 5th.

Notice that the secondary quadrads could be primary in another position or scale. They are secondary in these positions, as they aren't built with the “pick one skip one” method.

THE MELODIC MINOR SCALE

Figure 11 shows the *D Melodic minor* along with the Dorian mode of the *C Major* scale.

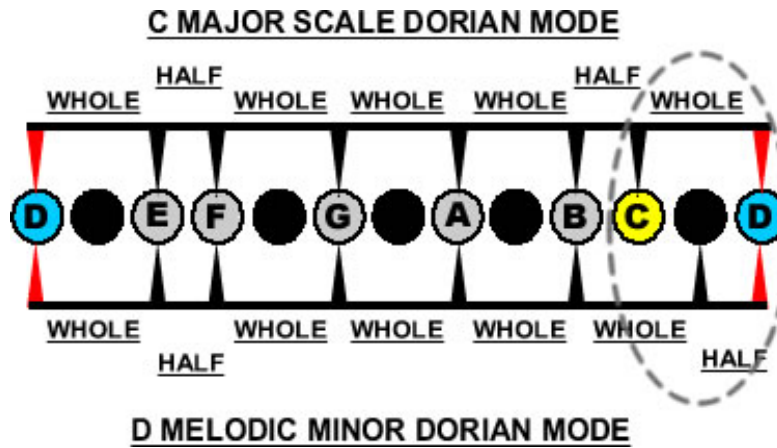


Figure 11.

The Melodic minor is akin to the Dorian mode of the Major scale. Just as the Harmonic minor differs from the Major Aeolian mode by raising the 7th to a Major 7th, the Melodic has a raised 7th. But, because the 7th is raised in the Dorian mode instead of the Aeolian, they are not the same.

Notice that the sixths are different in figure 12.

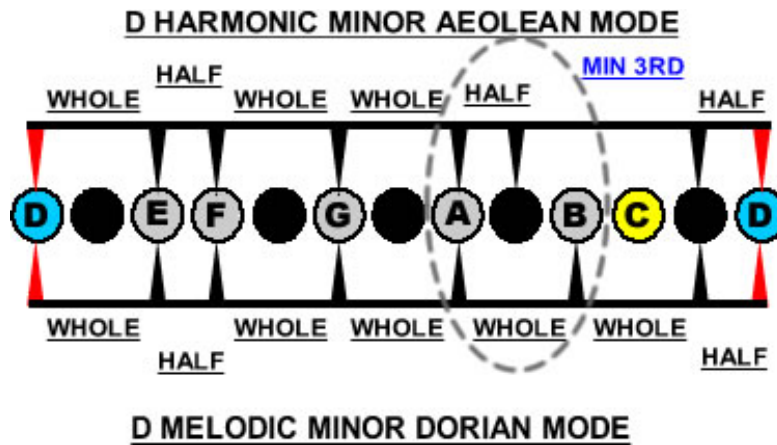


Figure 12

Figure 13 shows the primary quadrads and their intervals for the Melodic minor scale.

Figure 13

MELODIC PRIMARY QUADRADS

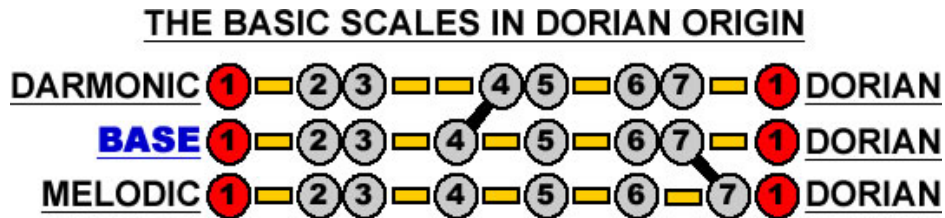
MODE	Ionian	Dorian	Phrygian	Lydian	Mixo-lydian	Aeolian	Locrian
QDRDS	min7b5	mM7	min7	augM7	Dom7	Dom7	min7b5
INTRVLS	mmM	mMM	mMm	MMm	Mmm	Mmm	mmM

Notice the two sets of twins. The Locrian and Ionian both have min7b5 primary quadrads; and the Mixolydian and Aeolian both have Dom7's. The Melodic minor also has a few secondary chords. You can find them with Scout/ScaleBlazer.

DORIAN ORIGIN

Up until now we have been looking at scales and chords from a conventional perspective, though I did simplify the mode naming in the Harmonic and Melodic minor scales. There are a lot of different names out there for modes in those two scales. There are names like the Ukrainian minor, the Spanish Phrygian, the Super or Hyper Locrian or just mode 1, mode 2 etc. For our purposes, to keep it simple, we just use the same mode names in each scale. Now we are going to look at the three basic scales in Dorian Origin.

The main purpose of Dorian Origin is to line up the Major, Harmonic minor and Melodic minor scales so we can use the Major scale as a base reference. Figure 14 shows the three scales together in their Dorian modes. *Note, only the intervals are important.*



What have we done? We are basing the Major scale in the Dorian mode and calling it the **Base** scale, as it is the base from which we build the other scales. To go from Major to Base means using the second note in the Major scale (up one whole step) as the tonic. So *C Major* becomes *D Base*; *G Major* becomes *A Base*; *F# Major* becomes *G# Base* and so on. Everything else about the scale remains the same. All we've done is move to a different mode of the same scale.

We did the same thing to the Harmonic. To avoid confusion, we call it the **Darmonic** (Dorian Harmonic minor). We changed the reference point from the Aeolian mode to the Dorian mode, which means using the fourth note (up a 4th) of the original as the start point of the new. To go from the Darmonic back to the Harmonic, go up a 5th (*C to F* is a 4th, *F to C* is a 5th). An easy way to remember it is "Five straight for (4) Dorian".

Now everything lines up. The modes, tonics, and note numbers are the same in each scale. The 1st, 3rd and 5th are the same notes in each scale. This means that the primary tonic triad for each scale is the same minor triad. To go from Base to Darmonic, just raise the 4th one half step (in the Harmonic Aeolian mode it was the 7th). To go from Base to Melodic, just raise the 7th one half step.

From here, all the other 7 and 8 note scales, except the Diminished, can be built and all their pertinent parts will line up. If you do this in the conventional system, where nothing lines up, you end up in a tangle of conversions.

With Dorian Origin everything is simple, neat and tidy. If you still prefer to use the conventional system, Dorian Origin is close enough that translating is easy, and there's also the AUTO CONVERT feature in Scout and ScaleBlazer.

Section 2

SCOUT MANUAL

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GLOSSARY

Cluster – Two or more consecutive notes with no space in between them, e.g. *C, C#, D* and *D#* together, make a four note cluster.

Root - The starting note of a chord, and the note for which the chord is named; e.g. *C* is the root note of the *C Major* chord. A root is also the starting note of a mode.

Overdrive – (Edit menu) Gives processor priority to midi and midi related functions. This is necessary for smooth playback and accurate timing. When Overdrive is off graphics may be “snappier”, but at the expense of reduced midi performance.

Tonic – The starting note of a scale, and the note for which the scale is named; e.g. *C* is the tonic note of the *C Major* scale.

DORIAN ORIGIN SCALE NAMES

Base – The Dorian mode of the Major scale.

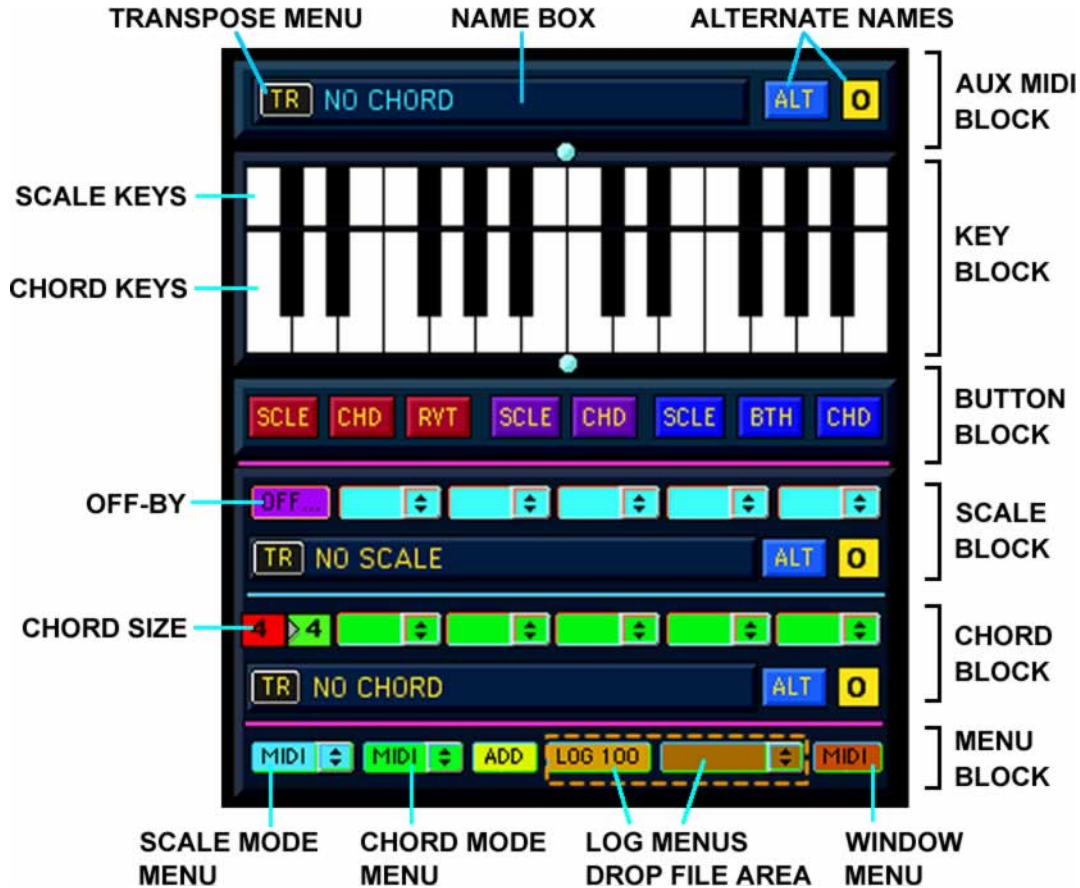
Darmonic – The Dorian mode of the Harmonic minor scale: It has a #4th in relation to the Base scale (Base scale with a #4th).

Melodic – Same as the Melodic minor in standard origin: Base scale with a #7th.

Darmel (Darmelodic) – Hybrid of the Darmonic and Melodic minor scales: It has the #4th of the Darmonic and #7th of the Melodic, in relation to the Base scale.

All other 7 and 8 note scales with the exception of the Diminished are built and have their names derived from the above four scales.

SCOUT MAIN WINDOW



AUXILIARY MIDI BLOCK

This block analyzes incoming midi notes to identify chords and intervals, whose names are then displayed in the **NAME BOX**. Notes are entered from a midi source such as a keyboard, midi guitar or even a sequencer track. Incoming notes are added to the chord so long as at least one note is held down. As soon as all notes are released the chord is entered and displayed. For example, if you wanted to enter a *C Maj7* chord, you could hold down the *C* then play *E*, *G* and *B* releasing them as you go. Once you're done release the *C* and the chord is entered. You can also enter chords by playing legato (overlapping note durations), or by using **STEP ENTRY** mode which is explained in the tutorial *Using Scout* (page 29). You can repeat notes as many times as you want. A note played two or more times or repeated in different octaves is entered only once in the calculation. Thus, you can enter extended chordal voicings and analyze melodies for chord content.

If a chord has **alternate names**, you can cycle through them by clicking the **ALT** button. The number box to the right of the **ALT** button tells you which name you're on, with "0" being the initial name. You can **change the root of a chord** using the **TR** (transpose) menu.

Click in the right side of the NAME box to enter a chord in the **LOG** (page 18). Click in the left side of the NAME box to **compare** a chord to the Scale and Chord Block selections (see Using Scout page 30). Click in the center of the NAME box to activate STEP ENTRY mode.

The Auxiliary Midi Block is independent of the Scale and Chord Blocks and **has its own midi in and out**.

KEY BLOCK

This block contains the “V-Keys” which display **scales (upper keys)** and **chords (lower keys)** that have been selected in the Scale and Chord blocks. When either the Scale or Chord blocks are set to **KEY mode** (Scale and Chord menus in the MENU block), you can enter chords and scales by clicking on the keys. Click once to add a note and again to remove it. The keys change color to indicate active selections.

BUTTON BLOCK

This block contains eight buttons in three groups. The first three on the left are for entering scales and chords created on the V-Keys. The “RVT” button sets the V-Keys back to the last entered settings. The two middle buttons are for sending chords and scales through the SEND port (page 20, 22). The three buttons on the right play scales, chords, or both simultaneously, through the PLAY ports (page 20, 22). SCLE (Scale), CHD (Chord), RVT (Revert), BTH (Both Scale and Chord).

SCALE BLOCK

This block is where scales are selected and processed. The upper row contains the scale menus and the “**OFF-BY**” menu (see Using Scout page 26) on the far left. The scale categories are:

- 1) **STANDARD** - These are scales that consist of seven notes with no interval over a minor 3rd and no clusters over two. There are six basic scale types: BASE (Major), MELODIC MINOR, DARMONIC (Harmonic) MINOR, DARMEL (Darmonic/Melodic hybrid), MELODIC b5 and the DARMONIC b2.
- 2) **ALTERNATE** - There are five alternate scale types: IN-SEN (5 note), MINOR PENTATONIC (5 note), BLUES SCALE (6 note), WHOLE TONE (6 note) and the AUGMENTED (6 note). The **Major Pentatonic** is the same as the Minor Pentatonic but starts on the second note up; you can reference it by clicking the ALT button.
- 3) **8 NOTE JAZZ** - This category contains the three BEBOP scales, and the DIMINISHED scale. (Note; be sure to check out the ALT names. That’s where you’ll find names like Dorian Bebop etc.)
- 4) **7 & 8 NOTE ABSTRACT** - These two categories contain all the remaining seven and eight-note scales that have clusters up to four and no interval over a minor 3rd. The scales with four note clusters are labeled “**CLU**”.

IMPORTANT - It is essential that you read thoroughly “Basic Theory and Dorian Origin”, in order to understand the Dorian Origin naming protocol used in Harmatrix.

Those of you that have been using ScaleBlazer are familiar with the **AUTO-CONVERSION** function. This function transposes the Base and Darmonic Minor scales to shift from conventional orientation to Dorian Origin. In Scout it has an invisible button on top of the Scale ALT number box. See *Using Scout* (page 32) for instructions on how to use it.

Lower Row

The lower row contains (from left to right): The scale **TR** menu, the scale **NAME BOX**, the scale **ALT** name button and the alternate number box.

The TR menu is where you select the tonic for the selected scale. When the Scale mode is “SELECT” the Scale menus don’t supply a tonic note. So you must choose it from the TR menu. The initial default is C; after that the tonics are “sticky” and will carry over from one scale selection to the next.

You can enter the selected scale into the LOG (page 18) by clicking in the right side of the NAME box. When you do so, the box will flash brown. By clicking in the left side of the box, you “**pump**” the scale selection into the calculator processor and the box will flash blue. Scales can only be pumped when the Chord mode is “MATCH”.

