Musical MIDI Accompaniment

Reference Manual

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Chapter 1

Overview and Introduction

Musical MIDI Accompaniment, MMA,[1] generates standard MIDI[2] files which can be used as a backup track for a soloist. It was written especially for me—I am an aspiring saxophonist and wanted a program to "play" the piano and drums so I could practice my jazz solos. With MMA I can create a track based on the chords in a song, transpose it to the correct key for my instrument, and play my very bad improvisations until they get a bit better.

I also lead a small combo group which is always missing at least one player. With MMA generated tracks the group can practice and perform even if a rhythm player is missing. This all works much better than I expected when I started to write the program . . . so much better that I have used MMA generated tracks for live performances with great success.

Around the world musicians are using MMA for practice, performance and in their studios. Much more than ever imagined when this project was started!

1.1 License, Version and Legalities

The program MMA was written by and is copyright Robert van der Poel, 2002—2007.

This program, the accompanying documentation, and library files can be freely distributed according to the terms of the GNU General Public License (see the distributed file "COPYING").

If you enjoy the program, make enhancements, find bugs, etc. send a note to me at `bob@mellowood.ca`; or a postcard (or even money) to PO Box 57, Wynndel, BC, Canada V0B 2N0.

The current version of this package is maintained at: `http://www.mellowood.ca/mma/`.

This document reflects version 1.2 of MMA.

[1] Musical MIDI Accompaniment and the short form MMA in the distinctive script are names for a program written by Bob van der Poel. The "MIDI Manufacturers Association, Inc." uses the acronym MMA, but there is no association between the two.

[2] MIDI is an acronym for Musical Instrument Digital Interface.

This program has recently changed its status from beta to a 1.x version. I have done everything I can to ensure that the program functions as advertised, but I assume no responsibility for ***anything*** *it does to your computer or data.*

Sorry for this disclaimer, but we live in paranoid times.

This manual most likely has lots of errors. Spelling, grammar, and probably a number of the examples need fixing. Please give me a hand and report anything. . . it'll make it much easier for me to generate a really good product for all of us to enjoy.

1.2 About this Manual

This manual was written by the program author—and this is always a very bad idea. But, having no volunteers, the choice is no manual at all or my bad perspectives.[3]

MMA is a large and complex program. It really does need a manual; and users really need to refer to the manual to get the most out of the program. Even the author frequently refers to the manual. Really.

I have tried to present the various commands in a logical and useful order. The table of contents should point you quickly to the relevant sections.

1.2.1 Typographic Conventions

- The name of the program is always set in the special logo type: *MMA*.
- *MMA* commands and directives are set in small caps: DIRECTIVE.
- Important stuff is emphasized: *important*.
- Websites look like this: `http://www.mellowood.ca/mma/index.html`
- Filenames are set in bold typewriter font: **`filename.mma`**
- Lines extracted from a *MMA* input file are set on individual lines:

```
A command from a file
```

- Commands you should type from a shell prompt (or other operating system interface) have a leading $ (to indicate a shell prompt) and are shown on separate lines:

```
$ enter this
```

[3] The problem, all humor aside, is that the viewpoints of a program's author and user are quite different. The two "see" problems and solutions differently, and for a user manual the programmer's view is not the best.

1.2.2 LaTeX and HTML

The manual has been prepared with the LaTeX typesetting system. Currently, there are two versions available: the primary version is a PDF file intended for printing or on-screen display (generated with `dvipdf`); the secondary version is in HTML (transformed with `LaTeX2HTML`) for electronic viewing. If other formats are needed . . . please offer to volunteer.

1.2.3 Other Documentation

In addition to this document the following other items are recommended reading:

- The standard library documentation supplied with this document in PDF and HTML formats.
- The *MMA* tutorial supplied with this document in pdf and html formats.
- Various `README` files in the distribution.
- The Python source files.

1.2.4 Music Notation

The various snippets of standard music notation in this manual have been prepared with the MUP program. I highly recommend this program and use it for most of my notation tasks. MUP is available from Arkkra Enterprises, `http://www.Arkkra.com/`.

1.3 Installing *MMA*

MMA is a Python program developed with version 2.4 of Python. At the very least you will need this version (or later) of Python!

To play the MIDI files you'll need a MIDI player. Pmidi, tse3play, and many others are available for Linux systems. For Windows and Mac systems I'm sure there are many, many choices.

You'll need a text editor like *vi*, *emacs*, etc. to create input files. Don't use a word processor!

MMA consists of a variety of bits and pieces:

- The executable Python script, `mma`[4], must somewhere in your path. For users running Windows or Mac, please check *MMA* website for details on how to install on these systems.
- A number of Python modules. These should all be installed under the directory `/usr/local/share/mma/MMA`. See the enclosed file `INSTALL` for some additional commentary.

[4] In the distribution this is `mma.py`. It is renamed to save a few keystrokes when entering the command.

- A number of library files defining standard rhythms. These should all be installed under the directory `/usr/local/share/mma/lib/stdlib`.

The scripts `cp-install` or `ln-install` will install MMA properly on most Linux systems. Both scripts assume that main script is to be installed in `/usr/local/bin` and the support files in `/usr/local/share/mma`. If you want an alternate location, you can edit the paths in the script. The only supported alternate to use is `/usr/share/mma`.

The difference between the two scripts is that `ln-install` creates symbolic links to the current location; `cp-install` copies the files. Which to use it up to you, but if you have unpacked the distribution in a stable location it is probably easier to use the link version.

In addition, you *can* run MMA from the directory created by the untar. This is not recommended, but will show some of MMA's stuff. In this case you'll have to execute the program file `mma.py`.

You should be "root" (or at least, you need write permissions in `/usr/local/`) to run either install script.

If you want to install MMA on a platform other than Linux, please get the latest updates from our website at `www.mellowood.ca/mma`.

1.4 Running MMA

For details on the command line operations in MMA please refer to chapter 2.

To create a MIDI file you need to:

1. Create a text file (also referred to as the "input file") with instructions which MMA understands. This includes the chord structure of the song, the rhythm to use, the tempo, etc. The file can be created with any suitable text editor.
2. Process the input file. From a command line the instruction:

   ```
   $ mma myfile <ENTER>
   ```

   will invoke MMA and, assuming no errors are found, create a MIDI file `myfile.mid`.
3. Play the MIDI file with any suitable MIDI player.
4. Edit the input file again and again until you get the perfect track.
5. Share any patterns, sequences and grooves with the author so they can be included in future releases!

An input file consists of the following information:

1. MMA directives. These include TEMPO, TIME, VOLUME, etc. See chapter 21.
2. PATTERN, SEQUENCE and GROOVE detailed in chapters 4, 5, and 6.
3. Music information. See chapter 8.
4. Comment lines and blank lines. See below.

Items 1 to 3 are detailed later in this manual. Please read them before you get too involved in this program.

1.5 Comments

Proper indentation, white space and comments are a *good thing*—and you really should use them. But, in most cases MtA really doesn't care:

- ♫ Any leading space or tab characters are ignored,
- ♫ Multiple tabs and other white space are treated as single characters,
- ♫ Any blank lines in the input file are ignored.

Each line is initially parsed for comments. A comment is anything following a "//" (2 forward slashes).[5]

Comments are stripped from the input stream. Lines starting with the COMMENT directive are also ignored. See the COMMENT discussion on page 134 for details.

1.6 Theory Of Operation

To understand how MtA works it's easiest to look at the initial development concept. Initially, a program was wanted which would take a file which looked something like:

```
Tempo 120
Fm
C7
...
```

and end up with a MIDI file which played the specified chords over a drum track.

Of course, after starting this "simple" project a lot of complexities developed.

First, the chord/bar specifications. Just having a single chord per bar doesn't work—many songs have more than one chord per bar. Second, what is the rhythm of the chords? What about bass line? Oh, and where is the drummer?

Well, things got more complex after that. At a bare minimum, the program or interface should have the ability to:

- ♫ Specify multiple chords per bar,
- ♫ Define different patterns for chords, bass lines and drum tracks,
- ♫ Have easy to create and debug input files,
- ♫ Provide a reusable library that a user could simply plug in, or modify.

[5] The first choice for a comment character was a single "#", but that sign is used for "sharps" in chord notation.

From these simple needs MtA was created.

The basic building blocks of MtA are PATTERNs. A pattern is a specification which tells MtA what notes of a chord to play, the start point in a bar for the chord/notes, and the duration and the volume of the notes.

MtA patterns are combined into SEQUENCEs. This lets you create multi-bar rhythms.

A collection of patterns can be saved and recalled as GROOVEs. This makes it easy to pre-define complex rhythms in library files and incorporate them into your song with a simple two word command.

MtA is bar or measure based (we use the words interchangeably in this document). This means that MtA processes your song one bar at a time. The music specification lines all assume that you are specifying a single bar of music. The number of beats per bar can be adjusted; however, all chord changes must fall on a beat division (the playing of the chord or drum note can occur anywhere in the bar).

To make the input files look more musical, MtA supports REPEATs and REPEATENDINGs. However, complexities like *D.S.* and *Coda* are not internally supported (but can be created by using the GOTO command).

1.7 Case Sensitivity

Just about everything in a MtA file is case insensitive.

This means that the command:

```
Tempo 120
```

could be entered in your file as:

```
TEMPO 120
```

or even

```
TeMpO 120
```

for the exact same results.

Names for patterns, and grooves are also case insensitive.

The only exceptions are the names for chords, notes in SOLOs, and filenames. In keeping with standard chord notation, chord names are in mixed case; this is detailed in Chapter 8. Filenames are covered in Chapter 24.

Chapter 2

Running MMA

MMA is a command line program. To run it, simply type the program name followed by the required options. For example,

```
$ mma test
```

processes the file `test`[1] and creates the MIDI file `test.mid`.

When *MMA* is finished it displays the name of the generated file, the number of bars of music processed and an estimate of the song's duration. Note:

- The duration is fairly accurate, but it does not take into account any mid-bar TEMPO changes.
- The report shows *minutes* and *hundredths* of minutes. This is done deliberately so that you can add a number of times together. Converting the time to minutes and seconds is left as an exercise for the user.

2.1 Command Line Options

The following command line options are available:

Option	*Description*
	Debugging and other aids to figuring out what's going on.
-v	Show program's version number and exit.
-d	Enable LOTS of debugging messages. This option is mainly designed for program development and may not be useful to users.[2]
-o	A debug subset. This option forces the display of complete filenames/paths as they are opened for reading. This can be quite helpful in determining which library files are being used.
-p	Display patterns as they are defined. The result of this output is not exactly a duplicate of your original definitions. Most notable are that the note duration is listed in MIDI ticks, and symbolic drum note names are listed with their numeric equivalents.

[1] Actually, the file `test` or `test.mma` is processed. Please read section 24.1.

[2] A number of the debugging commands can also be set dynamically in a song. See the debug section on page 135 for details.

-s	Display sequence info during run. This shows the expanded lists used in sequences. Useful if you have used sequences shorter (or longer) than the current sequence length.

-r	Display running progress. The bar numbers are displayed as they are created complete with the original input line. Don't be confused by multiple listing of "*" lines. For example the line
	`33 Cm * 2`
	would be displayed as:
	`88:  33 Cm *2`
	`89:  33 Cm *2`
	This makes perfect sense if you remember that the same line was used to create both bars 88 and 89.

-e	Show parsed/expanded lines. Since *MMA* does some internal fiddling with input lines, you may find this option useful in finding mismatched BEGIN blocks, etc.
-c	Display the tracks allocated and the MIDI channel assignments after processing the input file. No output is generated.

Commands which modify *MMA*'s behaviour.

-S	Set a macro. If a value is needed, join the value to the name with a '='. For example:
	`$ mma myfile -S tempo=120`
	will process the file `myfile.mma` with the variable $Tempo set with the value "120". You need not specify a value:
	`$ mma myfile -S test`
	just sets the variable $test with no value.

-n	Disable generation of MIDI output. This is useful for doing a test run or to check for syntax errors in your script.
-mBARS	Set the maximum number of bars which can be generated. The default setting is 500 bars (a long song![3]). This setting is needed since you can create infinite loops by improper use of the GOTO command. If your song really is longer than 500 bars use this option to increase the permitted size.
-Mx	Generate type 0 or 1 MIDI files. The parameter "x" must be set to the single digit "0" or "1". For more details, see the MIDISMF section on page 119.
-P	Play and delete MIDI file. Useful in testing, the generated file will be played with the defined MIDI file player (see section on page 152). The file is created in the current directory and has the name "MMAtmpXXX.mid" with "XXX" set to the current PID.
-0	Generate a synchronization tick at the start of every MIDI track. Note that the option character is a "zero", not a "O". For more details see SYNCHRONIZE, page 142.
-1	Force all tracks to end at the same offset. Note that the option character is a "one", not an "L". For more details see SYNCHRONIZE, page 142.

Maintaining *MMA*'s database.

[3] 500 bars with 4 beats per bar at 200 BPM is about 10 minutes.

-g	Update the library database for the files in the LIBPATH. You should run this command after installing new library files or adding a new groove to an existing library file. If the database (stored in the files in each library under the name `.mmaDB`) is not updated, *MMA* will not be able to auto-load an unknown groove. Please refer to the detailed discussion on page 157 for details. The current installation of *MMA* does not set directory permissions. It simply copies whatever is in the distribution. If you have trouble using this option, you will probably have to reset the permissions on the lib directory. *MMA* will update the groove database with all files in the current LIBPATH. All files *must* have a ".mma" extension. Any directory containing a file named `MMAIGNORE` will be ignored. Note, that `MMAIGNORE` consists of all uppercase letters and is usually an empty file.
-G	Same as the "-g" option (above), but the uppercase version forces the creation of a new database file—an update from scratch just in case something really goes wrong.

File commands.

-i	Specify the RC file to use. See page 156.
-fFILE	Set output to FILE. Normally the output is sent to a file with the name of the input file with the extension ".mid" appended to it. This option lets you set the output MIDI file to any file name.

The following commands are used to create the documentation. As a user you should probably never have a need for any of them.

-Dk	Print list of *MMA* keywords. For editor extension writers.
-Dxl	Expand and print DOC commands used to generate the standard library reference for Latex processing. No MIDI output is generated when this command is given. Doc strings in RC files are not processed. Files included in other files are processed.
-Dxh	Same as -Dxl, but generates HTML output. Used by the `mklibdoc.py` tool.

2.2 Lines and Spaces

When *MMA* reads a file it processes the lines in various places. The first reading strips out blank lines and comments of the "//" type.

On the initial pass though the file any continuation lines are joined. A continuation line is any line ending with a single "\"—simply, the next line is concatenated to the current line to create a longer line.

Unless otherwise noted in this manual, the various parts of a line are delimited from each other by runs of white space. White space can be tab characters or spaces. Other characters may work, but that is not recommended, and is really determined by Python's definitions.

2.3 Programming Comments

MtA is designed to read and write files; it is not a filter.[4]

As noted earlier in this manual, *MtA* has been written entirely in Python.There were some initial concerns about the speed of a "scripting language" when the project was started, but Python's speed appears to be entirely acceptable. On an AMD Athlon 1900+ system running Mandrake Linux 10.1, most of songs compile to MIDI in well under one second. If you need faster results, you're welcome to recode this program into C or C++, but it would be cheaper to buy a faster system, or spend a bit of time tweaking some of the more time intensive Python loops.

I've done a bit of testing with Psyco `http://psyco.sourceforge.net/` and have found speed increases in the order of 15% to 20%. Output seems fine, so use it if speed is important to you.

[4] A filter mode could be added to *MtA*, but I'm not sure why this would be needed.

Chapter 3

Tracks and Channels

This chapter discusses *MIA* tracks and MIDI channels. If you are reading this manual for the first time you might find some parts confusing. If you do just skip ahead—you can run *MIA* without knowing many of these details.

3.1 *MIA* Tracks

To create your accompaniment tracks, *MIA* divides output into several internal tracks. There are a total of 8 different types of tracks, and an unlimited number of sub-tracks.

When *MIA* is initialized there are no tracks assigned; however, as your library and song files are processed various tracks will be created. Each track is created a unique name. The track types are discussed later in this chapter, but for now they are BASS, CHORD, WALK, DRUM, ARPEGGIO, SCALE, MELODY, SOLO and ARIA.

All tracks are named by appending a "-" and "name" to the type-name. This makes it very easy to remember the names, without any complicated rules. So, drum tracks can have names "Drum-1", "Drum-Loud" or even "Drum-a-long-name". The other tracks follow the same rule.

In addition to the hyphenated names described above, you can also name a track using the type-name. So, "DRUM" is a valid drum track name. In the supplied library files you'll see that the hyphenated form is usually used to describe patterns.

All track names are case insensitive. This means that the names "Chord-Sus", "CHORD-SUS" and "CHORD-sus" all refer to the same track.

If you want to see the names defined in a song, just run *MIA* on the file with the "-c" command line option.

3.2 Track Channels

MIDI defines 16 distinct channels numbered 1 to 16.[1] There is nothing which says that "chording" should be sent to a specific channel, but the drum channel should always be channel 10.[2]

[1] The values 1 to 16 are used in this document. Internally they are stored as values 0 to 15.

[2] This is not a MIDI rule, but a convention established in the GM (General MIDI) standard. If you want to find out more about this, there are lots of books on MIDI available.

For *MtA* to produce any output, a MIDI channel must be assigned to a track. During initialization all of the DRUM tracks are assigned to special MIDI channel 10. As musical data is created other MIDI channels are assigned to various tracks as needed.

Channels are assigned from 16 down to 1. This means that the lower numbered channels will most likely not be used, and will be available for other programs or as a "keyboard track" on your synth.

In most cases this will work out just fine. However, there are a number of methods you can use to set the channels "manually." You might want to read the sections on CHANNEL (page 114), CHSHARE (page 115), ON (page 138), and OFF (page 138).

Why bother with all these channels? It would be much easier to put all the information onto one channel, but this would not permit you to set special effects (like MIDIGLIS or MIDIPAN) for a specific track. It would also mean that all your tracks would need to use the same instrumentation.

3.3 Track Descriptions

You might want to come back to this section after reading more of the manual. But, somewhere, the different track types, and why they exist needs to be detailed.

Musical accompaniment comes in a combination of the following:

- ♫ Chords played in a rhythmic or sustained manner,
- ♫ Single notes from chords played in a sustained manner,
- ♫ Bass notes. Usually played one at a time in a rhythmic manner,
- ♫ Scales, or parts of scales. Usually as an embellishment,
- ♫ Single notes from chords played one at time: arpeggios.
- ♫ Drums and other percussive instruments played rhythmically.

Of course, this leaves the melody . . . but that is up to you, not *MtA*. . . but, if you suspect that some power is missing here, read the brief description of SOLO and MELODY tracks (page 21) and the complete "Solo and Melody Tracks" chapter (page 58).

MtA comes with several types of tracks, each designed to fill different accompaniment roles. However, it's quite possible to use a track for different roles than originally envisioned. For example, the bass track can be used to generate a single, sustained treble note—or, by enabling HARMONY, multiple notes.

The following sections describe the tracks and give a few suggestions on their uses.

3.3.1 Drum

Drums are the first thing one usually thinks about when we hear the word "accompaniment". All *MtA* drum tracks share MIDI channel 10, which is a GM MIDI convention. Drum tracks play single notes determined

by the TONE setting for a particular sequence.

3.3.2 Chord

If you are familiar with the sound of guitar strumming, then you're familiar with the sound of a chord. *MtA* chord tracks play a number of notes, all at the same time. The volume of the notes (and the number of notes) and the rhythm is determined by pattern definitions. The instrument used for the chord is determined by the VOICE setting for a sequence.

3.3.3 Arpeggio

In musical terms an *arpeggio*[3] is the notes of a chord played one at a time. *MtA* arpeggio tracks take the current chord and, in accordance to the current pattern, play single notes from the chord. The choice of which note to play is mostly decided by *MtA*. You can help it along with the DIRECTION modifier.

ARPEGGIO tracks are used quite often to highlight rhythms. Using the RSKIP directive produces broken arpeggios.

Using different note length values in patterns helps to make interesting accompaniments.

3.3.4 Scale

The playing of scales is a common musical embellishment which adds depth and character to a piece.

When *MtA* plays a scale, it first determines the current chord. There is an associated scale for each chord which attempts to match the flavor of that chord. The following table sums up the logic used to create the scales:

Major A major scale

Minor A melodic minor scale[4]

Diminished A melodic minor scale with a minor fifth and minor dominant seventh.

All scales start on the tonic of the current chord.

If the SCALETYPE is set to CHROMATIC, then a chromatic scale is used. The default for SCALETYPE is AUTO.

MtA plays successive notes of a scale. The timing and length of the notes is determined by the current pattern. Depending on the DIRECTION setting, the notes are played up, down or up and down the scale.

[3] The term is derived from the Italian "to play like a harp".

[4] If you think that support for Melodic and Harmonic minor scales is important, please contact us.

3.3.5 Bass

BASS tracks are designed to play single notes for a chord for standard bass patterns. The note to be played, as well as its timing, is determined by the pattern definition. The pattern defines which note from the current chord to play. For example, a standard bass pattern might alternate the playing of the root and fifth notes of a scale or chord. You can also use BASS tracks to play single, sustained treble notes.

3.3.6 Walk

The WALK tracks are designed to imitate "walking bass" lines. Traditionally, they are played on bass instruments like the upright bass, bass guitar or tuba.

A WALK track uses a pattern to define the note timing and volume. Which note is played is determined from the current chord and a simplistic algorithm. There is no user control over the note selection.

3.3.7 Solo and Melody

SOLO and MELODY tracks are used for arbitrary note data. Most likely, this is a melody or counter-melody . . . but these tracks can also be used to create interesting endings, introductions or transitions.

3.3.8 Automatic Melodies

Real composers don't need to fear much from this feature . . . but it can create some interesting effects. ARIA tracks use a predefined pattern to generate melodies over a chord progression. They can be used to *actually* compose a bit of music or simply to augment a section of an existing piece.

3.4 Silencing a Track

There are a number of ways to silence a track:

- ♫ Use the OFF (page 138) command to stop the generation of MIDI data,
- ♫ Disable the sequence for the bar with an empty sequence (page 35).
- ♫ Delete the entire sequence with SEQCLEAR (page 36).
- ♫ Disable the MIDI channel with a "Channel 0" (page 114).

Please refer to the appropriate sections on this manual for further details.

Chapter 4

Patterns

MtA builds its output based on PATTERNs and SEQUENCEs supplied by you. These can be defined in the same file as the rest of the song data, or can be included (see chapter 24) from a library file.

A pattern is a definition for a voice or track which describes what rhythm to play during the current bar. The actual notes selected for the rhythm are determined by the song bar data (see chapter 8).

4.1 Defining a Pattern

The formats for the different tracks vary, but are similar enough to confuse the unwary.

Each pattern definition consists of three parts:

- A unique label to identify the pattern. This is case-insensitive. Note that the same label names can be used in different tracks—for example, you could use the name "MyPattern" in both a Drum and Chord pattern…but this is probably not a good idea. Names can use punctuation characters, but must not begin with an underscore ("_"). The pattern names "z" or "Z" and "-" are also reserved.
- A series of note definitions. Each set in the series is delimited with a ";".
- The end of the pattern definition is indicated by the end-of-line.

In the following sections definitions are shown in continuation lines; however, it is quite legal to mash all the information onto a single line.

The following concepts are used when defining a pattern:

Start When to start the note. This is expressed as a beat offset. For example, to start a note at the start of a bar you use "1", the second beat would be "2", the fourth "4", etc. You can easily use off-beats as well: The "and" of 2 is "2.5", the "and ahh" of the first beat is "1.75", etc. Using a beat offset greater than the number of beats in a bar or less than "0" is not permitted. Please note that offsets in the range "0" to ".999" will actually be played in the *previous* bar (this can be useful in Jazz charts, and it will generate a warning!).[1] See TIME (page 81).

The offset can be further modified by appending a note length (see the duration chart, below). If you want to specify an offset in the middle of the first beat you can use "1.5" or "1+8". The latter means the first beat plus the value of an eight note. This notation is quite useful when generating

[1] The exception is that RTIME may move the chord back into the bar.

"swing" sequences. For example, two "swing eights" chords on beat one would be notated as: "1 81 90; 1+81 82 90".

You can subtract note lengths as well, but this is rarely done. And, to make your style files completely unreadable, you can even use note length combinations. So, yes, the following pattern is fine:[2]

```
Chord Define C1 2-81+4 82 90
```

Duration The length of a note is somewhat standard musical notation. Since it is impractical to draw in graphical notes or to use fractions (like $\frac{1}{4}$) *MMA*, uses a shorthand notation detailed in the following table:

Notation	*Description*
1	Whole note
2	Half
4	Quarter
8	Eighth
81	The first of a pair of swing eights
82	The second of a pair of swing eights
16	Sixteenth
32	Thirty-second
64	Sixty-fourth
3	Eight note triplet
43	Quarter note triplet
23	Half note triplet
6	Sixteenth note triplet
5	Eight note quintuplet
0	A single MIDI tick

The "81" and "82" notations represent the values of a pair of eighth notes in a swing pair. These values vary depending on the setting of SWINGMODE SKEW, see page 88.

The note length "0" is a special value often used in drum tracks where the actual "ringing"length appears to be controlled by the MIDI synth, not the driving program. Internally, a "0" note length is converted to a single MIDI tick.

Lengths can have a single or double dot appended. For example, "2." is a dotted half note and "4.." adds an eight and sixteenth value to a quarter note.

Note lengths can be combined using "+". For example, to make a dotted eight note use the notation "8+16", a dotted half "2+4", and a quarter triplet "3+3".

Note lengths can also be combined using a "-". For example, to make a dotted half you could use "1-4". Subtraction might appear silly at first, but is useful in generating a note *just* a bit shorter than its full beat. For example, "1-0" will generate a note 1 MIDI tick shorter than a whole note. This

[2]The start offset is the value of the first of a pair of swing eights plus a quarter *before* the second beat.

can be used in generating breaks in sustained tones.[3]

It is permissible to combine notes with "dots", "+"s and "-"s. The notation "2.+4" would be the same as a whole note.

The actual duration given to a note will be adjusted by the ARTICULATE value page 133).

Volume The MIDI velocity[4] to use for the specified note. For a detailed explanation of how *MusA* calculates the volume of a note, see chapter 16.

MIDI velocities are limited to the range 0 to 127. However, *MusA* does not check the volumes specified in a pattern for validity.[5]

In most cases velocities in the range 50 to 100 are useful.

Offset The offset into the current chord. If you have, for example, a C minor chord (C, E♭, and G) has 3 offsets: 0, 1 and 2. Note that the offsets refer to the *chord* not the scale. For example, a musician might refer to the "fifth"—this means the fifth note of a scale . . . in a major chord this is the third note, which has an offset of 2 in *MusA*.

Patterns can be defined for BASS, WALK, CHORD, ARPEGGIO and DRUM tracks. All patterns are shared by the tracks of the same type—*Chord-Sus* and *Chord-Piano* share the patterns for *Chord*. As a convenience, *MusA* will permit you to define a pattern for a sub-track, but remember that it will be shared by all similar tracks. For example:

```
Drum Define S1 1 0 50
```

and

```
Drum-woof Define S1 1 0 50
```

Will generate identical outcomes.[6]

4.1.1 Bass

A bass pattern is defined with:

```
Position Duration Offset Volume ; ...
```

Each group consists of an beat offset for the start point, the note duration, the note offset and volume.

The note offset is one of the digits "1" through "7", each representing a note of the chord scale. So, if you want to play the root and fifth in a traditional bass pattern you'd use "1" and "5" in your pattern definition.

[3] See the supplied GROOVE "Bluegrass" for an example.

[4] MIDI "note on" events are declared with a "velocity" value. Think of this as the "striking pressure" on a piano.

[5] This is a feature that you probably don't want to use, but if you want to ensure that a note is always sounded use a very large value (e.g., 1000) for the volume. That way, future adjustments will maintain a large value and this large value will be clipped to the maximum permitted MIDI velocity.

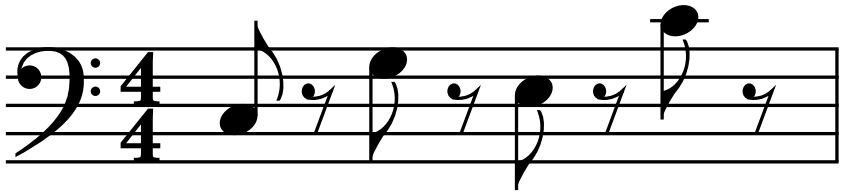
[6] What really happens is that this definition is stored in a slot named "DRUM".

The note offset can be modified by appending a single or multiple set of "+" or "-" signs. Each "+" will force the note up an octave; each "-" forces it down. This modifier is handy in creating bass patterns when you wish to alternate between the root note and the root up an octave . . . but users will find other interesting patterns. There is no limit to the number of "+"s or "-"s. You can even use both together if you're in a mood to obfuscate.