CHORD BLOCK

This block is where chords are selected and processed. It operates the same as the Scale block with a couple of small differences.

The upper row contains five menus and two number boxes. The menus display the chords available for selection. In **SELECT** mode the scales are categorized as indicated by the menu labels. They are as follows.

- 1) **REGULAR** - These are the least dissonant, most commonly used chords.
- 2) **PARTIAL** - These chords are missing either a 3rd, a 5th or both.
- 3) **DISSONANT** - These are the commonly used dissonant chords.
- 4) **COMPLEX** - This category contains very dissonant chords that are not found in the common scales.
- 5) **SLAMS** - These are not really chords, per say, but rather clusters of notes with little or no spacing.

In **MATCH** mode the chords are grouped by dissonance, from left to right. In the modes other than SELECT and MATCH the menus are inactive and empty.

CHORD SIZE - The number box on the far left shows the size of the currently active chord. In SELECT and MATCH modes, use the number box just to the right to select the chord size you want to work with. The size selection box will be unresponsive in other modes.

The lower row of the chord block works the same as the scale block lower row, except that the name box flashes green when a chord is pumped.

MENU BLOCK

SCALE & CHORD MODE MENU

The SCALE Mode menu is described below. The SCALE and CHORD Mode menus operate exactly the same.

In **MIDI** mode, scales are entered from a midi source such as a keyboard, midi guitar or sequencer track, in the same way as in the AUXILIARY MIDI block.

In **KEY** mode, scales are entered from the V-Keys.

In **SELECT** mode, you pick raw scale types from the menus and then select the tonics from the TR menu.

In **MATCH** mode, The menus fill with scales that contain the chord that was pumped.

The **CARRY** function, copies a scale that was entered in MIDI, MATCH or SELECT modes, into KEY mode for editing. First go into KEY mode then click “CARRY” to copy the last entered scale. When you’re done changing it, click the red SCLE button to enter the scale.

ADD MENU

The ADD menu is a simple adding machine for chords. It contains three commands: “Add”, “Sum” and “Clear”. Clicking “Add” adds the chord currently in the CHORD block to the list at the bottom of the menu. When you click “Sum”, the chords in the list are combined. SCOUT then compares the result with all the chords and scales in its library. You can add as many chords as you like and check the sum at any point. SCOUT keeps a running total for all your entries until you click “Clear” to clear the menu. If a “Sum” result is a chord in SCOUTS library it will appear in the CHORD block and the **CHORD mode will automatically switch to “KEY”**; if it’s a scale it will appear in the SCALE block and the SCALE mode switches to “KEY”.

LOG OPTION MENU

The Log Menu is where you can save scales and chords that you like for easy recall and playback. The Log Option Menu contains the functions and settings for the Log.

The first four choices in the Log Options Menu (LOG 10, 20, 40, 100) **set the log length** for your current session. Any time you change the length, the log is cleared, so set it ahead of time. It is initially set at LOG 100. The log length is the number of entries the Log will hold. When the Log is full every new entry will cause the oldest remaining entry to be deleted.

CLEAR LOG does just that.

To bullet a log item, select the item you wish to bullet, then select **MARK** from the menu. Use the same process to remove an existing bullet. Bullets are not saved with a log file.

Selecting **SAVE DEFAULT** saves the log to the default file within Scout. Consider this file as your working log, as it is **overwritten every time you close Harmatrix**. Scout automatically opens this file when you launch Harmatrix, so you can pickup where you left off.

Select “**SAVE AS**” if you want to **permanently store a log**. When you do so, the standard “Save As” dialog opens and you can name your log file.

Select “**OPEN**” to open an archived (Saved As) file. **Note:** Unless you have saved the default file and reopen it before quitting, the new file will become the default and overwrite the original when you quit Harmatrix.

Select “**OPEN DEFAULT**” to open the default file.

You can drag Log files or their aliases right into Scout. The **DROP-FILE** area is right over the LOG menu. When you drag a compatible file to it, a box will appear for you to drop it into. **If the box doesn’t appear, the file is not a Scout Log file.** You can put log files right on your desktop or in a desktop folder. This makes it possible to change logs rapidly. You may then find it convenient to work with a number of small logs instead of one large one.

Selecting “**PRINT**” will copy the log to the **Status** window, which you can access from the “Window” menu on the **main** menu bar. Once in the status window you can copy the log entries to a text editor for editing and printing. **Note:** Clear the Status window, before printing, by clicking anywhere in it and then selecting “Clear” from the Edit menu. You can only copy the entire contents of the window; it’s all or nothing. After you’ve printed to the Status window, just click in it and select “Copy” from the Edit menu (note, it won’t highlight). You can then paste it into a text editor.

LOG MENU

Click on this menu to view the contents of the log. You can select entries and they will appear in the corresponding block, SC (scale) entries in the scale block and CD (chord) entries in the chord block. If the corresponding player(s) is set to “On Select” (page 23), LOG selections will play automatically.

WINDOW MENU (in Scout, not the main menu bar)

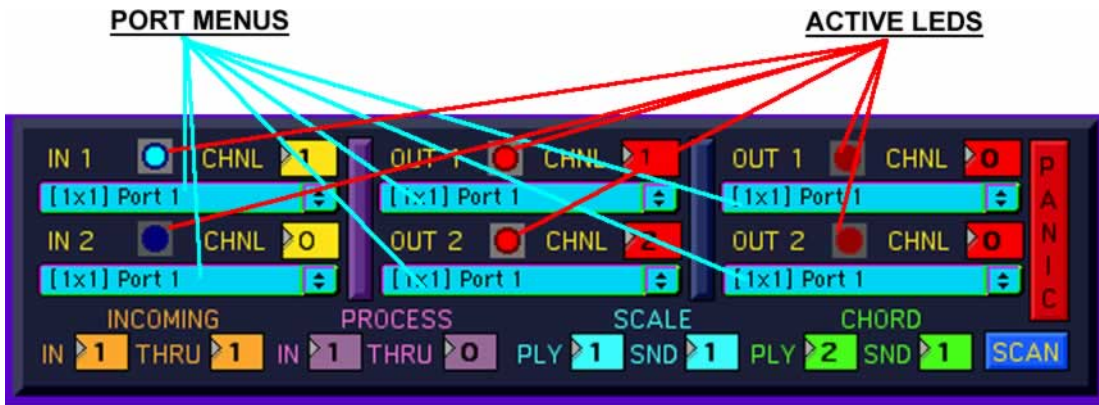
This menu is pretty self-explanatory. This is where you go to open Scout’s sub-windows. These windows, which will be covered later, are MIDI, PLAY, SEND, and PRESET.

Also in the Window menu is the **CHORD BY NOTE** function. This function is available when the Chord mode is set to “MATCH” and the Chord menus are full from a Scale pump.

When you select “CHORDS BY NOTE”, you can then select a note from the Chord TR menu and the Chord menus will fill with only chords in the scale containing that note. This is useful for making chord substitutions over a given melody note.

CHORD BY NOTE isn’t sticky; you must select it each time before you enter a note. It’s also timed and will turn itself off 10 seconds after you select it.

SCOUT MIDI WINDOW



IMPORTANT

In order for Harmatrix’s midi functions to work smoothly, **Overdrive must be enabled in the Edit menu** on the main menu bar. If Overdrive is not enabled, timing may be erratic and midi play functions may be “glitchy”.

The Midi window is where you make all your midi routings. Scout has two midi inputs and four midi outputs. The **PORT MENUS** contain all your available midi ports including inter-application terminals. In order for them to appear, devices/applications must be online when you open Harmatrix. If you put a midi device or application online while Harmatrix is open **USE THE SCAN BUTTON**, just under the PANIC button to update the menus. Please **check the READ ME** file for specifics on connections.

Just above each of the port menus is a **midi channel select box**. The range is 0 – 16. When “0” is selected, that midi connection is disabled and the LED to the left is dark. When you select channels 1 – 16, the connection is enabled and the LED lights up.

Below the port menus, are the **internal routing (number) boxes**. Use these boxes to select a connection (inputs 1 and 2: outputs 1 – 4) for the various Scout blocks and functions.

The **INCOMING** boxes are for Scouts Midi Block. The **PROCESS** boxes are for the Scale and Chord Blocks when they are in Midi mode. The **THRU** boxes allow you to echo the input to any one of the outputs.

The **SCALE** and **CHORD** boxes determine which outputs your scale and chord selections in the Scale and Chord blocks go to. The **PLY** boxes are for the Play buttons and the **SND** boxes are for the Send buttons (page 16).

The **PANIC** button turns off all midi notes on all 16 channels for all the ports currently listed in the output Port menus. Use this to turn off “stuck” notes (ringons).

INTER-APPLICATION CONNECTIONS

When you open one of the port menus you will find your hardware ports. For example: If you have a two port midi interface named “Wizbang 2X2” you will see “Wizbang 2X2 1” and “Wizbang 2X2 2” in both the input menus and output menus. In addition you will see your inter-application connections beginning with “to” and “from”. If you have another midi application open named “*Other-App*” you will see “to Harmatrix 1”, “to Harmatrix 2”, “from *Other-App* 1” and “from *Other-App* 2” in the input menus. In the output menus you will see “from Harmatrix 1”, “from Harmatrix 2”, “to *Other-App* 1” and “to *Other-App* 2”. In order for the two programs to communicate they must be connected to the same port. Selecting “to Harmatrix 1” from a Harmatrix (Scout) input menu and “from *Other-App* 1” from the *Other-App* output WON’T work. You have to pick the same port in both menus. Example: “to Harmatrix” in the Harmatrix input menu and “to Harmatrix” in the *Other-App* output menu.

As you can see the “to and from”s make sense when viewed externally but seem backwards when viewed internally. There are three ways to look at it that might help.

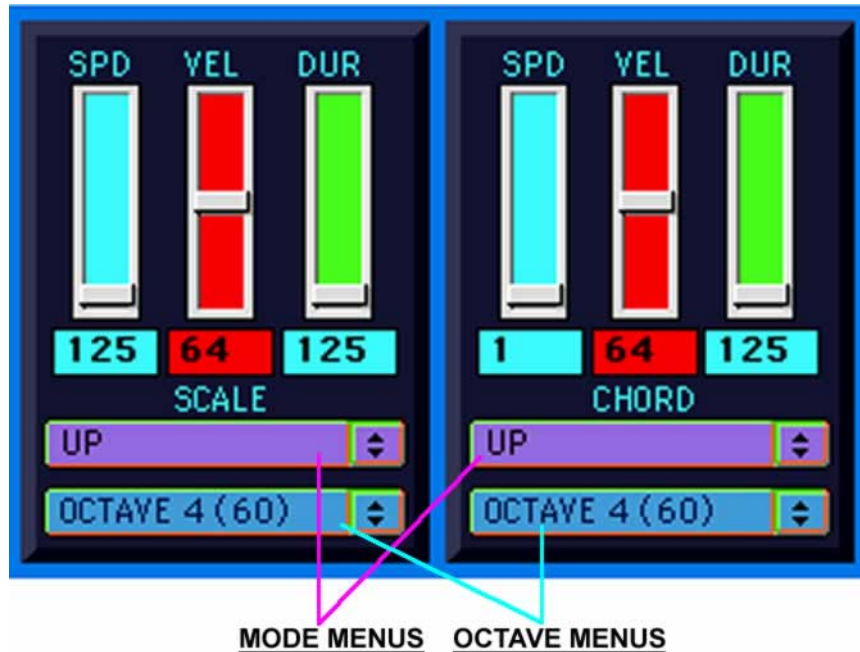
- 1) Think of the “to” or “from” as just part of the name of the port with no relevance to the direction of travel. Imagine a town named “ToWestport”. You could move to ToWestport or you could be from ToWestport.
- 2) Think of the port names like the addresses on a letter. If you were receiving a “midi letter” the address would be “to Harmatrix”. Or you could use the return address “from *Other-App*”. The difference is, you can only use one or the other, not both. The “to and from” would be opposite when sending a “midi letter”.
- 3) “To” = midi in for the name of the port that follows it; “from” = midi out for the name of the port that follows it. From inside Harmatrix “to Harmatrix” is Harmatrix’s midi in and “from Harmatrix” is Harmatrix’s midi out; “to *Other-App*” is *Other-App*’s midi in and “from *Other-App*” is *Other-App*’s midi out.

NOTE: Software sequencers often have an unlimited amount of midi tracks and won’t publish their ports to Harmatrix, unless they have a soft-synth plug-in on one or more tracks, in which case the soft-synth will appear in Harmatrix’s port menus. Harmatrix **will** show up in the sequencer’s ins and outs and the two can be connected that way.

MIDI SETUP

Harmatrix’s connection with Core Midi is in the Midi Setup window, which you’ll find in the File menu on the main menu bar. Harmatrix uses the default setup, and the port menus automatically take care of the linkups and channel offsets. In short there is nothing for you to set in the Midi Setup window. However, if you are having problems or Harmatrix doesn’t seem to be connected despite everything else being set up correctly, clicking Auto Setup might fix the problem. If your midi interface gets switched off or is turned on after you open Harmatrix, the Core Midi connection may fail. Clicking Auto Setup then reselecting the ports should reconnect it. If it doesn’t, quit Harmatrix, make sure all your other midi devices are online, and then reopen Harmatrix. Sometimes Harmatrix just likes to be the *last one to enter the room*. **Check the Read Me file for the most current info on making and trouble-shooting midi connections.**

THE PLAY AND SEND WINDOWS



The Play window and the Send window look and operate the same except that the **Play window has a blue frame and the Send window has a purple frame**. You can use either to play chords and scales. The only functional difference is in the buttons on the main window. For the Play function there is the “**BTH**” button that will play a scale and chord simultaneously.

The SEND window is provided as a way to send data directly to an external processor such as an arpeggiator or sequencer, while using the PLAY window to pre-audition scales/chords through a sound module. You could also use SEND as an alternate audition source using a different setup and/or midi routing.

THE CONTROLS

There are three sliders in the Scale and Chord panes: “**SPD**”, “**VEL**” and “**DUR**”. In addition to dragging the sliders with the mouse, you can click on them and use the up and down cursor keys to make fine adjustments.

The **SPD** (Note Spread) allows you to select the spacing between notes in milliseconds. The range for chords is 1 to 500; scales 125 to 500 in the PLAY window and **1 to 500 in the SEND Window**.

The **VEL** sliders set the midi note **velocities** from 1 to 127.

The **DUR** sliders set the **duration** of each note in milliseconds. The range is 125 to 1000.

While not designed to generate a “finished musical product”, you can get some very musical results, with these adjustments, that are more than adequate for auditioning purposes.

SENDING DATA TO AN ARPEGGIATOR

When sending scale/chords to an arpeggiator you will usually want to keep the note spread and duration as short as possible. This is the reason for the lower minimum spread time for scales in the SEND window. When the note spread is less than 10 milliseconds you may get some occasional glitches. Settings of 10 are usually fast enough to be unnoticeable but experiment to see what works best for you. What ever your note spread is set at it's most often necessary to have the duration set longer so that the notes overlap (legato) in order for the arpeggiator to correctly interpret the chord/scale.