The note offset can be further modified with a single accidental "#", "&" or "b". This modifier will raise or lower the note by a semitone.[7] In the boogie-woogie library file a "6#" is used to generate a dominant 7th.

```
Bass Define Broken8 1 8 1 90 ; \
    2 8 5 80 ; \
    3 8 3 90 ; \
    4 8 1+ 80
```

Sheet Music Equivalent



Example 4.1: Bass Definition

Example 4.1 defines 4 bass notes (probably staccato eight notes) at beats 1, 2, 3 and 4 in a $\frac{4}{4}$ time bar. The first note is the root of the chord, the second is the fifth; the third note is the third; the last note is the root up an octave. The volumes of the notes are set to a MIDI velocity of 90 for beats 1 and 3 and 80 for beats 2 and 4.

MidiA refers to note tables to determine the "scale" to use in a bass pattern. Each recognized chord type has an associated scale. For example, the chord "Cm" consists of the notes "c", "e♭" and "g"; the scale for this chord is "c, d, e♭, f, g, a, b".

Due to the ease in which specific notes of a scale can be specified, BASS tracks and patterns are useful for much more than "bass" lines! These tracks are useful for sustained string voices, interesting arpeggio and scale lines, and counter melodies.

4.1.2 Chord

A Chord pattern is defined with:

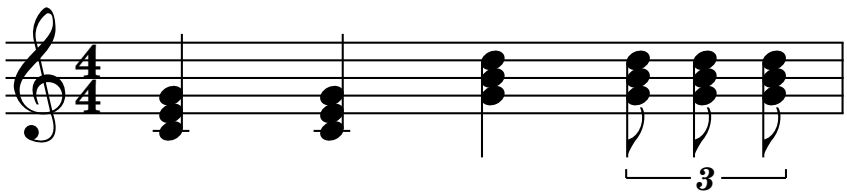
[7] Be careful using this feature . . . certain scales/chords may return non-musical results.

```
Position Duration Volume1 Volume2 ..  ; ...
```

Each group consists of an beat offset for the start point, the note duration, and the volumes for each note in the chord. If you have fewer volumes than notes in a chord, the last volume will apply to the remaining notes.

```
Chord Define Straight4+3 1 4 100 ; \
    2 4 90 ; \
    3 4 100 ;\
    4 3 90 ; \
    4.3 3 80 ; \
    4.6 3 80
```

Sheet Music Equivalent



Example 4.2: Chord Definition

Example 4.2 defines a $\frac{4}{4}$ pattern in a quarter, quarter, quarter, triplet rhythm. The quarter notes sound on beats 1, 2 and 3; the triplet is played on beat 4. The example assumes that you have C major for beats 1 and 2, and G major for 3 and 4.

Using a volume of "0" will disable a note. So, you want only the root and third of a chord to sound, you could use something like:

```
Chord Define Dups 1 8 90 0 90 0; 3 8 90 0 90 0
```

4.1.3 Arpeggio

An Arpeggio pattern is defined with:

```
Position Duration Volume ; ...
```

The arpeggio tracks play notes from a chord one at a time. This is quite different from chords where the notes are played all at once—refer to the STRUM directive (page 142).

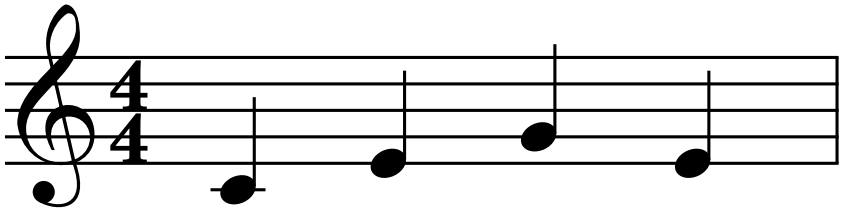
Each group consists of an beat offset, the note duration, and the note volume. You have no choice as to which notes of a chord are played (however, they are played in alternating ascending/descending order.[8]

[8] See the DIRECTION command (page 136).

Volumes are selected for the specific beat, not for the actual note.

```
Arpeggio Define 4s 1 4 100; \
    2 4 90; \
    3 4 100; \
    4 4 100
```

Sheet Music Equivalent



Example 4.3: Arpeggio Definition

Example 4.3 plays quarter note on beats 1, 2, 3 and 4 of a bar in $\frac{4}{4}$ time.

4.1.4 Walk

A Walking Bass pattern is defined with:

```
Position Duration Volume ; ...
```

Walking bass tracks play up and down the first part of a scale, paying attention to the "color"[9] of the chord. Walking bass lines are very common in jazz and swing music. They appear quite often as an "emphasis" bar in marches.

Each group consists of an beat offset, the note duration, and the note volume. *MMA* selects the actual note pitches to play based on the current chord (you cannot change this).

Example 4.4 plays a bass note on beats 1, 2 and 3 of a bar in $\frac{3}{4}$ time.

4.1.5 Scale

A scale pattern is defined with:

[9]The color of a chord are items like "minor", "major", etc. The current walking bass algorithm generates acceptable (uninspired) lines. If you want something better there is nothing stopping you from using a RIFF to over-ride the computer generated pattern for important bars.

```
Walk Define Walk4 1 4 100 ; \
    2 4 90; \
    3 4 90
```

Example 4.4: Walking Bass Definition

```
Position Duration Volume ; ...
```

Each group consists of an beat offset for the start point, the note duration, and volume.

```
Scale Define S1 1 1 90
Scale Define S4 S1 * 4
Scale Define S8 S1 * 8
```

Example 4.5: Scale Definition

Example 4.5 defines three scale patterns: “S1” is just a single whole note, not that useful on its own, but it is used as a base for “S4” and “S8”.

“S4” is 4 quarter notes and “S8” is 8 eight notes. All the volumes are set to a MIDI velocity of 90.

Scale patterns are quite useful in endings. More options for scales detailed in the SCALEDIRECTION (page 136) and SCALETYPE (page 141) sections.

4.1.6 Aria

An aria pattern is defined with:

```
Position Duration Volume ; ...
```

much like a scale pattern. Please refer to the the ARIA section (page 65) for more details.

4.1.7 Drum

Drum tracks are a bit different from the other tracks discussed so far. Instead of having each track saved as a separate MIDI track, all the drum tracks are combined onto MIDI track 10.

A Drum pattern is defined with:

```
Drum Define S2 1 0 100; \
    2 0 80 ; \
    3 0 100 ; \
    4 0 80
```

Example 4.6: Drum Definition

```
Position Duration Volume; ...
```

Example 4.6 plays a drum sound on beats 1, 2, 3 and 4 of a bar in $\frac{4}{4}$ time. The MIDI velocity (volume) of the drum is 100 on beats 1 and 3; 80 on beats 2 and 4.

This example uses the special duration of "0", which indicates 1 MIDI tick.

4.1.8 Drum Tone

Essential to drum definitions is the TONE directive.

When a drum pattern is defined it uses the default "note" or "tone" which is a snare drum sound. But, this can (and should) be changed using the TONE directive. This is normally issued at the same time as a sequence is set up (see chapter 5).

TONE is a list of drum sounds which match the sequence length. Here's a short, concocted example (see the library files for many more):

```
Drum Define S1 1 0 90
Drum Define S2 S1 * 2
Drum Define S4 S1 * 4
SeqClear
SeqSize 4
Drum Sequence S4 S2 S2 S4
Drum Tone SnareDrum1 SideKick LowTom1 Slap
```

Here the drum patterns "S2" and "S4" are defined to sound a drum on beats 1 and 3, and 1, 2, 3 and 4 respectively (see section 4.3 for details on the "*" option). Next, a sequence size of 4 bars and a drum sequence are set to use this pattern. Finally, *MIA* is instructed to use a SnareDrum1 sound in bar 1, a SideKick sound in bar 2, a LowTom1 in bar 3 and a Slap in bar 4. If the song has more than four bars, this sequence will be repeated.

In most cases you will probably use a single drum tone name for the entire sequence, but it can be useful to alternate the tone between bars.

To repeat the same "tone" in a sequence list, use a single "/".

The “tone” can be specified with a MIDI note value or with a symbolic name. For example, a snare drum could be specified as “38” or “SnareDrum1”. Appendix A.3 lists all the defined symbolic names.

It is possible to substitute tone values. See the TONETR command (see page 130).

4.2 Including Existing Patterns in New Definitions

When defining a pattern, you can use an existing pattern name in place of a definition grouping. For example, if you have already defined a chord pattern (which is played on beats 1 and 3) as:

```
Chord Define M13 1 4 80; 3 4 80
```

you can create a new pattern which plays on same beats and adds a single push note just before the third beat:

```
Chord Define M1+3 M13; 2.5 16 80 0
```

A few points to note:

- the existing pattern must exist and belong to the same track,
- the existing pattern is expanded in place,
- it is perfectly acceptable to have several existing definitions, just be sure to delimit each with a “;”,
- the order of items in a definition does not matter, each will be placed at the correct position in the bar.

This is a powerful shortcut in creating patterns. See the included library files for examples.

4.3 Multiplying and Shifting Patterns

Since most pattern definitions are, internally, repetitious, you can create complex rhythms by multiplying a copy of an existing pattern. For example, if you have defined a pattern to play a chord on beats 1 though 4 (a quarter note strum), you can easily create a similar pattern to play eighth note chords on beats 1, 1.5, etc. though 4.5 with a command like:

```
Track Define NewPattern OldPattern * N
```

where “Track” is a valid track name (“Chord”, “Walk”, “Bass”, “Arpeggio” or “Drum”, as well as “Chord2” or “DRUM3”, etc.).

The “*” is absolutely required.

“N” can be any integer value between 2 and 100.

In example 4.7 a Drum pattern is defined which plays a drum tone on beat 1 (assuming $\frac{4}{4}$ time). Then a new pattern, “S13”, is created. This is the old “S1” multiplied by 2. This new pattern will play a tone on beats 1 and 3.

```
Drum Define S1 1 1 100
Drum Define S13 S1 * 2
Drum Define S1234 S1 * 4
Drum Define S8 S1234 * 2
Drum Define S16 S8 * 2
Drum Define S32 S16 * 2
Drum Define S64 S1 * 64
```

Example 4.7: Multiply Define

Next, "S1234" is created. This plays 4 notes, one the each beat.

Note the definition for "S64": "S32" could have been multiplied by 2, but, for illustrative purposes, "S1" has been multiplied by 64—same result either way.

When *MtA* multiplies an existing pattern it will (usually) do what you expect. The start positions for all notes are adjusted to the new positions; the length of all the notes are adjusted (quarter notes become eighth notes, etc.). No changes are made to note offsets or volumes.

Example 4.8 shows how to get a swing pattern which might be useful on a snare drum.

To see the effects of multiplying patterns, create a simple test file and process it though *MtA* with the "-p" option.

Even cooler[10] is combining a multiplier, and existing pattern and a new pattern all in one statement. The following is quite legal (and useful):

```
Drum Define D1234 1 0 90 * 4
```

which creates drum hits on beats 1, 2, 3 and 4.

More contrived (but examples are needed) is:

```
Drum Define Dfunny D1234 * 2; 1.5 0 70 * 2
```

If you're really interested in the result, run *MtA* with the "-p" option with the above definition.

An existing pattern can be modified by *shifting* it a beat, or portion of a beat. This is done in a *MtA* definition with the SHIFT directive. Example 4.9 shows a triplet pattern created to play on beat 1, and then a second pattern played on beat 3.

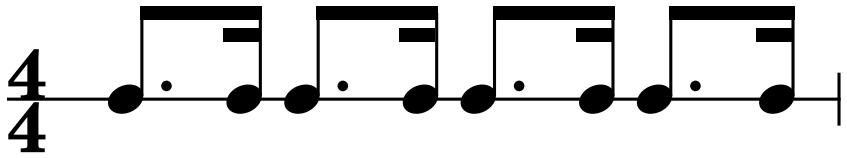
Note that the shift factor can be a negative or positive value. It can be fractional. Just be sure that the factor doesn't force the note placement to be less than 1 or greater than the TIME setting.

And, just like the multiplier discussed earlier you can shift patterns as they are defined. And shifts and multipliers can be combined. So, to define a series of quarter notes on the offbeat you could use:

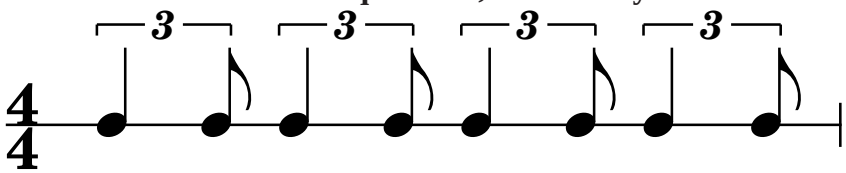
[10] In this case the word "cool" substitutes for the more correct "useful".

```
Begin Drum Define
    SB8 1 2+16 0 90 ; 3.66 4+32 80
    SB8 SB8 * 4
End
```

Sheet Music Equivalent, Normal Notation



Sheet Music Equivalent, Actual Rhythm



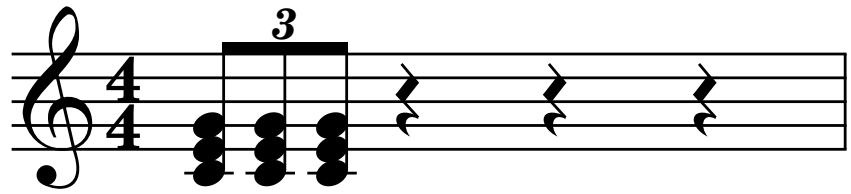
Example 4.8: Swing Beat Drum Definition

```
Drum Define D1234’ 1 0 90 * 4 Shift .5
```

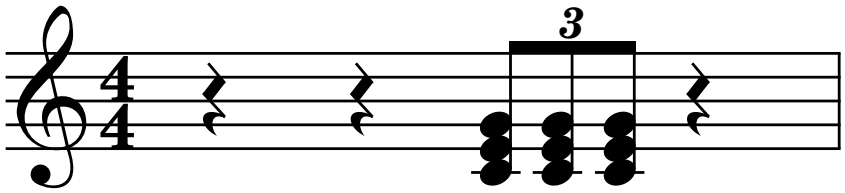
which would create the same pattern as the longer:

```
Drum Define D1234’ 1.5 1 90; 2.5 1 90; 3.5 1 90; 4.5 1 90
```

```
Chord Define C1-3 1 3 90; \
    1.33 3 90; 1.66 3 90
```




```
Chord Define C3-3 C1-3 Shift 2
```



Example 4.9: Shift Pattern Definition

Chapter 5

Sequences

Patterns by themselves don't do much good. They have to be combined into sequences to be of any use to you or to *MIA*.

5.1 Defining Sequences

A SEQUENCE command sets the pattern(s) used in creating each track in your song:

```
Track Sequence Pattern1 Pattern2 ...
```

"Track" can be any valid track name: "Chord", "Walk", "Walk-Sus", "Arpeggio-88", etc.

All pattern names used when setting a sequence need to be defined when this command is issued; or you can use what appears to be a pattern definition right in the sequence command by enclosing the pattern definition in a set of curly brackets "{ }".

```
SeqClear
SeqSize 2
Begin Drum
    Sequence Snare4
    Tone Snaredrum1
End
Begin Drum-1
    Sequence Bass1 Bass2
    Tone KickDrum2
End
Chord Sequence Broken8
Bass Sequence Broken8
Arpeggio Sequence { 1 1 100 * 8 } { 1 1
  80 * 4 }
```

Example 5.1: Simple Sequence

Example5.1 creates a 2 bar pattern. The Drum, Chord and Bass patterns repeat on every bar; the Drum-1 sequence repeats after 2 bars. Note how the Arpeggio pattern is defined at run-time.[1]

If there are fewer patterns than SEQSIZE, the sequence will be filled out to correct size. If the number of patterns used is greater than SEQSIZE (see chapter 21) a warning message will be printed and the pattern list will be truncated.

When defining longer sequences, you can use the "repeat" symbol, a single "/", to save typing. For example, the following two lines are equivalent:

```
Bass Sequence Bass1 Bass1 Bass2 Bass2
Bass Sequence Bass1 / Bass2 /
```

The special pattern name "-" (no quotes, just a single hyphen), or a single "z" can be used to turn a track off. For example, if you have set the sequences in example 5.1 and decide to delete the Bass halfway though the song you could:

```
Bass Sequence -
```

The special sequences, "-" or "z", are also the equivalent of a rest or "tacet" sequence. For example, in defining a 4 bar sequence with a 1-5 bass pattern on the first 3 bars and a walking bass on bar 4 you might do something like:

```
Bass Sequence Bass4-13 / / z
Walk Sequence z / / Walk4-4
```

If you already have a sequence defined[2] you can repeat or copy the existing pattern by using a single "*" as the pattern name. This is useful when you are modifying an existing sequence.

For example, assume that we have created a four bar GROOVE called "Neato". Now, we want to change the CHORD pattern to use for an introduction ... but, we really only want to change the fourth bar in the pattern:

```
Groove Neato
Chord Sequence * * * {1 2 90}
Defgroove NeatoIntro
```

When a sequence is created a series of pointers to the existing patterns are created. If you change the definition of a particular pattern later in your file the new definition will have *no* effect on your existing sequences.

Sequences are the workhorse of *MIDIA*. With them you can set up many interesting patterns and variations. This chapter should certainly give more detail and many more examples.

The following commands help manipulate sequences in your creations:

[1] If you run *MIDIA* with the "-s" option you'll see pattern names in the format "_1". The leading underscore indicates that the pattern was dynamically created in the sequence.

[2] In reality there is always a sequence defined for every track, but it might be a series of "rest" bars.

5.2 SeqClear

This command clears all existing sequences from memory. It is useful when defining a new sequence and you want to be sure that no "leftover" sequences are active. The command:

```
SeqClear
```

deletes all sequence information, with the important exception that SOLO tracks are ignored.

Alternately, the command:

```
Drum SeqClear
```

deletes *all* drum sequences. This includes the track "Drum", "Drum1", etc.

If you use a sub-track:

```
Chord-Piano SeqClear
```

only the sequence for that track is cleared.[3]

In addition to clearing the sequence pattern, the following other settings are restored to a default condition:

- ♫ Track Invert setting,
- ♫ Track Sequence Rnd setting,
- ♫ Track MidiSeq setting,
- ♫ Track octave,
- ♫ Track voice,
- ♫ Track Rvolume,
- ♫ Track Volume,
- ♫ Track RTime,
- ♫ Track Strum.

CAUTION: It is not possible to clear only a track like DRUM or CHORD using this command. The command

```
Chord SeqClear
```

resets *all* CHORD tracks, whereas the command:

[3] It is probably easier to use the command:

```
Chord-Piano Sequence -
```

if that is what you want to do. In this case *only* sequence pattern is cleared.

```
Chord-Foo SeqClear
```

resets the CHORD-FOO track. If you need to clear *only* the CHORD track use the "-" option.

5.3 SeqRnd

Normally, the patterns used for each bar are selected in order. For example, if you had a sequence:

```
Drum-2 Sequence P1 P2 P3 z
```

bar 1 would use "P1", bar 2 "P2", etc. However, it is quite possible (and fun and useful) to insert a randomness to the order of sequences. *MtA* can achieve this in three different ways:

1. Separately for each track:

   ```
   Drum-Snare SeqRnd On
   ```

2. Globally for all tracks:

   ```
   SeqRnd On
   ```

3. For a selected set of tracks (keeping the tracks synchronized):

   ```
   SeqRnd Drum-Snare Chord-2 Chord-3
   ```

To disable random sequencing:

```
SeqRnd Off
Drum SeqRnd Off
```

To illustrate the different effects you can generate, assume that you have a total of four tracks defined: Drum-Snare, Drum-Low, Chord and Bass; your sequence size is 4 bars; and you have created some type of sequence for each track with a commands similar to:

```
Drum-Snare Sequence D1 D2 D3 D4
Drum-Low Sequence D11 D22 D33 D44
Chord Sequence C1 C2 C3 C4
Bass Sequence B1 B2 B3 B4
```

With no sequence randomization at all, the tracks will be be processed as:

Track \ Bar	1	2	3	4	5
Drum-Snare	D1	D2	D3	D4	D1
Drum-Low	D11	D22	D33	D44	D11
Chord	C1	C2	C3	C4	C1
Bass	B1	B2	B3	B4	B1

Next, assume we have set sequence randomization with:

SeqRnd On

Now, the sequence may look like:

Track \ Bar	1	2	3	4	5
Drum-Snare	D3	D1	D1	D2	D4
Drum-Low	D33	D11	D11	D22	D44
Chord	C3	C1	C1	C2	C4
Bass	B3	B1	B1	B2	B4

Note that the randomization keeps the different sequences together: Drum sequences D3 and D33 are always played with Chord sequence C3, etc.

Next, we will set randomization for a Drum and Chord track only:

Drum-Low SeqRnd On
Chord SeqRnd On

Track \ Bar	1	2	3	4	5
Drum-Snare	D1	D2	D3	D4	D1
Drum-Low	D22	D11	D44	D44	D33
Chord	C3	C4	C2	C1	C1
Bass	B1	B2	B3	B4	B1

In this case there is no relationship between any of the randomized tracks.

Finally, it is possible to set a “global” randomization for a selected set of tracks. In this case we will set the Drum tracks only:

SeqRnd Drum-Snare Drum-Low

Track \ Bar	1	2	3	4	5
Drum-Snare	D3	D1	D4	D4	D2
Drum-Low	D33	D11	D44	D44	D22
Chord	C1	C2	C3	C4	C1
Bass	B1	B2	B3	B4	B1

Note that the drum sequences always “line up” with each other and the Chord and Bass sequences follow in the normal order.

The SEQCLEAR command will disable all sequence randomization. The SEQ command will disable “global” (for all tracks) randomization.

5.4 SeqRndWeight

When SEQRND is enabled each sequence for the track (or globally) has an equal chance of being selected. There are times when you may want to change this behaviour. For example, you might have a sequence like this:

```
Chord Sequence C1 C2 C3 C4
```

and you feel that the patterns C1 and C2 need to be used twice as often as C3 and C4. Simple:

```
Chord SeqRndWeight 2 2 1 1
```

Think of the random selection occurring like selecting balls out of bag. The SEQRNDWEIGHT command "fills up the bag." In the above case, there will be two C1 and C2 balls, one C3 and C4 ball— for a total of six balls.

This command can be used in both a track and global context.

The effects are saved in GROOVES.

SEQCLEAR will reset both global and track contexts to the default (equal) condition.

5.5 SeqSize

The number of bars in a sequence are set with the "SeqSize" command. For example:

```
SeqSize 4
```

sets it to 4 bars. The SeqSize applies to all tracks.

This command resets the *sequence counter* to 1.

If some sequences have already been defined, they will be truncated or expanded to the new size. Truncation is done by removing patterns from the end of the sequence; expansion is done by duplicating the sequence until it is long enough.

Chapter 6

Grooves

Grooves, in some ways, are *MusE*'s answer to macros. . . but they are cooler, easier to use, and have a more musical name.

Really, though, a groove is just a simple mechanism for saving and restoring a set of patterns and sequences. Using grooves it is easy to create sequence libraries which can be incorporated into your songs with a single command.

6.1 Creating A Groove

A groove can be created at anytime in an input file with the command:

```
DefGroove SlowRhumba
```

Optionally, you can include a documentation string to the end of this command:

```
DefGroove SlowRumba A descriptive comment!
```

A groove name can include any character, including digits and punctuation. However, it cannot include a space character (used as a delimiter) or a '/'[1], nor can consist solely of digits[2]

In normal operation the documentation strings are ignored. However, when *MusE* is run with the -Dx command line option these strings are printed to the terminal screen in LaTeX format. The standard library document is generated from this data. The comments *must* be suitable for LaTeX: this means that special symbols like "#", "&", etc. must be "quoted" with a preceding "\".

At this point the following information is saved:

- Current Sequence size,
- The current sequence for each track,
- Time setting (quarter notes per bar),
- "Accent",
- "Articulation" settings for each track,

[1] The '/' is reserved for future enhancements.

[2] **12345** and **2** are invalid; **11foo11** and **a2-2** are permitted.

- ♫ “Compress”,
- ♫ “Direction”,
- ♫ “DupRoot”,
- ♫ “Harmony”,
- ♫ “HarmonyOnly”,
- ♫ “HarmonyVolume”,
- ♫ “Invert”,
- ♫ “Limit”,
- ♫ “Mallet” (rate and decay),
- ♫ “MidiSeq”,
- ♫ “MidiVoice”,
- ♫ “MidiClear”
- ♫ “NoteSpan”,
- ♫ “Octave”,
- ♫ “Range”,
- ♫ “RSkip”,
- ♫ “Rtime”,
- ♫ “Rvolume”,
- ♫ “Scale”,
- ♫ “SeqRnd”, globally and for each track,
- ♫ “SeqRndWeight”, globally and for each track,
- ♫ “Strum”,
- ♫ “SwingMode” Status and Skew,
- ♫ “Time Signature”,
- ♫ “Tone” for drum tracks,
- ♫ “Unify”,
- ♫ “Voice”,
- ♫ “VoicingCenter”,
- ♫ “VoicingMode”,
- ♫ “VoicingMove”,

- “VoicingRange”,
- “Volume” for tracks and master,
- “VolumeRatio”.

6.2 Using A Groove

You can restore a previously defined groove at anytime in your song with:

```
Groove Name
```

At this point all of the previously saved information is restored.

A few cautions:

- Pattern definitions are *not* saved in grooves. Redefining a pattern results in a new pattern definition. Sequences use the pattern definition in effect when the sequence is declared.
- The “SeqSize” setting is restored with a groove. The sequence point is also reset to bar 1. If you have multi-bar sequences, restoring a groove may upset your idea of the sequence pattern.

To make life (infinitely) more interesting, you can specify more than one previously defined groove. In this case the next groove is selected after each bar. For example:

```
Groove Tango LightTango LightTangoSus LightTango
```

would create the following bars:

1. Tango
2. LightTango
3. LightTangoSus
4. LightTango
5. Tango

Note how the groove pattern wraps around to the first one when the list is exhausted. There is no way to select an item from the list, except by going though it.

You might find this handy if you have a piece with an alternating time signature. For example, you might have a $\frac{3}{4}$ $\frac{4}{4}$ song. Rather than creating a 2 bar groove, you could do something like:

```
Groove Groove34 Groove44
```

For long lists you can use the “/” to repeat the last groove in the list. The example above could be written:

```
Groove Tango LightTango LightTangoSus /
```

When you use the "list" feature of GROOVEs you should be aware of what happens with the bar sequence number. Normally the sequence number is incremented after each bar is processed; and, when a new groove is selected the sequence number is reset (see SEQ, page 141). When you use a list which changes the GROOVE after each bar the sequence number is reset after each bar . . . with one exception: if the same GROOVE is being used for two or more bars the sequence will not be reset.[3]

Another way to select GROOVEs is to use a list of grooves with a leading value. This lets you select the GROOVE to use based on the value of a variable . . . handy if you want different sounds for repeated sections. Again, an example:

```
Set loop 1 // create counter with value of 1
Repeat
  Groove $loop BossaNovaSus BossaNova1Sus BossaNovaFill
  print This is loop $Loop ...  Groove is $_Groove
  1 A / Am
  Inc Loop // Bump the counter value
RepeatEnd 4
```

If you use this option, make sure the value of the counter is greater than 0. Also, note that the values larger than the list count are "looped" to be valid. The use of "/"s for repeated names is also permitted. For an example have a look at the file `grooves.mma`, included in this distribution. You could get the same results with various "if" statements, but this is easier.

6.2.1 Overlay Grooves

To make the creation of variations easier, you can use GROOVE in a track setting:

```
Scale Groove Funny
```

In this case only the information saved in the corresponding DEFGROOVE FUNNY for the SCALE track will be restored. You might think of this as a "groove overlay". Have a look at the sample song "Yellow Bird" for an example.

When restoring track grooves, as in the above example, the SEQSIZE is not reset. The sequence size of the restored track is adjusted to fit the current sequence size setting.

One caution with these "overlays" is that no check is done to see if the track you're using exists. Yes, the GROOVE must have been defined, but not the track. Huh? Well, you need to know a bit about how *MMA* parses files and how it handles new tracks. When *MMA* reads a line in a file it first checks to see if the first word on the line is a simple command like PRINT, MIDI or any other command which doesn't require a leading trackname. If it is, the appropriate function is called and file parsing continues. If it is not a simple command *MMA* tests to see if it is a track specific command. But to do that, it first has to test the first word to see if it is a valid track name like *Bass* or *Chord-Major*. And, if it is a valid track name and that track

[3] Actually, *MMA* checks to see the next GROOVE in the list is the same as the current one, and if it is then no change is done.

doesn't exist, the track is created…this is done *before* the rest of the command is processed. So, if you have a command like:

```
Bass-Foo Groove Something
```

and you really meant to type:

```
Bass-Foe Groove Something
```

you'll have a number of things happening:

1. The track *Bass-Foo* will be created. This is not an issue to be concerned over since no data will be created for this new track unless you set a SEQUENCE for it.
2. As part of the creation, all the existing GROOVEs will have the *Bass-Foo* track (with its default/empty settings) added to them.
3. And the current setting you think you're modifying with the *Bass-Foe* settings will be created with the *Bass-Foo* settings (which are nothing).
4. Eventually you'll wonder why *MtA* isn't working.

So, be very careful using this command option. Check your spelling. And use the PRINTACTIVE command to verify your GROOVE creations. A basic test is done by *MtA* when you use a GROOVE in this manner and if the sequence for the named track is not defined you will get a warning.

6.3 Deleting Grooves

There are times when you might want *MtA* to forget about all the GROOVEs in its memory. Just do a:

```
GrooveClear
```

at any point in your input file and that is exactly what happens. But, "why," you may ask, "would one want to do this?" One case would be to force the re-reading of a library file. For example, a library file might have a user setting like:

```
If Ndef ChordVoice
  Set ChordVoice Piano1
Endif
```

In this case you could set the variable "ChordVoice" before loading any of the GROOVEs in the file. All works! Now, assume that you have a repeated section and want to change the voice. Simply changing the variable *does not work*. The library file isn't re-read since the existing GROOVE data is already in memory. Using GROOVECLEAR erases the existing data and forces a re-reading of the library file.

Please note that low-level setting like MIDI track assignments are *not* changed by this command.

6.4 Library Issues

If you are using a groove from a library file, you just need to do something like:

```
Groove Rhumba2
```

at the appropriate position in your input file.

One minor problem which *may* arise is that more than one library file has defined the same groove name. This might happen if you have a third-party library file. For the proposes of this example, lets assume that the standard library file “rhumba.mma” and a second file “xyz-rhumba.mma” both define the groove “Rhumba2”. The auto-load (see page 154) routines which search the library database will load the first “Rhumba2” it finds, and the search order cannot be determined. To overcome this possible problem, do a explicit loading of the correct file. In this case, simply do:

```
Use xyz-rhumba
```

near the top of your file. And if you wish to switch to the groove defined in the standard file, you can always do:

```
Use rhumba
```

just before the groove call. The USE will read the specified file and overwrite the old definition of “Rhumba2” with its own.

This issue in covered in more detail on page 157 of this manual.

Chapter 7

Riffs

In previous chapters you were shown how to create a PATTERN which becomes a part of a SEQUENCE. And how to set a musical style by defining a GROOVE.

These predefined GROOVEs are wonderful things. And, yes, entire accompaniment tracks can be created with just some chords and a single GROOVE. But, often a bit of variety in the track is needed.

The RIFF command permits the setting of an alternate pattern for any track for a single bar–this overrides the current SEQUENCE for that track.

The syntax for RIFF is very similar to that of DEFINE, with the exception that no pattern name is used. You might think of RIFF as the setting of an SEQUENCE with an anonymous pattern.

A RIFF is set with the command:

```
Track Riff Pattern
```

where:

Track is any valid *MIA* track name,

Pattern is any existing pattern name defined for the specified track, or a pattern definition following the same syntax as a DEFINE. In addition the pattern can be a single "z", indicating no pattern for the specified track.

Following is a short example using RIFF to change the Chord Pattern:

```
Groove Rhumba
1 Fm7
2 Bb7
3 EbM7
Chord Riff 1 4 100; 3 8 90; 3.666 8 80; 4.333 8 70
4 Eb6 / Eb
5 Fm7
```

In this case there is a Rhumba Groove for the song; however, in bar 4 the melodic pattern is emphasized by chording a quarter-note triplet over beats 3 and 4. In this case the pattern has been defined right in the RIFF command.

The next example shows that RIFF patterns can be defined just like the patterns used in a sequence.

```
Drum Define Emph8 1 0 128 * 8
Groove Blues
1 C
2 G
Drum-Clap Riff Emph8
3 G
4 F
Drum-Clap Riff Emph8
5 C
```

Here the *Emph8* pattern is defined as a series of eighth notes. This is applied for the third and fifth bars. If you compile and play this example you will hear a sporadic hand-clap on bar 3. The *Drum-Clap* track was previously defined in the Blues GROOVE as random claps on beats 2 and 4—our RIFF changes this to a louder volume with multiple hits.

The special pattern "z" can be used to turn off a track for a single bar. This is similar to using a "z" in the SEQUENCE directive.

A few things to keep in mind when using RIFFs:

- Each RIFF is in effect for only one bar (see the discussion below about multiple RIFFs.
- RIFF sequences are always enabled. Even if there is no sequence for a track, or if the "z" sequence is being used, the pattern specified in RIFF will apply.
- The existing voicing, articulation, etc. for the track will apply to the RIFF.
- It's quite possible to use a macro for repeated RIFFs. The following example uses a macro which sets the VOLUME, ARTICULATE, etc. as well as the pattern. Note how the pattern is initially set as single whole note, but, redefined in the RIFF as a run controlled by another macro. In bar 2 an eight note run is played and in bar 5 this is changed to a run of triplets.

```
Mset CRiff
  Begin Scale
    Define Run 1 1 120
    Riff Run * $SSpeed
    Voice AltoSax
    Volume f
    Articulate 80
    Rskip 5
  End
MsetEnd
Groove Blues
1 C
Set SSpeed 8
$CRiff
2 G
3 G
Set SSpeed 12
```

```
$CRIFF
5 C
```

♫ A RIFF can only be deleted by using it (i.e., a music bar follows the setting), with a SEQCLEAR or by a track DELETE.

RIFFs can also be used to specify a bar of music in a SOLO or MELODY track. Please see the "Solo and Melody" chapter 10.

The above examples show how to apply a temporary pattern to a single bar—the bar which follows the RIFF command. But, you can "stack"[1] a number of patterns to be processed sequentially. Each successive RIFF command adds a pattern to the stack; these patterns are then "pulled" from the stack as successive chord lines are processed.

Recycling an earlier example, lets assume that you want to use a customized pattern for bars 4 and 5 in a mythical song:

```
Groove Rhumba
1 Fm7
2 Bb7
3 EbM7
Chord Riff 1 4 100; 3 8 90; 3.666 8 80; 4.333 8 70
Chord Riff 1 2 100; 3 8 90;
4 Eb6 / Eb
5 Fm7
```

In this example the first *Chord Riff* will be used in bar 4; the second in bar 5. For an example of this see the sample file `egs/riffs.mma`.

I often use this feature when creating a SOLO line.

[1] Actually a queue or FIFO (First In, First Out) buffer.

Chapter 8

Musical Data Format

Compared to patterns, sequences, grooves and the various directives used in *MMA*, the actual bar by bar chord notations are surprisingly simple.

Any line in your input file which is not a directive or comment is assumed to be a bar of chord data.

A line for chord data consists of the following parts:

- Optional line number,
- Chord or Rest data,
- Optional lyric data,
- Optional solo or melody data,
- Optional multiplier.

Formally, this becomes:

```
[num] Chord [Chord ...]  [lyric] [solo] [* Factor]
```

As you can see, all that is really needed is a single chord. So, the line:

```
Cm
```

is completely valid. As is:

```
10 Cm Dm Em Fm * 4
```

The optional solo or melody data is enclosed in "{ }"s. The complete format and use is detailed in the *Solo and Melody Tracks*, page 58.

Lyrics are enclosed in "[ ]" brackets. See the *Lyrics chapter*, page 53.

8.1 Bar Numbers

The optional leading bar number is silently discarded by *MMA*. It is really just a specialized comment which helps you debug your music. Note that only a numeric item is permitted here.

Get in the habit of using bar numbers. You'll thank yourself when a song seems to be missing a bar, or appears to have an extra one. Without the leading bar numbers it can be quite frustrating to match your input file to a piece of sheet music.

You should note that it is perfectly acceptable to have only a bar number on a line. This is common when you are using bar repeat, for example:

```
1 Cm * 4
2
3
4
5 A
```

In the above example bars 2, 3 and 4 are comment bars.

8.2 Bar Repeat

Quite often music has several sequential identical bars. Instead of typing these bars over and over again, *MtA* has an optional *multiplier* which can be placed at the end of a line of music data. The multiplier or factor can is specified as "* NN" This will cause the current bar to repeated the specified number of times. For example:

```
Cm / Dm / * 4
```

produces 4 bars of output with each the first 2 beats of each bar a Cm chord and the last 2 a Dm. (The "/" is explained below.)

8.3 Chords

The most important part of a musical data line is, of course, the chords. You can specify a different chord for each beat in your music. For example:

```
Cm Dm Em Fm
```

specifies four different chords in a bar. It should be obvious by now that in a piece in $\frac{4}{4}$ you'll end up with a "Cm" chord on beat 1, "Dm" on 2, etc.

If you have fewer chord names than beats, the bar will be filled automatically with the last chord name on the line. In other words:

```
Cm
```

and

```
Cm Cm Cm Cm
```

are equivalent (assuming 4 beats per bar). There must be one (or more) spaces between each chord.

One further shorthand is the "/". This simply means to repeat the last chord. So:

```
Cm / Dm /
```

is the same as

```
Cm Cm Dm Dm
```

It is perfectly okay to start a line with a "/". In this case the last chord from the previous line is used. If the first line of music data begins with a "/" you'll get an error—*MMA* tries to be smart, but it doesn't read minds.

MMA recognizes a wide variety of chords in standard notation. In addition, you can specify slash chords and shift the octave up or down. Refer to the complete table in the appendix for details, page 165.

8.4 Rests

To disable a voice for a beat you can use a "z" for a chord name. If used by itself a "z" will disable all but the drum tracks for the given beat. However, you can disable "Chord", "Arpeggio", "Scale", "Walk", "Aria", or "Bass" tracks as well by appending a track specifier to the "z". Track specifiers are the single letters "C", "A", "S", "W", "B", "R" or 'D" and "!". Track specifiers are only valid if you also specify a chord. The track specifiers are:

D - All drum tracks,
W - All walking bass tracks,
B - All bass tracks,
C - All chord tracks,
A - All arpeggio tracks,
S - All scale tracks,
R - All aria tracks,
! - All tracks (almost the same as DWBCA, see below).

Assuming the "C" is the chord and "AB" are the track specifiers:

CzAB - mutes the ARPEGGIO and BASS tracks,
z - mutes all the tracks except for the drums,
Cz - is not permitted,
zAB - is not permitted.

Assuming that you have a drum, chord and bass pattern defined:

```
Fm z G7zC CmzD
```

would generate the following beats:

1 - Drum pattern, Fm chord and bass,

2 - Drum pattern only,
3 - Drum pattern and G7 bass, no chord,
4 - Cm chord and bass, no drum.

In addition, there is a super-z notation. “z!” forces all instruments to be silent for the given beats. “z!” is the same as “zABCDWR”, except that the latter is not valid since it needs a prefixed chord.

The “z” notation is used when you have a “tacet” beat or beats. The alternate notations can be used to silence specific tracks for a beat or two, but this is used less frequently.

8.5 Case Sensitivity

In direct conflict with the rest of the rules for input files, all chord names *are* case sensitive. This means that you *can not* use notations like “cm”—use “Cm” instead.

The “z” and the associated track specifiers are also case sensitive. For example, the form “Zc” will *not* work!

Chapter 9

Lyrics

MIDI files can include song lyrics. And some MIDI players or sequencers can display them as a file is played. Some, but not all.

I'm not aware of any keyboards which display lyrics; and most Linux based players do not display them. Exceptions to the rule are the programs *Kmid* which displays and highlights lyrics almost in a Karaoke manner, *xplaymidi* and *timidity* which display the lyrics in a secondary panel.

With this qualifier out of the way, there really is no reason for lyrics NOT to be useful in a program like *MtA*. Singers do not want a melody playing while they are vocalizing (really, they are no different in this than any other instrumentalist). And some platforms[1] other than Linux support lyric display in a more useful format.

The "Standard MIDI File" document describes a *Lyric* Meta-event:

> **FF 05 len text *Lyric*.** A lyric to be sung. Generally, each syllable will be a separate lyric event which begins at the event's time.[2]

Unfortunately, not all players and creators follow the specification—the most notable exception are ".kar" files. These files eschew the *Lyric* event and place their lyrics as a *Text Event*. There are programs strewn on the net which convert between the two formats (but I really don't know if conversion is needed).

If you want to read the word from the source, refer to the official MIDI lyrics documentation at `http://www.midi.org/about-midi/smf/rp017.shtml`.

9.1 Lyric Options

MtA has a number of options in setting lyrics. They are all called via the LYRIC command. Most options are set as option/setting pairs with the option name and the setting joined with an "=".

9.1.1 Event Type

MtA supports both format for lyrics (discussed above). The EVENT option is used to select the desired

[1] Pointers and reviews to other players would be would appreciated.

[2] I am quoting from "MIDI Documentation" distributed with the TSE Library. Pete Goodliffe, Oct. 21, 1999. Page 41.

mode.

```
Lyric EVENT=LYRIC
```

selects the default LYRIC EVENT mode.

```
Lyric EVENT=TEXT
```

selects the TEXT EVENT mode. Use of this option also prints a warning message.

9.1.2 Word Splitting

Another option controlled by the LYRIC command is to determine the method used to split words. As mentioned earlier (and in various MIDI documents), the lyrics should be split into syllables. *MtA* does this by taking each word (anything with white space surrounding it) and setting a MIDI event for that. However, depending on your player, you might want only one event per bar. You might even want to put the lyrics for several bars into one event. In this case simply set the "bar at a time" flag:

```
Lyric SPLIT=BAR
```

You can return to normal (syllable/word) mode at anytime with:

```
Lyric SPLIT=NORMAL
```

9.2 Chord Name Insertion

It is possible to have *MtA* duplicate the current chord names and insert them as a lyrics. The option:

```
Lyric CHORDS=On
```

will enable this. In this mode the chord line is parsed and inserted as verse one into each bar.

The mode is enabled with "On" or "1" and disabled with "Off" or "0".

After the chords are extracted they are treated exactly like a verse you have entered as to word splitting, etc. Note that the special chord "z" is converted to "N.C." and directives after the "z" in constructs like "C7zCS" will appear with only the chord name.

9.2.1 Chord Transposition

If you are transposing a piece or if you with to display the chords for a guitar with a cappo you can tell *MtA* to transpose the chord names inserted with CHORDS=ON. Just add a transpose directive in the LYRIC command:

```
Lyric CHORDS=On Transpose=2
```

Please note that the Lyrics code does *not* look at the global TRANSPOSE setting.[3]

MMA isn't too smart in it's transposition and will often display the "wrong" chord names in relation to "sharp" and "flat" names. If you find that you are getting too many "wrong" names, try setting the CNAMES option to either "Sharp" or "Flat". Another example:

```
Lyric CHORDS=On Transpose=2 CNames=Flat
```

By default, the "flat" setting is used. In addition to "Flat" and "Sharp" you can use the abbreviations "#", "b" and "&".

You can (and may well need to) change the CNAMES setting anywhere in the song.

9.3 Setting Lyrics

Adding a lyric to your song is a simple matter . . . and like so many things, there is more than one way to do it.

Lyrics can be set for a bar in-between a pair of **[]**s somewhere in a data bar.[4] For example:

```
z [ Pardon ]
C [ me, If I'm ]
E7 [ sentimental, \r]
C [when we say good ]
```

The alternate method is to use the LYRIC SET directive:

```
Lyric Set Hello Young Lovers
```

Unlike the other LYRIC options, the SET option must be the last one on a line, and it does not use the "=" sign. If you are setting the lyric for a single verse the **[]**s are optional; however, for multiple verses they are used (just like they are when you include the lyric in a data/chord line). The advantage to using LYRIC SET is that you can specify multiple bars of lyrics at one point in your file. See the sample file `egs/lyrics.mma` for an example.

The lyrics for each bar are separated into individual events, one for each word . . . unless the option SPLIT=BAR has been used, in which case the entire lyric is placed at the offset corresponding to the start of the bar.

MMA recognizes two special characters in a LYRIC:

- ♫ A **\r** is converted into an EOL character (hex value 0x0D). A **\r** should appear at the end of each lyrical line.

[3] This is a feature! It permits you to have separate control over music generation and chord symbol display.

[4] Although the lyric can be placed anywhere in the bar, it is recommended that you only place the lyric at the end of the bar. All the examples follow this style.

- A **\n** is converted into a LF character (hex value 0x0A). A **\n** should appear at the end of each verse or paragraph.

When a multi-verse section is created using a REPEAT or GOTO, different lyrics can be specified for different passes. In this case you simply specify two more sets of lyrics:

```
A / Am / [First verse] [Second Verse]
```

However, for this work properly you must set the internal counter LYRICVERSE for any verse other than 1. This counter is set with the command:

```
Lyric Verse=Value | INC | DEC
```

This means that you can directly set the value (the default value is 1) with a command like:

```
Lyric Verse=2
```

And you can increment or decrement the value with the INC and DEC options. This is handy at to use in repeat sections:

```
Lyric Verse=Inc
```

You cannot set the value to a value less than 1.

There are a couple of special cases:

- If there is only one set of lyrics in a line, it will be treated as text for verse 1, regardless of the value of LYRICVERSE.
- If the value of LYRICVERSE is greater than the number of verses found after splitting the line, then no lyrics are produced. In most cases this is probably not what you want.

At times you may wish to override *MMA*'s method of determining the beat offsets for a lyric or a single syllable in a lyric. You can specify the beat in the bar by enclosing the value in "<>" brackets. For example, suppose that your song starts with a pickup bar and you'd like the lyrics for the first bar to start on beat 4:

```
z z z C [ <4>Hello ]
F [ Young lovers ]
```

Assuming $\frac{4}{4}$ the above would put the word "Hello" at beat 4 of the first bar; "Young" on the first beat of bar 2; and "lovers" on beat 3 of bar 2.

Note: there must not be a space inside the "<>", nor can there be a space between the bracket and the syllable it applies to.

Only the first "<>" is checked. So, if you really want to have the characters "<" or ">" in a lyric just include a dummy to keep *MMA* happy:

```
C [ <><Verse_1.>This is a Demo ]
```

Example 9.1 [5] shows a complete song with lyrics. You should also examine the file `egs/lyrics.mma` for an alternate example.

[5] Included in this distribution as `songs/twinkle.mma`.

```
Tempo 200
Groove Folk
Repeat
  1 G [Twinkle,] [When the]
  2 G [Twinkle] [blazing ]
  3 C [little] [sun is]
  4 G [star; \r] [gone, \r]
  5 Am [How I] [When he ]
  6 G [wonder] [nothing]
  7 D7 [what you] [shines u-]
  8 G [are.  \r] [pon.  \r]
  9 G [Up a-] [then you]
  10 D7 [bove the] [show your]
  11 G [world so] [little]
  12 D [high, \r] [light, \r]
  13 G [Like a] [Twinkle, ]
  14 D7 [diamond] [twinkle,]
  15 G [in the] [all the]
  16 D7 [sky!  \r] [night.  \r]
  17 G [Twinkle,]
  18 G [twinkle]
  19 C [Little]
  20 G [star, \r]
  21 Am [How I]
  22 G [wonder]
  23 D7 [what you]
  24 G [are.  \r \n]

  Lyric Verse=Inc
RepeatEnd
```

Example 9.1: Twinkle, Twinkle, Little Star

9.3.1 Limitations

A few combinations are not permitted:

- ♫ You cannot specify lyrics in bars that are being repeated with the "*" option.
- ♫ You cannot insert lyrics with LYRIC SET and [STUFF].

Chapter 10

Solo and Melody Tracks

So far the creation of accompaniment tracks using drum and chord patterns has been discussed. However, there are times when chording (and chord variations such as arpeggios) are not sufficient. Sometimes you might want a real melody line!

MMA has two internal track types reserved for melodic lines. They are the SOLO and MELODY tracks. These two track types are identical with two major exceptions:

- SOLO tracks are only initialized once, at start up. Commands like SEQCLEAR are ignored by SOLO tracks.
- No settings in SOLO tracks are saved or restored with GROOVE commands.

These differences mean that you can set parameters for a SOLO track in a preamble in your music file and have those settings valid for the entire song. For example, you may want to set an instrument at the top of a song:

```
Solo Voice TenorSax
```

On the other hand, MELODY tracks save and restore grooves just like all the other available tracks. If you have the following sequence in a song file:

```
Melody Voice TenorSax
Groove Blues
...  musical data
```

no one will be surprised to find that the MELODY track playing with the default voice (Piano).

As a general rule, MELODY tracks have been designed as a "voice" to accompany a predefined form defined in a GROOVE—it is a good idea to define MELODY parameters as part of a GROOVE. SOLO tracks are thought to be specific to a certain song file, with their parameters defined in the song file.

Apart from the exceptions noted above, SOLO and MELODY tracks are identical.

Unlike the other available tracks, you do not define a sequence or pattern for a SOLO or MELODY track. Instead, you specify a series of notes as a RIFF pattern. For example, consider the first two bars of "Bill Bailey" (the details of melody notation will be covered later in this chapter):

```
Solo Riff 4c;2d;4f;
F
Solo Riff 4.a;8g#;4a;4c+;
```

```
F
```

In this example the melody has been added to the song file.

Specifying a RIFF for each bar of your song can get tedious, so there is a shortcut . . . any data surrounded by curly brackets "{ }" is interpreted as a RIFF for a SOLO or MELODY track. This means that the above example could be rewritten as:

```
F {4c;2d;4f;}
F {4.a;8g#;4a;4c+;}
```

By default the note data is inserted into the SOLO track. If more than one set of note data is present, it will be inserted into the next track set by the AUTOSOLOTRACKS command (page 62).

10.1 Note Data Format

The notes in a SOLO or MELODY track are specified as a series of "chords". Each chord can be a single note, or several notes (all with the same duration). Each chord in the bar is delimited with a single semicolon.[1]

Each chord can have several parts. All missing parts will default to the value in the previous chord. The various parts of a chord must be specified in the order given in the following table.

Duration The duration of the note. This is specified in the same manner as chord patterns; see page 23 for details on how to specify a note duration.

Pitch The note in standard musical notation. The lowercase letters "a" to "g" are recognized as well as "r" to specify a rest (please note the exception for *Drum Solo Tracks*, page 63).

Accidental A pitch modifier consisting of a single "#" (sharp), "&" (flat) or "n" (natural). Please note that an accidental will override the current KEYSIG for the current bar (just like in real musical notation). Unlike standard musical notation the accidental *will* apply to similarly named notes in different octaves.

Please note that when you specify a chord in *MtA* you can use either a "b" or a "&" to represent a flat sign; however, when specifying notes for a SOLO you can only use the "&" character.

Octave Without an octave modifier, the current octave specified by the OCTAVE directive is used for the pitch(es). Any number of "-" or "+" signs can be appended to a note. Each "-" drops the note by an octave and each "+" will increase it. The base octave begins with "c" below the treble clef staff.

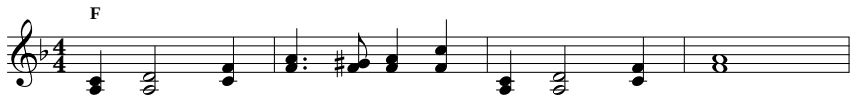
Volume A volume can be specified. The volume is a string like "ff" surrounded by "<>" brackets. For example, to set the volume of a chord to "very loud", you could use the string <ffff> in the chord specification (page 91) Of course, it is probably easier to set accented beats with the ACCENT directive (page 92).

[1] I have borrowed heavily from the notation program MUP for the syntax used here. For notation I highly recommend MUP and use it for most of my notation tasks, including the creation of the score snippets in this manual. MUP is available from Arkkra Enterprises, `http://www.Arkkra.com/`.

Tilde The tilde character, ~, can appear as the first or last item in a note sequence. As the last character it signals that the final note duration extend past the end of the bar; as the first character it signals to use the duration extending past the end of the previous bar as an initial offset. For details, see below.

Null You can set a "ignore" or "do nothing" chord with the simple notation "<>". If this is the only item in the chord then that chord will be ignored This means that no tones will be generated, and the offset into the bar will not be changed. The use of the notation is mainly for tilde notation with notes held over multiple bars.

To make your note data more readable, you can include any number of space and tab characters (which are ignored by *MtA*).



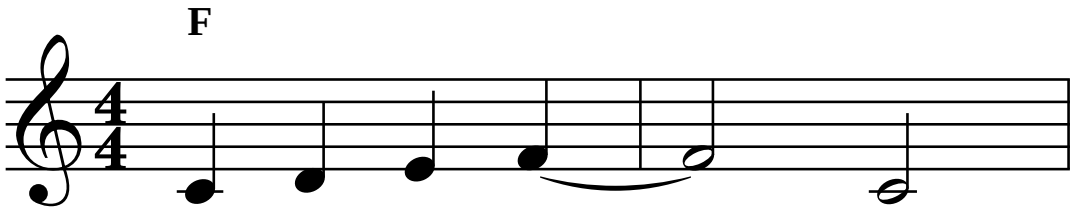

```
KeySig 1b
F { 4ca-; 2da-; 4fd; }
F { 4.af; 8g#f; 4af; c+f; }
F { 4ca-; 2da-; 4fc; }
F { 1af; }
```

Example 10.1: Solo Notation

Example 10.1 shows a few bars of "Bill Bailey" with the *MtA* equivalent.

10.1.1 Long Notes

Notes tied across bar lines can be easily handled in *MtA* scores. Consider the following:



It can be handled in three different ways in your score:

♫
```
F {4c;d;e;4+2f;}
F {2r;2c;}
```

In this case you *MtA* will generate a warning message since the last note of the first bar ends past the end of that bar. The rest in the second bar is used to position the half note correctly.

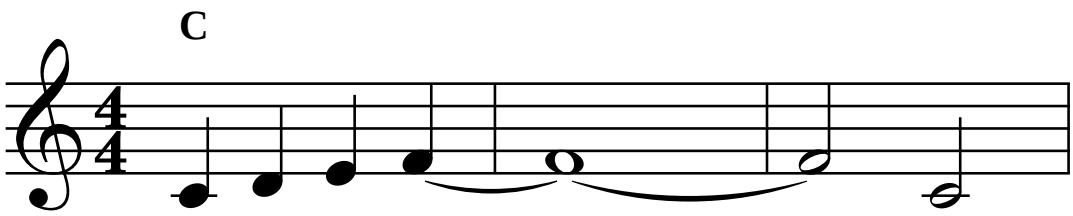
♫
```
F {4c;d;e;4+2f~};
F {2r;2c;}
```

This time a ~ character has been added to the end of the first line. In this case it just signals that you "know" that the note is too long, so no warning is printed.

♫
```
F {4c;d;e;4+2f~;}
F {~2c;}
```

The cleanest method is shown here. The ~forces the insertion of the extra 2 beats from the previous bar into the start of the bar.

If you have a very long note, as in this example:



you can have both leading and ending tildes in the same chord; however, to force MtA to ignore the chord you need to include an empty chord marker:

```
C {4c;d;e;4+2f~;}
C {~<>~;}
C {~2c;}
```

MtA has some built-in error detection which will signal problems if you use a tilde at the end of a line which doesn't have a note held past the end of the current bar or if you use a tilde to start a bar which doesn't have one at the end of the previous bar.

10.1.2 Using Defaults

The use of default values can be a great time-saver, and lead to confusion! For example, the following all generate four quarter note "f"s:

```
Solo Riff 4f; 4f; 4f; 4f;
Solo Riff 4f; f; f; f;
Solo Riff 4f; 4; 4; 4;
Solo Riff 4f; ; ; ;
```

10.1.3 Other Commands

Most of the timing and volume commands available in other tracks also apply to SOLO and MELODY tracks. Important commands to consider include ARTICULATE, VOICE and OCTAVE. Also note that TRANSPOSE is applied to your note data.

10.2 KeySig

If you are including SOLO or MELODY tracks you should set the key signature for the song:

```
KeySig 2b
```

The argument consists of a single digit “0” to “7” followed by a “b” or “&” for flat keys or a “#” for sharp keys.

As an alternate, you can use a musical name like “F” or “G#”.

The optional keywords “Major” or “Minor” (these can be abbreviated to “Maj” or “Min” ... and case doesn’t count) can be added to this command. This will accomplish two things:

1. The MIDI track Key Signature event will be set to reflect minor or major.
2. If you are using a musical name the proper key will be used.

Setting the key signature effects the notes used in SOLO or MELODY tracks and sets a MIDI Key Signature event.[2]

To summarize, the following are all valid KEYSIG directives:

```
KeySig 2# Major
KeySig 1b
KeySig 0b Min
KeySig F Min
KeySig A Major
```

10.3 AutoSoloTracks

When a “{ }” expression is found in a chord line, it is assumed to be note data and is treated as a RIFF. You can have any number of “{ }” expressions in a chord line. They will be assigned to the tracks specified in the AUTOSOLOTRACKS directive.

By default, four tracks are assigned: *Solo*, *Solo-1*, *Solo-2*, and *Solo-3*. This order can be changed:

```
AutoSoloTracks Melody-Oboe Melody-Trumpet Melody-Horn
```

Any number of tracks can be specified in this command, but they must all be SOLO or MELODY tracks. You can reissue this command at any time to change the assignments.