Note: Not all arpeggiators will interpret scales and many will not be able to recognize all of the chords that are available in Scout. However, Ranger will recognize all of Scout's scales and chords.

SENDING DATA TO RANGER

In Harmatrix, Scout sends scale and chord data to Ranger through an internal non-midi link. This link is enabled/disabled in the Ranger Midi Window. Settings in the Play and Send windows have no effect on data sent to Ranger. When sending to Ranger, you need not worry about note spread, duration or velocity. **The only thing in common is the use of the Send buttons in Scout's main window.**

THE MODE MENUS

- 1) **OFF** --- Disables the Scale/Chord Play function.
- 2) **BUTTON ONLY** --- Scale/chord plays only when the corresponding Play button is used.
- 3) **ON SELECT** --- Scale/chord will also play when selected.
- 4) **UP** --- Plays the notes of the scale/chord in ascending order.
- 5) **DOWN** --- Plays the notes in descending order.
- 6) **RANDOM** --- Plays the notes in random pattern. A new pattern is generated each time the scale/chord is played.
- 7) **FREEZE** --- Locks the last random pattern. You can play and change the scale/chord as many times as you like using the same pattern. You can alternate between FREEZE and the UP and DOWN modes. The pattern is maintained until you click on RANDOM again. However, if you select a scale/chord of a different length, FREEZE will automatically shift back to RANDOM and the previous pattern will be replaced.
- 8) **TRIG-CHORD/TRIG-SCALE** --- Used in conjunction with the "ON SELECT" mode. When TRIG-CHORD is active, the selected chord will play along with the scale when the scale is selected. The inverse is true when TRIG-SCALE is active in the Chord mode menu.

THE OCTAVE MENUS

The octave menus are where you select the ranges that the scales and chords play in. Each menu has four octave ranges (2 – 5) plus "AUTO-SHIFT". The number in parenthesis is the midi note number of "C" in that octave.

AUTO-SHIFT mode divides the selected octave at F#. This can help keep certain selections more in the same range for better comparison. Any scale or chord from F# - B will be played one octave lower. In normal mode, if you were to play a C chord and

then select a *B* chord, the *B* chord would be played up 12 half steps. In AUTO-SHIFT mode it would be much closer, only one half step down. Conversely an *F* chord would play 12 steps up from an *F#*. Depending on the range or key you're working in, AUTO SHIFT may or may not tighten the spacing between your scale/chord selections. You should experiment by toggling it on and off and playing various combinations.

A note about chord voicings (note order and octave placement): Don't dismiss a chord just because it doesn't sound good right out of Scout. There are numerous voicing possibilities but Scout gives just the root inversion in one octave. Often is the case that an "ugly" or inappropriate sounding chord can be made to sound beautiful, just by finding the right voicing. Using the SPD to arpeggiate dissonant chords can help you decide; a chord that sounds good arpeggiated is often a good candidate for re-voicing.

SCOUT PRESETS WINDOW



Here you can save your settings for the Midi, Play and Send windows. **To save a preset**, simply select a slot (1 – 10) from the store menu. To name the preset, select the preset from the Preset menu. Then select “**NAME CURRENT**” from the Store menu and the Name dialog window will pop up. There you can enter a new name or use the default (one – ten). It's a good idea to name your presets. Even if you just use the default, you will at least know there is something in the slot.

Scout automatically saves the preset bank (presets 1 – 10) every time you store or name a preset. Scout saves these to whatever bank file you have open. When you open Scout, the default “SCOUT INTERNAL PRESET BANK” is automatically loaded. If you wish to save your banks as a new/alternate file, use “**SAVE AS**”. Use “**OPEN**” to select and load a bank. Use “**CLEAR**” to set the current settings back to the default settings. **Note:** CLEAR only affects the current working settings. It does not clear the stored preset. **To clear a stored preset, you must store it again after clearing.**

If you wish to **have Scout automatically load a specific preset when a file is opened**, first select the preset, and then select “**SET CURRENT**” from the store menu. The next time you open that file, Scout will load your selected preset for you. This will also work for the default bank.

You can drag Scout Preset bank files, or their aliases, right into the window as a quick alternative to using the Open dialog. The **DROP FILE** area box will appear only if a compatible Scout Preset file is dragged to it. Other file types are not accepted.

Section 3

USING SCOUT

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SIMPLE CHORD AND SCALE CALCULATIONS

Find all the Chords in a Given Scale:

- 1) Set the Scale Mode menu to SELECT. Set the Chord menu to "MATCH". Select "Base ALT1" from the leftmost Scale menu. The Scale name box should read "C Base ALT1".
- 2) Change the tonic by selecting "A" from the Scale TR menu. The name box should now read "A Base ALT1".
- 3) Set the Chord size box to "4".
- 4) **Pump** the scale into the processor by clicking in the left portion of the Scale name box. It should flash green: If it doesn't, check to make sure the Chord mode is set to MATCH. The Chord menus will now be filled with all the four-note chords in the *A Base* scale. Note that only three of the menus will have chords in them. Go through the Chord menus to see how the chords are laid out.
- 5) Now try changing the Chord size setting and then see how the contents of the Chord menus change accordingly. Finally, go back to the four-note chord setting for the next exercise.

Find all the Scales that Contain a Given Chord:

- 1) Select a chord from the menus. For this exercise select "B min7". Note: In the future, if you are starting from scratch you will need to pick a chord using SELECT Mode in the same way you picked the first scale.
- 2) Set the Scale Mode to MATCH, and then pump the chord by clicking in the left portion of the Chord Name box. The Scale menus will now be filled with all the scales that contain the *B min7* chord.

OFF-BY

Use to narrow down the above scale list.

After performing steps 1 and 2 open the OFF-BY menu to the left of the Scale menus. Select "OFF BY 1". You now have a list of scales that contain *B min7* and differ from the *A Base* scale by just one note. You can pick *OFF BY 1 – 4*.

Using What You've Learned

Using the procedure in the first exercise, you can create chord progressions diatonic to (within) any scale in Scout's library. In the second exercise, you set yourself up for a modulation using the *B min7* chord as a pivot or reference point. You can cycle these procedures continuously to build progressions, bridges and modulations of any complexity. By using the OFF BY function, you can create modulations of a specific intensity, with *1* being very subtle to *4* being quite dramatic.

THE V-KEYS

Any scale/chord that is displayed in Scale/Chord block Name box is also displayed on the V-keys. Scales are on the upper keys and chords on the lower.

Building Scales and Chords on the V-keys

- 1) Select “Base ALT1” from the leftmost scale menu (with the Scale mode set to SELECT).
- 2) Set the Chord mode to KEY. You can now click on the Chord keys to activate them and build any chord you wish. But by selecting only notes that match the highlighted scale keys, your chord will be diatonic to that scale.
- 3) When you’re done, click on the CHRD button (red one second from the left just under the keys) to enter the chord. You can then pump the chord (after switching the Scale mode to MATCH) for a new list of scales containing the new chord.
- 4) To edit your chord creations simply click again on a key you wish to deselect and or select new keys. When you’re done, enter the chord as before.
- 5) Use the Scale keys in exactly the same way as the Chord keys.

CARRY

(Bring a Scale/Chord into Key Mode)

- 1) Set the Scale mode to SELECT and pull up a *D Darmonic b2* scale.
- 2) Set the Chord mode to MATCH, pump the scale and select *D min7* from the left Chord menu.
- 3) Set the Chord mode to KEY. The chord will disappear from the keys.
- 4) Select “**CARRY**” from the Chord Mode menu. The *D min7* chord will reappear.
- 5) On the Chord keys, click a *G#* and then click the red CHD button to enter the chord. The chord name will change to “F Maj6 #9 ALT1”
- 6) Click the Chord ALT button, just for kicks. It will say “D min7 #11”.
- 7) Click the *G#* key to de-select it, then click the *F#* key and enter the new chord. You’ll have a *D V7 #9*, which, if you look at the keys, is not in the *D Darmonic b2* scale.
- 8) Set the Scale Mode menu to MATCH and pump the chord. You now have a new set of scales you can modulate to, that contain the new chord. If you use the OFF-BY function you can narrow the choices down to scales that differ from the original by a specific amount (if there are any).

You can perform the same operation with scales. Note that if you try to enter a chord with more than six notes, you will get a “NO CHORD” reading and Chord keys will reset. Any combination of seven or eight notes falls into scale only territory. Likewise, if you try to enter a scale that is not recognized, you will get “NO SCALE” and Scale keys will reset.

ADDING CHORDS TOGETHER

In this next exercise you’re going to test a group of chords to see what scale/s they coexist in. You will do this using the “Add” function.

- 1) Set the Chord mode to SELECT. Then set the Chord Size to “3” and select “Maj” from the Chord menus. Select “C” from the Chord TR menu.
- 2) From the ADD menu select “ADD”. Open the ADD menu again: The chord should be listed at the bottom.

- 3) Go back to the Chord menus and select “min”. Next select “E” from the Chord TR menu and repeat the ADD steps.
- 4) Now select sum from the ADD menu. The Chord mode will change to KEY (if it wasn't already) and the Chord name box should read “C Maj7”.
- 5) Go back to SELECT mode and select “min” from the Chord menus then “D” from the Chord TR menu and repeat the Add step one more time.
- 6) Select SUM again. The Scale mode will change to KEY and the Scale name box should now read “D Base ALT1”.

The Results

The *C Major* (C, E and G) and the *E minor* (E, G and B) chords together make a *C Major 7* (C, E, G and B). The *E* and *G* in the *E minor* chord are ignored because they were already in the *C Major* so all that was added was the *B*. The *D minor* chord adds (D, F and A). All together we get *C, D, E, F, G, A, and B*: the *D Base (C Major) Scale*.

Notice how we added two chords, then got a sum, then added another chord and got a new sum. You can add as many chords as you like and you can get a sum any time you like. Scout keeps a running tab in the ADD menu with the prefix “ADD” on the chords you enter and “SUM” on the sums. This is great for **finding the key of a chord progression**. When you want to start a new calculation select “CLEAR” from the menu.

No Scale and Chords that are Scales

Some of your calculations may produce a “a “NO SCALE” result. Any sum of three to six notes WILL produce a chord result. Any sum over eight notes will produce a NO SCALE and last chord will remain on display. Seven and eight note sums will produce a scale as long as there is no interval over a minor third and there are no clusters over 4. Chords that are also scales (e.g. a minor 7 11 chord is also a pentatonic scale) will produce a chord result. Use the ALT button to see the scale equivalent. If you get a NO SCALE, you must clear the ADD buffer (menu) and start over, as any new chords added will still produce a “NO SCALE”.

USING SCOUT WITH MIDI

ANALYZING INCOMING MIDI

- 1) Open the Scout Midi window, either from Scout or Harmatrix. In the IN 1 port menu, select the port your midi keyboard/controller is connected to. Set the channel to match the output of your controller.
- 2) Set the INCOMING IN box to “1” (input 1).
- 3) Play a chord on your controller, making sure that at least one key is held down until all the notes have been entered. The name of the chord should appear in the AUX MIDI block.
- 4) Now hold down any two notes and then release them. The interval will appear like so: Number of steps, Interval, Inverse. The inverse is the interval as if the high note was played as the low note. Example: *C3* to *G3* is a fifth (7 half steps); *G2* to *C3* is a fourth (5 half steps).

STEP ENTRY

There are times where overlapping all the notes of a chord or scale is difficult, like when inputting from midi drum pads or guitar, and analyzing prerecorded material. In STEP ENTRY mode you can manually set the selection to be analyzed and you can also get scale readings. However, you can't use the ALT, LOG and COMPARE (described later) functions, nor can you get interval readings.

- 1) Click in the center of the AUX MIDI Name box. The box will turn purple and read "ANALYZING".
- 2) Enter the notes, or play the selection you want analyzed.
- 3) Click again in the center and the chord/scale name, if recognized, will appear. If the selection is not a recognized chord or scale, the display will read "NO SCALE NO CHORD".
- 4) Click again to return to regular operation.

CALCULATING WITH INCOMING MIDI

If you want to perform calculations with scales/chords entered via midi, they must be entered directly into the SCALE/CHORD blocks. Note that the SCALE and CHORD blocks don't support STEP ENTRY or give interval readings.

- 1) In the Scout Midi window set the PROCESS IN box to "1" (assuming every thing else is set up as before).
- 2) Set the SCALE and CHORD mode menus to "MIDI".
- 3) Play a chord (keeping at least one note held as before). The chord name will appear in the CHORD block Name box.
- 4) Play a scale. The scale name will appear in the SCALE name box and the chord will disappear leaving a NO CHORD reading.
- 5) You can now set the CHORD mode to MATCH and pump the scale for chords or vice versa.

AUDITIONING (Playing) SCALES AND CHORDS

- 1) In the Scout Midi window, set the port menu for OUT 1 to the port for your sound module.
- 2) Set up your sound module to play an appropriate sound and then match up the channels between the module and Scout.
- 3) In the Scout Midi window set both the SCALE PLY and CHORD PLY boxes to "1".
- 4) Now open the PLAY window.
- 5) Set the SCALE SPD to "140", VEL to "70" and DUR to "150".
- 6) Set the CHORD SPD to "60", VEL to "70" and DUR to "1000".
- 7) Select a scale and pump it for chords.
- 8) Select a chord.
- 9) Click the blue CHD button to play the chord, the SCLE button to play the scale and the BTH button to play them together.
- 10) Select "RANDOM" from the Scale Mode menu and play the scale a few times. The note pattern changes each time you play the scale.

- 11) Select “FREEZE” from the Scale Mode menu. The last pattern will now be repeated each time.
- 12) Select “ON SELECT” from the Chord Mode menu and pick a chord from the Chord menus. The chord will play as soon as it’s selected.
- 13) Select “TRIG-SCLE” from the Chord Mode menu. This time when you select a chord the scale will play as well. You can also trigger chords when selecting scales.

TRY THIS

- 1) Select “RANDOM” in both the Scale and Chord mode menus.
- 2) Set the Scale SPD to 180 and the Chord SPD to 360.
- 3) Select a chord and play it by itself a few times until you find a pattern you like; then freeze the pattern.
- 4) Now play the chords and scale together. Experiment with different timing combinations.

TRY THIS

- 1) Keeping the settings from above, go to the Scout Midi window.
- 2) Set the OUT 2 port to your sound module and match the channel up with a different channel than OUT 1.
- 3) Select a new sound for that channel in your sound module, e.g. a piano on 1 and a guitar on 2.
- 4) Set the Chord PLY box to 2. Now the scales and chords will sound on different instruments.

Experiment with all the various settings and octaves. If you are working on a composition, try and get the sounds and rhythms to match as closely as possible. Although you probably won’t be recording Scout’s output, the closer the sound is to that of your project, the easier it will be to make the right scale and chord choices.

THE THRU BOXES (in the Scout Midi window)

If you are relying on your computer to connect your controller with your sound module, use the THRU connections for INCOMING and PROCESS. This will allow you to monitor your input as well as send it to Scout. It’s important to remember to turn off the THRU connections if you are making the connection elsewhere, such as in your sequencer or Ranger etc. Also, unless you are using different controllers for INCOMING and PROCESS, enable **THRU** in **only one or the other**. Doubling up THRU connections will make notes sound twice at almost the same time, which will have a chorusing effect and may cause temporary problems with your midi system.