The list set in this command is also used to “fill out” melody lines for tracks set as HARMONYONLY. Again, an example:

[2]For the most part, MIDI Key Signature events are ignored by playback programs. However, they *may* be used in other MIDI programs which handle notation.

```
AutoSoloTracks Solo-1 Solo-2 Solo-3 Solo-4
Solo-2 HarmonyOnly 3Above
Solo-3 HarmonyOnly 8Above
```

Of course, some voicing is also set . . . and a chord line:

```
C {4a;b;c;d;}
```

The note data *{4a;b;c;d;}* will be set to the *Solo-1* track. But, if you've not set any other note data by way of RIFF commands to *Solo-2* and *Solo-3*, the note data will also be copied to these two tracks. Note that the track *Solo-4* is unaffected since it is *not* a HARMONYONLY track. This feature can be very useful in creating harmony lines with the harmonies going to different instruments. The supplied file `egs/harmony.mma` shows an example.

10.4 Drum Solo Tracks

A solo or melody track can also be used to create drum solos. The first thing to do is to set a track as a drum solo type:

```
Solo-MyDrums DrumType
```

This will create a new SOLO track with the name *Solo-MyDrums* and set its "Drum" flag. If the track already exists and has data in it, the command will fail. The MIDI channel 10 is automatically assigned to all tracks created in this manner. You cannot change a "drum" track back to a normal track.

These is no limit to the number of SOLO or MELODY tracks you can create . . . and it probably makes sense to have several different tracks if you are creating anything beyond a simple drum pattern.

Tracks with the "drum" setting ignore TRANSPOSE and HARMONY settings.

The specification for pitches is different in these tracks. Instead of standard notation pitches, you must specify a series of drum tone names or MIDI values. If you want more than one tone to be sounded simultaneously, create a list of tones separated by commas.

Some examples:

```
Solo-MyDrums Riff 4 SnareDrum1; ; r ; SnareDrum1;
```

would create a snare hit on beats 1, 2 and 4 of a bar. Note how the second hit uses the default tone set in the first beat.

```
Solo-MyDrums Riff 8,38;;;;
```

creates 4 hits, starting on beat 1. Instead of "names" MIDI values have been used ("38" and "SnareDrum1" are identical). Note how "," is used to separate the initial length from the first tone.

```
Solo-MyDrums Riff 4 SnareDrum1,53,81; r; 4 SideKick ;
```

creates a "chord" of 3 tones on beat 1, a rest on beat 2, and a "SideKick" on beat 3.

Using MIDI values instead of names lets you use the full range of note values from 0 to 127. Not all will produce valid tones on all synths.

To make the use of solo drum tracks a bit easier, you can use the the TONE command to set the default drum tone to use (by default this is a SnareDrum. If you do not specify a tone to use in a solo the default will be used.

You can access the default tone by using the special Tone "*". In the following example:

```
Begin Solo-Block
  DrumType
  Tone LowWoodBlock
End
   ...
Solo-Block Riff 4r; SnareDrum; * ; ;
   ...
Solo-Block Riff 4;;;;
```

The first solo created will have a rest on beat 1, a SnareDrum on beat 2 and LowWoodBlock on beats 3 and 4. The second will have LowWoodBlock on each beat.

Chapter 11

Automatic Melodies: Aria Tracks

ARIA tracks are designed to let *MIA* automatically generate something resembling melody. Honest, this will never put real composers on the unemployment line (well, no more than they are mostly there already).

You might want to use an ARIA to embellish a section of a song (like an introduction or an ending). Or you can have *MIA* generate a complete melody over the song chords.

In a traditional song the melody depends on two parts: patterns (IE. note lengths, volume, articulation) and pitch (usually determined by the chords in a song). If you have been using *MIA* at all you will know that that chords are the building block of what *MIA* does already. So, to generate a melody we just need some kind of pattern. And, since *MIA* already uses patterns in most things it does, it is a short step to use a specialized pattern to generate a melody.

It might serve to look at the sample song files enclosed in this package in the directory `egs/aria`. Compile and play them. Not too bad?

Just like other track, you can create as many ARIAs as you want. So, you can have the tracks ARIA-1, ARIA, and ARIA-SILLY all at the same time. And, the majority of other commands (like OCTAVE, ARTICULATE, etc.) apply to ARIAs.

The following commands are important to note:

Range Just like scale tracks. A RANGE of 2 would let *MIA* work on a 2 octave chord, etc.

ScaleType Much like a scale track. By default, the setting for this is CHORD. But, you can use AUTO, SCALE or CHROMATIC. AUTO and SCALE are identical and force *MIA* to select notes from the scale associated with the current chord; CHROMATIC generates an 11 tone scale starting at the root note of the chord.

Direction As *MIA* processes the song it moves a note-selection pointer up or down. By default DIRECTION is set to the single value ”1” which tells *MIA* to add 1 after each note is generated. However, you can set the value to an integer -4 to 4 or the special value ”r”. With ”r” a random value -1, 0 or 1 will be used. Important: in an ARIA track the sequence size/point is ignored for DIRECTION.

A bit more detail on defining an ARIA:

First, here is a simplified sample track definition:

```
Begin Aria
  Voice JazzGuitar
  Volume f
```

```
Sequence 1.5 8 90; 2 8 90; 2.5 8 90;
  3 8 90; 3.5 8 90; 4 8 90; 4.5 8 90
Direction r 0 0 1 -1 0 0 1 r
```

Next assume that we have a few bars of music with only a CMajor chord the default RANGE of "1" and the default SCALETYPE of "Scale'. The following table shows the notes which would be generated for each time event:

Event	Offset Pointer	Note
1	0	c
2	0	c
3	1	e
4	3 .. 0	c
5	4 .. 0	c
6	-2 .. 2	g
7	random	c, e or g
8	random	c, e, or g
9	....	etc.

In the above table the ".." notation indicates that the offset is out-of-range and converted to the second value.

If you were to change the SCALETYPE or RANGE you would get a completely different series.

Please note the following:

- ARIAs are *not* saved or modified by GROOVE commands. Well, almost . . . the sequence size will be adjusted to match the new size from the groove. This might be unexpected:
  - Load a groove. Let's say it has a SEQSIZE of 4.
  - Create an ARIA. Use 4 patterns to match the groove size (if you don't *MtA* will expand the sequence size for the ARIA, just like other tracks).
  - Process a few bars of music.
  - Load a new groove, but this time with a SEQSIZE of 2. Now, the ARIA will be truncated. This behaviour is duplicated in other tracks as well, but it might be unexpected here.
- DIRECTION can not be changed on a bar per bar basis. It applies to the entire sequence.

You can make dramatic changes to your songs with a few simple tricks. Try modifying the DIRECTION settings just slightly; use several patterns and SEQRND to generate less predicable patterns; use HARMONLYONLY with a different voice and pattern.

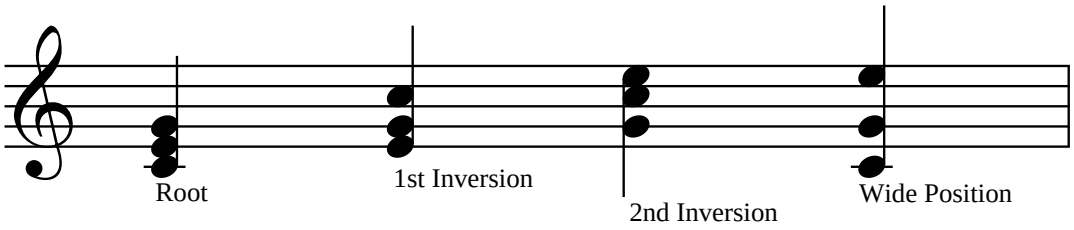
Oh, and have fun!

Chapter 12

Chord Voicing

In music, a chord is simply defined as two more notes played simultaneously. Now, this doesn't mean that you can play just any two or three notes and get a chord which sounds nice—but whatever you do get will be a chord of some type. And, to further confuse the unwary, different arrangements of the same notes sound better (or worse) in different musical situations.

As a simple example, consider a C major chord. Built on the first, third and fifth notes of a C major scale it can be manipulated into a variety of sounds:



These are all C major chords . . . but they all have a different sound or color. The different forms a chord can take are called "voicings". Again, this manual is not intended to be a primer on musical theory—that's a subject for which lots of lessons with your favorite music teacher is recommended. You'll need a bit of basic music theory if you want to understand how and why *MhA* creates its tracks.

The different options in this chapter effect not only the way chords are constructed, but also the way bass lines and other tracks are formed.

There are generally two ways in *MhA* to take care of voicings.

1. use *MhA*'s extensive VOICING options, most likely with the *"Optimal"* voicing algorithm,
2. do everything by yourself with the commands INVERT and COMPRESS.

The commands LIMIT and DUPROOT may be used independently for both variants.

12.1 Voicing

The VOICING command is used to set the voicing mode and several other options relating to the selected mode. The command needs to have a CHORD track specified and a series of Option=Value pairs. For example:

```
Chord-Piano Voicing Mode=Optimal Rmove=10 Range=9
```

In the following sections all the options available will be covered.

12.1.1 Voicing Mode

The easiest way to deal with chord voicings is via the VOICING MODE=XX option.

When choosing the inversion of a chord to play an accompanist will take into consideration the style of the piece and the chord sequences. In a general sense, this is referred to as "voicing".

A large number of the library files have been written to take advantage of the following voicing commands. However, not all styles of music take well to the concept. And, don't forget about the other commands since they are useful in manipulating bass lines, as well as other chord tracks (e.g., sustained strings).

MtA has a variety of sophisticated, intelligent algorithms[1] to deal with voicing.

As a general rule you should not use the INVERT and COMPRESS commands in conjunction with the VOICING command. If you do, you may create beautiful sounds. But, the results are more likely to be less-than-pleasing. Use of voicing and other combinations will display various warning messages.

The main command to enable voicings is:

```
Chord Voicing Mode=Type
```

As mentioned above, this command can only be applied to CHORD tracks. Also note that this effects all bars in the sequence . . . you cannot have different voicings for different bars in the sequence (attempting to do this would make no sense).

The following MODE types are available:

Optimal A basic algorithm which automatically chooses the best sounding voicing depending on the voicing played before. Always try this option before anything else. It might work just fine without further work.

The idea behind this algorithm is to keep voicings in a sequence close together. A pianist leaves his or her fingers where they are, if they still fit the next chord. Then, the notes closest to the fingers are selected for the next chord. This way characteristic notes are emphasized.

Root This Option may for example be used to turn off VOICING within a song. VOICING MODE=ROOT means nothing else than doing nothing, leaving all chords in root position.

None This is the same as the ROOT option.

Invert Rather than basing the inversion selection on an analysis of past chords, this method quite stupidly tries to keep chords around the base point of "C" by inverting "G" and "A" chords upward and "D", "E" and "F" downward. The chords are also compressed. Certainly not an ideal algorithm, but it can be used to add variety in a piece.

[1] Great thanks are due to Alain Brenzikofer who not only pressured me into including the VOICING options, but wrote a great deal of the actual code.

Compressed Does the same as the stand-alone COMPRESS command. Like ROOT, it is only added to be used in some parts of a song where VOICING MODE=OPTIMAL is used.

12.1.2 Voicing Range

To get wider or closer voicings, you may define a range for the voicings. This can be adjusted with the RANGE option:

```
Chord-Guitar Voicing Mode=Optimal Range=12
```

In most cases the default value of 12 should work just fine. But, you may want to fine tune . . . it's all up to you. This command only effects chords created with MODE=OPTIMAL.

12.1.3 Voicing Center

Just minimizing the Euclidean distance between chords doesn't do the trick as there could be runaway progressions that let the voicings drift up or down infinitely.

When a chord is "voiced" or moved to a new position, a "center point" must be used as a base. By default, the fourth degree of the scale corresponding to the chord is a reasonable choice. However, you can change this with:

```
Chord-1 Voicing Center=<value>
```

The *value* in this command can be any number in the range 0 to 12. Try different values. The color of your whole song might change.

Note that the value is the note in the scale, not a chord-note position.

This command only effects chords created with MODE=OPTIMAL.

12.1.4 Voicing Move

To intensify a chord progression you may want to have ascending or descending movement of voicings. This option, in conjunction with the DIR optional (see below) sets the number of bars over which a movement is done.

For the MOVE option to have any effect you must also set the direction to either -1 or 1. Be careful that you don't force the chord too high or low on the scale. Use of this command in a REPEAT section can cause unexpected results. For this reason you should include a SEQ command at the beginning of repeated sections of your songs.

In most cases the use of this command is limited to a section of a song, its use is not recommended in groove files. You might want to do something like this in a song:

```
..select groove with voicing
chords..
Chord-Piano Voicing Move=5 Dir=1
more chords..
Chord-Piano Voicing Move=5 Dir=-1
more chords..
```

12.1.5 Voicing Dir

This option is used in conjunction with the MOVE option to set the direction (-1 or 1) of the movement.

12.1.6 Voicing Rmove

As an alternate to movement in a specified direction, random movement can add some color and variety to your songs. The command option is quite useful (and safe to use) in groove files. The argument for this option is a percentage value specifying the frequency to apply a move in a random direction.

For example:

```
Chord-3 Voicing Mode=Optimal Rmove=20
```

would cause a movement (randomly up or down) in 20% of the bars. As noted earlier, using explicit movement instructions can move the chord into an undesirable range or even “off the keyboard”; however, the algorithm used in RMOVE has a sanity check to ensure that the chord center position remains, approximately, in a two octave range.

12.2 ChordAdjust

The actual notes used in a chord are derived from a table which contains the notes for each variation of a “C” chord—this data is converted to the desired chord by adding or subtracting a constant value according to the following table:

G♭	-6	B	-1	D♯	3
G	-5	C♭	-1	E♭	3
G♯	-4	B♯	0	E	4
A♭	-4	C	0	F♭	4
A	-3	C♯	1	E♯	5
A♯	-2	D♭	1	F	5
B♭	-2	D	2	F♯	6

This means that when *MiA* encounters an “Am” chord it adjusts the notes in the chord table down by 3 MIDI values; an “F” chord is adjusted 5 MIDI values up. This also means that “A” chords will sound lower than “F” chords.

In most cases this works just fine; but, there are times when the "F" chord might sound better *lower* than the "A". You can force a single chord by prefacing it with a single "-" or "+" (see page 169). But, if the entire song needs adjustment you can use CHORDADJUST command to raise or lower selected chord pitches:

```
ChordAdjust E=-1 F=-1 Bb=1
```

Each item in the command consists of a pitch ("B♭", "C", etc.) an "=" and an octave specifier (-1, 0 or 1). The pitch values are case sensitive and must be in upper case; there must *not* be a space on either side of the "=".

To a large extent the need for octave adjustments depends on the chord range of a song. For example, the supplied song "A Day In The Life Of A Fool" needs all "E" and "F" chords to be adjusted down an octave.

The value "0" will reset the adjustment to the original value; setting a value a second time has no effect.

12.3 Compress

When *MtA* grabs the notes for a chord, the notes are spread out from the root position. This means that if you specify a "C13" you will have an "A" nearly 2 octaves above the root note as part of the chord. Depending on your instrumentation, pattern, and the chord structure of your piece, notes outside of the "normal" single octave range for a chord *may* sound strange.

```
Chord Compress 1
```

Forces *MtA* to put all chord notes in a single octave range.

This command is only effective in CHORD and ARPEGGIO tracks. A warning message is printed if it is used in other contexts.

Notes: COMPRESS takes any value between 1 and 5 as arguments (however, some values will have no effect as detailed above). You can specify a different COMPRESS for each bar in a sequence. Repeated values can be represented with a "/":

```
Chord Compress 1 / 0 /
```

To restore to its default (off) setting, use a "0" as the argument.

For a similar command, with different results, see the LIMIT command (page 73).

12.4 DupRoot

To add a bit of fullness to chords, it is quite common of keyboard players to duplicate the root tone of a chord into a lower (or higher) octave. This is accomplished in *MtA* with the command:

```
DupRoot -1 1 -1 1
```

The command determines whether or not the root tone of a chord is duplicated in another octave. By default notes are not added. A value of -1 will add a note one octave lower than the root note, -2 will add the tone 2 octaves lower, etc. Similarly, the value of 1 will add a note one octave higher than the root tone, etc.

Only the values -9 to 9 are permitted.

The volume used for the generated note is an adjusted average of the notes in the chord. This volume is always less than the chord notes—which is probably what you want. If you want a loud bass note, create a second track (probably a BASS track) with the appropriate pattern.

Different values can be used in each bar of the sequence.

The option is reset to 0 after all SEQUENCE or SEQCLEAR commands.

The DUPROOT command is only valid in CHORD tracks.

12.5 Invert

By default *MIA* uses chords in the root position. By example, the notes of a C major chord are C, E and G. Chords can be inverted (something musicians do all the time). Sticking with the C major chord, the first inversion shifts the root note up an octave and the chord becomes E, G and C. The second inversion is G, C and E.

MIA extends the concept of inversion a bit by permitting the shift to be to the left or right, and the number of shifts is not limited. So, you could shift a chord up several octaves by using large invert values.[2]

Inversions apply to each bar of a sequence. So, the following is a good example:

```
SeqSize 4
Chord-1 Sequence STR1
Chord-1 Invert 0 1 0 1
```

Here the sequence pattern size is set to 4 bars and the pattern for each bar in the Chord-1 track is set to "STR1". Without the next line, this would result in a rather boring, repeating pattern. But, the Invert command forces the chord to be in the root position for the first bar, the first inversion for the second, etc.

You can use a negative Invert value:

```
Chord-1 Invert -1
```

In this case the C major chord becomes G, C and E.

Note that using fewer Invert arguments than the current sequence size is permitted. *MIA* simply expands the number of arguments to the current sequence size. You may use a "/" for a repeated value.

[2]The term "shift" is used here, but that's not quite what *MIA* does. The order of the notes in the internal buffer stays the same, just the octave for the notes is changed. So, if the chord notes are "C E G" with the MIDI values "0, 4, 7" an invert of 1 would change the notes to "C[2] E G" and the MIDI values to "12, 4, 7".

A SEQUENCE or CLEARSEQ command resets INVERT to 0.

This command on has an effect in CHORD and ARPEGGIO tracks. And, frankly, ARPEGGIOs sound a bit odd with inversions.

If you use a large value for INVERT you can force the notes out of the normal MIDI range. In this case the lowest or highest possible MIDI note value will be used.

12.6 Limit

If you use "jazz" chords in your piece, some people might not like the results. To some folks, chords like 11th, 13th, and variations have a dissonant sound. And, sometimes they are in a chart, but don't really make sense. The LIMIT command can be used to set the number of notes of a chord used.

For example:

```
Chord Limit 4
```

will limit any chords used in the CHORD track to the first 4 notes of a chord. So, if you have a C11 chord which is C, E, G, B♭, D, and F, the chord will be truncated to C, E, G and B♭.

This command only applies to CHORD and ARPEGGIO tracks. It can be set for other tracks, but the setting will have no effect.

Notes: LIMIT takes any value between 0 and 8 as an argument. The "0" argument will disable the command. This command applies to all chords in the sequence—only one value can be given in the command.

To restore to its default (off) setting, use a "0" as the argument.

For a similar command, with different results, see the COMPRESS command (page 71).

12.7 NoteSpan

Many instruments have a limited range. For example, the bass section of an accordion is limited to a single octave[3] To emulate these sounds it is a simple matter of limiting *MmA*'s output to match the instrument. For example, in the "frenchwaltz" file you will find the directive:

```
Chord NoteSpan 48 59
```

which forces all CHORD tones to the single octave represented by the MIDI values 48 though 59.

This command is applied over other voicing commands like OCTAVE and RANGE and even TRANSPOSE. Notes will still be calculated with respect to these settings, but then they'll be forced into the limited NOTESPAN.

[3] Some accordions have "freebass" switches which overcomes this, but that is the exception.

NOTESPAN expects two arguments: The first is the range start, the second the range end (first and last notes to use). The values are MIDI tones and must be in the range 0 to 127. The first value must be less than the second, and the range must represent at least one full octave (12 notes). It can be applied to all tracks except DRUM.

12.8 Range

For ARPEGGIO and SCALE tracks you can specify the number of octaves used. The effects of the RANGE command is slightly different between the two.

SCALE: Scale tracks, by default, create three octave scales. The RANGE value will modify this to the number of octaves specified. For example:

```
Scale Range 1
```

will force the scales to one octave. A value of 4 would create 4 octave scales, etc.

You can use fractional values when specifying RANGE. For example:

```
Scale Range .3
```

will create a scale of 2 notes.[4] And,

```
Scale Range 1.5
```

will create a scale of 10 notes. Now, this gets a bit more confusing for you if you have set SCALETYPE CHROMATIC. In this case a RANGE 1 would generate 12 notes, and RANGE 1.5 18.

Partial scales are useful in generating special effects.

ARPEGGIO: Normally, arpeggios use a single octave.[5] The RANGE command specifies the number of octaves[6] to use. A fractional value can be used; the exact result depends on the number of notes in the current chord.

In all cases the values of “0” and ”1” have the same effect.

For both SCALE and ARPEGGIO there will always be a minimum of two notes in the sequence.

12.9 DefChord

MbA comes with a large number of chord types already defined. In most cases, the supplied set (see page 165) is sufficient for all the “modern” or “pop” charts normally encountered. However, there are those times when you want to do something else, or something different.

[4] Simple math here: take the number of notes in a scale (7) and multiply by .3. Take the integer result as the number of notes.
[5] Not quite true: they use whatever notes are in the chord, which might exceed an octave span.
[6] Again, not quite true: the command just duplicates the arpeggio notes the number of times specified in the RANGE setting.

You can define additional chord types at any time, or redefine existing chord types. The DEFCHORD command makes no distinction between a new chord type or a redefinition, with the exception that a warning message is printed for the later.

The syntax of the command is quite strict:

```
DefChord NAME (NoteList) (ScaleList)
```

where:

- *Name* can be any string, but cannot contain a "/", ">" or space. It is case sensitive. Examples of valid *name*s include "dim", "NO3" and "foo-12-xx".
- *NoteList* is a comma separated list of note offsets (actually MIDI note values), all of which are enclosed in a set of "()"s. There must be at least 2 note offsets and no more than 8 and all values must be in the range 0 to 24. Using an existing chord type, a "7" chord would be defined with (0, 4, 7, 10). In the case of a C7 chord, this translates to the notes (c, e, g, b♭).
- *ScaleList* is a list of note offsets (again, MIDI note values), all of which are enclosed in a set of "()"s. There must be exactly 7 values in the list and all values must be in the range 0 to 24. Following on the C7 example above, the scale list would be (0, 2, 4, 5, 7, 9, 10) or the notes (c, d, e, f, g, a, b♭).

Some examples might clarify. First, assume that you have a section of your piece which has a major chord, but you only want the root and fifth to sound for the chords and you want the arpeggios and bass notes to *only* use the root. You could create new patterns, but it's just as easy to create a new chord type.

```
DefChord 15 (0,4) (0, 0, 0, 0, 0, 0, 0)
15 C / G /
16 C15 / G15
```

In this case a normal Major chords will be used in line 15. In line 16 the new "15" will be used. Note the trick in the scale: by setting all the offsets to "0" only the root note is available to the WALK and BASS tracks.

Sometimes you'll see a new chord type that *MMA* doesn't know. You could write the author and ask him to add this new type, but if it is something quite odd or rare, it might be easier to define it in your song. Let's pretend that you've encountered a "Cmaj12" A reasonable guess is that this is a major 7 with an added 12th (just the 5th up an octave). You could change the "maj12" part of the chord to a "M7" or "maj7" and it should sound fine. But:

```
DefChord maj12 (0, 4, 7, 11, 19) (0, 2, 4, 5, 7, 9, 11)
```

is much more fun. Note a few details:

- The name "maj12" can be used with any chord. You can have "Cmaj12" or G♭maj12".
- "maj12" a case sensitive name. The name "Maj12" is quite different (and unknown).
- A better name might be "maj(add12)".
- The note and scale offsets are MIDI values. They are easy to figure if you think of the chord as a "C". Just count off notes from "C" on a keyboard (C is note 0).

♫ *Do Not* include a chord name (ie: C or B♭) in the definition. Just the *type*.

The final example handles a minor problem in MMA and "diminished" chords. In most of the music the author of MMA encounters, the marking "dim" on a chord usually means a "diminished 7th". So, when MMA initializes it creates a copy of the "dim7" and calls it "dim". But, some people think that "dim" should reference a "diminished triad". It's pretty easy to change this by creating a new definition for "dim":

```
DefChord dim (0, 3, 6) (0, 2, 3, 5, 6, 8, 9 )
```

In this example the scale notes use the same notes as those in a "dim7". You might want to change the B𝄫 (9) to B♭ (10) or B (11). If you really disagree with the choice to make a dim7 the default you could even put this in a `mmarc` file.

It is even easier to use the non-standard notation "dim3" to specify a diminished triad.

12.10 PrintChord

This command can be used to make the create of custom chords a bit simpler. Simply pass one or more chord types after the command and they will be displayed on your terminal. Example:

```
PrintChord m M7 dim
```

in a file should display:

```
m :  (0, 3, 7) (0, 2, 3, 5, 7, 9, 11) Minor triad.
M7 :  (0, 4, 7, 11) (0, 2, 4, 5, 7, 9, 11) Major 7th.
dim :  (0, 3, 6, 9) (0, 2, 3, 5, 6, 8, 9) Diminished.  MMA assumes
   a diminished 7th.
```

From this you can cut and paste, change the chord or scale and insert the data into a DEFCHORD command.

12.11 Notes

MMA makes other adjustments on-the-fly to your chords. This is done to make the resulting sounds "more musical" . . . to keep life interesting, the definition of "more musical" is quite elusive. The following notes will try to list some of the more common adjustments made "behind your back".

♫ Just before the notes (MIDI events) for a chord are generated the first and last notes in the chord are compared. If they are a separated by a half-step (or 1 MIDI value) or an octave plus half-step, the volume of the first note is halved. This happens in chords such as a Major-7th or Flat-9th. If the adjustment is not done the dissonance between the two tones overwhelms the ear.

Chapter 13

Harmony

MIA can generate harmony notes for you . . . just like hitting two or more keys on the piano! And you don't have to take lessons.

Automatic harmonies are available for the following track types: Bass, Walk, Arpeggio, Scale, Solo and Melody.

Just in case you are thinking that *MIA* is a wonderful musical creator when it comes to harmonies, don't be fooled. *MIA*'s ideas of harmony are quite facile. It determines harmony notes by finding a note lower or higher than the current note being sounded within the current chord. And its notion of "open" is certainly not that of traditional music theory. But, the sound isn't too bad.

13.1 Harmony

To enable harmony notes, use a command like:

```
Solo Harmony 2
```

You can set a different harmony method for each bar in your sequence.

The following are valid harmony methods:

2 or **2Below** Two part harmony. The harmony note selected is lower (on the scale).

2Above The same as "2", but the harmony note is raised an octave.

3 or **3Below** Three part harmony. The harmony notes selected are lower.

3Above The same as "3", but both notes are raised an octave.

Open or **OpenBelow** Two part harmony, however the gap between the two notes is larger than in "2".

OpenAbove Same as "Open", but the added note is above the original.

8 or **8Below** A note 1 octave lower is added.

8Above A note 2 octave higher is added.

16 or **16Below** A single note two octaves below is added.

16Above A single note two octaves above are added.

24 or **24Below** A single note three octaves below is added.

24Above A single note three octaves above is added.

You can combine any of the above harmony modes by using a "+". For example:

OPEN+8Below will produce harmony notes with an "Open" harmony and a note an octave below the current note.

3Above+16 will generate 2 harmony notes above the current note plus a note 2 octaves below.

8Below+8Above+16Below will generate 3 notes: one 2 octaves below the current, one an octave below, and one an octave above.

There is no limit to the number of modes you can concatenate. Any duplicate notes generated will be ignored.

All harmonies are created using the current chord.

To disable harmony use a "0", "-" or "None".

Be careful in using harmonies. They can make your song sound heavy, especially with BASS notes (applying a different volume may help).

The command has no effect in DRUM or CHORD tracks.

13.2 HarmonyOnly

As a added feature to the automatic harmony generation discussed in the previous section, it is possible to set a track so that it *only* plays the harmony notes. For example, you might want to set up two arpeggio tracks with one playing quarter notes on a piano and a harmony track playing half notes on a violin. The following snippet is extracted from the song file "Cry Me A River" and sets up 2 different choir voices:

```
Begin Arpeggio
    Sequence A4
    Voice ChoirAahs
    Invert 0 1 2 3
    SeqRnd
    Octave 5
    RSkip 40
    Volume p
    Articulate 99
End

Begin Arpeggio-2
    Sequence A4
    Voice VoiceOohs
```

```
    Octave 5
    RSkip 40
    Volume p
    Articulate 99
    HarmonyOnly Open
End
```

Just like the HARMONY command, above, you can have different settings for each bar in your sequence. Setting a bar (or the entire sequence) to ''-" or "0" disables both the HARMONY and HARMONYONLY settings.

The command has no effect in DRUM or CHORD tracks.

If you want to use this feature with SOLO or MELODY tracks you can duplicate the notes in your RIFF or in-line notation *or* with the AUTOHARMONYTRACKS command, see page 62.

13.3 HarmonyVolume

By default, *MIA* will use a volume (velocity) of 80% of that used by the original note for all harmony notes it generates. You can change this with the the HARMONYVOLUME command. For example:

```
Begin Solo
  Voice JazzGuitar
  Harmony Open
  HarmonyVolume 80
End
```

You can specify different values for each bar in the sequence. The values are percentages and must be greater than 0 (large values works just fine if you want the harmony louder than the original). The command has no effect in DRUM or CHORD tracks.

Chapter 14

Tempo and Timing

MtA has a rich set of commands to adjust and vary the timing of your song.

14.1 Tempo

The tempo of a piece is set in Beats per Minute with the "Tempo" directive.

```
Tempo 120
```

sets the tempo to 120 beats/minute. You can also use the tempo command to increase or decrease the current rate by including a leading "+", "-" or "*" in the rate. For example (assuming the current rate is 120):

```
Tempo +10
```

will increase the current rate to 130 beats/minute.

The tempo can be changed series of beats, much like a rit. or acc. in real music. Assuming that a time signature of $\frac{4}{4}$, the current tempo is 120, and there are 4 beats in a bar, the command:

```
Tempo 100 1
```

will cause 4 tempo entries to be placed in the current bar (in the MIDI meta track). The start of the bar will be 115, the 2nd beat will be at 110, the 3rd at 105 and the last at 100.

You can also vary an existing rate using a "+", "-" or "*" in the rate.

You can vary the tempo over more than one bar. For example:

```
Tempo +20 5.5
```

tells *MtA* to increase the tempo by 20 beats per minute and to step the increase over the next five and a half bars. Assuming a start tempo of 100 and 4 beats/bar, the meta track will have a tempo settings of 101, 102, 103 . . . 120. This will occur over 22 beats (5.5 bars * 4 beats) of music.

Using the multiplier is handy if you are switching to "double time":

```
Tempo *2
```

and to return:

```
Temp *.5
```

Note that the "+", "-" or "*" sign must *not* be separated from the tempo value by any spaces. The value for TEMPO can be any value, but will be converted to integer for the final setting.

14.2 Time

MtA doesn't really understand time signatures. It just cares about the number of beats in a bar. So, if you have a piece in $\frac{4}{4}$ time you would use:

```
Time 4
```

For $\frac{3}{4}$ use:

```
Time 3
```

For $\frac{6}{8}$ you'd probably want either "2" or "6".

Changing the time also cancels all existing sequences. So, after a time directive you'll need to set up your sequences or load a new groove.[1]

14.3 TimeSig

Even though *MtA* doesn't really use Time Signatures, some MIDI programs do recognize and use them. So, here's a command which will let you insert a Time Signature in your MIDI output:

```
TimeSig NN DD
```

The NN parameter is the time signature numerator (the number of beats per bar). In $\frac{3}{4}$ you would set this to "3".

The DD parameter is the time signature denominator (the length of the note getting a single beat). In $\frac{3}{4}$ you would set this to "4".

The NN value must be an integer in the range of 1 to 126. The DD value must be one of 1, 2, 4, 8, 16, 32 or 64.

MtA assumes that all songs are in $\frac{4}{4}$ and places that MIDI event at offset 0 in the Meta track.

The TIMESIG value is remembered by GROOVES and is properly set when grooves are switched. You should probably have a time signature in any groove library files you create (the supplied files all do).

The common time signatures "common" and "cut" are supported. They are translated by *MtA* to $\frac{4}{4}$ and $\frac{2}{2}$.

[1] The time value is saved/restored with grooves so setting a time is redundant in this case.

14.4 BeatAdjust

Internally, MMA tracks its position in a song according to beats. For example, in a $\frac{4}{4}$ piece the beat position is incremented by 4 after each bar is processed. For the most part, this works fine; however, there are some conditions when it would be nice to manually adjust the beat position:

- ♫ Insert some extra (silent) beats at the end of bar to simulate a pause,
- ♫ Delete some beats to handle a "short" bar.
- ♫ Change a pattern in the middle of a bar.

Each problem will be dealt with in turn. In example 14.1 a pause is simulated at the end of bar 10. One problem with this logic is that the inserted beat will be silent, but certain notes (percussive things like piano) often will continue to sound (this is related to the decay of the note, not that MMA has not turned off the note). Frankly, this really doesn't work too well . . . which is why the FERMATA (page 83) was added.

```
Time 4
1 Cm / / /
...
10 Am / C /
BeatAdjust 1
...
```

Example 14.1: Adding Extra Beats

In example 14.2 the problem of the "short bar" is handled. In this example, the sheet music has the majority of the song in $\frac{4}{4}$ time, but bar 4 is in $\frac{2}{4}$. This could be handled by setting the TIME setting to 2 and creating some different patterns. Forcing silence on the last 2 beats and backing up the counter is a bit easier.

```
1 Cm / / /
...
4 Am / z!  /
BeatAdjust -2
...
```

Example 14.2: Short Bar Adjustment

Note that the adjustment factor can be a partial beat. For example:

```
BeatAdjust .5
```

will insert half of a beat between the current bars.

Finally in example 14.3, the problem of overlapping bars is handled. We want to change the GROOVE in the middle of a bar. So, we create the third bar two times. The first one has a "z!" (silence) for beats 3 and 4; the second has "z!" for beats 1 and 2. This permits the two halves to overlap without conflict. The BEATADJUST forces the two bars to overlap completely.

```
Groove BigBand
1 C
Groove BigBandFill
2 Am
3 / / z!
BeatAdjust -4
Groove BigBand
   z!  / F
5 F
...
```

Example 14.3: Mid-Bar Groove Change

14.5 Fermata

A "fermata" or "pause" in written music tells the musician to hold a note for a longer period than the notation would otherwise indicate. In standard music notation it is represented by a "𝄐" above a note.

To indicate all this *MtA* uses a command like:

```
Fermata 1 1 200
```

Note that there are three parts to the command:

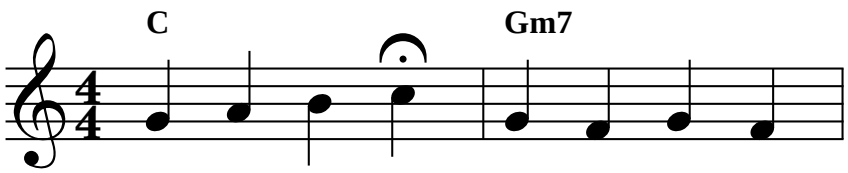
1. The beat offset from the current point in the score to apply the "pause". The offset can be positive or negative and is calculated from the current bar. Positive numbers will apply to the next bar; negative to the previous. For offsets into the next bar you use offsets starting at "0"; for offsets into the previous bar an offset of "-1" represents the last beat in that bar.

   For example, if you were in $\frac{4}{4}$ time and wanted the quarter note at the end of the next bar to be paused, you would use an offset of 3. The same effect can be achieved by putting the FERMATA command after the bar and using an offset of -1.

2. The duration of the pause in beats. For example, if you have a quarter note to pause your duration would be 1, a half note (or 2 quarter notes) would be 2.

3. The adjustment. This represented as a percentage of the current value. For example, to force a note to be held for twice the normal time you would use 200 (two-hundred percent). You can use a value smaller than 100 to force a shorter note, but this is seldom done.

Example 14.4 shows how you can place a FERMATA before or after the effected bar.




```
MtA Equivalent

Fermata 3 1 200
C
Gm7
Alternate

C
Fermata -1 1 200
Gm7
```

Example 14.4: Fermata

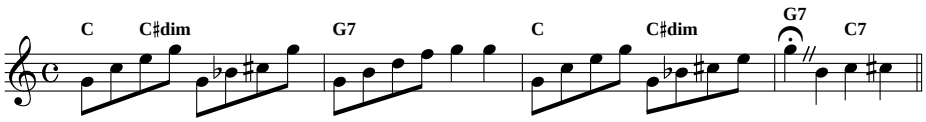
Here example 14.5 shows the first four bars of a popular torch song. The problem with the piece is that the first beat of bar four needs to be paused, and the accompaniment style has to switch in the middle of the bar. The example shows how to split the fourth bar with the first beat on one line and the balance on a second. The "z!"s are used to "fill in" the 4 beats skipped by the BEATADJUST.

The following conditions will generate warning messages:

- A beat offset greater than one bar,
- A duration greater than one bar,
- An adjustment value less than 100.

This command works by adjusting the global tempo in the MIDI meta track at the point of the fermata. In most cases you can put more than one FERMATA command in the same bar, but they should be in beat order (no checks are done). If the FERMATA command has a negative position argument, special code is invoked to remove any note-on events in the duration specified, after the start of the beat.[2] This means that extra rhythm notes will not be sounded—probably what you expect a held note to sound like.

[2]Technically speaking, *MtA* determines an interval starting 5% of a beat after the start of the fermata to a point 5% of a beat before the end. Any MIDI Note-On events in this range (in all tracks) are deleted.




```
C C#dim
G7
C / C#dim
G7 z!
Fermata -4 1 200
Cut -3
BeatAdjust -3.5
Groove EasySwing
z!  G7 C7
```

Example 14.5: Fermata with Cut

14.6 Cut

This command was born of the need to simulate a “cut” or, more correctly, a “caesura”. This is indicated in music by two parallel lines put at the top of a staff indicating the end of a musical thought. The symbol is also referred to as “railroad tracks”.

The idea is to stop the music on all tracks, pause briefly, and resume.[3]

MIA provides the CUT command to help deal with this situation. But, before the command is described in detail, a diversion: just how is a note or chord sustained in a MIDI file?

Assume that a *MIA* input file (and the associated library) files dictates that some notes are to be played from beat 2 to beat 4 in an arbitrary bar. What *MIA* does is:

- ♫ determine the position in the piece as a midi offset to the current bar,
- ♫ calculate the start and end times for the notes,
- ♫ adjust the times (if necessary) based on adjustable features such as STRUM, ARTICULATE, RTIME, etc.,
- ♫ insert the required MIDI “note on” and “note off” commands at the appropriate point in the track.

You may think that a given note starts on beat 2 and ends (using ARTICULATE 100) right on beat 3—but you would most likely be wrong. So, if you want the note or chord to be “cut”, what point do you use to

[3]The answer to the music theory question of whether the “pause” takes time *from* the current beat or is treated as a “fermata” is not clear—but as far as *MIA* is concerned the command has no effect on timing.

instruct MIA correctly? Unfortunately, the simple answer is "it depends". Again, the answers will consist of some examples.

In this first case you wish to stop the track in the middle of the last bar. The simplest answer is:

```
1 C
...
36 C / z!  /
```

Unfortunately, this will "almost" work. But, any chords which are longer than one or two beats may continue to sound. This, often, gives a "dirty" sound to the end of the piece. The simple solution is to add to the end of the piece:

```
Cut -2
```

Depending on the rhythm you might have to fiddle a bit with the cut value. But, the example here puts a "all notes off" message in all the active tracks at the start of beat 3. The exact same result can be achieved by placing:

```
Cut 3
```

before the final bar.

In this second example a tiny bit of silence is desired between bars 4 and 5 (this might be the end of a musical introduction). The following bit should work:

```
1 C
2 G
3 G
4 C
Cut
BeatAdjust .2
5 G
...
```

In this case the "all notes off" is placed at the end of bar 4 and two-tenths of a beat is inserted at the same location. Bar 5 continues the track.

The final example show how you might combine CUT with FERMATA. In this case the sheet music shows a caesura after the first quarter note and fermatas over the quarter notes on beats 2, 3 and 4.

```
1 C C#dim
2 G7
3 C / C#dim
Fermata 1 3 120
Cut 1.9
Cut 2.9
Cut 3.9
4 G7 / C7 /
5 F6
```

A few tutorial notes on the above:

- The command

  ```
  Fermata 1 3 120
  ```

  applies a slow-down in tempo to the second beat for the following bar (an offset of 1), for 3 beats. These 3 beats will be played 20% slower than the set tempo.

- The three CUT commands insert MIDI "all notes off" in all the active tracks just *before* beats 2, 3 and 4.

Finally, the proper syntax for the command:

```
[Voice] Cut [Offset]
```

If the voice is omitted, MIDI "all notes off" will be inserted into each active track.

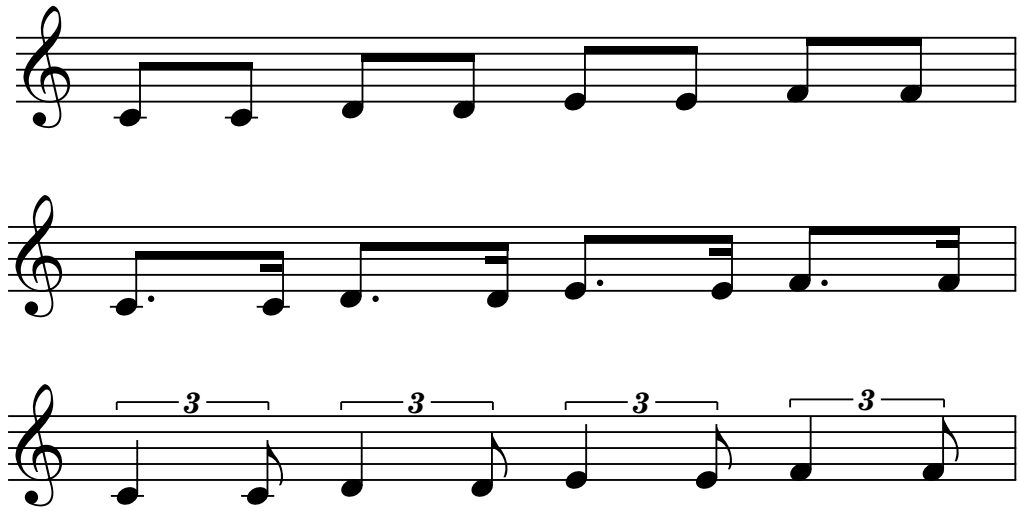
If the offset is omitted, the current bar position will be used. This the same as using an offset value of 0.

Chapter 15

Swing

In jazz and swing music there is a convention to apply special timing to eighth notes. Normally, the first of a pair of eights is lengthened and the second is shortened. In the sheet music this can is sometimes notated as sequences of a dotted eighth followed by a sixteenth. But, if you were to foolish enough to play the song with this timing you'd get a funny look from a jazz musician who will tell you to "swing" the notes.

The easiest way to think about swing eighths is to mentally convert them to a triplet consisting of a quarter note and and eighth.



In the above music the first and second bar are both played as in the third.

MMA can handle this musical style in a number of ways, the control is though the SWINGMODE command and options.

In default mode *MMA* assumes that you don't want your song to swing.

To enable automatic conversions, simply set SWINGMODE to "on":

```
SwingMode On
```

This directive accepts the value "On" and "Off" or "1" and "0".

With SWINGMODE enabled *MMA* takes some extra steps when creating patterns and processing of SOLO and MELODY parts.

- Any eighth note in a pattern "on the beat" (1, 2, etc.) is converted to a "81" note.

- ♫ Any eighth note is a pattern "off the beat" (1.5, 2.5, etc.) is converted to "82" note, and the offset is adjusted to the prior beat plus the value of an "81" note.
- ♫ Drum notes with a value of a single MIDI tick are handled in the same way, but only the offset adjustment is needed.
- ♫ In SOLO and MELODY tracks any successive pairs of eighth notes (or rests) are adjusted.

Important: when defining patterns and sequences remember that the adjustment is made when the pattern is compiled. With a DEFINE command the arguments are compiled (and swing will be applied). But a SEQUENCE command with an already defined pattern will use the existing pattern values (the swing adjustment may or may not have been done at define time). Finally, if you have a dynamic define in the sequence the adjustment will take place if needed.

SWINGMODE has an additional option, SKEW. This factor is used to create the "81" and "82" note lengths (see page 23). By default the value "66" is used. This simply means that the note length "81" is assigned 66% of the value of an eight note, and "82" is assigned 34%.

You can change this setting at any point in your song or style files. It will take effect immediately on all future patterns and solo lines.

The setting:

```
SwingMode Skew=60
```

will set a 60/40 setting.

If you want to experiment, find a GROOVE with note lengths of "81" and "82" ("swing" is as good a choice as any). Now, put a SWINGMODE SKEW=VALUE directive at the top of your song file (before selecting any GROOVES). Compile and play the song with different values to hear the effects.

If you want to play with different effects you could do something like this:

```
SwingMode On Skew=40
...  Set CHORD pattern/groove
SwingMode Skew=30
...  Set Drum-1 pattern/groove
SwingMode Skew=whatever
...  Set Drum-2
```

This will give different rates for different tracks. I'll probably not enjoy your results, but I play polkas on the accordion for fun.

The complete SWINGMODE setting is saved in the current GROOVE and can be accessed via the $_SwingMode built-in macro.

The easy (and ugly and unintuitive) way to handle swing is to hard-code the value right into your patterns. For example, you could set a swing chord pattern with:

```
Chord Define Swing8 1 3+3 80; 1.33 3 80; 2 3+3 80; 2.33 3 80 ...
```

We really don't recommend this for the simple reason that the swing rate is frozen as quarter/eighth triplets.

If you refer to the table of note lengths (page 23) you will find the cryptic values of “81” and “82”. These notes are adjusted depending of the SWINGSKEW value. So:

```
Chord Define Swing8 1 81 80; 1+81 82 80; 2 81 80; 2+81 82 80 ...
```

is a bit better. In this case we have set a chord on beat 1 as the first of an eighth note, and a chord on the off-beat as the second. Note how we specify the off-beats as “1+81”, etc.

In this example the feel of the swing will vary with the SWINGSKEW setting.

But, aren’t computers supposed to make life simple? Well, here is our recommended method:

```
SwingMode On
Chord Define Swing8 1 8 80; 1.5 8 80; 2 8 80; 2.5 8 80 ...
```

Now, *MiA* will convert the values for you. Magic, well . . . almost.

There are times when you will need to be more explicit, especially in SOLO and MELODY tracks:

- ♫ If a bar has both swing and straight eighths.
- ♫ If the note following an eighth is not an eight.

Chapter 16

Volume and Dynamics

MfA is very versatile when it comes to the volumes or dynamics used in your song. [1]

Each generated note goes though several adjustments:

1. The initial velocity is set in the pattern definition, see chapter 4,[2]
2. the velocity is then adjusted by the master and track volume settings (see page 93 for the discussion of ADJUSTVOLUME RATIO),
3. if certain notes are to be accented, yet another adjustment is made,
4. and, finally, if the random volume is set, more adjustment.

For the most part *MfA* uses conventional musical score notation for volumes. Internally, the dynamic name is converted to a percentage value. The note volume is adjusted by the percentage.

The following table shows the available volume settings and the adjustment values.

Symbolic Name	*Ratio (Percentage) Adjustment*
off	0
pppp	5
ppp	10
pp	25
p	40
mp	70
m	100
mf	110
f	130
ff	160
fff	180
ffff	200

The setting OFF is useful for generating fades at the end of a piece. For example:

[1] We'll try to be consistent and refer to a MIDI "volume" as a "velocity" and internal *MfA* adjustments to velocity as volumes.
[2] Solo and Melody track notes use an initial velocity of 90.

```
Volume ff
Decresc Off 5
G / Gm / * 5
```

will cause the last 5 bars of your music to fade from a *ff* to silence.

The initial velocity of a note is set in the pattern definition (see chapter 4). The following commands set the master volume, track volume and random volume adjustments.

In addition to the note velocities generated by *MtA* your MIDI device can also change the mix between channels. See the discussion for MIDIVOLUME (page 127).

16.1 Accent

"Real musicians"[3], in an almost automatic manner, emphasize notes on certain beats. In popular Western music written in $\frac{4}{4}$ time this is usually beats one and three. This emphasis sets the pulse or beat in a piece.

In *MtA* you can set the velocities in a pattern so that this emphasis is automatically adjusted. For example, when setting a walking bass line pattern you could use a pattern definition like:

```
Define Walk W1234 1 4 100; 2 4 70; 3 4 80; 4 4 70
```

However, it is much easier to use a definition which has all the velocities the same:

```
Define Walk W1234 1 1 90 * 4
```

and use the ACCENT command to increase or decrease the volume of notes on certain beats:

```
Walk Accent 1 20 2 -10 4 -10
```

The above command will increase the volume for walking bass notes on beat 1 by 20%, and decrease the volumes of notes on beats 2 and 4 by 10%.

You can use this command in all tracks.

When specifying the accents, you must have matching pairs of data. The first item in the pair is the beat (which can be fractional), the second is the volume adjustment. This is a percentage of the current note volume that is added (or subtracted) to the volume. Adjustment factors must be integers in the range -100 to 100.

The ACCENTs can apply to all bars in a track; as well, you can set different accents for different bars. Just use a "{}" pair to delimit each bar. For example:

```
Bass Accent {1 20} / / {1 30 3 30}
```

The above line will set an accent on beat 1 of bars 1, 2 and 3; in bar 4 beats 1 and 3 will be accented.

You can use a "/" to repeat a setting. The "/" can be enclosed in a "{}" delimiter if you want.

[3] as opposed to mechanical.

16.2 AdjustVolume

16.2.1 Mnemonic Volume Ratios

The ratios used to adjust the volume can be changed from the table at the start of this chapter. For example, to change the percentage used for the MF setting:

```
AdjustVolume MF=95 f=120
```

Note that you can have multiple setting on the same line.

The values used have the same format as those used for the VOLUME command, below. For now, a few examples:

```
AdjustVolume Mf=mp+200
```

will set the adjustment factor for *mf* to that of *mp* plus 200%.

And,

```
AdjustVolume mf=+20
```

will increase the current *mf* setting by 20%.

You might want to do these adjustment in your MMArc file(s).

16.2.2 Master Volume Ratio

MMA uses both the master and track volumes to determine the final velocity of a note. By default, the track volume setting accounts for 60% of the adjustment and the master volume for the remaining 40%. The simple-minded logic behind this is that if the user goes to the effort of setting a volume for a track, then that is probably more important than a volume set for the entire piece.

You can change the ratio used at anytime with the ADJUSTVOLUME RATIO=<VALUE> directive. <Value> is the percentage to use for the *Track* volume. A few examples:

```
AdjustVolume Ratio=60
```

This duplicates the default setting.

```
AdjustVolume Ratio=40
```

Volume adjustments use 40% of the track volume and 60% of the master volume.

```
AdjustVolume Ratio=100
```

Volume adjustments use only the track volume (and ignore the master volume completely).

```
AdjustVolume Ratio=0
```

Volume adjustments use only the master volume (and ignore the track volumes completely).

Any value in the range 0 to 100 can be used as an argument for this command. This setting is saved in GROOVES.

Feel free to experiment with different ratios.

16.3 Volume

The volume for a track and the master volume, is set with the VOLUME command. Volumes can be specified much like standard sheet music with the conventional dynamic names. These volumes can be applied to a track or to the entire song. For example:

```
Arpeggio-Piano Volume p
```

sets the volume for the Arpeggio-Piano track to something approximating *piano*.

```
Volume f
```

sets the master volume to *forte*.

In most cases the volume for a specific track will be set within the GROOVE definition; the master volume is used in the music file to adjust the overall feel of the piece.

When using VOLUME for a specific track, you can use a different value for each bar in a sequence:

```
Drum Volume mp ff / ppp
```

A "/" can be used to repeat values.

In addition to the "musical symbols" like *ff* and *mp* you can also use numeric values to indicate a percentage. In this case you can use intermediate values to those specified in the table above. For example, to set the volume between *mf* and *f*, you could do something like:

```
Volume 87
```

But, we don't recommend that you use this!

A better option is to increment or decrement an existing volume by a percentage. A numeric value prefaced by a "+" or "-" is interpreted as a change. So:

```
Drum-Snare Volume -20
```

would decrement the existing volume of the DRUM-SNARE track by 20%.

And, finally, for fine tuning you can adjust a "musical symbol" volume by a percentage. The volume "mf-10" will generate a volume 10% less than the value of "mf"; "f+20" will generate a volume 20% greater than "f".

16.4 Cresc and Decresc

If you wish to adjust the volume over one or more bars use the CRESC or DECRESC commands. These commands work in both the master context and individual tracks.

For all practical purposes, the two commands are equivalent, except for a possible warning message. If the new volume in less than the current volume in a CRESC a warning will be displayed; the converse applies to a DECRESC. In addition, a warning will be displayed if the effect of either command results in no volume change.

The command requires two or three arguments. The first argument is an optional initial volume followed by the new (destination) volume and the number of bars the adjustment will take.

For example:

```
Cresc fff 5
```

will gradually vary the master volume from its current setting to a “triple forte” over the next 5 bars. Note that the very next bar will be played at the current volume and the fifth bar at *fff* with the other three bars at increasing volumes.

Similarly:

```
Drum-Snare Decresc mp 2
```

will decrease the “drum-snare” volume to “mezzo piano” over the next 2 bars.

Finally, consider:

```
Cresc pp mf 4
```

which will set the current volume to *pp* and then increase it to *mf* over the next 4 bars. Again, note that the very next bar will be played at *pp* and the fourth at *mf*.

You can use numeric values (not recommended!) in these directives:

```
Cresc 20 100 4
```

As well as increment/decrement:

```
Volume ff
...
Decresc -10 -40 4
```

The above example will first set the volume to 10% less than the current *ff* setting. Then it will decrease the volume over the next 4 bars to a volume 40% less than the new setting for the first bar.

A SEQCLEAR command will reset all track volumes to the default M.

When applying CRESC or DECRESC at the track level the volumes for each bar in the sequence will end up being the same. For example, assuming a two bar sequence length, you might have:

```
Chord Volume MP F
```

which alternates the volume between successive bars in the CHORD track. Now, if you were to:

```
Chord Cresc M FF 4
```

The following actions take effect:

1. A warning message will be displayed,
2. The volume for the chord track will be set to *m*,
3. The volume for the chord track will increment to *ff* over the next four bars,
4. The volume for the sequence will end up being *ff* for all the bars in the remaining sequence. You may need to reissue the initial chord volume command.

You may find that certain volume adjustments don't create the volumes you are expecting. In most cases this will be due to the fact that *MoA* uses a master and track volume to determine the final result. So, if you want a fade at the end of a piece you might do:

```
Decresc m pppp 4
```

and find that the volume on the last bar is still too loud. There are two simple solutions:

- ♫ Add a command to decrease the track volumes. For example:

  ```
  Alltracks Decresc m pppp 4
  ```

  in addition to to the master setting.

- ♫ Change the ratio between track and master settings:

  ```
  AdjustVolume Ratio=0
  ```

  or some other small value.

These methods will produce similar, but different results.

The adjustments made for CRESC and DECRESC are applied over each bar effected. This means that the first note or notes in a bar will be louder (or softer) than the last. You can use this effect for interesting changes by using a single bar for the range. Assuming a current volume of *mp*:

```
Cresc fff 1
```

will set the final notes in the following bar to be *fff*, etc.

16.5 RVolume

Not even the best musician can play each note at the same volume. Nor would he or she want to—the result would be quite unmusical … so *MoA* tries to be a bit human by randomly adjusting note volume with the RVOLUME command.

The command can be applied to any specific track. Examples:

```
Chord RVolume 10
Drum-Snare RVolume 5
```

The RVOLUME argument is a percentage value by which a volume is adjusted. A setting of 0 disables the adjustment for a track (this is the default).

When set, the note velocity (after the track and master volume adjustments) is randomized up or down by the value. Again, using the above example, let us assume that a note in the current pattern gets a MIDI velocity of 88. The random factor of 10 will adjust this by 10% up or down—the new value can be from 78 to 98.

The idea behind this is to give the track a more human sounding effect. You can use large values, but it's not recommended. Usually, values in the 5 to 10 range work well. You might want slightly larger values for drum tracks. Using a value greater than 30 will generate a warning message.

Notes:

- No generated value will be out of the valid MIDI velocity range of 1 to 127.
- A different value can be used for each bar in a sequence:

  ```
  Scale RVolume 10 0 / 20
  ```

- A "/" can be used to repeat values.

16.6 Saving and Restoring Volumes

Dynamics can get quite complicated, especially when you are adjusting the volumes of a track inside a repeat or other complicated sections of music. In this section attempts to give some general guidelines and hints.

For the most part, the supplied groove files will have balanced volumes between the different instruments. If you find that some instruments or drum tones are consistently too loud or soft, spend some time with the chapter on Fine Tuning, page 128.

Remember that GROOVEs save all the current volume settings. This includes the master setting as well as individual track settings. So, if you are using the mythical groove "Wonderful" and think that the *Chord-Piano* volume should be louder in a particular song it's easy to do something like:

```
Groove Wonderful
Chord-Piano Volume ff
DefGroove Wonderful
```

Now, when you call this groove the new volume will be used. Note that you'll have to do this for each variation of the groove that you use in the song.