To enable a THRU connection, simply set the number to the appropriate output.

THE COMPARE FUNCTION

The Compare function allows you to check incoming chords against the chords and scales selected in the Chord and Scale blocks. This is especially useful when entering notes from a controller other than a keyboard, such as a midi guitar, or working with pre-recorded input. It’s also useful when you are building chords by ear to fit with some of the more unfamiliar scales.

For this exercise we'll use a "tougher" scale than the ones we've been using.

- 1) Set the Scale mode to SELECT and the Chord mode to "MATCH".
- 2) From the third Scale menu from the left, select "Base + b5 ALT2" and select *F* as the tonic.
- 3) Set the chord size to 5, pump the scale and select "B aug Maj7 13 ALT2" from the third Chord menu from the left.
- 4) Now, just to see how it works, play a *D diminished* chord (D, F, G#, B).
- 5) Click in the left side of the AUX MIDI name box. The box should flash blue, indicating that the chord is in the selected scale.
- 6) Play a *G# minor* chord (G#, B, D#) and click in the name box again. The box will flash red, indicating that the chord played is in the scale and in (part of) the selected chord.
- 7) Change the scale tonic to "G" and click in the box again. The box will flash green, indicating that the chord played is in the selected chord but not the selected scale. This, obviously, will only happen when the selected chord is not within the selected scale or there is no scale selected.

USING THE LOG

The LOG is useful for keeping track of your progress as you build progressions or explore harmonic possibilities. It also provides a means to do quick comparisons and experiment with different chord orders.

For this example, set Scout up to play chords and scales with the following settings in the PLAY window. Scale: SPD – 150, VEL – 70, DUR – 150, Mode – RANDOM, Octave – 4. Chord: SPD – 20, VEL – 60, DUR – 1000. Chord modes: UP, ON SELECT and TRIG-SCLE. Octave – 3. If you can, set up the midi outputs so that the scales play a *piano* and the chords play a *guitar*.

- 1) Set the Scale mode to SELECT and select the same *G Dorian b2* scale as above.
- 2) Set the Chord mode to "MATCH", the Chord size to "4" and pump the scale.
- 3) Click in the right side of the Scale name box. The box will flash brown and the scale name will appear in the LOG menu.
- 4) Select "A# sus4 7" from the leftmost Chord menu.
- 5) Click in the right side of the Chord Name box to log the chord.
- 6) Repeat steps 4 and 5 for the following chords: *A# Maj9*, *D# Maj7* and *G# Maj # 11* (middle menu).
- 7) Go into the LOG menu and click on the scale (SC prefix). Play the scale with the blue SCLE button.
- 8) Now select a chord from the LOG (CD prefix). Both the chord and the scale play automatically.
- 9) Select chords from the LOG one after the other in various orders.

Marking your Log Entries

- 1) Select an entry.
- 2) In the LOG OPTIONS menu, select “MARK”.
- 3) Reopen the log. The chord/scale you selected is now bulleted.
- 4) Select MARK again and the bullet goes away.

You can select “CLEAR” from the LOG OPTIONS menu to delete ALL the entries. At this time you cannot delete single entries. *The LOG function may be expanded in the future and have its own window and probably its own little sequencer.*

Saving Your Logs

The current log is saved automatically to the default file within Harmatrix when you quit Harmatrix.

You can save the current log to the default file, any time, by selecting “SAVE” from the LOG OPTIONS menu. You can also save it to a named file, in any location, by selecting “SAVE AS”. This is the same as the standard filing system, except that SAVE **always** saves to the default file and OPEN DEFAULT always opens the default file. Use the OPEN command to open your named Log files.

There are two main reasons for saving your default files manually.

- 1) In case of a system failure or if Harmatrix unexpectedly quits.
- 2) If you want to keep the current default but want to open another file temporarily. If you save it, you can then go back to it using the OPEN DEFAULT command.

Important

If you open a named file, but you don't want it to overwrite your default file when you quit Harmatrix, you **must reopen the default file before quitting**. However, the safest way to preserve a valued default file is to save it as a named file. You can always return it to default file status by opening it and then using the SAVE DEFAULT command. The default file is your working file that's there for convenience. It is opened automatically when you open Harmatrix, so you can pick up where you left off.

AUTO CONVERSION

There is an invisible button over the Scale ALT number box. This is the AUTO CONVERSION button. It is there to help you get used to Dorian Origin. When clicked, it will transpose a Base scale selection up one whole step and a Darmonic minor scale selection up a fourth. **It has no effect on any of the other scales.**

The Base scale is the same as the Major scale in the Dorian mode; e.g. *C Major* is the same as *D Base* (if you start the *C Major* scale on *D* you're in the Dorian mode).

In conventional theory, the Harmonic minor scale is derived from the Aeolian mode of the Major scale, and therefore referred to in its Aeolian mode. In Dorian Origin, it's referred to in its Dorian Mode and called the Darmonic. The Dorian mode is up a fourth (down a fifth) from the Aeolian mode.

You can enter a scale as you would think of it in the conventional system and then click the AUTO CONVERT button to get the Dorian Origin equivalent. Example: If you

want the *C Major* scale, enter the *C Base* scale and click AUTO CONVERT. You will now have the *D Base* scale, WHICH IS THE C MAJOR SCALE in Dorian Origin. Likewise: If you want the *G Harmonic minor* scale that you know and love from the conventional system, just enter the *G Darmonic* and click AUTO CONVERT. You will now have the *C Darmonic minor*, which is the conventional *G Harmonic minor* in Dorian Origin (the Dorian mode of the Harmonic minor scale).

After you click AUTO CONVERT, look at the Scale V-Keys. You will see the scale, as you know it, regardless of its new name.

Section 4

RANGER MANUAL

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GLOSSARY

Cluster – Two or more consecutive notes with no space in between them, e.g. *C, C#, D* and *D#* together, make a four note cluster.

Grace note – Non scale tone; passing tone; accidental. Example: All the black keys in the key of *C Major*.

Overdrive – (Edit menu) Gives processor priority to midi and midi related functions. This is necessary for smooth playback and accurate timing. When Overdrive is off graphics may be “snappier”, but at the expense of reduced midi performance.

Root - The starting note of a chord, and the note for which the chord is named; e.g. *C* is the root note of the *C Major* chord. A root is also the starting note of a mode.

Scale-tone – Anyone of the notes of the scale.

Tonic – The starting note of a scale, and the note for which the scale is named; e.g. *C* is the tonic note of the *C Major* scale.

DORIAN ORIGIN SCALE NAMES

Base – The Dorian mode of the Major scale.

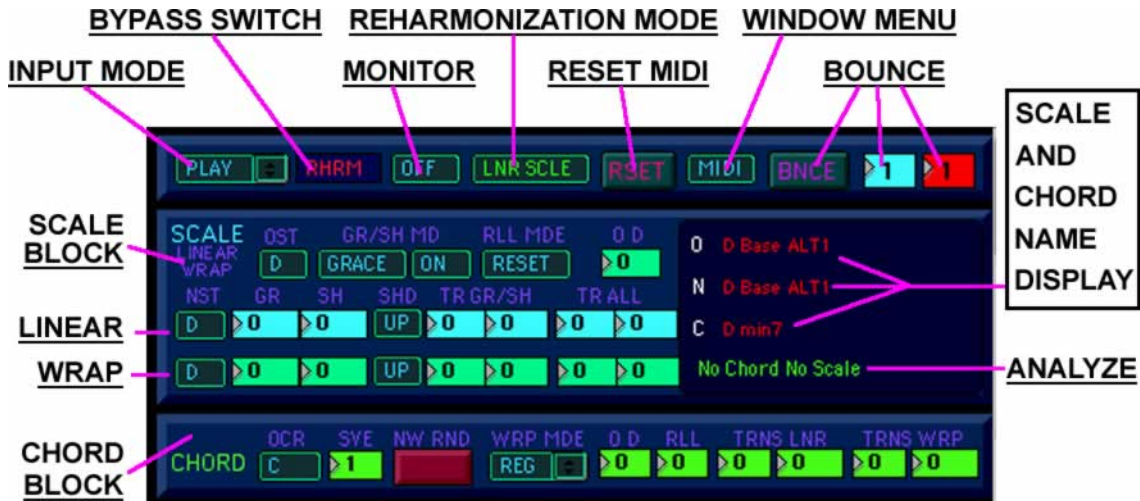
Darmonic – The Dorian mode of the Harmonic minor scale: It has a #4th in relation to the Base scale (Base scale with a #4th).

Melodic – Same as the Melodic minor in standard origin: Base scale with a #7th.

Darmel (Darmelodic) – Hybrid of the Darmonic and Melodic minor scales: It has the #4th of the Darmonic and #7th of the Melodic, in relation to the Base scale.

All other 7 and 8 note scales with the exception of the Diminished are built and have their names derived from the above four scales.

RANGER MAIN WINDOW



TOP ROW (from left to right)

INPUT MODE MENU

Input of scales and chords can be done either from Scout or via midi depending on your "SET INPUT" selection in the Ranger Midi Window explained later. WHEN INPUTTING FROM A MIDI SOURCE, at least one note of the chord/scale being entered must be held until all the other notes are entered. Ranger calculates the chord/scale as soon as all notes are released, just as Scout does.

- 1) **ORG SCLE** --- (Original Scale) Enter the scale of the midi music to be reharmonized. If you're not sure of the scale, you can use the Analyze function in Scout or Ranger's own (described later).
- 2) **NEW SCLE** --- Enter the scale to reharmonize to.
- 3) **CHORD ON THE FLY** --- When checked, you can enter the NEW CHRD and the OCR (page 39) from your midi controller while in PLAY. When you play three to six different notes, they are entered as the new chord. If you play only a single note, it is entered as the OCR. **CAUTION: Don't set the SET INPUT to the same port and channel as the PLAY INPUT (see page 41, MIDI WINDOW) when using CHORD ON THE FLY.** If you do, the notes to be reharmonized will also be changing your chords and OCR, causing erratic behavior. CHORD ON THE FLY is turned off automatically whenever you leave PLAY mode; you have to reset it whenever you change scales etc. CHORD ON THE FLY is great for quick entry of familiar chords as well as experimenting with unknown note combinations. However, because Ranger has to re-map all the notes for each new chord, you may experience an occasional glitch or stuck note. Glitches are more likely when the input is dense (lots of notes at the same time) and or you are changing chords rapidly. Don't let an occasional glitch discourage you from using it; there's always the RESET button.
- 4) **NEW CHRD** --- Enter the chord to reharmonize to. If you are using Scout to enter chord data, you can do so in Play mode, in real time; you don't need to use "NEW

CHRD”. Use “NEW CHRD” when you are using the same midi source for SET INPUT (inputting scales/chords) and PLAY INPUT (notes to be reharmonized). See the MIDI WINDOW on page 41.

- 5) **PLAY** --- You are ready to reharmonize. In the previous setup modes, PLAY input is turned off and the BYPASS switch will read “BPASS”. When you select “PLAY” mode, it switches to RHRM (reharmonize) mode and PLAY input is re-enabled.

BYPASS SWITCH

- 1) **BPASS** --- When the input mode is set to anything other than “PLAY” midi notes are sent to the setup processor for entering scales and chords and the Bypass switch is locked in “BPASS”. In Play mode you can toggle between BPASS and RHARM. When set to BPASS in Play mode, midi notes bypass the reharmonizer altogether.
- 2) **RHARM** --- Midi notes are sent through the reharmonizer.
- 3) **FLASH** --- Flash mode is accessed only from the Flash Presets window, however, you can turn “FLASH” **off** with the Bypass switch. In Flash mode, midi notes are played through the Flash Presets (described later). When you turn “FLASH” off, either with the Bypass switch or in the Flash Presets window, the Bypass switch will return to the state it was in before you switched to “FLASH”.

MONITOR SOURCE REMOTE MENU

The Monitor Source Remote Menu controls the Monitor Source menu in the Ranger Midi window. The choices are abbreviated so you can read them when the menu is closed, e.g. “RGST” is “RANGER SET” “SPLY” is “SEQUENCER PLAY” etc. The functions of these items are explained in the Ranger Midi section.

REHARMONIZATION MODE MENU

In this menu you select how your music will be reharmonized. There are four choices.

- 1) **LNR SCLE** (Linear Scale) - The midi notes are remapped up or down to the target scale while preserving the melodic structure of the original music.
- 2) **WRP SCLE** (Wrap Scale) - The target octaves are divided at a user settable point (C default). The midi notes are remapped up to the target scale. Any notes that land over an octave division are wrapped around to the next octave down. This keeps the music in roughly the same range as the original, but also rearranges the melodic structure. You can further control note and octave placement with the Wrap Scale controls explained later.
- 3) **LNR CHRD** (Linear Chord) - Basically the same as Linear Scale except that all notes (including grace notes) are confined to a selected chord.
- 4) **WRP CHRD** (Wrap Chord) - is to “WRP SCLE” as “LNR CHRD” is to “LNR SCLE”.

ABOUT THE SCALE AND CHORD MODES

The scale modes allow for the reharmonization of music containing varied harmonic content, such as chord progressions, while maintaining the harmonic structural relationship. Example: If you start out with a chord progression such as *C Major*, *F Major* and *G Major*, you would probably determine this to be in the key of *C Major* Ionian mode (*D Base* in Dorian Origin). You could then reharmonize it to a different mode of the same scale. If you were to reharmonize it to *E minor* (Phrygian mode), the resulting progression would be *E minor*, *A minor* and *B minor 7 b5*. The chords are different, but the relative structure is maintained. This applies to melodic as well as chordal content, to and from any mode or scale.

The scale modes also allow for the manipulation of grace notes (accidentals, passing tones). Notes that are not in the selected original scale are treated as grace notes. They are remapped to grace notes in the target scale. From there, they can be wrapped and transposed independently. You also have the choice of confining grace notes to the target scale or filtering them out altogether.

The chord modes confine all notes to a selected chord, thus effectively eliminating the grace notes. Any chord progressions are “flattened out” to conform to the selected chord. You may however, end up with some pattern variations and “sub progressions” within that chord. This will depend on the music and complexity of the target chord. There are a number of controls to modify the resulting melodic structure of music in WRP CHR D mode. The chord modes are good for building new progressions, chord by chord, from pattern based input.

NOTE: Reharmonizing to a scale of a different length than the original, will yield some “unusual re-mappings. Reharmonizing to a shorter scale will shorten the octaves; to a longer scale will lengthen the octaves. In both cases the grace/shake notes won’t be mapped “parallel” to the scale tones. This can produce some very interesting results and be fun to play through. Just be aware of what’s going on and watch the high and low ranges.

RSET (Reset)

The RSET button resets certain midi functions such as sustain and key down sensing. If you experience **stuck notes** or other midi maladies, try the RSET button. Then, if necessary, use the PANIC button in the midi window or in the Window menu (next). Reset affects only Ranger’s output; Panic turns all notes off in your whole midi system.

WINDOW MENU

(In Ranger not the main menu bar)

The first three choices in the Window menu access Ranger’s Midi, Flash Presets and Sequencer windows. Next is “**PANIC**”, which is linked to the Panic button in the Midi window. Then there is “**SNUBRUB**” and “**INDYSUS**” (Independent Sustain), which are both used to eliminate note snubbing when notes of the same pitch overlap. INDYSUS is more reliable than SNUBRUB but also uses more CPU horsepower. You can select one or the other. **Change SNUBRUB/INDYSUS settings while there are no notes being played** or you might get “stuck” notes and have to reset.

BNCE (Bounce)

The “BNCE” button and the two number boxes to the right of it are used in conjunction with the built in sequencer and will be discussed later.

SCALE BLOCK

OST (Original Scale Tonic/Mode Root) and NST (New Scale Tonic/ Mode Root) MENUS

The **OST** and **NST** menus work together to establish the scale position/mode (Dorian, Ionian etc.) the music will be reharmonized to. **Their settings are relative to each other.** Select the scale position of the original music from the OST menu, then select the target position from the NST menu. As long as you select the correct OST, selecting the NST will be intuitive. However, you can use different combinations to achieve the same positioning in different ranges (octaves). Doing so will make predicting the target position less intuitive, so you’ll probably find it easier to use the transpose boxes for range placement.

GRACE MODE MENUS

When “**GRACE**” is selected from the left menu, grace notes in the original scale are reharmonized to be grace notes in the new scale. When “**SHAKE**” is selected grace notes from the original scale are passed through a virtual shaker and converted to scale tones of the new scale. The “**SH D**” (Shake Up/Down) menus below determine which direction the notes will gravitate to when put through the shaker.

When “**OFF**” is selected from the right menu, grace notes are silenced. This can affect the rhythmic as well as the melodic structure, as there will be holes where the grace notes were. When “**BP**” (Bypass) is selected, the original grace notes are played as is. When “**ON**” is selected, the grace notes are reharmonized or “shaken”, depending on the left menu status.

ROLL BOXES AND ROLL MODE

The “Roll” boxes to the right of the NST menus are labeled “**R GR**” and “**R SH**” for Grace and Shake. With these boxes you can change the relative position the Grace and Shake notes independently. The range is +/- 24. When you increment the roll box(s), the grace/shake notes shift down in relation to the scale tones. When you decrement the box(s) the grace/shake notes shift up. This may sound backwards, but in practice it’s more intuitive. Example: In the key of *D Base* (C Major), all the black keys (C#, D#, F#, G#, A#) are grace notes. The note C# falls between C and D. If you roll up (increment), D# now falls between C and D and all the other grace notes will shift accordingly. So when you roll up the grace notes sound higher, roll down and they’re lower. This will also affect which grace notes are mapped to the originals and can have a significant effect on the melodic and harmonic content.

The “**RLL MDE**” (Roll Mode) menu determines what happens to your roll settings when you shift in and out of Play or change the OD. In “**RESET**” mode the roll settings are set to zero. In “**RESUME**” mode the settings are preserved. Remember that if you are

entering chords from Scout or in CHORD ON THE FLY mode, you don't have to shift out of Play.

TRANSPOSE BOXES

Each scale mode has two transpose sections, one for grace/shake notes (**TR GR/SH**) and one for all notes (**TR ALL**). The range is +/- three octaves. The right box is for semitones and the left for octaves. Use the "TR GR/SH" boxes to change the grace/shake notes range relative to the scale tones and the "TR ALL" boxes to set the overall range.

OD (Scale Octave Division)

The "OD" box determines the point at which notes will wrap around in Wrap Scale mode. The points and effects will vary depending on scale choices and other settings. There is no way to predict exact results. Use the numbers (0 – 12) only as relative references. Most of the settings will not change the harmonic structure, however there is often one, and sometimes more that will. This is a "wild card" control that you just have to play with. It can yield some very interesting results.

CHORD BLOCK

OCR (Original Chord Root) MENU

The **OCR** menu determines which note, from the original music, will become the root of the new chord. Example: If you select *C* as the OCR and *D minor 7* as the new chord, an incoming *C Major 7* chord in root position, would be played as a *D minor 7* in root position. Other chords would result in different inversions or sub-chords of *D minor 7*. A sub-chord is a smaller chord who's notes are in the main chord, such as *D minor* or *F Major* (*D minor 7* = *D, F, A* and *C*, minus the *D* is *F, A*, and *C* = *F Major*). The OCR affects arpeggios and melodies in the same manner: It is **simply the point of alignment between the old and the new.**

SVE (Chord Sieve)

The original notes pass through the same type of virtual shaker that the grace notes, in "Scale Shake" mode, do. Because chords can vary in the way they are spread out over an octave, some combinations might not distribute the new chord tones as well as others. Example: A *D minor 7* chord is distributed over an entire octave fairly evenly. A *C minor b5 9* chord only lays out over a half an octave. When you reharmonize one to the other, some notes of the new chord may be omitted, while others are repeated. In order to deal with this, ten different sieve screens are provided for the shaker. **Higher SVE settings will spread out new chords that are "scrunched" while lower settings work better for new chords that are spread out already.** The effect of the SVE settings can also vary with the OCR, OD, RLL and RAND settings (the last three discussed later).

NW RND (New Random) BUTTON

This button generates a new random pattern (explained below).

WRP MDE (Wrap mode) MENU

- 1) **REG** --- This is the regular Wrap Chord mode in which note placement is determined solely by the other controls.
- 2) **RAND** --- A random generator determines note order in conjunction with the other controls. A new pattern is generated each time: A) A new chord is selected. B) A new OCR is selected. C) The SVE or OD settings are changed. D) The NW RAND button just to the left of the menu is clicked. E) Any selection other than FRZE or OPEN is made from the menu and FRZE is not checked.
- 3) **FRZE** --- Freezes the random pattern. You can toggle back and forth between REG, FRZE and MAN without losing the frozen pattern, but when you select RAND the pattern is replaced.
- 4) **MAN** --- Select patterns manually from the Pattern Window (page 43).
- 5) **PATT** --- Opens the Pattern window.

OD and RLL

These boxes work only for the Wrap chord mode and function the same as Wrap Scale Octave Divide and Roll boxes described in the Scale Block section. Note: The RLL box affects the entire pattern; there are no grace notes in the Chord modes.

THE CHORD TRANSPOSE BOXES

There are two sets of Transpose boxes: “**TR LNR**” for the Linear Chord mode and “**TR WRP**” for the Wrap Chord mode. They function just like those in the Scale Block.

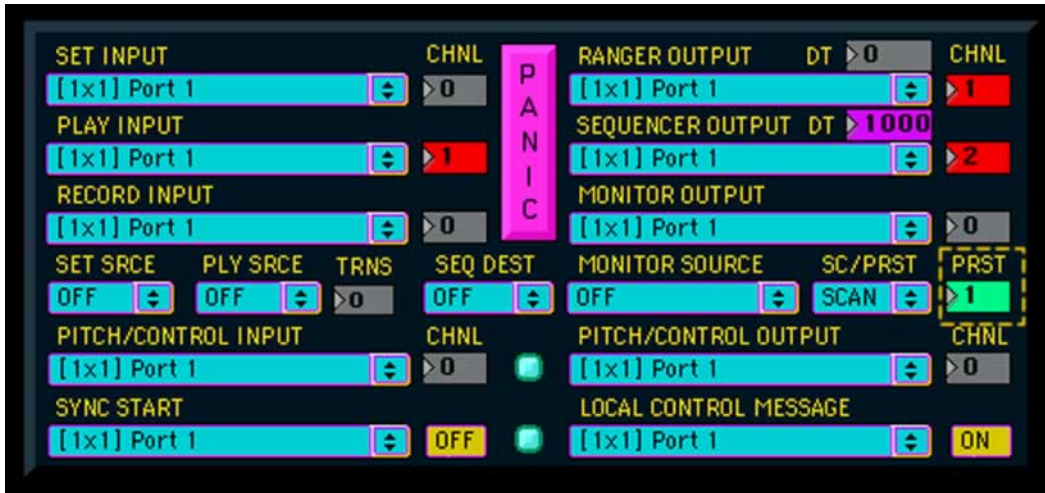
THE SCALE AND CHORD NAME DISPLAY

There are four name display lines. “**O**” is for the original scale. “**N**” is for the new scale. “**C**” is for the new chord. The bottom line is the **Analyze** display (described next) and is not labeled.

THE ANALYZE FUNCTION

The scale/chord analyzer identifies midi notes as they leave Ranger to determine the scale or chord they form together. It analyzes reharmonized notes in RHRM mode or original notes in BPASS mode. **Click in the ANALYZE display area** at the start of the music selection you want to analyze. The display will read “ANALYZING”. Click again at the end of the selection and the result will be displayed. If the subject notes don’t match any of the scales or chords in the Harmatrix library, “**NO SCALE NO CHORD**” will be displayed. This happens when there are not enough notes to make up a chord or too many grace notes for a scale reading. If you get a “**NO SCALE NO CHORD**” reading, try changing the music selection for better results. If you have a lot of grace notes, sample a shorter selection leaving out enough notes to get a scale reading. Select the scale in Scout and then *carry* it into KEY mode. From there, you can add the missing notes, by ear, and then delete the ones you think are extraneous grace notes. It may take a few attempts to find an appropriate scale.

THE RANGER MIDI WINDOW



Here is where you set all your routings for Ranger. Pick your midi ports/devices from the *INPUT* and *OUTPUT* Port menus. Each Port menu has a CHNL (channel) box just to the right of it with the exception of the Sync Start and Local Control menus, which have On/Off switches. When a channel box is set to “0”, it will be grayed out and that port will be disabled. Disable unused ports to conserve resources.

IMPORTANT

In order for Harmatrix’s midi functions to work smoothly, **Overdrive must be enabled in the Edit menu** on the main menu bar. If Overdrive is not enabled, timing may be erratic and midi play functions may be “glitchy”.

INPUTS

- 1) **SET INPUT** --- This is the input you use to enter scales and chords via midi. You don’t need to use this if your entering from Scout, which is connected internally to Ranger.
- 2) **PLAY INPUT** --- This input is for the source music to be reharmonized.
- 3) **RECORD INPUT** --- This input goes to the Sequencer record function.
- 4) **PITCH/CONTROL INPUT** --- Pitch-bend and control data, from a keyboard, external sequencer etc., enters here and is routed straight through to the **PITCH/CONTROL OUTPUT**. **Ranger does not record or process pitch-bend or control data.** However, you can route it and mix it with the processed midi notes for simultaneous recording or play to an external device/application. In other words, pitch-bend/control data can be applied to the notes, after Ranger has processed them.
- 5) **SYNC START** --- This is for real-time MTC Start, Stop and Continue (250, 251, 252) messages. These are routed to the sequencer’s Sync Start function. This input is not channel specific. Instead of a channel box, it has an on/off menu, just to the right. Sync Start must be enabled here, in the sequencer and external source in order to function.

NOTE: The PLAY INPUT and the RECORD INPUT both have a channel 17 that's used for real-time recording of one internal sequence to another, through Ranger. See page 53, *RECORDING REAL-TIME REHARMONIZATION INTERNALLY*, for details.

OUTPUTS

- 1) **RANGER SEND** --- This is Ranger's main output for external recording or play.
- 2) **SEQUENCER SEND** --- This is the Sequencer's main output for recording or play.
- 3) **MONITOR** --- This is Ranger's auxiliary output (described below in "ROUTING MENU").
- 4) **PITCH/CONTROL OUTPUT** --- See "PITCH/CONTROL INPUT" above.
- 5) **LOCAL CONTROL MESSAGE** --- Sends local control on/off to the selected port/device. Use this to prevent "doubling up" of midi data when you send it back to the source. Tip: if you are reharmonizing notes from a synth keyboard, and you don't want to hear the original notes, turn off local control for the keyboard.
- 6) **DT** (Delay Time) --- Set the delay time in milliseconds for doing rhythmical offsets. The Sequencer Output delay only works when the SEQ DEST is set to "MIX". To tap in the tempo, first click in the number box, then tap the **tab** key, then type "T" or "t" to enter the time. The Tap function is not very precise, but it will get you close.

ROUTING MENUS

SET SRCE (Set Source)

This is where you select the input source for the scales and chords the original music will be re-harmonized to. The choices are "OFF", "MIDI" and "SCOUT". When you select "MIDI", you then use the "SET INPUT" menu to select the port and channel.

PLY SRCE (Play Source)

Here you select the source for the incoming music to be processed. The choices are "OFF", "MIDI" and "SEQ" (Ranger's internal sequencer). Using the "TRNS" box you can transpose the input +/- one octave. TIP: Transposing the input gives you more grace notes to play with, which can create some interesting and controllable melodic mayhem.

SEQ DEST (Sequencer Destination)

Here you set the output destination for the **internal sequencer**. The choices are OFF, MIDI, RNGR and MIX. Selecting "RNGR" routes the output through Ranger's processor. **In order for Ranger to process the Sequencer output, the PLY SRCE must be set to "SEQ" and the SEQ DEST must be set to "RANGER"**.

Choosing "MIX" sends the Sequencer output through Ranger and around Ranger at the same time. The two signals are then mixed and sent to the Ranger output. You can add delay independently to either signal; the Sequencer delay is applied only to the bypass signal and the direct SEQUENCER OUTPUT, and only in MIX mode. You can monitor and record the mix either to an external sequencer or the internal one (see *RECORDING REAL-TIME REHARMONIZATION INTERNALLY*, page 53).

MONITOR SOURCE

- 1) Here you select what will be sent to the Monitor output. The selected source is routed to the port chosen from the Monitor port menu. This menu is echoed in

Ranger's main window. Use the monitor output to hear a source that would otherwise have no audible output, or to send a source to two separate outputs.

SC/PRST AND (PRST)

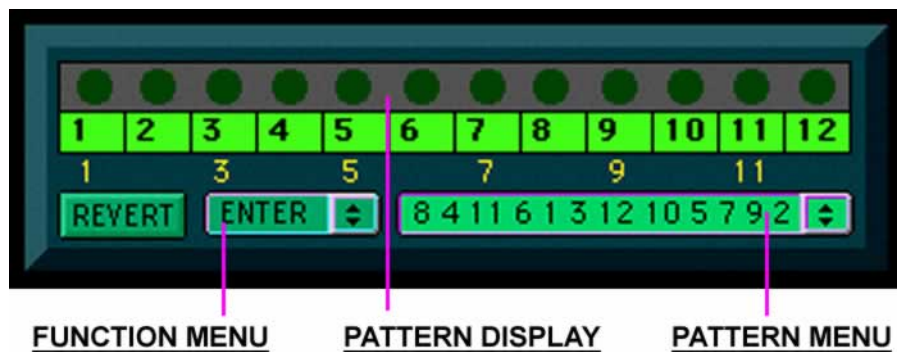
Select “**SCAN**” from the SC/PRST menu to scan your midi setup and fill the Port menus with all the available ports/devices. Select “**PRESETS**” to open the Presets window. You can select and load presets using the **PRST** number box just to the right or from the Presets window. **Note:** You have to actually change the number. If you drag the number with the mouse to, let's say “4” and then back to “1” without actually selecting “4”, number 1 isn't sent; the box thinks there was no change made.