In most songs you will not need to do major changes. But, it is nice to use the same volume each time though a section. In most cases you'll want to do a explicit setting at the start of a section. For example:

```
Repeat
Volume mf
....
Cresc ff 5
...
EndRepeat
```

Another useful technique is the use of the $_LASTVOLUME macro. For example:

```
Volume pp
...
Cresc f 5
...
$_LastVolume // restores to pp
```

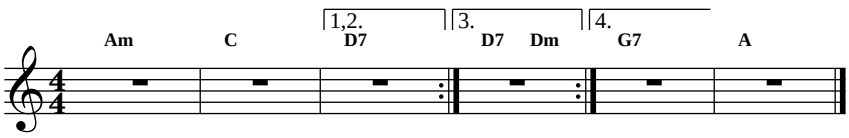
Chapter 17

Repeats

MtA attempts to be as comfortable to use as standard sheet music. This includes *repeats* and *endings*.

More complex structures like *D.S.*, *Coda*, etc. are *not* directly supported. But, they are easily simulated with by using some simple variables, conditionals and GOTOs. See chapter 18 for details. Often as not, it may be easier to use your editor to cut, paste and duplicate. Another, alternate, method of handling complicated repeats is to set sections of code in MSET (see page 104) variables and simply expand those.

A section of music to be repeated is indicated with a REPEAT and REPEATEND or ENDREPEAT[1] In addition, you can have REPEATENDINGS.




```
Repeat
1 Am
2 C
RepeatEnding 2
3 D7
RepeatEnding
4 D7 / Dm
RepeatEnd
5 G7
6 A
```

Example 17.1: Repeats

In example 17.1 *MtA* produces music with bars:

1, 2, 3,

[1]The reason for both ENDREPEAT and REPEATEND is to match IFEND and ENDIF.

1, 2, 3,
1, 2, 4,
1, 2, 5, 6

This works just like standard sheet music. Note that both REPEATENDING and REPEATEND can take an optional argument indicating the number of times to use the ending or to repeat the block. The effect of an optional count for REPEATENDING is illustrated in the example, above. The following simple example:

```
Repeat
1   Am
2   Cm
RepeatEnd 3
```

Will expand to:

1, 2,
1, 2,
1, 2

Note that the optional argument "3" produces a total of three copies. The default argument for REPEAT is "2". Using "1" cancels the REPEAT and "0" deletes the entire section. Using "1" and "0" are useful in setting up Coda sections where you want a different count the second time the section is played. Note that the count argument can be a macro. Have a look at the sample file `repeats.mma` for lots of examples.

Combining optional counts with both REPEATENDING and REPEATEND is permitted. Another example:

```
Repeat
1 Am
2 C
RepeatEnding 2
3 D7
RepeatEnd 2
```

Produces:

1, 2, 3,
1, 2, 3,
1, 2,
1, 2

MMA processes repeats by reading the input file and creating duplicates of the repeated material. This means that a directive in the repeated material would be processed multiple times. Unless you know what you are doing, directives should not be inserted in repeat sections. Be especially careful if you define a pattern inside a repeat. Using TEMPO with a "+" or "-" will be problematic as well.

Repeats can be nested to any level.

Some count values for REPEATEND or ENDREPEAT and REPEATENDING will generate a warning message. Using the optional text *NoWarn* as the first argument will suppress the message:

```
Repeat
...
RepeatEnd Nowarn 1
```

There must be one REPEATEND or ENDREPEAT for every REPEAT. Any number of REPEATENDINGS can be included before the REPEATEND.

Chapter 18

Variables, Conditionals and Jumps

To make the processing of your music easier, *MIA* supports a very primitive set for variable manipulations along with some conditional testing and the oft-frowned-upon GOTO command.

18.1 Variables

MIA lets you set a variable, much like in other programming languages and to do some basic manipulations on them. Variables are most likely to be used for two reasons:

- For use in setting up conditional segments of your file,
- As a shortcut to entering complex chord sequences.

To begin, the following list shows the available commands to set and manipulate variables:

```
Set VariableName String
Mset VariableName ...  MsetEnd
UnSet VariableName
ShowVars
Inc Variablename [value]
Dec Variablename [value]
Vexpand ON/Off
```

All variable names are case-insensitive. Any characters can be used in a variable name. The only exceptions are that a variable name cannot start with a "$" or a "_" (an underscore—this is reserved for internal variables, see below).

Variables are set and manipulated by using their names. Variables are expanded when their name is prefaced by a space followed by single "$" sign. For example:

```
Set Silly Am / Bm /
1 $Silly
```

The first line creates the variable "Silly"; the second creates a bar of music with the chords "Am / Bm /".

Note that the "$" must be the first item on a line or follow a space character. For example, the following will NOT work:

```
Set Silly 4a;b;c;d;
1 Am {$Silly}
```

However:

```
1 Am { $Silly}
```

will work fine.

Following are details on all the available variable commands:

18.1.1 Set

Set or create a variable. You can skip the *String* if you do want to assign an empty string to the variable. A valid example is:

```
Set PassCount 1
```

You can concatenate variables or constants by using a single "+". For example:

```
Groove Rhumba
Repeat
...
Set a $_Groove + Sus
Groove $a
...
Groove Rhumba1
Repeatend
```

This can be useful in calling GROOVE variations.

18.1.2 NewSet

The NEWSET command works the same as SET with the exception that that it is completely ignored if the variable already exists. So,

```
NewSet ChordVoice JazzGuitar
```

and

```
If NDef ChordVoice
   Set ChordVoice JazzGuitar
Endif
```

have identical results.

18.1.3 Mset

This command is quite similar to SET, but MSET expects multiple lines. An example:

```
MSet LongVar
  1 Cm
  2 Gm
  3 G7
MsetEnd
```

It is quite possible to set a variable to hold an entire section of music (perhaps a chorus) and insert this via macro expansion at various places in your file.

Each MSET must be terminated by a ENDMSET or MSETEND command (on its own separate line).

Be careful if you use an MSET variable in a PRINT statement . . . you'll probably get an error. The PRINT command will print the *first* line of the variable and the remainder will be reinserted into the input stream for interpretation.

Special code in *MtA* will maintain the block settings from BEGIN/END. So, you can do something like:

```
Mset Spam
  Line one
  Line 2
  333
EndMset
Begin Print
  $Spam
End
```

18.1.4 RndSet

There are times when you may want a random value to use in selecting a GROOVE or for other more creative purposes. The RNDSET command sets a variable from a value in a list. The list can be anything; just remember that each white space forms the start of a new item. So,

```
RndSet Var 1 2 3 4 5
```

will set $VAR to one of the values 1, 2, 3, 4 or 5.

You could use this to randomly select a GROOVE:

```
Groove $var Groove1 Groove2 Groove3
```

Alternately,

```
RndSet Grv Groove1 Groove2 Groove3
```

will set $GRV to one of "Groove1", "Groove2" or "Groove3".

Then you can do the same as in the earlier example with:

```
Groove $Grv
```

You can also have fun using random values for timing, transposition, etc.

18.1.5 UnSet VariableName

Removes the variable. This can be useful if you have conditional tests which simply rely on a certain variable being "defined".

18.1.6 ShowVars

Mainly used for debugging, this command displays the names of the defined variables and their contents. The display will preface each variable name with a "$". Note that internal *MIA* variables are not displayed with this command.

You can call SHOWVARS with an argument list. In this case the values of the variables names in the list will be printed. Variables which do not exist will *not* cause an error. Eg:

```
ShowVars xXx Count foo
   $XXX - not defined
   $COUNT: 11
   $FOO: This is Foo
```

18.1.7 Inc and Dec

These commands increment or decrement a variable. If no argument is given, a value of 1 is used; otherwise, the value specified is used. The value can be an integer or a floating point number.

A short example:

```
Set PassCount 1
Set Foobar 4
Showvars
Inc FooBar 4
Inc PassCount
ShowVars
```

This command is quite useful for creating conditional tests for proper handling of codas or groove changes in repeats.

18.1.8 VExpand On or Off

Normally variable expansion is enabled. These two options will turn expansion on or off. Why would you want to do this? Well, here's a simple example:

```
Set LeftC Am Em
Set RightC G /
VExpand Off
Set Full $LeftC $RightC
VExpand On
```

In this case the actual contents of the variable "Full" is "$LeftC $RightC". If the OFF/ON option lines had not been used, the contents would be "Am Em G /". You can easily verify this with the SHOWVARS option.

When *MIA* processes a file it expands variables in a recursive manner. This means that, in the above example, the line:

```
1 $Full
```

will be changed to:

```
1 Am Em G /
```

However, if later in the file, you change the definition of one of the variables . . . for example:

```
Set LeftC Am /
```

the same line will now be "1 Am / G /".

Most of *MIA*'s internal commands *can* be redefined with variables. However, you really shouldn't use this feature. It's been left for two reasons: it might be useful, and, it's hard to disable.

However, not all commands can be redefined. The following is short list of things which will work (but, again, not all suggestions should be used!):

```
Set Rate Tempo 120
$Rate
Set R Repeat
$R
```

But, the following will *not* work:

```
Set B Begin
Set E End
$B Arpeggio Define
....
$E
```

This fails since the Begin/End constructs are expanded before variable expansion. However:

```
Set A Define Arpeggio
Begin $a ...  End
```

is quite alright.

Even though you can use a variable to substitute for the REPEAT or IF directives, using one for REPEATEND, ENDREPEAT, REPEATENDING, LABEL, IFEND or ENDIF will fail.

Variable expansion should usually not be a concern. In most normal files, MMA will expand variables as they are encountered. However, when reading the data in a REPEAT, IF or MSET section the expansion function is skipped—but, when the lines are processed, after being stored in an internal queue, variables are expanded.

18.1.9 StackValue

Sometimes you just want to save a value for a few lines of code. The STACKVALUE command will save its arguments. You can later retrieve them via the $_StackValue macro. For example (taken from the `stdpats.mma` file):

```
StackValue $_SwingMode
SwingMode On
Begin Drum Define
  Swing8 1 0 90 * 8
End
  ...
SwingMode $_StackValue
```

Note that the $_StackValue macro removes the last value from the stack. If you invoke the macro when there is nothing saved an error will occur.

18.2 Predefined Variables

For your convenience MMA tracks a number of internal settings and you can access these values with special macros.[1] All of these "system" variables are prefaced with a single underscore. For example, the current tempo is displayed with the variable $_TEMPO.

There are two categories of system variables. The first are the simple values for global settings:

$_AutoLibPath Current AUTOLIBPATH setting.

$_BarNum Current bar number of song.

$_Debug Current debug settings.

$_Groove Name of the currently selected groove. May be empty if no groove has been selected.

$_KeySig Key signature as defined in song file. If no key signature is set the somewhat cryptic 0# will be returned.

$_LineNum Line number in current file.

$_IncPath Current INCPATH setting.

[1] The values are dynamically created and reflect the current settings, and may not be exactly the same as the value you originally set due to internal roundings, etc.

$_LastDebug Debug settings prior to last DEBUG command. This setting can be used to restore settings, IE:

```
Debug Warnings=off
...  stuff generating annoying warnings
Debug $_LastDebug
```

$_LastGroove Name of the groove selected *before* the currently selected groove.

$_LastVolume Previously set global volume setting.

$_LibPath Current LIBPATH setting.

$_Lyric Current LYRIC settings.

$_MIDISplit List of SPLITCHANNELS.

$_OutPath Current OUTPATH setting.

$_SeqRnd Global SEQRND setting (on, off or track list).

$_SeqRndWeight Global SEQRNDWEIGHT settings.

$_SeqSize Current SEQSIZE setting.

$_SwingMode Current SWINGMODE setting (On or Off) and the Skew value.

$_StackValue The last value stored on the STACKVALUE stack.

$_Tempo Current TEMPO. Note that if you have used the optional *bar count* in setting the tempo this will be the target tempo.

$_Time The current TIME (beats per bar) setting.

$_ToneTr List of all TONETR settings.

$_Transpose Current TRANSPOSE setting.

$_VExpand VExpand value (On/Off). Not very useful since you can't enable VEXPAND back with a macro.

$_VoiceTr List of all VOICETR settings.

$_Volume Current global volume setting.

$_VolumeRatio Global volume ratio (track vrs. master) from ADJUSTVOLUME Ratio setting.

The second type of system variable is for settings in a certain track. Each of these variables is in the form $_TRACKNAME_VALUE. For example, the current voice setting for the "Bass-Sus" track can be accessed with the variable $_Bass-Sus_Voice.

If the associated command permits a value for each sequence in your pattern, the macro will more than one value. For example (assuming a SEQSIZE of 4):

```
Bass Octave 3 4 2 4
Print $_Bass_Octave
...
3 4 2 4
```

The following are the available “TrackName” macros:

$_TRACKNAME_Accent

$_TRACKNAME_Articulate

$_TRACKNAME_Channel Assigned MIDI channel 1–16, 0 if not assigned.

$_TRACKNAME_Compress

$_TRACKNAME_Direction

$_TRACKNAME_DupRoot (only permitted in Chord Tracks)

$_TRACKNAME_Harmony

$_TRACKNAME_HarmonyVolume

$_TRACKNAME_Invert

$_TRACKNAME_Limit

$_TRACKNAME_Mallet Rate and delay values (only valid in Solo and Melody tracks)

$_TRACKNAME_NoteSpan

$_TRACKNAME_Octave

$_TRACKNAME_Range

$_TRACKNAME_Rskip

$_TRACKNAME_Rtime

$_TRACKNAME_Rvolume

$_TRACKNAME_SeqRnd

$_TRACKNAME_SeqRndWeight

$_TRACKNAME_Strum (only permitted in Chord tracks)

$_TRACKNAME_Tone (only permitted in Drum tracks)

$_TRACKNAME_Unify

$_TRACKNAME_Voice

$_TRACKNAME_Voicing (only permitted in Chord tracks)

$_TRACKNAME_Volume

The "TrackName" macros are useful in copying values between non-similar tracks and CHSHARE tracks. For example:

```
Begin Bass
  Voice AcousticBass
  Octave 3
  ...
End
Begin Walk
  ChShare Bass
  Voice $_Bass_Voice
  Octave $_Bass_Octave
  ...
End
```

18.3 Conditionals

The most important reason to have variables in MMA is to use them available in conditionals. In MMA a conditional consists of a line starting with an IF directive, a test, a series of lines to process (depending upon the result of the test), and a closing ENDIF or IFEND[2] directive. An optional ELSE statement may be included.

The first set of tests are unary (they take no arguments):

Def VariableName Returns true if the variable has been defined.

Ndef VariableName Returns true if the variable has not been defined.

In the above tests you must supply the name of a variable—don't make the mistake of including a "$" which will invoke expansion and result in something you were not expecting.

A simple example:

```
If Def InCoda
  5 Cm
  6 /
Endif
```

The other tests are binary (they take two arguments):

LT Str1 Str2 Returns true if *Str1* is less than *Str2*. (Please see the discussion below on how the tests are done.)

LE Str1 Str2 Returns true if *str1* is less than or equal to *Str2*.

EQ Str1 Str2 Returns true if *str1* is equal to *Str2*.

[2] MMA's author probably suffers from mild dyslexia and can't remember if the command is IFEND or ENDIF, so both are permitted. Use whichever is more comfortable for you.

NE Str1 Str2 Returns true if *str1* is not equal to *Str2*.

GT Str1 Str2 Returns true if *str1* is greater than *Str2*.

GE Str1 Str2 Returns true if *str1* is greater than or equal to *Str2*.

In the above tests you have several choices in specifying *Str1* and *Str2*. At some point, when *MtA* does the actual comparison, two strings or numeric values are expected. So, you really could do:

```
If EQ abc ABC
```

and get a "true" result. The reason that "abc" equals "ABC" is that all the comparisons in *MtA* are case-insensitive.

You can also compare a variable to a string:

```
If GT $foo abc
```

will evaluate to "true" if the *contents* of the variable "foo" evaluates to something "greater than" "abc". But, there is a bit of a "gotcha' here. If you have set "foo" to a two word string, then *MtA* will choke on the command. In the following example:

```
Set Foo A B
If GT $Foo abc
```

the comparison is passed the line:

```
If GT A B abc
```

and *MtA* seeing three arguments generates an error. If you want the comparison done on a variable which might be more than one word, use the "$$" syntax. This delays the expansion of the variable until the IF directive is entered. So:

```
If $$foo abc
```

would generate a comparison between "A B" and "ABC".

Delayed expansion can be applied to either variable. It only works in an IF directive.

Strings and numeric values can be confusing in comparisons. For example, if you have the strings "22" and "3" and compare them as strings, "3" is greater than "22"; however, if you compare them as values then 3 is less than 22.

The rule in *MtA* is quite simple: If either string in a comparison is a numeric value, both strings are converted to values. Otherwise they are compared as strings.[3]

This lets you do consistent comparisons in situations like:

```
Set Count 1
If LE $$Count 4
  ....
IfEnd
```

[3] An attempt is made to convert each string to a float. If conversion of both strings is successful, the comparison is made between two floats, otherwise two strings are used.

Note that the above example could have used "$Count", but you should probably always use the "$$" in tests.

Much like other programming languages, an optional ELSE condition may be used:

```
If Def Coda
  Groove Rhumba1
Else
  Groove Rhumba
Endif
```

The ELSE statement(s) are processed only if the test for the IF test is false.

Nesting of IFs is permitted:

```
If ndef Foo
  Print Foo has been defined.
Else
  If def bar
    Print bar has been defined.  Cool.
  Else
    Print no bar...go thirsty.
  Endif
Endif
```

works just fine. Indentation has been used in these examples to clearly show the nesting and conditions. You should do the same.

18.4 Goto

The GOTO command redirects the execution order of your script to the point at which a LABEL or line number has been defined. There are really two parts to this:

1. A command defining a label, and,
2. The GOTO command.

A label is set with the LABEL directive:

```
Label Point1
```

The string defining the label can be any sequence of characters. Labels are case-insensitive.

To make this look a lot more line those old BASIC programs, any lines starting with a line number are considered to be label lines as well.

A few considerations on labels and line numbers:

- A duplicate label generated with a LABEL command will generate an error.

- A line number label duplicating a LABEL is an error.
- A LABEL duplicating a line number is an error.
- Duplicate line numbers are permitted. The last one encountered will be the one used.
- All label points are generated when the file is opened, not as it is parsed.
- Line numbers (really, just comments) do not need to be in any order.

The command:

```
Goto Point1
```

causes an immediate jump to a new point in the file. If you are currently in repeat or conditional segment of the file, the remaining lines in that segment will be ignored.

MMA does not check to see if you are jumping into a repeat or conditional section of code—but doing so will usually cause an error. Jumping out of these sections is usually safe.

The following example shows the use of both types of label. In this example only lines 2, 3, 5 and 6 will be processed.

```
Goto Foo
1 Cm
Label Foo
2 Dm
3 /
Goto 5
4 Am
5 Cm
6 Dm
```

For an example of how to use some simple labels to simulate a “DS al Coda” examine the file “lullaby-of-Broadway” in the sample songs directory.

Chapter 19

Low Level MIDI Commands

The commands discussed in this chapter directly effect your MIDI output devices.

Not all MIDI devices are equal. Many of the effects in this chapter may be ignored by your devices. Sorry, but that's just the way MIDI is.

19.1 Channel

As noted in the Tracks and Channels chapter (page 18) *MMA* assigns MIDI channels dynamically as it creates tracks. In most cases this works fine; however, you can if you wish force the assignment of a specific MIDI channel to a track with the CHANNEL command.

You cannot assign a channel number to a track if it already defined (well, see the section CHSHARE, below, for the inevitable exception), nor can you change the channel assignments for any of the DRUM tracks.

Let us assume that you want the *Bass* track assigned to MIDI channel 8. Simply use:

```
Bass Channel 8
```

Caution: If the selected channel is already in use an error will be generated. Due to the way *MMA* allocates tracks, if you really need to manually assign track it is recommended that you do this in a MMARC file.

You can disable a channel at any time by using a channel number of 0:

```
Arpeggio-1 Channel 0
```

will disable the Arpeggio-1 channel, freeing it for use by other tracks. A warning message is generated. Disabling a track without a valid channel is fine. When you set a channel to 0 the track is also disabled. You can restart the track with the ON command (see page 138).

You don't need to have a valid MIDI channel assigned to a track to do things like: MIDIPAN, MIDIGLIS, MIDIVOLUME or even the assignment of any music to a track. MIDI data is created in tracks and then sent out to the MIDI buffers. Channel assignment is checked and allocated at this point, and an error will be generated if no channels are available.

It's quite acceptable to do channel reassignments in the middle of a song. Just assign channel 0 to the unneeded track first.

MIDI channel settings are *not* saved in GROOVES.

MMA inserts a MIDI "track name" meta event when the channel buffers are first assigned at a MIDI offset of 0. If the MIDI channel is reassigned, a new "track name" is inserted at the current song offset.

A more general method is to use CHANNELPREF detailed below.

You can access the currently assigned channel with the $_TRACK_CHANNEL macro.

19.2 ChannelPref

If you prefer to have certain tracks assigned to certain channels you can use the CHANNELPREF command to create a custom set of preferences. By default, MMA assigns channels starting at 16 and working down to 1 (with the expectation of drum tracks which are all assigned channel 10). If, for example, you would like the *Bass* track to be on channel 9, sustained bass on channel 3, and *Arpeggio* on channel 5, you can have a command like:

```
ChannelPref Bass=9 Arpeggio=5 Bass-Sus=3
```

Most likely this will be in your MMARC file.

You can use multiple command lines, or have multiple assignments on a single line. Just make sure that each item consists of a trackname, an "=" and a channel number in the range 1 to 16.

19.3 ChShare

MMA is fairly conservative in its use of MIDI tracks. "Out of the box" it demands a separate MIDI channel for each of its tracks, but only as they are actually used. In most cases, this works just fine.

However, there are times when you might need more tracks than the available MIDI channels or you may want to free up some channels for other programs.

If you have different tracks with the same voicing, it's quite simple. For example, you might have an arpeggio and scale track:

```
Arpeggio Sequence A16 z
Arpeggio Voice Piano1
Scale Sequence z S8
Scale Voice Piano1
```

In this example, MMA will use different MIDI channels for the *Arpeggio* and the *Scale*. Now, if you force channel sharing:

```
Scale ChShare Arpeggio
```

both tracks will use the same MIDI channel.

This is really foolproof in the above example, especially since the same voice is being used for both. Now, what if you wanted to use a different voice for the tracks?

```
Arpeggio Sequence A16 z
Arpeggio Voice Piano1 Strings
Scale Sequence z S8
Scale ChShare Arpeggio
```

You might think that this would work, but it doesn't. *MMA* ignores voice changes for bars which don't have a sequence, so it will set "Piano1" for the first bar, then "Strings" for the second (so far, so good). But, when it does the third bar (an ARPEGGIO) it will not know that the voice has been changed to "Strings" by the *Scale* track.

So, the general rule for track channel sharing is to use only one voice.

One more example which doesn't work:

```
Arpeggio Sequence A8
Scale Sequence S4
Arpeggio Voice Piano1
Scale Voice Piano1
Scale ChShare Arpeggio
```

This example has an active scale and arpeggio sequence in each bar. Since both use the same voice, you may think that it will work just fine . . . but it may not. The problem here is that *MMA* will generate MIDI on and off events which may overlap each other. One or the other will be truncated. If you are using a different octave, it will work much better. It may sound okay, but you should probably find a better way to do this.

When a CHSHARE directive is parsed the "shared" channel is first checked to ensure that it has been assigned. If not currently assigned, the assignment is first done. What this means is that you are subverting *MMA*'s normal dynamic channel allocation scheme. This may cause is a depletion of available channels.

Please note that that the use of the CHSHARE command is probably never really needed, so it might have more problems than outlined here. If you want to see how much a bother channel sharing becomes, have a look at the standard library file `frenchwaltz.mma`. All this so the accordion bass can use one channel instead of 6. If I were to write it again I'd just let it suck up the MIDI channels.

For another, simpler, way of reassigning MIDI tracks and letting *MMA* do most of the work for you, refer to the DELETE command, see page 136.

19.4 ForceOut

Under normal conditions *MMA* only generates the MIDI tracks it thinks are valid or relevant. So, if you create a track but insert no note data into that track it will not be generated. An easy way to verify this is by creating file and running *MMA* with the -c command line option. Lets start off by creating a file you might think will set the keyboard channel on your synth to a TenorSax voice:

```
Begin Solo-Keyboard
  Channel 1
```

```
  Voice TenorSax
  MIDIVolume 100
End
```

If you compile this you should get:

```
$ mma test -c

File 'test' parsed, but no MIDI file produced!

Tracks allocated:
 SOLO-KEYBOARD

Channel assignments:
1 SOLO-KEYBOARD
```

So, a *MIDI* track was created, but if you compile this file and examine the resulting MIDI file you will find that the voice *has not* been set.

To overcome this, insert the FORCEOUT command at the end of the track setup. For example, here is a more complete file which will set the keyboard track to TenorSax with a volume of 100, play a bar of accompaniment, set a Trumpet voice with a louder volume, play another bar, and finally reset the keyboard to the default Piano voice.

```
Groove BossaNova

Begin Solo
  Channel 1
  Voice TenorSax
  MIDIVolume 100
  ForceOut
End

1 C

Begin Solo
  Voice Trumpet
  MIDIVolume 120
  ForceOut
End

2 G

Begin Solo
  Voice Piano1
  MIDIVolume 127
  ForceOut
```

```
End
```

Note: The same or similar results could be accomplished with the MIDI command; however, it's a bit harder to use and the commands would be in the Meta track.

19.5 MIDI

The complete set of MIDI commands is not limitless—but from this end it seems that adding commands to suit every possible configuration is never-ending. So, in an attempt to satisfy everyone, a command which will place any arbitrary MIDI stream in your tracks has been implemented. In most cases this will be a MIDI "Sysex" or "Meta" event.

For example, you might want to start a song off with a MIDI reset:

```
MIDI 0xF0 0x05 0x7e 0x7f 0x09 0x01 0xf7
```

The values passed to the MIDI command are normal integers; however, they must all be in the range of 0x00 to 0xff. In most cases it is easiest to use hexadecimal numbers by using the "0x" prefix. But, you can use plain decimal integers if you prefer.

In the above example:

0xF0 Designates a SYSEX message

0x05 The length of the message

0x7e . . . The actual message

Another example places the key signature of F major (1 flat) in the meta track:[1]

```
MIDI 0xff 0x59 0x02 0xff 0x00
```

Some *cautions:*

- ♫ *MMA* makes no attempt to verify the validity of the data!
- ♫ The "Length" field must be manually calculated.
- ♫ Malformed sequences can create unplayable MIDI files. In extreme situations, these might even damage your synth. You are on your own with this command . . . be careful.
- ♫ The MIDI directive always places data in the *Meta* track at the current time offset into the file. This should not be a problem.

Cautions aside, `includes/init.mma` has been included in this distribution. I use this without apparent problems; to use it add the command line:

[1] This is much easier to do with the KeySig command, page 62

```
MMAstart init
```

in your MMARC file. The file is pretty well commented and it sets a synth up to something reasonably sane.

If you need a brief delay after a raw MIDI command, it is possible to insert a silent beat with the BEATADJUST command (see page 82). See the file `includes/reset.mma` for an example.

19.6 MIDIClear

As noted earlier in this manual you should be very careful in programming MIDI sequences into your song and/or library files. Doing damage to a synthesizer is probably a remote possibility . . . but leaving it in a unexpected mode is likely. For this reason the MIDICLEAR command has been added as a companion to the MIDIVOICE and MIDISEQ commands.

Each time a MIDI track (not necessary the same as a *MMA* track) is ended or a new GROOVE is started, a check is done to see if any MIDI data has been inserted in the track with a MIDIVOICE or MIDISEQ command. If it has, a further check is done to see if there is an "undo" sequence defined via a MIDICLEAR command. That data is then sent; or, if data has not be defined for the track, a warning message is displayed.

The MIDICLEAR command uses the same syntax as MIDIVOICE and MIDISEQ; however, you can not specify different sequence for different bars in the sequence:

```
Bass-Funky MIDIClear 1 Modulation 0; 1 ReleaseTime 0
```

As in MIDIVOICE and MIDISEQ you can include sequences defined in a MIDIDEF. The <beat>offsets are required, but ignored.

19.7 MIDIFile

This option controls some fine points of the generated MIDI file. The command is issued with a series of parameters in the form "MODE=VALUE". You can have multiple settings in a single MIDIFILE command.

MMA can generate two types of SMF (Standard MIDI Files):

0. This file contains only one track into which the data for all the different channel tracks has been merged. A number of synths which accept SMF (Casio, Yamaha and others) only accept type 0 files.

1. This file has the data for each MIDI channel in its own track. This is the default file generated by *MMA*.

You can set the filetype in an RC file (or, for that matter, in any file processed by *MMA*) with the command:

```
MidiFile SMF=0
```

or

```
MidiFile SMF=1
```

You can also set it on the command line with the -M option. Using the command line option will override the MIDISMF command if it is in a RC file.