The dotted box around the PRST number box is the **Drop-File area**. You can load preset **bank** files by dragging the **file or its alias** to this area. When a **compatible file** is dragged to this area **the box appears**. It will **only accept Ranger Midi Preset files**.

PRESETS WINDOW

The Ranger Midi Presets window is identical in operation to the Scout Presets window (see the PRESETS section in the SCOUT MANUAL, page 24).

THE PATTERN WINDOW



Open this window by selecting “**PATT**” from the WRP MDE menu in the Chord Block. Here you can store and recall patterns generated by the Random function. Patterns are displayed in the 12 number boxes each time a new pattern is generated. Choose “**STORE**” from the **FUNCTION** menu to store a pattern. The stored patterns are listed in the **PATTERN** menu on the lower right. When the WRP MDE menu is set to **MAN** (Manual), you can select and play the patterns from the menu. Select “**DELETE**” from the middle menu to delete the pattern currently displayed in the Pattern menu. Select “**CLEAR**” to delete all entries.

Currently, you can not save patterns to disk. However, you can print them out and re-enter them at a later time. When you select “**PRINT**” from the middle menu, the pattern, currently displayed in the Pattern menu, will appear in the Status window (accessed from the Window menu in your computer's main menu bar). If you select “**PRINT ALL**”, the entire contents of the Pattern menu will appear. **Note:** Clear the Status window, before printing, by clicking anywhere in it and then selecting “**Clear**” from the Edit menu. You can only copy the entire contents of the window; it's all or nothing. When you select text from the status window it doesn't highlight, but it will copy and paste just the same. Just

click in the Status window and select “Copy” from the Edit menu. You can then paste it into any text editor and print/save it.

To enter a pattern, you rearrange the numbers in the display. Click on the **LED** above the number you wish to move, then click on the LED above the box you wish to move it to. The numbers will switch places. When you finish arranging, select “**ENTER**” from the middle menu. The “**REVERT**” button flashes whenever a change is made to an entered pattern. You can click REVERT anytime before you select ENTER to set the display back to the last entered pattern. Select “**RESET**” to set the pattern display to 1 – 12 in order.

Manual pattern entry is for inputting patterns you’ve printed. It is not designed for intuitive pattern editing or creation. Trying to predictably arrange the pattern will drive you #@\$. Even if you are a dedicated puzzle hound and manage to figure out a system, you’ll find it’s much easier to rearrange the notes in a regular sequencer. However, you might come up with some interesting patterns by accident; but then, that’s what the Random function is for.

FLASH PRESETS

Ranger reharmonizes midi notes by re-mapping them. Many of the changes to settings will cause Ranger to generate a new mapping table or list. This can take a moment. While only a few milliseconds it can cause an audible glitch or an occasional “stuck note”.

The reharmonization settings that **WON’T** generate a new list are:

- 1) BPASS/RHRM/FLASH
- 2) The main mode setting, WRP SCLE, WRP CHRD etc.
- 3) GRACE/SHAKE, OFF/BP/ON
- 4) The RLL MDE.
- 5) Any of the transpose settings.

You CAN change these settings on the fly with virtually no glitches.

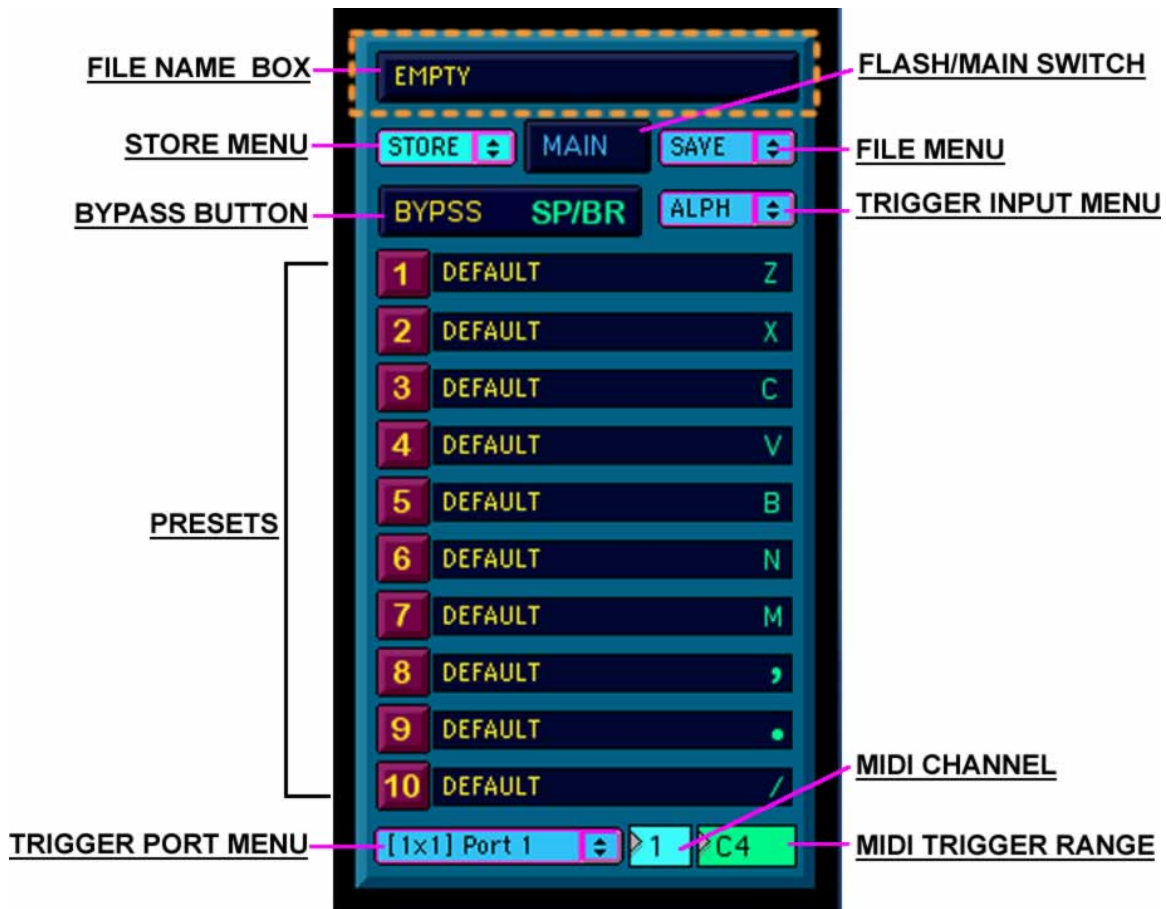
The following **WILL** generate a new list:

- 1) Entering a new scale or chord or changing any of the roots/tonics.
- 2) Changing any of the roll settings or octave divide settings.
- 3) Changing the Shake direction or the sieve.
- 4) Changing the Chord “WRP MDE”.

While an occasional glitch is not a problem when auditioning various settings, it can be a hindrance when trying to record quick changes. This is where the Flash Presets come in.

You can store any re-mapping as a Flash preset and save the presets in banks of 10. Flash Presets can be changed instantly with no rebuild time using the mouse, computer keys or midi. Note: When you change presets any notes playing are stopped; you need to time your changes accordingly so as not to “snub” notes inappropriately. If you want to overlap changes, you’ll need to adjust the note durations afterwards in your main sequencer.

THE FLASH PRESETS WINDOW



To store a preset, simply select a number from the **STORE** menu. **To name a preset**, click on the letter on the right side of the preset's NAME box and the Name dialog window will appear. In the dialog box you can either enter a descriptive name or just click "OK" to enter the default number. By naming the preset, even if only the default number, you'll at least know something is in there. **Note: Storing or naming a preset does not save it to disk.** You must save the preset bank using "SAVE" or "SAVE AS" from the **Preset FILE** menu, where you will also find the other standard file operations "OPEN" and "REVERT". The dotted box around the **FILE NAME** box is the **Drop-File area**. The box appears when you drag a **Flash preset** file or its alias to this area. Other files are not accepted. Use the Drop-File area as an alternative to the Open dialog.

To select a preset with the mouse, click on the numbered button to the left of the NAME box.

To select a preset using the computer keyboard, select "ALPHA" (alphabet) mode from the **TRIGGER INPUT** menu. Use the characters shown on the right of the NAME box (**CAPITOLS ONLY**). Use the **spacebar** to enter "BYPASS".

Select "NUM" from the **TRIGGER INPUT** menu, to use the numbers 1 – 9 respectively and "0" (zero) for **preset 10**. You can use either the numbers on the

keyboard or numeric keypad. Use either the numeric “Enter” key or the space bar for BYPASS.

IMPORTANT NOTE: Computer keyboard preset selection only works when the Flash Presets window is the active window.

SELECTING PRESETS VIA MIDI

Presets can be selected/triggered using midi notes from any source e.g. keyboard, sequencer. To use midi triggering, **select “MIDI”** from the TRIGGER INPUT menu. Next select the port from the **TRIGGER PORT** menu and the channel from the **CHANNEL** box. Select “SCAN” to update the Port menu if necessary. The **MIDI TRIGGER RANGE** box determines which note numbers will be used as triggers. Midi note numbers range from 0 – 127, with zero and all multiples of 12 being “C”. In other words, each octave starting with a “C” would start with note numbers 0, 12, 24 etc. Presets are triggered by the note numbers 0 – 10 with 0 being “Bypass”. **These numbers are added to the note in the MIDI TRIGGER RANGE box.** Example: Using a setting of “C4”, C4 would trigger Bypass, C#4 -- preset 1, D4 -- preset 2 etc. Middle C is C4 on some systems, C3 on others. You may have to experiment to see how the ranges line up on your system. **Trick:** Click and hold just to the right of the RANGE box and play the note you want to set it to.

Unlike computer keyboard triggering, midi triggering does not require the Flash Presets window to be the active window. You can be working in any window, even one from another application and still trigger presets via midi.

Entering Bypass, either from the **BYPASS** button or a trigger, allows the original notes to play unharmonized. The **FLASH/MAIN** switch toggles between the Flash presets and the settings in Ranger’s Main window. You can switch instantly, on the fly, between Flash, Main and Bypass. This essentially gives you 12 presets to work with.

THE SEQUENCER

Ranger has a small sequencer built into it. It has limited editing capabilities and is not meant to be used as your main sequencer. It is a very basic device. It is provided for convenience and to perform specific functions that might be awkward in an external sequencer. The main uses are:

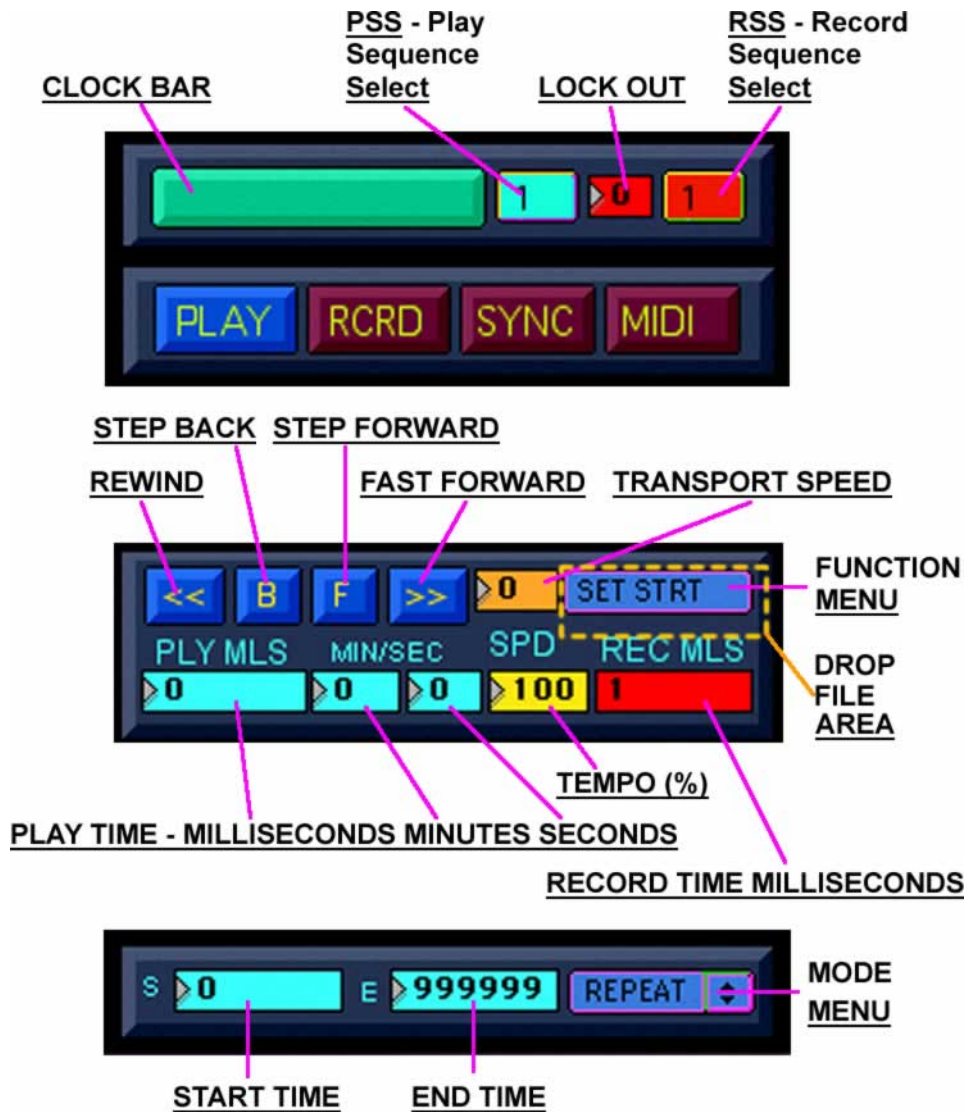
- 1) **Instant Bounce Reharmonization** – Using the Bounce (BNCE) button in Ranger’s main window, you can run one sequence through the reharmonizer and create a new sequence almost instantly. You can then use the new sequence as the raw material to be reharmonized. This ability to morph the midi music quickly and continuously is a very powerful feature. Combine morphing with the numerous reharmonization tweaks and there is no limit to the possibilities.
- 2) **Transfer Station** – When reharmonizing using an external sequencer, you would normally record off of one track through Ranger onto another track. In a project with many tracks, finding the space for extra bounce tracks can be a problem. You can record your original section into Ranger’s sequencer and then reharmonize it back into another spot on the original track without having to open a new track. This way

you can also do multiple reharmonizations of the same source material quickly and easily. With ten sequences, you can load up multiple tracks for quick section building.

- 3) **Experimentation** - There may be times when you just want to explore some harmonic possibilities with Harmatrix alone. With the built in sequencer you can record, experiment and save your sequences. Later, you can transfer them to your main sequencer. You can even do unlimited overdubs to build patterns. You only have one track to work with, but if your sound module has zone splits, you can simulate multi-tracking.

The sequencer will record single-track sequences up to 16.5 minutes long. It records only midi notes. It does not record pitch-bend or control data. You can, however, mix pitch-bend and control data with the output (see page 41).

THE SEQUENCER WINDOW



CLOCK BAR – Starts and stops the internal clock that controls record and playback. This acts like a pause button that is initially set to pause. When this bar is yellow, the clock is running.

PSS – Selects the sequence to be played back.