By default MusA uses "running status" when generating MIDI files. This can be disabled with the command:

```
MidiFile Running=0
```

or enabled (but this is the default) with:

```
MidiFile Running=1
```

Files generated without running status will be about 20 to 30% larger than their compressed counterparts. They may be useful for use with brain-dead sequencers and in debugging generated code. There is no command line equivalent for this option.

19.8 MIDIGlis

This sets the MIDI portamento[2] (in case you're new to all this, portamento is like glissando between notes—wonderful, if you like trombones! To enable portamento:

```
Arpeggio MIDIGlis 30
```

The parameter can be any value between 1 and 127. To turn the sliding off:

```
Arpeggio MIDIGlis 0
```

This command will work with any track (including drum tracks). However, the results may be somewhat "interesting" or "disappointing", and many MIDI devices don't support portamento at all. So, be cautious. The data generated is not sent into the MIDI stream until musical data is created for the relevant MIDI channel.

19.9 MIDIInc

MusA has the ability to include a user supplied MIDI file at any point of its generated files. These included files can be used to play a melodic solo over a MusA pattern or to fill a section of a song with something like a drum solo.

When the MIDIINC command is encountered the current line is parsed for options, the file is inserted into the stored MIDI stream, and processing continues. The include has no effect on any song pointers, etc.

[2]The name "Glis" is used because "MIDIPortamento" gets to be a bit long to type and "MIDIPort" might be interpreted as something to do with "ports".

MIDIINC has a number of options, all set in the form OPTION=VALUE. Following are the recognized options:

FILENAME The filename of the file to be included. This must be a complete filename. The filename will be expanded by the Python os.path.expanduser() function for tilde expansion. No prefixes or extensions are added by *MMA*. Examples: FILENAME=`/home/bob/midi/myfile.mid`. or FILENAME=`~/sounds/myfile.mid`.

VOLUME An adjustment for the volume of all the note on events in the included MIDI file. The adjustment is specified as a percentage with values under 100 decreasing the volume and over 100 increasing it. If the resultant volume (velocity) is less than 1 a velocity of 1 will be used; if it is over 127, 127 will be used. Example: VOLUME=80.

OCTAVE Octave adjustment for all notes in the file. Values in the range -4 to 4 are permitted. Notes in drum tracks (channel 10) will not be effected. Example: OCTAVE=2.

TRANSPOSE Transposition adjustment settings in the range -24 to 24 are permitted. If you do not set a value for this the global transpose setting will be applied (expecting channel 10, drum, notes). Example: TRANSPOSE=-2.

LYRIC This option will copy any *Lyric* events to the *MMA* meta track. The valid settings are "On" or "Off". By default this is set to "Off". Example LYRIC=On.

TEXT This option will copy any *Text* events to the *MMA* meta track. The valid settings are "On" or "Off". By default this is set to "Off". Example TEXT=On.

START Specifies the start point *of the file to be included* in beats. For example, "Start=22" would start the include process 22 beats into the file. The data will be inserted at the current song position in your MMA file. The value used must greater or equal to 0 and may be a fractional beat value (18.456 if fine).

END Specifies the end point *of the file to be included* in beats. For example, "End=100" would discard all data after 100 beats in the file. The value used must be greater that the *Start* position and can be fractional.

TRACK A trackname must be be set into which notes are inserted. You can set more than one track/channel if you wish. For example, if you had the option *DRUM=10* any notes in the MIDI file with a channel 10 setting would be inserted into the *MMA Drum* track. Similarity, *Solo-Tenor=1* will copy notes from channel 1 into the *Solo-Tenor* track. If the track doesn't exist, it will be created. Note: this means that the channel assignment in your included file and the new *MMA* generated file will most likely be different. Example: SOLO=1

A complete example of usage is shown in the files in the directory `egs/frankie` in the distribution. A short example:

```
MIDIinc File=test.mid Solo-Piano=1 Drum=10 Volume=70
```

will include the MIDI file "test.mid" at the current position and assign all notes in channel 1 to the *Solo-Piano* track and the notes from channel 10 to the *Drum* track. The volumes for all the notes will be adjusted to 70% of that in the original.

A few notes:

- MIDI files to be included do not have to have the same tempo. MIDI adjusts this automatically on playback. However, the internal setting for beat division should be the same. *MtA* assumes a beat division of 192 (this is set in bytes 12 and 13 of the MIDI file). If the included file differs a warning is printed and *MtA* will attempt to adjust the timings.
- All files are parsed to find the offset of the first note-on event; notes to be included are set with their offsets compensated by that time. This means that any silence at the start of the included file is skipped (this may surprise you if you have used the optional *Start* setting). If you want the included file to start somewhere besides the start of the current bar you can use a BEATADJUST before the MIDIINC—use another to move the pointer back right after the include to keep the song pointer correct.
- Not all events in the included files are transferred: notably all system and meta events (other than text and lyric, see above) are ignored.
- If you want to apply different VOLUME or other options to different tracks, just do multiple includes of the same file (with each include using a different track and options).

19.10 MIDIMark

You can insert a MIDI Marker event into the Meta track with this command. The mark can be useful in debugging your MIDI output with a sequencer or editor which supports Mark events (most do).

```
MidiMark Label
```

will insert the text “Label” at the current position. You can add an optional negative or positive offset in beats:

```
MidiMark 2 Label4
```

will insert “Label4” 2 beats into the next bar.

19.11 MIDIPan

In MIDI-speak “pan” is the same as “balance” on a stereo. By adjusting the MIDIPAN for a track you can direct the output to the left, right or both speakers. Example:

```
Bass MIDIPan 4
```

This command is only available in track mode. The data generated is not sent into the MIDI stream until musical data is created for the relevant MIDI channel.

The value specified must be in the range 0 to 127, and must be an integer.

MIDIPAN is not saved or restored by GROOVE commands, nor is it effected by SEQCLEAR. A MIDIPAN is inserted directly into the MIDI track at the point at which it is encountered in the music file. This means that the effect of MIDIPAN will be in use until another MIDIPAN is encountered.

MIDIPAN can be used in MIDI compositions to emulate the sound of an orchestra. By assigning different values to different groups of instruments, you can get the feeling of strings, horns, etc. all placed in the "correct" position on the stage.

MIDIPAN can be used for much cruder purposes. When creating accompaniment tracks for a mythical jazz group, you might set all the bass tracks (Bass, Walk, Bass-1, etc) set to aMIDIPAN 0. Now, when practicing at home you have a "full band"; and the bass player can practice without the generated bass lines simply by turning off the left speaker.

Because most MIDI keyboard do not reset between tunes, there should be a MIDIPAN to undo the effects at the end of the file. Example:[3]

```
Include swing
Groove Swing
Bass MIDIPan 0
Walk MIDIPan 0
1 C
2 C
...
123 C
Bass MIDIPan 64
Walk MIDIPan 64
```

19.12 MIDISeq

It is possible to associate a set of MIDI controller messages with certain beats in a sequence. For example, you might want to have the Modulation Wheel set for the first beats in a bar, but not for the third. The following example shows how:

```
Seqsize 4
Begin Bass-2
 Voice NylonGuitar
 Octave 4
 Sequence { 1 4 1 90; 2 4 3 90; 3 4 5 90; 4 4 1+ 90}
 MIDIDef WheelStuff 1 1 0x7f ; 2 1 0x50; 3 1 0
 MidiSeq WheelStuff
 Articulate 90
End

C * 4
```

[3]This is much easier to do with the MMAStart and MMAEnd options see chapter 24.

The MIDISEQ command is specific to a track and is saved as part of the GROOVE definition. This lets style file writers use enhanced MIDI features to dress up their sounds.

The command has the following syntax:

```
TrackName MidiSeq <Beat> <Controller> <Datum> [ ; ...]
```

where:

Beat is the Beat in the bar. This can be an integer (1,2, etc.) or a floating point value (1.2, 2.25, etc.). It must be 1 or greater and less than the end of bar (in $\frac{4}{4}$ it must be less than 5).

Controller A valid MIDI controller. This can be a value in the range 0x00 to 0x7f or a symbolic name. See the appendix (page 176) for a list of defined names.

Datum All controller messages use a single byte "parameter" in the range 0x00 to 0x7f.

You can enter the values in either standard decimal notation or in hexadecimal with the prefixed "0x". In most cases, your code will be clearer if you use values like "0x7f" rather than the equivalent "127".

The MIDI sequences specified can take several forms:

1. A simple series like:

   ```
   MIDISeq 1 ReleaseTime 50; 3 ReleaseTime 0
   ```

   in this case the commands are applied to beats 1 and 3 in each bar of the sequence.

19.12.1

2. As a set of names predefined in an MIDIDEF command:

   ```
   MIDIdef Rel1 1 ReleaseTime 50; 3 ReleaseTime 0
   MIDIdef Rel2 2 ReleaseTime 50; 4 ReleaseTime 0
   MIDISeq Rel1 Rel2
   ```

   Here, the commands defined in "Rel1" are applied to the first bar in the sequence, "Rel2" to the second. And, if there are more bars in the sequence than definitions in the line, the series will be repeated for each bar.

3. A set of series enclosed in { } braces. Each braced series is applied to a different bar in the sequence. The example above could have been does as:

   ```
   MIDISeq { 1 ReleaseTime 50; 3 ReleaseTime 0 } \
    { 2 ReleaseTime 50; 4 ReleaseTime 0 }
   ```

4. Finally, you can combine the above into different combinations. For example:

   ```
   MIDIDef Rel1 1 ReleaseTime 50
   MIDIDef Rel2 2 ReleaseTime 50
   MIDISeq { Rel1; 3 ReleaseTime 0 } { Rel2; 4 ReleaseTime 0 }
   ```

You can have specify different messages for different beats (or different messages/controllers for the same beat) by listing them on the same MIDISEQ line separated by ";"s.

If you need to repeat a sequence for a measure in a sequence you can use the special notation "/" to force the use of the previous line. The special symbol "z" or "-" can be used to disable a bar (or number of bars). For example:

```
Bass-Dumb MIDISeq 1 ReleaseTime 20 z / FOOBAR
```

would set the "ReleaseTime" sequence for the first bar of the sequence, no MIDISeq events for the second and third, and the contents of "FOOBAR" for the fourth.

To disable the sending of messages just use a single "-":

```
Bass-2 MidiSeq - // disable controllers
```

19.13 MIDISplit

For certain post-processing effects it is convenient to have each different drum tone in a separate MIDI track. This makes it easier to apply an effect to, for example, the snare drum. Just to make this a bit more fun you can split any track created by *MuA*.

To use this feature:

```
MIDISplit <list of channels>
```

So, to split out just the drum channel[4] you would have the command:

```
MIDISplit 10
```

somewhere in your song file.

When processing *MuA* creates an internal list of MIDI note-on events for each tone or pitch in the track. It then creates a separate MIDI track for each list. Any other events are written to another track.

19.14 MIDITname

When creating a MIDI track, *MuA* inserts a MIDI Track Name event at the start of the track. By default, this name is the same as the associated *MuA* track name. You can change this by issuing the MIDITNAME command. For example, to change the CHORD track name you might do something like:

```
Chord MidiTname Piano
```

Please note that this *only* effects the tracks in the generated MIDI file. You still refer to the track in your file as CHORD.

[4] In *MuA* this will always be channel 10.

19.15 MIDIVoice

Similar to the MIDISEQ command discussed in the previous section, the MIDIVOICE command is used to insert MIDI controller messages into your files. Instead of sending the data for each bar as MIDISEQ does, this command just sends the listed control events at the start of a track and then, if needed, at the start of each bar.

Again, a short example. Let us assume that you want to use the "Release Time" controller to sustain notes in a bass line:

```
Seqsize 4
Begin Bass-2
 Voice NylonGuitar
 MidiVoice 1 ReleaseTime 50
 Octave 4
 Sequence { 1 4 1 90; 2 4 3 90; 3 4 5 90; 4 4 1+ 90}
 Articulate 60
End

C * 4
```

should give an interesting effect.

The syntax for the command is:

```
Track MIDIVoice <beat> <controller> <Datum> [; ...]
```

This syntax is identical to that discussed in the section for MIDISEQ, above. The <beat>value is required for the command—it determines if the data is sent before or after the VOICE command is sent. Some controllers are reset by a voice, others not. My experiments show that BANK should be sent before, most others after. Using a "beat" of "0" forces the MidiVoice data to be sent before the Voice control; any other "beat" value causes the data to be sent after the Voice control. In this silly example:

```
Voice Piano1
MidiVoice {0 Bank 5; 1 ReleaseTime 100}
```

the MIDI data is created in an order like:

0 Param Ch=xx Con=00 val=05
0 ProgCh Ch=xx Prog=00
0 Param Ch=xx Con=72 val=80

All the MIDI events occur at the same offset, but the order is (may be) important.

By default *MuA* assumes that the MIDIVoice data is to be used only for the first bar in the sequence. But, it's possible to have a different sequence for each bar in the sequence (just like you can have a different VOICE for each bar). In this case, group the different data groups with {} brackets:

```
Bass-1 MIDIVoice {1 ReleaseTime 50} {1 ReleaseTime 20}
```

This list is stored with other GROOVE data, so is ideal for inclusion in a style file.

If you want to disable this command after it has been issued you can use the form:

```
Track MIDIVoice - // disable
```

Some technical notes:

- *MMA* tracks the events sent for each bar and will not duplicate sequences.
- Be cautious in using this command to switch voice banks. If you don't switch the voice bank back to a sane value you'll be playing the wrong instruments!
- Do use the MIDICLEAR command (see section 19.6) to "undo" anything you've done via a MIDIVOICE command.

19.16 MIDIVolume

MIDI devices equipped with mixer settings can make use of the "Channel" or "Master" volume settings.[5]

MMA doesn't set any channel volumes without your knowledge. If you want to use a set of reasonable defaults, look at the file `includes/init.mma` which sets all channels other than "1" to "100". Channel "1" is assumed to be a solo/keyboard track and is set to the maximum volume of "127".

You can set selected MIDIVOLUMES:

```
Chord MIDIVolume 55
```

will set the Chord track channel. For most users, the use of this command is *not* recommended since it will upset the balance of the library grooves. If you need a track softer or louder you should use the volume setting for the track.

The data generated is not sent into the MIDI stream until musical data is created for the relevant MIDI channel.

Caution: If you use the command with ALLTRACKS you should note that only existing *MMA* tracks will be effected.

[5] I discovered this on my keyboard after many frustrating hours attempting to balance the volumes in the library. Other programs would change the keyboard settings, and not being aware of the changes, I'd end up scratching my head.

Chapter 20

Fine Tuning (Translations)

A program such as *MMA* which is intended to be run of various computers and synthesizers (both hardware keyboards and software versions) suffers from a minor deficiency of the MIDI standards: mainly that the standard says nothing about what a certain instrument should sound like, or the relative volumes between instruments. The GM extension helps a bit, but only a bit, by saying that certain instruments should be assigned certain program change values. This means that all GM synths will play a ”Piano” if instrument 000 is selected.

But, if one plays a GM file on a Casio keyboard, then on PC soft-synth, and then on a Yahama keyboard you will get three quite different sounds. The files supplied in this distribution have been created to sound good on the author’s setup: A Casio WK-3000 keyboard.

But, what if your hardware is different? Well, there are solutions! Later in this chapter commands are shown which will change the preselected voice and tone commands and the default volumes. At this time there are no example files supplied with *MMA*, but your contributions are welcome.

The general suggestion is that:

1. You create a file with the various translations you need. For example, the file might be called `yamaha.mma` and contain lines like:

   ```
   VoiceTR Piano1=Piano2
   ToneTr SnareDrum2=SnareDrum1
   VoiceVolTr Piano2=120 BottleBlow=80
   DrumVolTr RideBell=90 Tambourine=120
   ```

   Place this file in the directory `/usr/local/share/mma/includes`.

2. Include this file in your `\~{}/.mmarc` file. Following the above example, you would have a line:

   ```
   Include yamaha
   ```

That’s it! Now, whenever you compile a *MMA* file the translations will be done.

All of the following translation settings follow a similar logic as to “when” they take effect, and that is at the time the VOICE, VOLUME, etc. command is issued. This may confuse the unwary if GROOVES are being used. But, the following sequence:

1. You set a voice with the VOICE command,
2. You save that voice into a GROOVE with DEFGROOVE,
3. You create a voice translation with VOICETR,
4. You activate the previously defined GROOVE.

Wrong!

does not have the desired effect. In the above sequence the VOICETR will have *no* effect. For the desired translations to work the VOICE (or whatever) command must come *after* the translation command.

20.1 VoiceTr

In previous section you saw how to set a voice for a track by using its standard MIDI name. The VOICETR command sets up a translation table that can be used in two different situations:

- ♫ It permits creation of your own names for voices (perhaps for a foreign language),
- ♫ It lets you override or change voices used in standard library files.

VOICETR works by setting up a simple translation table of "name" and "alias" pairs. Whenever *MtA* encounters a voice name in a track command it first attempts to translate this name though the alias table.

To set a translation (or series of translations):

```
VoiceTr Piano1=Clavinet Hmmm=18
```

Note that you additional VOICETR commands will add entries to the existing table. To clear the table use the command with no arguments:

```
VoiceTr // Empty table
```

Assuming the first command, the following will occur:

```
Chord-Main Voice Hmmm
```

The VOICE for the *Chord-Main* track will be set to "18" or "Organ3".

```
Chord-2 Voice Piano1
```

The VOICE for the *Chord-2* track will be set to "Clavinet".

If your synth does not follow standard GM-MIDI voice naming conventions you can create a translation table which can be included in all your *MtA* song files via an RC file. But, do note that the resulting files will not play properly on a synth conforming to the GM-MIDI specification.

Following is an abbreviated and untested example for using an obsolete and unnamed synth:

```
VoiceTr Piano1=3 \
  Piano2=4 \
  Piano3=5 \
  ...  \
  Strings=55 \
  ...
```

Notes: the translation is only done one time and no verification is done when the table is created.

For translating drum tone values, see the DRUMTR command (page 130).

20.2 DrumTr

It is possible to create a translation table which will substitute one Drum Tone for another. This can be useful in a variety of situations, but consider:

- Your synth lacks certain drum tones—in this case you may want to set certain DRUMTR commands in a MMARC file.
- You are using an existing GROOVE in a song, but don't like one or more of the Drum Tones selected. Rather than editing the library file you can set a translation right in the song. Note, do this *before any* GROOVE commands.

To set a translation (or set of translations) just use a list of drumtone values or symbolic names with each pair separated by white space. For example:

```
ToneTR SnareDrum2=SnareDrum1 HandClap=44
```

will use a "SnareDrum1" instead of a "SnareDrum2" and the value "44" (actually a "PedalHiHat") instead of a "HandClap".

You can turn off all drum tone translations with an empty line:

```
ToneTR
```

The syntax and usage of DRUMTR is quite similar to the VOICETR command (see page 129).

20.3 VoiceVolTr

If you find that a particular voice, i.e., Piano2, is too loud or soft you can create an entry in the "Voice Volume Translation Table". The concept is quite simple: *MMA* checks the table whenever a track-specific VOLUME command is processed. The table is created in a similar manner to the VOICETR command:

```
VoiceVolTr Piano2=120 105=75
```

Each voice pair must contain a valid MIDI voice (or numeric value), an "=" and a volume adjustment factor. The factor is a percentage value which is applied to the normal volume. In the above example two adjustments are created:

1. Piano2 will be played at %120 of the normal value,
2. Banjo (voice 105) will be played at %75 of the normal value.

The adjustments are made when a track VOLUME command is encountered. For example, if the above translation has be set and *MMA* encounters the following commands:

```
Begin Chord
   Voice Piano2
   Volume mp
   Sequence 1 4 90
End
```

the following adjustments are made:

1. A look up is done in the global volume table. The volume “mf” is determined to be %85 for the set MIDI velocity,
2. the adjustment of %120 is applied to the %85, changing that to %102.
3. Assuming that no other volume adjustments are being made (probably there will be a global volume and, perhaps, a RVOLUME) the MIDI velocity in the sequence will be changed from 90 to 91. Without the translation the 90 would have been changed to 76.

To disable all volume translations:

```
VoiceVolTr // Empty table
```

20.4 DrumVolTr

You can change the volumes of individual drum tones with the DRUMVOLTR translation. This command works just like the VOICEVOLTR command described above. It just uses drum tones instead of instrument voices.

For example, if you wish to make the drum tones “SnareDrum1” and “HandClap” a bit louder:

```
DrumVolTr SnareDrum1=120 HandClap=110
```

The drum tone names can be symbolic constants, or MIDI values as in the next example:

```
DrumVolTr 44=90 31=55
```

All drum tone translations can be disabled with:

```
DrumVolTr // Empty table
```

Chapter 21

Other Commands and Directives

In addition to the “Pattern”, “Sequence”, “Groove” and “Repeat” and other directives discussed earlier, and chord data, *MtA* supports a number of directives which affect the flavor of your music.

The subjects presented in this chapter are ordered alphabetically.

21.1 AllTracks

Sometimes you want to apply the same command to all the currently defined tracks; for example, you might want to ensure that *no* tracks have SEQRND set. Yes, you could go though each track (and hope you don’t miss any) and explicitly issue the command:

```
Bass SeqRnd Off ....
Chord SeqRnd Off
```

But,

```
AllTracks SeqRnd Off
```

is much simpler. Similarly, you can set the articulation for all tracks with:

```
AllTracks Articulate 80
```

You can even combine this with a BEGIN/END like:

```
Begin AllTracks
  Articulate 80
  SeqRnd Off
  Rskip 0
End
```

This command is handy when you are changing an existing GROOVE.

Note that *only* currently defined tracks are effected by this command.

A further option is to limit ALLTRACKS to specific tracks type. For example, you might want to set all the DRUM track volumes to “FF”:

```
AllTracks Drum Volume ff
```

Or to set the articulation on BASS and WALK tracks:

```
AllTracks Bass Walk Articulate 55
```

It is assumed that all the arguments following the initial command which are valid track types (Bass, Chord, Arpeggio, Scale, Drum, Walk, Melody, or Solo) are track type limiters.

21.2 Articulate

When *MtA* processes a music file, all the note lengths specified in a pattern are converted to MIDI lengths.

For example in:

```
Bass Define BB 1 4 1 100; 2 4 5 90; 3 4 1 80; 4 4 5 90
```

bass notes on beats 1, 2, 3 and 4 are define. All are quarter notes. *MtA*, being quite literal about things, will make each note exactly 192 MIDI ticks long—which means that the note on beat 2 will start at the same time as the note on beat 1 ends.

MtA has an articulate setting for each voice. This value is applied to shorten or lengthen the note length. By default, the setting is 90. Each generated note duration is taken to be a percentage of this setting, So, a quarter note with a MIDI tick duration of 192 will become 172 ticks long.

If articulate is applied to a short note, you are guaranteed that the note will never be less than 1 MIDI tick in length.

To set the value, use a line like:

```
Chord-1 Articulate 96
```

Articulate values must be greater than 0 and less than or equal to 200. Values over 100 will lengthen the note. Settings greater than 120 will generate a warning.

You can specify a different ARTICULATE for each bar in a sequence. Repeated values can be represented with a "/":

```
Chord Articulate 50 60 / 30
```

Notes: The full values for the notes are saved with the pattern definition. The articulation adjustment is applied at run time. The ARTICULATE setting is saved with a GROOVE.

21.3 Copy

Sometimes it is useful to duplicate the settings from one voice to another. The COPY command does just that:

```
Bass-1 Copy Bass
```

will copy the settings from the *Bass* track to the *Bass-1* track.

The COPY command only works between tracks of the same type.

The following settings are copied:

- ♫ Articulate (page 133)
- ♫ Compress (page 71)
- ♫ Direction (page 136)
- ♫ Harmony (page 77)
- ♫ Invert (page 72)
- ♫ Octave (page 138)
- ♫ RSkip (page 140)
- ♫ RTime (page 140)
- ♫ RVolume (page **??**)
- ♫ ScaleType (page 141)
- ♫ Strum (page 142)
- ♫ Voice (page 144) or Tone (page 29)
- ♫ Volume (page 94)

Warning: You are probably better off to use internal macros for this.

21.4 Comment

As previously discussed, a comment in *MMA* is anything following a "//" in a line. A second way of marking a comment is with the COMMENT directive. This is quite useful in combination the BEGIN and END directives. For example:

```
Begin Comment
    This is a description spanning
        several lines which will be
        ignored by MMA.
End
```

You could achieve the same with:

```
// This is a description spanning
// several lines which will be
// ignored by MMA.
```

or even:

```
Comment This is a description spanning
Comment several lines which will be
Comment ignored by MMA.
```

One minor difference between // and COMMENT is that the first is discarded when the input stream is read; the more verbose version is discarded during line processing.

Quite often it is handy to delete large sections of a song with a BEGIN COMMENT/END on a temporary basis.

21.5 Debug

To enable you to find problems in your song files (and, perhaps, even find problems with *MMA* itself) various debugging messages can be displayed. These are normally set from the command line command line (page 14).

However, it is possible to enable various debugging messages dynamically in a song file using the DEBUG directive. In a debug statement you can enable or disable any of a variety of messages. A typical directive is:

```
Debug Debug=On Expand=Off Patterns=On
```

Each section of the debug directive consists of a *mode* and the command word ON or OFF. The two parts must be joined by a single "=". You may use the values "0" for "Off" and "1" for "On" if desired.

The available modes with the equivalent command line switches are:

Mode	*Command Line Equivalent*	
Debug	-d	debugging messages
Filenames	-o	display file names
Patterns	-p	pattern creation
Sequence	-s	sequence creation
Runtime	-r	running progress
Warnings	-w	warning messages
Expand	-e	display expanded lines

The modes and command are case-insensitive (although the command line switches are not).

The current state of the debug flags is saved in the variable $_Debug and the state prior to a change is saved in $_LastDebug.

21.6 Delete

If you are using a track in only one part of your song, especially if it is at the start, it may be wise to free that track's resources when you are done with it. The DELETE command does just that:

```
Solo Delete
```

If a MIDI channel has been assigned to that track, it is marked as "available" and the track is deleted. Any data already saved in the MIDI track will be written when *MtA* is finished processing the song file.

21.7 Direction

In tracks using chords or scales you can change the direction in which they are applied:

```
Scale Direction UP
```

The effects differ in different track types. For SCALE and ARPEGGIO tracks:

UP	Plays in upward direction only
DOWN	Plays in downward direction only
BOTH	Plays upward and downward (*default*)
RANDOM	Plays notes from the chord or scale randomly

When this command is encountered in a SCALE track the start point of the scale is reset.

A WALK track recognizes the following option settings:

BOTH	The default. The bass pattern will go up and down a partial scale. Some notes may be repeated.
UP	Notes will be chosen sequentially from an ascending, partial scale.
DOWN	Notes will be chosen sequentially from a descending, partial scale.
RANDOM	Notes will be chosen in a random direction from a partial scale.

All four patterns are useful and create quite different effects.

The CHORD tracks DIRECTION only has an effect when the STRUM setting has a non-zero value. In this case the following applies:

UP	The default. Notes are sounded from the lowest tone to the highest.
DOWN	Notes are sounded from the highest to the lowest.
BOTH	The UP and DOWN values are alternated.
RANDOM	Ignored (uses UP).

You can specify a different DIRECTION for each bar in a sequence. Repeated values can be represented with a "/":

```
Arpeggio Direction Up Down / Both
```

The setting is ignored by BASS, DRUM and SOLO tracks.

21.8 Mallet

Some instruments (Steel-drums, banjos, marimbas, etc.) are normally played with rapidly repeating notes. Instead of painfully inserting long lists of these notes, you can use the MALLET directive. The MALLET directive accepts a number of options, each an OPTION=VALUE pair. For example:

```
Solo-Marimba Mallet Rate=16 Decay=-5
```

This command is also useful in creating drum rolls. For example:

```
Begin Drum-Snare2
  Tone SnareDrum1
  Volume F
  Mallet Rate=32 Decay=-3
  Rvolume 3
  Sequence z z z 1 1 100
End
```

The following options are supported:

21.8.1 Rate

The RATE must be a valid note length (i.e., 8, 16, or even 16.+8).

For example:

```
Solo-Marimba Mallet Rate=16
```

will set all the notes in the “Solo-Marimba” track to be sounded a series of 16th notes.

- ♫ Note duration modifiers such as articulate are applied to each resultant note,
- ♫ It is guaranteed that the note will sound at least once,
- ♫ The use of note lengths assures a consistent sound independent of the song tempo.

To disable this setting use a value of “0”.

21.8.2 Decay

You can adjust the volume (velocity) of the notes being repeated when MALLET is enabled:

```
Drum-Snare Mallet Decay=-15
```

The argument is a percentage of the current value to add to the note each time it is struck. In this example, assuming that the note length calls for 4 “strikes” and the initial velocity is 100, the note will be struck with a velocity of 100, 85, 73 and 63.

Important: a positive value will cause the notes to get louder, negative values cause the notes to get softer.

Note velocities will never go below 1 or above 255. Note, however, that notes with a velocity of 1 will most likely be inaudible.

The decay option value must be in the range -50 to 50; however, be cautious using any values outside the range -5 to 5 since the volume (velocity) of the notes will change quite quickly. The default value is 0 (no decay).