RSS – Selects the sequence to record into. **The RCRD button (coming up) must be off to select sequences for recording.**

LOCKOUT – Selects a sequence to which recording will be prevented (write protection).

PLAY – This button enables playback. Once enabled, click on the CLOCK BAR to start playback. If the CLOCK BAR is already on (yellow), enabling playback also starts it. Starting with the **PLAY button resets the clock to the time in the START TIME box**, whereas, starting with the **CLOCK BAR continues from the current position**. The PLAY button is yellow when engaged and reads “STOP”. Both the PLAY and the RCRD buttons read what will happen when you click them, not what’s currently happening, e.g. the PLAY button reads “PLAY” when off and “STOP” when on.

(RCRD) – This enables recording, but otherwise operates the same as the PLAY button.

Important note: Whenever RCRD is engaged, the currently record enabled sequence is erased in preparation for recording. For safety, **keep the RSS set to “0” until ready to record**, to prevent accidental erasure.

SYNC – This enables reception of midi sync; must also be enabled in Ranger Midi.

MIDI – This button toggles between **MIDI and DUB**. DUB can only be activated when the RECORD INPUT is enabled in Ranger Midi (not 0). When it reads “MIDI” the sequencer records from the midi source set in Ranger’s Midi window. When it’s set to “DUB” the midi source is mixed with the current PLAYBACK sequence. When you enter **DUB mode**, the RSS is automatically set to “0” and the current playback sequence is removed from the menu. You must **then select the sequence to record into**, and, you cannot dub into the playback sequence. **First select DUB or MIDI, then select the sequence to record, then engage the RCRD button!**

Normally, you can not have both the PLAY and the RCRD buttons on at the same time, but in DUB mode you can. DUB mode is also used for real-time bouncing through Ranger. See *Using the Sequencer/Recording Real-time Reharmonization* on page 53.

The CLOCK BAR must be OFF to use the TRANSPORT controls.

REWIND and FAST FORWARD – These operate like normal rewind and fast forward except that they wrap around. When you rewind past zero, the counter goes to the end of the sequence and continues down from there. When you fast forward past the end of a sequence, the counter goes to zero and continues up from there.

STEP BACK and STEP FORWARD – These move the counter back and forth one event at a time. These also wrap around. **NOTE: events include both note-ons and note-offs (key down and key up)**. When you use the “B” button right after playback or changing the play-time via the number boxes, it must first locate the next note **forward**. In those cases, you have to click **three times** to get the next note **back**. Otherwise, you only need to click once.

TRANSPORT SPEED – Sets the speed for rewind and fast forward. Range is 0-10.

THE FUNCTION MENU

IMPORTANT: All functions in this menu affect the selected **PLAYBACK** sequence.

SET START – This sets the time at which playback will begin; it copies the current playback time to the START TIME box. CLOCK BAR must be off.

SET END – This sets the time at which playback will end; it copies the current playback time to the END TIME box. CLOCK BAR must be off.

SHIFT – This moves the entire sequence back so that the first note is on “1”, thus eliminating empty space at the beginning of a sequence. CLOCK BAR must be off.

CROP – This eliminates (**ERASES**) all events before the START TIME and after the END TIME. Note offs for any notes still held down in the “kept” part of the sequence are retained and placed at the end. CLOCK BAR must be off.

SAVE – Save the selected sequence to disk using the standard Save dialog.

LOAD – Load a sequence from disk into the currently selected sequence slot (1-10), using the standard Open dialog. You can also drag the file to the **DROP FILE** area. **This will replace whatever is already in that sequence slot, so use caution.**

PLAY TIME – These three boxes display the current playback position. You can also use them to move to a specific point in the sequence (with the CLOCK BAR off). The MLS counter will appear to be erratic. This is because it only updates when an event is encountered and will appear to stand still when no notes are being played. The minutes and seconds displays will tick away steadily as the sequencer runs. The MLS counter tells the exact location of each event, whereas the minutes and seconds indicate the current time. Note that even though the exact time in milliseconds may not be displayed, it is faithfully transferred when using the “SET START” and “SET END” functions.

TEMPO – This adjusts the playback speed. **The sequencer ALWAYS RECORDS AT 100%**, so 100% is normal speed, 25% is ¼ speed and 200% is 2x speed.

RECORD TIME – This displays the current position when recording. Recording always starts at “1” or continues from the current position; you can not change the time in this box. The display is only updated every 500 milliseconds while recording but will show the exact end time when recording is stopped.

START TIME – This displays/sets the time at which the sequence will begin playing. Engaging the PLAY button resets the counter to this time. Note that the start time value cannot exceed the end time value. If you are trying to set a start time and it won’t take, increase the end time value to accommodate it.

END TIME – This displays/sets the time playback will stop when AUTO STOP is engaged, or when playback will loop back to the start time when REPEAT is engaged.

THE MODE MENU

REPEAT – In this mode, the portion of the sequence within the start and end time plays back repeatedly (loops). Repeat affects only playback. Any sequence being recorded will not loop. Because of this, you can loop the playback, play along with it or change reharmonization settings and record the whole thing in DUB mode. It’s important to remember to turn off repeat and reset the end time of the newly recorded sequence before playing it back. If you forget, you’ll only hear the first loop and think that you didn’t record the rest.

AUTO STOP – In this mode playback stops at the specified end time.

MIDI START – In this mode the CLOCK BAR is engaged when the first midi note comes through the RECORD INPUT port. This is a quick and easy way to “sync up” to an external source. When using MIDI START, enable record or playback (or both in DUB mode), but don’t engage the CLOCK BAR; it will automatically engage when the first note comes through. In order to keep from being barraged with incoming midi notes, MIDI START turns itself off after the first note. This means you must turn it on each time you use it.

SNUBRUB and INDYSUS (Independent Sustain) – Both are used to eliminate note snubbing when notes of the same pitch overlap. INDYSUS is more reliable than SNUBRUB but also uses more CPU horsepower. You can select one or the other.

Change SNUBRUB/INDYSUS settings while there are no notes being played or you might get “stuck” notes and have to reset.

Section 5

USING THE SEQUENCER

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RECORDING FROM A MIDI INSTRUMENT

IN THE RANGER MIDI WINDOW:

- 1) Set the input port and channel, in the Ranger Midi window (RECORD INPUT), to the port and channel your midi controller/instrument is connected to.
- 2) Set the SEQUENCER SEND OUTPUT to the port and channel of your sound source.
- 3) Set the SEQ DEST to "MIDI".
- 4) If you like, you can save this setup in the Ranger Midi Presets window.

IN THE SEQUENCER WINDOW:

- 1) When you are ready to record, click on the RCRD button; it will turn yellow and say "STOP".
- 2) Select a sequence to record into from the RSS (Record Sequence Select) menu.
- 3) Select "MIDI START" from the MODE MENU. Recording will begin as soon as you start playing. You can also just click the CLOCK BAR then start playing. You will need to use the SHIFT function if you want to move the start to "1".
- 4) When you're finished, click the RCRD button again to stop recording. You can also click on the CLOCK BAR, or both.
- 5) To prevent accidental erasure of your new sequence, set the RSS menu to "0" and/or the LOCKOUT box to the new sequence number.

PLAYING BACK YOUR SEQUENCE

- 1) Select the sequence you want to play (the one you just recorded) from the PLAY SEQUENCE menu.
- 2) Click on the PLAY button; it should be yellow and say “STOP”.
- 3) Click on the CLOCK BAR to start playback.
- 4) To stop playback, click either the PLAY button or the CLOCK BAR, or both.
- 5) You can adjust the playback speed with the TEMPO control box.
- 6) With the CLOCK BAR off and PLAY on you can use the transport controls and/or the PLAY-TIME boxes to move to a specific point in the sequence.

DUBBING

In DUB mode, you can play along with a pre-recorded sequence and record the mix to a new sequence. You can do this as many times as needed to build up your final sequence. Note: **The RECORD INPUT in the MIDI window must be enabled.**

- 1) Click the MIDI button to enter DUB mode.
- 2) Select the sequences to record to and from. Notice that the RSS automatically goes to “0” when you click the MIDI button; you have to select the sequence afterwards.
- 3) Engage PLAY and RCRD and start recording using the STOP/START bar or MIDI START.

NOTE: You will have to use SHIFT, after dubbing, if you want the new sequence to start exactly on “1”. There will be a **latency** of a few milliseconds, when recording starts.

SETTING UP A LOOP

- 1) Select “SHIFT” from the FUNCTION menu. If you used MIDI START to record the sequence, this step may not be necessary.
- 2) Play back the sequence and stop it at the point you feel it should begin again. You don’t have to get it right on just yet. Tapping your feet will help get you close. Make sure you use the CLOCK BAR to stop and leave PLAY on.
- 3) Select “SET END” from the FUNCTION MENU. The value in the END TIME box should be the current time (remember the PLAY TIME milliseconds box shows the last event which will be close to, but not exactly the current time).
- 4) Select “REPEAT” from the MODE menu, then resume playback.
- 5) By changing the value in the END TIME box you can get the loop to play with the right timing. Remember the END TIME box value is in milliseconds. With 1000 milliseconds a second, if you were way off in step 2, you’ll have to change the value considerably. With a little practice, you should be able to get very close in step 2.

SETTING A NEW START TIME

There will be times when you want a sequence to start at a point other than “0”. You can enter a new start time in the START TIME box by dragging, using the cursor keys or numeric input from the keyboard; the tricky part is locating the exact point. There are two tools provided to help with this; there’s SET START in the FUNCTION menu and the

STEP-BACK/FORWARD buttons. Below is a technique for setting a new start position. Remember, transport controls and SET START work only with the CLOCK BAR off.

- 1) Play the sequence and stop it as close to the desired start time as you can.
- 2) Use the STEP BACK/FORWARD buttons to locate the start note. The PLAY TIME millisecond box will show the exact location of the note. **Note-ons will sound when you land on them. The seemingly empty positions are note-offs.**
- 3) Select “SET START” from the function menu, or enter the time manually.
- 4) Only notes that were played at exactly the same time will occupy the same position in a sequence. Normally, the notes of a chord will be spaced a few milliseconds apart and will not necessarily be in order from low to high or vice versa. If your start point is on or near a chord, you may have to repeat the process a couple of times to hone in on the right start note. After you’ve done it a few times it becomes quick and easy.

PLAYING A SEQUENCE THROUGH RANGER

In the Rangers Midi window, set the SEQ DEST to “RNGR”. Next, set the PLY SOURCE to “SEQ”. Now set the RANGER SEND OUTPUT port and channel to that of your sound source. Your sequence will now go through Ranger to the sound source. Read “USING RANGER” for instructions on reharmonizing.

INSTANT REHARMONIZATION (BOUNCING)

Once you have Ranger reharmonizing your sequence the way you want, you can record a new reharmonized version, in about a second, using the BOUNCE function in Ranger’s Main window.

- 1) Select the sequence you’re reharmonizing from the left (blue) Bounce number box.
- 2) Select the sequence slot you want to bounce to from the right (red) Bounce number box.
- 3) Click BNCE and in about a second (depends on the length of the sequence) you’ll have a new reharmonized sequence. You can bounce as many times as you wish. You can even bounce a sequence back into itself.

RECORDING REAL-TIME REHARMONIZATION INTERNALLY

Bouncing is great for quickly recording sequences with a single fixed set of reharmonization settings. However, there will be times when you want to change settings or flash presets in real-time, while recording from one internal sequence to another. Here’s how you do it.

- 1) In the Ranger Midi window: Set both the RECORD input and the RANGER SEND output channels to “17”. Set the PLY SRCE to “SEQ” and the SEQ DEST to “RNGR”. Set the MONITOR SOURCE to “RANGER PLAY”.
- 2) In the Sequencer window: Set the MIDI button to “DUB”, then select the sequences to record to and from.
- 3) Engage PLAY and RCRD. Start playback with the CLOCK BAR and make your setting changes as the sequence plays.
- 4) Stop the sequencer. If you had REPEAT on, turn it off.

- 5) In the Midi window, set the MONITOR SOURCE to “SEQUENCE PLAY”.
- 6) Play back the new sequence.
- 7) You can now reset the END TIME if you want to loop your new sequence, using REPEAT.
- 8) Remember to put the RECORD and RANGER SEND channels back from 17 to resume regular operation. Channel 17 is strictly internal and has no midi connection.

USING WITH AN EXTERNAL SEQUENCER

RECORDING FROM ANOTHER SEQUENCER

- 1) In Ranger’s Midi window, use the same setup as for recording from an instrument, but set the RECORD INPUT port and channel to that of the external sequencer track you’re going to record from. If you’re using a software sequencer on the same computer, see *Inter-Application Connections* on page 21.
- 2) Queue up the external sequencer to play just the part you wish to record.
- 3) In the SEQUENCER window, select the sequence slot to record to and then engage the RCRD button.
- 4) Select MIDI START and then start the external sequencer.
- 5) When the selection is finished, disengage the RCRD button and the CLOCK BAR and your done.

RECORDING INTO ANOTHER SEQUENCER

If you are sending a sequence created in this sequencer, getting the timing to match the external sequencers time grid will involve some trial and error. Some software sequencers have the ability to conform their grid to raw input. If you have one of these your all set.

In this section, we are assuming that the sequence you’re going to send into the external sequencer originated there and that you have reharmonized it or are going to as you record. As long as you sync up (explained shortly) and the tempos haven’t been changed, you should get fairly accurate note placement time-wise.

- 1) If you are recording through Ranger, set the RANGER SEND OUTPUT port and channel to that of the external sequencer track you’re going to record to.
- 2) If you’re recording directly from this sequencer, set the SEQUENCER SEND OUTPUT as above.
- 3) Sync up (explained in the next section) and engage the PLAY button.
- 4) If you’re not recording an extended loop, you can use AUTO STOP in the MODE menu to stop playback after the last note.
- 5) Start recording either from this sequencer or the external depending on your sync setup.
- 6) Stop both of the sequencers if they’re not set up to do so automatically and you’re done. You may have to shift the newly recorded section back a few ticks/milliseconds to account for the midi lag-time/latency.

SYNCING UP

The sequencers SYNC is not a true sync in that it is not tempo locked; it merely synchronizes the start. This is adequate for short sections, but will drift over time. Most of the time you will be working with short sections, as you will want to change harmony settings and such. If you need to do a longer section, you can minimize the drift with subtle adjustments to the tempo and thus minimize the editing needed to line every thing up.

The easiest way to sync up is to use the **MIDI START** function. Most other sequencers will also have some form of this that you can use when recording **into them**.

If your other sequencer doesn't have this feature, you can use the one in this sequencer.

Here's how to use MIDI START when recording into an external sequencer.

- 1) Find a track that has a note at the desired start point. Use this as the trigger note for the MIDI START. If you need to, put in a temporary note or, temporarily move an existing note to the right spot. The note should be just a hair before the start. It doesn't matter what else is on the track; you won't be recording it. If this is your first track, set up a temporary "sync" track for the trigger note.
- 2) In the MIDI window set the RECORD INPUT to match the track with the trigger note.
- 3) In the other sequencer, set the start time a little ahead of the trigger note and arm the destination track for recording. Make sure the sync track is **play** enabled.
- 4) Engage PLAY and MIDI START in this sequencer.
- 5) Start recording in the other sequencer. Playback in this sequencer will start as soon as the trigger note is received through the RECORD INPUT.

MIDI SYNC

Another option is to use midi sync. If your other sequencer can send midi START, CONTINUE and STOP (real-time messages 250,251 and 252), you can use these to start and stop this sequencer.

- 1) In Ranger's Midi window, set the SYNC INPUT port to match the sync output of your other sequencer and set the switch to "ON". Consult the manuals for both your other sequencer and/or your midi interface for information on which port to use.
- 2) Engage the SYNC button in the sequencer window.
- 3) If everything is hooked up properly, the CLOCK BAR should go on and off in sync with your other sequencer's play and stop.

Midi sync can be trickier to set up, but if you get it working properly, you may find it more convenient. I have found it to be problematic. Some sequencers may claim to send Start and Stop messages, but actually just send a barrage of midi clock ticks, which won't work. Sometimes, figuring out which port to use can be confusing, and in some cases, pressing pause on the other sequencer will start this one. If MIDI SYNC works with your other sequencer, great. If not, you have MIDI START.

Section 6 **USING RANGER**

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OVERVIEW

The following exercises will take you through the controls and demonstrate some of the possibilities that Ranger has to offer. Going through all the possibilities is far beyond the scope of this tutorial. With some creative experimentation, you should be able to quickly expand on what you learn here. These exercises utilize Ranger’s own sequencer. Using an external sequencer is very similar. Other than making the necessary connections, you will need to consult the documentation that came with the external sequencer.

In order to get the most out of Ranger, it is **VERY IMPORTANT** to approach it in the right way. First, not everything will sound good, especially when you start manipulating grace notes. However, even when things sound terrible, an interesting and potentially useful pattern is only a few clicks away. Second, don’t expect Ranger to generate perfect arrangements. Although there will be a good portion that are usable as is, a lot of what comes out will need some adjustments. The place to make those adjustments is in your main sequencer. When you find yourself saying “that would be perfect if only those two notes...” that’s when it’s time to record it into your main sequencer and edit it there. Ranger is designed as a creative and inspirational tool that will help you explore numerous possibilities quickly and then generate arrangements that need only a *little tweaking*.

SETTING UP

In the Harmatrix folder is the Demo Sequences folder. In there you'll find some sequences that, although a little "cheesy" are appropriate for the following exercises. To load one, set the PSS box (Sequencer window) to the slot you want to put it in, then drag the file into the DROP FILE box or use the LOAD command.

In the Ranger Midi window:

- 1) Set the SET SRCE to "SCOUT", the PLY SRCE to "SEQ" and the SEQ DEST to "RNGR".
- 2) Set the RANGER SEND OUTPUT port and channel to your midi sound module.
- 3) All other inputs and outputs should be off (set to 0).
- 4) Open the Ranger Presets window either from the SC/PRST menu or the Harmatrix Main window.
- 5) Select "STORE ONE" from the top menu.
- 6) Select "NAME CURRENT" from the same menu and then enter a name in the dialog box. If you click "OK" without entering a name, it will name the preset "ONE".
- 7) You can close the Presets window if you like.

SCALE REHARMONIZING

Exercise 1

In the Ranger Main window:

Make sure the INPUT MODE menu is set to "PLAY" and set the BYPASS switch to "BPASS". Make sure Overdrive is enabled in the Edit menu.

Load *Demo sequence 1* and set it up to loop as described in *USING THE SEQUENCER*. Once you have everything set up and playing we can start reharmonizing. The following steps will go through all the controls so you can hear their effect on the sequence. With the sequence playing, switch from BPASS to RHRM. If the Scale and Chord settings are still at their default selections you shouldn't hear any change yet. You should be in LNR SCLE mode with *D BASE* as the Original and New scales. The OST and NST should be set to "D".

- 1) Cycle through all the Linear NST choices to hear the music in the different modes (Ionian, Dorian etc.).
- 2) When you get up to *C*, the music will be playing almost an octave higher. Set the Linear TR ALL octave (left) box to "-1" to bring the notes back down an octave.
- 3) Shift into WRP SCLE mode and repeat step 1 using the Wrap NST. Notice how the music stays in roughly the same range; some notes go higher, some lower. You may notice that one note seems to creep higher and higher.
- 4) Increment the OD box one step at a time and see what happens to that "runaway note" as well as the others.

Exercise 2

Reharmonizing to a New Scale

- 1) In the Ranger window, set the Input mode to “NEW SCLE”.
- 2) Open up Scout and pull up the *G Darmonic* scale.
- 3) Click the SCLE send button (purple). The *G Darmonic* should now appear in Ranger’s New Scale display.
- 4) Set Ranger’s Input mode back to Play and repeat steps 1 – 4 from the first exercise.
- 5) Notice that the OD will sometimes change the harmonic as well as the melodic structure. That’s its *wild card* nature.
- 6) Try toggling between RHRM and BPASS.

Exercise 3

Changing the Original Scale

Now things will start to get interesting. *Demo sequence 1* is in *D Base* (C Major). If we change the Original scale to something other than *D Base*, we’ll be introducing grace notes into the mix. We’ll use *F Base*. This will change the *E*, *A* and *B* that are in *D Base* to *E_b*, *A_b* and *B_b*, giving us three grace notes to play with. Any *E*, *A* or *B* coming in will now be treated as a grace note.

- 1) Set the Input mode to “ORG SCLE” and send the *F Base* scale over from Scout as before.
- 2) Set the Input mode back to PLAY and go through the first four steps again. Make sure the GR/SH MDE menus are set to “GRACE” and “ON”. Some of the NST modes get a little weird, don’t they?
- 3) In LNR SCLE mode, find a particularly “off” sounding NST setting.
- 4) Now start playing with the Linear Scale R GR (Roll Grace) setting. It will go +/- 24.
- 5) When the grace notes start to go to high or low, you can bring them back with the TR GR/SH octave control. Hear the changes? You can also change the harmonic content by transposing the grace notes in semi-tones (right TR GR/SH box).
- 6) Repeat steps 4 and 5 in WRP SCLE mode, this time also playing with the OD setting.
- 7) Notice that whenever you change the OD the R GR gets reset to “0”. To prevent this, set the RLL MDE to “RESUME”.

Exercise 4

SHAKE (Confine grace notes to Scale)

In exercise 3, we manipulated and transposed grace notes to change the melodic and harmonic structure of the sequence. By shifting into “SHAKE” mode, we can still manipulate the grace notes, but keep them confined to the *new* scale. This allows us to change the melodic structure without going out of key. You can go out of key, if you want, by transposing the shake notes in semitones, as in step 5 of exercise 3.

Use the same setup as in exercise 3, but change the *new* scale back to *D BASE* and set the GR/SH menu to “SHAKE”. Run through the NST modes and play around with the other settings. Try the SH D UP/DN, which changes the direction in which grace notes are shifted to scale tones; sometimes it has an effect and sometimes it doesn’t, depending on other settings.

Exercise 5

Transposing the Input

Want more grace notes to play with? Transpose the input in the Ranger Midi window. If you transpose up 1 semitone, the incoming *D Base* notes will be in *D# Base* when they get to Ranger. This gives you *C#, D#, F#, G#* and *A#* as grace notes. In GRACE mode try transposing the grace notes in the opposite direction from the input transposition.

ANALYZE (Sounds good, but what is it?)

Once you start playing around with grace notes and transpositions, it will become difficult if not impossible to judge, from your settings, what the output is. You can find out what the harmonic content of the output is by clicking on the bottom line of the NAME display. With the sequence playing, click once at the beginning of the part you want to analyze (it will say ANALYZING) and again at the end. If you get a “NO SCALE NO CHORD” reading, there are too many notes to fit into a recognized scale. In that event, try analyzing a different or shorter section of the sequence. When you have successfully analyzed the output, you can use that information in Scout, to help you decide what to do with your new creation.

Exercise 6

Eliminating Grace Notes

By using different scales and transpositions, we are able to change which incoming notes become grace notes. If you select “OFF” from the GR/SH MD menu, you can silence the grace notes. This gives you the ability to change the rhythmic as well as the melodic and harmonic structures. You can use this to make syncopated counter melodies, cannons, bridges, breaks etc. We’ll assume that all the settings are as they were from the last exercises.

- 1) In the Ranger Midi window, set the SEQ DEST to “MIX”.
- 2) Set both the Ranger and Sequencer outputs to your sound module (preferably to different channels and sounds).
- 3) Load *Demo sequence 2* and set it up to repeat.
- 4) Set the GR/SH MDE to “OFF”.
- 5) Now play with the settings and see how many accompaniments you can come up with for the original sequence. Note that the R GR, R SH, SH D, TR GR/SH and GR/SH controls won’t have any effect since the grace notes are turned off. The settings to play with are the input transposition, the output transposition, the NST and the OD (in WRP SCLE mode). Also try different Original and New scales.
- 6) Play with the delay (DT boxes) settings. Using the tap tempo feature, see if you can get one output to be offset by one beat (about 222 for *Demo 2* at regular speed). Then divide that time in half to make the notes fall in between the others. You can make a real mess in a hurry, but a little tweaking can give you some cool patterns.
- 7) If you want to record the mix back into the sequencer: Set the RECORD INPUT and the RANGER OUTPUT channel boxes to “17”. Monitor Ranger’s output through the MONITOR OUTPUT instead of the RANGER OUTPUT. Record as explained in *RECORDING REAL-TIME REHARMONIZATION INTERNALLY*, page 53.

CHORD REHARMONIZING

Exercise 7

The Chord Block works much the same way as the Scale Block, but with a few twists. First, go into the Ranger Midi window and set the PRST box to “2” and then back to “1”. This reloads preset 1, and should put the settings back the way they were at the start of exercise 1. **Note:** You have to actually change the number. If you drag the number with the mouse to, let’s say “4” and then back to “1” without actually selecting “4”, number 1 isn’t sent (the box thinks there was no change made).

- 1) In the Ranger window set the Original and New scales back to *D BASE* (from Scout) and switch to LNR CHD (Linear Chord) mode. The New Chord should still be the default *D min 7*.
- 2) Start the sequencer and run through all the OCR settings. You’ll notice that with some of the roots (OCRs), you’ll have a poor note spread. You won’t hear the full chord and some of the notes will repeat excessively.
- 3) Select a root that gives a poor spread. Then run through the SVE settings. You should be able to find one or two that will yield an acceptable pattern.

Another way to improve the spread is to use a fuller chord. If the music coming in contains all the notes of a seven-note scale and is being confined to only four notes of a chord, you’ll have three notes that have to become notes that are already in use. By using a five or six-note chord, you can find a compromise between chordal and scalar confinement. A *D min 7 11* might work well in place of the *D min 7* and give the pattern a little more breathing room.

Exercise 8

Changing Chords on the fly from Scout

- 1) With the sequencer playing, and Scout in Chord SELECT mode select “*min 7 11*” (5 note chord, leftmost menu) and select “D” from the TR menu. Then click the CHD send button. The sequence will now play in the new chord.
- 2) In Scout’s SEND window, go into the Chord Mode menu and enable “ON SELECT”.
- 3) Select “*aug Maj7 #11*” (5 note chord, leftmost menu). The Ranger should immediately shift to the *D aug Maj7 #11*. Using this setup, you can quickly change chords in Ranger from Scout just by selecting them and/or changing the TR. You can send scales the same way, but you have to shift Ranger into ORG SCLE or NEW SCLE. You can also transpose chords right in Ranger with the TR LNR and TR WRP boxes in the Chord block.

You can change chords via midi, while in PLAY when CHORD ON THE FLY is checked in the Input Mode menu in Ranger’s main window, see page 35.

WRP CHD (Wrap Chord)

If you want to mix the notes up more, use WRP CHD mode. There are three more ways to rearrange the pattern that work only in this Chord mode. You have OD (Octave Division) and RLL (Roll Pattern) which work the same as they do in WRP SCLE mode,

except that RLL rolls the entire pattern as opposed to just grace notes. You also have the Random Pattern generator and the Pattern storage window, both of which are described in detail in the Ranger Manual section.

REHARMONIZING EXTERNAL SEQUENCES

This is a basic outline; the exact procedure will depend on how your sequencer operates. Consult the documentation that came with it.

SETTING UP

In the Ranger Midi window:

- 1) Set the PLAY INPUT to match the port and channel of the track, in your sequencer, that contains the selection you want to reharmonize. See *Inter-Application Connections* in section 2, page 21.
- 2) Set up a track in the sequencer to record in to and set the RANGER SEND OUTPUT port and channel to match.
- 3) Set the MONITOR SOURCE to RANGER PLAY and the MONITOR OUTPUT to match the port and channel of your sound module. If your sequencer is set to monitor the record input (“midi patch thru”), omit this step.

General:

- 1) Use the punch-in/punch-out feature of your sequencer (if it has one) to set the recording start and stop times.
- 2) If your sequencer is capable, set the selection to loop, and start playback (not recording).
- 3) Make the necessary reharmonization settings in Ranger.
- 4) Turn off the loop feature in the sequencer and queue up the selection a bit before the punch-in time.
- 5) Record the selection.

Note: there will always be a small lag on the new track, so you will need to shift the entire selection back a few ticks/milliseconds. This may not matter if the timing doesn't have to be absolutely perfect and or you won't be reharmonizing the new section. However, the lag will be cumulative if you reprocess or loop the new section. In other words, the lag time will double each time you progressively re-record the section.

You can change reharmonization settings as you record or use the FLASH PRESETS as described in section 4, page 44. If track space is tight in your sequencer, you can record your selection into Ranger's sequencer and then send it back out to a new spot on the original track in your main sequencer. When doing this you can reharmonize it on the way in, out or both. See *Using the Sequencer*, section 5 page 53 and 54.

A final note: Ranger can also do some really interesting things with drum and percussion tracks; give it a shot.

GLOSSARY

Cluster – Two or more consecutive notes with no space in between them, e.g. *C*, *C#*, *D* and *D#* together, make a four note cluster.

Grace note – Non scale tone; passing tone; accidental. Example: All the black keys in the key of *C Major*.

Overdrive – (Edit menu) Gives processor priority to midi and midi related functions. This is necessary for smooth playback and accurate timing. When Overdrive is off graphics may be “snappier”, but at the expense of reduced midi performance.

Root - The starting note of a chord, and the note for which the chord is named; e.g. *C* is the root note of the *C Major* chord. A root is also the starting note of a mode. Read the “Basic Theory and Dorian Origin”.

Scale-tone – Any one of the notes of the scale.

Tonic – The starting note of a scale, and the note for which the scale is named; e.g. *C* is the tonic note of the *C Major* scale.

DORIAN ORIGIN SCALE NAMES

Base – The Dorian mode of the Major scale.

Darmonic – The Dorian mode of the Harmonic minor scale: It has a #4th in relation to the Base scale (Base scale with a #4th).

Melodic – Same as the Melodic minor in standard origin: Base scale with a #7th.

Darmel (Darmelodic) – Hybrid of the Darmonic and Melodic minor scales: It has the #4th of the Darmonic and #7th of the Melodic, in relation to the Base scale.

All other 7 and 8 note scales with the exception of the Diminished are built and have their names derived from the above four scales.

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