21.9 Octave

When *MnA* initializes and after the SEQCLEAR command all track octaves are set to "4". This will place most chord and bass notes in the region of middle C.

You can change the octave for any voice with OCTAVE command. For example:

```
Bass-1 Octave 3
```

Sets the notes used in the "Bass-1" track one octave lower than normal.

The octave specification can be any value from 0 to 10. Various combinations of INVERT, TRANSPOSE and OCTAVE can force notes to be out of the valid MIDI range. In this case the lowest or highest available note will be used.

You can specify a different OCTAVE for each bar in a sequence. Repeated values can be represented with a "/":

```
Chord Octave 4 5 / 4
```

21.10 Off

To disable the generation of MIDI output on a specific track:

```
Bass Off
```

This can be used anywhere in a file. Use it to override the effect of a predefined groove, if you wish. This is simpler than resetting a voice in a groove. The only way to reset this command is with a ON directive.

21.11 On

To enable the generation of MIDI output on a specific track which has been disabled with an OFF directive:

```
Bass On
```

21.12 Print

The PRINT directive will display its argument to the screen when it is encountered. For example, if you want to print the file name of the input file while processing, you could insert:

```
Print Making beautiful music for MY SONG
```

No control characters are supported.

This can be useful in debugging input files.

21.13 PrintActive

The PRINTACTIVE directive will the currently active GROOVE and the active tracks. This can be quite useful when writing groove files and you want to modify and existing groove.

Any parameters given are printed as single comment at the end of the header line.

This is strictly a debugging tool. No PRINTACTIVE statements should appear in finalized grooves or song files.

21.14 RndSeed

All of the random functions (RTIME, RSKIP, etc.) in *MIA* depend on the *Python random* module. Each time *MIA* generates a track the values generated by the random functions will be different. In most cases this is a "good thing"; however, you may want *MIA* to use the same sequence of random values[1] each time it generates a track. Simple: just use:

```
RndSeed 123.56
```

at the top of your song file. You can use any value you want: it really doesn't make any difference, but different values will generate different sequences.

You can also use this with no value, in which case Python uses its own value (see the Python manual for details). Essentially, using no value undoes the effect which permits the mixing of random and not-so-random sections in the same song.

One interesting use of RNDSEED could be to ensure that a repeated section is identical: simply start the section with something like:

```
Repeat
RndSeed 8
...  chords
```

It is highly recommended that you *do not* use this command in library files.

[1] Yes, this is a contradiction of terms.

21.15 RSkip

To aid in creating syncopated sounding patterns, you can use the RSKIP directive to randomly silence or skip notes. The command takes a value in the range 0 to 99. The "0" argument disables skipping. For example:

```
Begin Drum
    Define D1 1 0 90
    Define D8 D1 * 8
    Sequence D8
    Tone OpenHiHat
    RSkip 40
End
```

In this case a drum pattern has been defined to hit short "OpenHiHat" notes 8 per bar. The RSKIP argument of "40" causes the note to be NOT sounded (randomly) only 40% of the time.

Using a value of "10" will cause notes to be skipped 10% of the time (they are played 90% of the time), "90" means to skip the notes 90% of the time, etc.

You can specify a different RSKIP for each bar in a sequence. Repeated values can be represented with a "/":

```
Scale RSkip 40 90 / 40
```

If you use the RSKIP in a chord track, the entire chord *will not* be silenced. The option will be applied to the individual notes of each chord. This may or may not be what you are after. You cannot use this option to generate entire chords randomly. For this effect you need to create several chord patterns and select them with SEQRND.

21.16 RTime

One of the biggest problem with computer generated drum and rhythm tracks is that, unlike real musicians, the beats are precise and "on the beat". The RTIME directive attempts to solve this.

The command can be applied to all tracks.

```
Drum-4 Rtime 4
```

The value passed to the RTime directive are the number of MIDI ticks with which to vary the start time of the notes. For example, if you specify "5" the start times will vary from -5 to +5 ticks) on each note for the specified track. There are 192 MIDI ticks in each quarter note.

Any value from 0 to 100 can be used; however values in the range 0 to 10 are most commonly used. Exercise caution in using large values!

You can specify a different RTIME for each bar in a sequence. Repeated values can be represented with a "/":

```
Chord RTime 4 10 / 4
```

RTIME is guaranteed never to start a note before the start of a bar.

21.17 ScaleType

This option is only used by SCALE tracks. It can be set for other tracks, but the setting is not used.

By default, the SCALETYPE is set to AUTO. The settings permissible are:

CHROMATIC	Forces use of a chromatic scale
AUTO	Uses scale based on the current chord (default)

When this command is encountered in a SCALE track the start point of the scale is reset.

21.18 Seq

If your sequence, or groove, has more than one pattern (i.e., you have set SeqSize to a value other than 1), you can use this directive to force a particular pattern point to be used. The directive:

```
Seq
```

resets the *sequence counter* to 1. This means that the next bar will use the first pattern in the current sequence. You can force a specific pattern point by using an optional value after the directive. For example:

```
Seq 8
```

forces the use of pattern point 8 for the next bar. This can be quite useful if you have a multi-bar sequence and, perhaps, the eight bar is variation which you want used every eight bars, but also for a transition bar, or the final bar. Just put a SEQ 8 at those points. You might also want to put a SEQ at the start of sections to force the restart of the count.

If you have enable sequence randomization with the SEQRND ON command, the randomization will be disabled by a SEQ command.[2] However, settings of track SEQRND will not be effected. One difference between SEQRND OFF and SEQ is that the current sequence point is set with the latter; with SEQRND OFF it is left at a random point.

Note: Using a value greater than the current SEQSIZE is not permitted.

This is a very useful command! For example, look at the four bar introduction of the song “Exactly Like You”:

[2] A warning message will also be displayed.

```
Groove BossanovaEnd
seq 3
1 C
seq 2
2 Am7
seq 1
3 Dm7
seq 3
4 G7 / G7#5
```

In this example the four bar “ending groove” has been used to create an interesting introduction.

21.19 Strum

By default *MtA* plays all the notes in a chord at the same time. To make the chord more like something a guitar or banjo might play, use the STRUM directive. For example:

```
Chord-1 Strum 5
```

sets the strumming factor to 5 for track Chord-1.

Setting the STRUM in any track other than a CHORD track will generate a warning message and the command will be ignored.

The strum factor is specified in MIDI ticks. Usually values around 10 to 15 work just fine. The valid range for STRUM is 0 to 100.

You can specify a different STRUM for each bar in a sequence. Repeated values can be represented with a “/”:

```
Chord Strum 20 5 / 10
```

Note: When chords have both a STRUM and INVERT applied, the order of the notes played will not necessarily be root, third, etc. The notes are sorted into ascending order, so for a C major scale with and INVERT of 1 the notes played would be “E G C”. That is, unless the DIRECTION (see page 136) has been set to “DOWN” in which case the order would be reversed (but the notes would be the same).

21.20 Synchronize

The MIDI tracks generated by *MtA* are perfectly “legit” and should be playable in any MIDI file player. However, there are a few programs and/or situations in which you might need to use the SYNCHRONIZE options.

First, when a program is expecting all tracks to start at the same location, or is intolerant of "emptiness" at the start of a track, you can add a "tick note" at the start of each track. [3]

```
Synchronize START
```

will insert a one tick note on/off event at MIDI offset 1. You can also generate this with the "-0" command line option.

Second, some programs think (wrongly) that all tracks should end at the same point.[4] Adding the command:

```
Synchronize END
```

will delete all MIDI data past the end of the last bar in your input file and insert MIDI "all notes off" events at that point. You can also generate this effect with the "-1" command line option.

The commands can be combined in any order:

```
Synchronize End Start
```

is perfectly valid.

21.21 Transpose

You can change the key of a piece with the "Transpose" command. For example, if you have a piece notated in the key of "C" and you want it played back in the key of "D":

```
Transpose 2
```

will raise the playback by 2 semi-tones. Since *MtA*'s author plays tenor saxophone

```
Transpose -2
```

which puts the MIDI keyboard into the same key as the horn, is not an uncommon directive

You can use any value between -12 and 12. All tracks (with the logical exception of the drum tracks) are effected by this command.

21.22 Unify

The UNIFY command is used to force multiple notes of the same voice and pitch to be combined into a single, long, tone. This is very useful when creating a sustained voice track. For example, consider the following which might be used in real groove file:

[3] Timidity truncates the start of tracks up to the first MIDI event when splitting out single tracks.

[4] Seq24 does strange looping if all tracks don't end identically.

```
Begin Bass-Sus
 Sequence  1 1 1 90  4
 Articulate 100
 Unify On
 Voice TremoloStrings
End
```

Without the UNIFY ON command the strings would be sounded (or hit) four times during each bar; with it enabled the four hits are combined into one long tone. This tone can span several bars if the note(s) remain the same.

The use of this command depends on a number of items:

- The VOICE being used. It makes sense to use enable the setting if using a sustained tone like "Strings"; it probably doesn't make sense if using a tone like "Piano1".
- For tones to be combined you will need to have ARTICULATE set to a value of 100. Otherwise the on/off events will have small gaps in them which will cancel the effects of UNIFY.
- Ensure that RTIME is not set for UNIFY tracks since the start times may cause gaps.
- If your pattern or sequence has different volumes in different beats (or bars) the effect of a UNIFY will be to ignore volumes other than the first. Only the first NOTE ON and the last NOTE OFF events will appear in the MIDI file.

You can specify a different UNIFY for each bar in a sequence. Repeated values can be represented with a "/":

```
Chord Unify On / / Off
```

But, you probably don't want to use this particular feature.

Valid arguments are "On" or "1" to enable; "Off" or "0" to disable.

21.23 Voice

The MIDI instrument or voice used for a track is set with:

```
Chord-2 Voice Piano1
```

Voices apply only to the specified track. The actual instrument can be specified via the MIDI instrument number, or with the symbolic name. See the tables in the MIDI voicing section (page 171) for lists of the recognized names.

You can create interesting effects by varying the voice used with drum tracks. By default "Voice 0" is used. However, you can change the drum voices. The supplied library files do not change the voices since this appears to be highly dependent on the MIDI synth you are using.

You can specify a different VOICE for each bar in a sequence. Repeated values can be represented with a "/":

```
Chord Voice Piano1 / / Piano2
```

It is possible to set up translations for the selected voice: see the VOICETR command (see page 129).

Chapter 22

Begin/End Blocks

Entering a series of directives for a specific track can get quite tedious. To make the creation of library files a bit easier, you can create a block. For example, the following:

```
Drum Define X 0 2 100; 50 2 90
Drum Define Y 0 2 100
Drum Sequence X Y
```

Can be replaced with:

```
Drum Begin
    Define X 0 2 100; 50 2 90
    Define Y 0 2 100 End
Drum Sequence X Y
```

Or, even more simply, with:

```
Drum Begin Define
    X 0 2 100; 50 2 90
    Y 0 2 100
End
```

If you examine some of the library files you will see that this shortcut is used a lot.

22.1 Begin

The BEGIN command requires any number of arguments. Valid examples include:

```
Begin Drum
Begin Chord2
Begin Walk Define
```

Once a BEGIN block has been entered, all subsequent lines have the words from the BEGIN command prepended to each line of data. There is not much magic here—BEGIN/END is really just some syntactic sugar.

22.2 End

To finish off a BEGIN block, use a single END on a line by itself.

Defining musical data, repeats, or other BEGINs inside a block (other than COMMENT blocks) will not work.

Nesting is permitted. Eg:

```
Scale Begin
    Begin Define
        stuff
    End
    Sequence stuff
End
```

A BEGIN must be competed with a END before the end of a file, otherwise an error will be generated. The USE and INCLUDE commands are not permitted inside a block.

Chapter 23

Documentation Strings

It has been mentioned a few times already the importance of clearly documenting your files and library files. For the most part, you can use comments in your files; but in library files you use the DOC directive.

In addition to the commands listed in this chapter, you should also note DEFGROOVES, section 6).

For some real-life examples of how to document your library files, look at any of the library files supplied with this distribution.

23.1 Doc

A DOC command is pretty simple:

```
Doc This is a documentation string!
```

In most cases, DOCs are treated as COMMENTS. However, if the *-Dx*[1] option is given on the command line, DOCs are processed and printed to standard output.

For producing the *MMA Standard Library Reference* a trivial Python program is used to collate the output generated with a command like:

```
$ mma -Dxl -w /usr/local/lib/mma/swing
```

Note, the '-w' option has been used to suppress the printing of warning messages.

23.2 Author

As part of the documentation package, there is a AUTHOR command:

```
Author Bob van der Poel
```

Currently AUTHOR lines are processed and the data is saved, but never used. It may be used in a future library documentation procedures, so you should use it in any library files you write.

[1] See the command summary, page 14.

23.3 DocVar

If any variables are used to change the behavior of a library file they should be documented with a DOCVAR command. Normally these lines are treated as comments, but when processing with the -Dxl or -Dxh command line options the data is parsed and written to the output documentation files.

Assuming that you are using the *MIA* variable $CHORDVOICE as an optional voice setting in your file, you might have the following in a library file:

```
Begin DocVar
  ChordVoice Voice used in Chord tracks (defaults to Piano2).
End

If NDef ChordVoice
  Set ChordVoice Piano2
Endif
```

All variables used in the library file should be documented. You should list the user variables first, and then any variables internal to the library file. To double check to see what variables are used you can add a SHOWVARS to the end of the library file and compile. Then document the variables and remove the SHOWVARS.

Chapter 24

Paths, Files and Libraries

This chapter covers *MMA* filenames, extensions and a variety of commands and/or directives which effect the way in which files are read and processed.

But, first a few comments on the location of the *MMA* Python modules.

The Python language (which was used to write *MMA*) has a very useful feature: it can include other files and refer to functions and data defined in these files. A large number of these files or modules are included in every Python distribution. The program *MMA* consists of a short "main" program and several "module" files. Without these additional modules *MMA* will not work.

The only sticky problem in a program intended for a wider audience is where to place these modules. Hopefully, it is a "good thing" that they should be in one of three locations:

- `/usr/local/share/mma/MMA`
- `/usr/share/mma/MMA`
- `./MMA`

If, when initializing itself, *MMA* cannot find one of the above directories, it will terminate with an error message.

If you are using *MMA* on a Windows platform please see the comments about the default paths (on page 159).

24.1 File Extensions

For most files the use of a the file name extension ".mma" is optional. However, it is suggested that most files (with the exceptions listed below) have the extension present. It makes it much easier to identify *MMA* song and library files and to do selective processing on these files.

In processing an input song file *MMA* can encounter several different types of input files. For all files, the initial search is done by adding the file name extension ".mma" to file name (unless it is already present), then a search for the file as given is done.

For files included with the USE directive, the directory set with SETLIBPATH is first checked, followed by the current directory.

For files included with the INCLUDE directive, the directory set with SETINCPATH is first checked, followed by the current directory.

Following is a summary of the different files supported:

Song Files The input file specified on the command line should always be named with the ".mma" extension. When MMA searches for the file it will automatically add the extension if the file name specified does not exist and doesn't have the extension.

Library Files Library files *really should* all be named with the extension. MMA will find non-extension names when used in a USE or INCLUDE directive. However, it will not process these files when creating indexes with the "-g" command line option—these index files are used by the GROOVE commands to automatically find and include libraries.

RC Files As noted in the RC-File discussion (see page 156) MMA will automatically include a variety of "RC" files. You can use the extension on these files, but common usage suggests that these files are probably better without.

MMAstart and MMAend MMA will automatically include a file at the beginning or end of processing (see page 156). Typically these files are named MMASTART and MMAEND. Common usage is to *not* use the extension if the file is in the current directory; use the file if it is in an "includes" directory.

One further point to remember is that filenames specified on the command line are subject to wild-card expansion via the shell you are using.

24.2 Tilde Expansion

On Unix-like systems all filenames may be prefaced with tilde or a tilde with a user name. All file operations in MMA honor this convention. This includes the setting of library and include paths.

The result of this operation is system dependent. See the entry for *os.path.expanduser* in the Python library reference.

24.3 Eof

Normally, a file is processed until its end. However, you can short-circuit this behavior with the EOF directive. If MMA finds a line starting with EOF no further processing will be done on that file … it's just as if the real end of file was encountered. Anything on the same line, after the EOF is also discarded.

You may find this handy if you want to test process only a part of a file, or if you making large edits to a library file. It is often used to quit when using the LABEL and GOTO directives to simulate constructs like *D.C. al Coda*, etc.

24.4 LibPath

The search for library files can be set with the LibPath variable. To set LIBPATH:

```
SetLibPath PATH
```

You can have only one path in the SETLIBPATH directive.

When *MMA* starts up it sets the library path to the first valid directory in the list:

- ♫ `/usr/local/share/mma/lib`
- ♫ `/usr/share/mma/lib`
- ♫ `./lib`

The last choice lets you run *MMA* directly from the distribution directory.

You are free to change this to any other location in a RCFile, page 156.

LIBPATH is used by the routine which auto-loads grooves from the library, and the USE directive. The -g command line option is used to maintain the library database, page 16).

The current setting can be accessed via the macro $_LibPath.

24.5 AutoLibPath

The sub-directory containing the current library files to automatically load is determined by the current setting of AUTOLIBPATH. Please see the library file discussion on page 157 for details.

You can change the automatic include directory by resetting this variable. It must be a sub-directory of LIBPATH for it to work.

The command to reset the variable is:

```
SetAutoLibPath mydir
```

The current setting can be accessed via the macro $_AutoLibPath. By default the setting is “stdlib”.

Any existing GROOVE definitions are deleted from memory when this command is issued (this it to avoid name conflicts between libraries).

24.6 MIDIPlayer

When using the -P command line option *MMA* uses the MIDI file player defined with SETMIDIPLAYER to play the generated file. By default the program is set to “aplaymidi”. You can change this to anything you want.

```
SetMIDIplayer /usr/local/kmid
```

You will probably want to use this command in an RC file.

24.7 OutPath

MIDI file generation is to an automatically generated filename (see page 14). If the OUTPATH variable is set, that value will be prepended to the output filename. To set the value:

```
SetOutPath PATH
```

Just make sure that "PATH" is a simple path name with *no* spaces in it. The variable is case sensitive (assuming that your operating system supports case sensitive filenames). This is a common directive in a RC file (see page 156). By default, it has no value.

You can disable the OUTPATH variable quite simply: just issue the command without an argument.

If the name set by this command begins with a ".", "/" or "\" it is prepended to the complete filename specified on the command line. For example, if you have the input filename `test.mma` and the output path is `~/mids` —the output file will be `/home/bob/mids/test.mid`.

If the name doesn't start with the special characters noted in the preceding paragraph the contents of the path will be inserted before the filename portion of the input filename. Again, an example: the input filename is `mma/rock/crying` and the output path is "midi"—the output file will be `mma/rock/midi/crying.mid`.

The current setting can be accessed via the macro $_OutPath.

Note that this option is ignored if you use the -f command line option (page 16) or if an absolute name for the input file (one starting with a "/" or a "~") is used.

24.8 Include

Other files with sequence, pattern or music data can be included at any point in your input file. There is no limit to the level of includes.

```
Include Filename
```

A search for the file is done in the INCPATH directory (see below) and the current directory. The ".mma" filename extension is optional (if a filename exists both with and without the ".mma" extension, the file with the extension will be used).

The use of this command should be quite rare in user files; however, it is used extensively in library files to include standard patterns.

24.9 IncPath

The search for include files can be set with the INCPATH variable. To set INCPATH:

```
SetIncPath PATH
```

You can have only one path in the SETINCPATH directive.

When *MMA* initializes it sets the include path to first found directory in:

- `/usr/local/share/mma/includes`
- `/usr/share/mma/includes`
- `./includes`

The last location lets you run *MMA* from the distribution directory.

If this value is not appropriate for your system, you are free to change it in a RC File.

The current setting can be accessed via the macro $_IncPath.

24.10 Use

Similar to INCLUDE, but a bit more useful. The USE command is used to include library files and their predefined grooves.

Compared to INCLUDE, USE has important features:

- The search for the file is done in the paths specified by the LibPath variable,
- The current state of the program is saved before the library file is read and restored when the operation is complete.

Let's examine each feature in a bit more detail.

When a USE directive is issued, eg:

```
use stdlib/swing
```

MMA first attempts to locate the file "stdlib/swing" in the directory specified by LIBPATH or the current directory. As mentioned above, *MMA* automatically added the ".mma" extension to the file and checks for the non-extension filename if that can't be found.

If things aren't working out quite right, check to see if the filename is correct. Problems you can encounter include:

- Search order: you might be expecting the file in the current directory to be used, but the same filename exists in the LIBPATH, in which case that file is used.
- Not using extensions: Remember that files *with* the extension added are first checked.

- Case: The filename is *case sensitive*. The files "Swing" and "swing" are not the same. Since most things in *MMA* are case insensitive, this can be an easy mistake to make.
- The file is in a sub directory of the LIBPATH. In a standard distribution the actual library files are in `/usr/local/share/mma/lib/stdlib`, but the libpath is set to `/usr/local/share/mma/lib`. In this case you must name the file to be used as `stdlib/rhumba` *not* `rhumba`.

As mentioned above, the current state of the compiler is saved during a USE. *MMA* accomplishes this by issuing a slightly modified DEFGROOVE and GROOVE command before and after the reading of the file. Please note that INCLUDE doesn't do this. But, don't let this feature fool you—since the effects of defining grooves are cumulative you *really should* have SEQCLEAR statements at the top of all your library files. If you don't you'll end up with unwanted tracks in the grooves you are defining.

In most cases you will not need to use the USE *directive in your music files.* If you have properly installed *MMA* and keep the database up-to-date by using the command:

```
$ mma -g
```

grooves from library files will be automatically found and loaded. Internally, the USE directive is used, so existing states are saved.

If you are developing new or alternate library files you will find the USE directive handy.

24.11 MmaStart

If you wish to process a certain file or files before your main input file, set the MMASTART filename in an RCFile. For example, you might have a number of files in a directory which you wish to use certain PAN settings. In that directory, you just need to have a file `mmarc` which contains the following command:

```
MmaStart setpan
```

The actual file `setpan` has the following directives:

```
Bass Pan 0
Bass1 Pan 0
Bass2 Pan 0
Walk Pan 0
Walk1 Pan 0
Walk2 Pan 0
```

So, before each file in that directory is processed, the PAN for the bass and walking bass voices are set to the left channel.

If the file specified by a MMASTART directive does not exist a warning message will be printed (this is not an error).

Also useful is the ability to include a generic file with all the MIDI files you create. For example, you might like to have a MIDI reset at the start of your files—simple, just include the following in your `mmarc` file:

```
MMAstart reset
```

This includes the file `reset.mma` located in the "includes" directory (see page 154).

Multiple MMASTART directives are permitted. The files are processed in the order declared. You can have multiple filenames on a MMASTART line.

One caution with MMASTART files: the file is processed after the RC file, just before the actual song file.

24.12 MmaEnd

Just the opposite of MMASTART, this command specifies a file to be included at the end of a main input file. See the comments above for more details.

To continue this example, in your `mmarc` file you would have:

```
MmaEnd nopan
```

and in the file `nopan` have:

```
Bass Pan 64
Bass1 Pan 64
Bass2 Pan 64
Walk Pan 64
Walk1 Pan 64
Walk2 Pan 64
```

If the file specified by a MMAEND directive does not exist a warning message will be printed (this is not an error).

Multiple MMAEND directives are permitted and processed in the order declared. You can have multiple filenames on a MMAEND line.

24.13 RC Files

When *MMA* starts it checks for initialization files. Only the first found file is processed. The following locations/files are checked (in order):

1. `mmarc` — this is a normal file in the current directory.
2. `\~{}/.mmarc` — this is an "invisible" file in the users home directory.
3. `/usr/local/etc/mmarc`
4. `/etc/mmarc`

Only the first found file will be processed. This means you can override a "global" RC file with a user specific one. If you just want to override some specific commands you might want to:

1. Create the file `mmarc` in a directory with *MMA* files,
2. As the first line in that file have the command:

   ```
   include \~{}/.mmarc
   ```

   to force the inclusion of your global stuff,
3. Now, place your directory specific commands in your custom RC file.

By default, no RC files are installed. You may want to create an empty `\~{}/.mmarc` file to eliminate a warning message.

An alternate method for using a different RC file is to specify the name of the file on the command line by using the *-i* option (see page 16). Using this option you can have several RC files in a directory and compile your songs differently depending on the RC file you specify.

The RC file is processed as a *MMA* input file. As such, it can contain anything a normal input file can, including music commands. However, you should limit the contents of RC files to things like:

```
SetOutPath
SetLibPath
MMAStart
MMAEnd
```

A useful setup is to have your source files in one directory and MIDI files saved into a different directory. Having the file `mmarc` in the directory with the source files permits setting OUTPATH to the MIDI path.

24.14 Library Files

Included in this distribution are a number of predefined patterns, sequences and grooves. They are in different files in the “lib” directory.

The library files should be self-documenting. A list of standard file and the grooves they define is included in the separate document, supplied in this distribution as “`mma-lib.ps`”.

24.14.1 Maintaining and Using Libraries

The basic *MMA* distribution comes with a set of pattern files which are installed in the `mma/lib/stdlib` directory. Each one of these files has a number of GROOVES defined in them. For example, the file `mma/lib/stdlib/rhumba.mma` contains the grooves *Rhumba*, *RhumbaEnd* and many more.

If you are writing GROOVES with the intention of adding them to the standard library you should ensure that none of the names you choose duplicate existing names already used.

If you are creating a set of alternate grooves to duplicate the existing library you might do the following:

1. Create a directory with your name or other short id in the `mma/lib/` hierarchy. For example, if your name is "Bob van der Poel" you might create the directory `mma/lib/bvdp`.
2. Place all your files (or modified files) in that directory.
3. Now, when your song wants to use a groove, you have two choices:
   (a) Include the file with the USE directive. For example, if you have created the file `rock.mma` and want to use the GROOVE *rock8* you would:
      i. place the directive USE BVDP/ROCK near the top of the song file. Note: it might not be apparent from the typeface here, but the filename here is all *lowercase*. In Unix/Linux case is important, so please make sure of the case of the filenames in commands like USE.
      ii. enable the groove with the directive GROOVE ROCK8 (and here the case is not important since *MMA* thinks that upper and lower case are the same).
   (b) Force *MMA* to use *your* groove directory by resetting the auto-lib directory (again, the case for the path is important):

```
SetAutoLibPath bvdp
```

   You will have to update the *MMA* database with the -g or -G command line options for this to work. If you elect this route, please note that the files in the standard library will not be available, but you can use both with something like this:

```
Groove Metronome2-4
   z * 2
SetAutoLibPath bvdp
Groove BossaNova // the bossa from lib/bvdp, not stdlib!
  chords...
```

   The nice thing about this method is that you can have multiple sets of library files *all using the same* GROOVE *names*. To create a different version you just need to change the SETAUTOLIBPATH variable in your song file . . . or, for a collection of songs put the variable in your MMARC file.

For those who "really need to know", here are the steps that *MMA* takes when it encounters a GROOVE command:

1. if the named groove has been loaded/created already *MMA* just switches to the internal version of that groove.
2. if the groove can't be found in memory, a search of the groove database (created with the -g command line option) is done. If no database is in memory it is loaded from the directory pointed to by the LIBPATH and AUTOLIBPATH variables. This database is then searched for the needed GROOVE. The database contains the filenames associated with each GROOVE and that file is then read with the USE code.

The database is a file `.mmaDB` stored in each sub directory of LIBPATH. This is a "hidden" file (due to the leading "." in the filename). You cannot change the name of this file. If there are sub-directories the entries for them will be stored in the database file for the main tree.

By using a USE directive or by resetting AUTOLIBDIR you force the loading of your set of grooves.

24.15 Paths on Windows Platforms

To make *MMA* as platform independent as possible a number of additional paths have been defined. When starting up, in addition to the standard Linux paths discussed above, the following are also checked:

- Modules can be in `c:\\mma\MMA`,
- Include files can be in `c:\\mma\\includes`,
- Library files can be in `c:\\mma\\lib`.

Chapter 25

Creating Effects

It's really quite amazing how easy and effective it is to create different patterns, sequences and special effects. As MMA was developed lots of silly things were tried. . . this chapter is an attempt to display and preserve some of them.

The examples don't show any music to apply the patterns or sequences to. The manual assumes that if you've read this far you'll know that you should have something like:

```
1 C
2 G
3 G
4 C
```

as a simple test piece to apply tests to.

25.1 Overlapping Notes

As a general rule, you should not create patterns in which notes overlap. However, here's an interesting effect which relies on ignoring that rule:

```
Begin Scale
    define S1 1 1+1+1+1 90
    define S32 S1 * 32
    Sequence S32
    ScaleType
    Direction Both
    Voice Accordion
    Octave 5
End
```

"S1" is defined with a note length of 4 whole notes (1+1+1+1) so that when it is multiplied for S32 a pattern of 32 8th notes is created. Of course, the notes overlap. Running this up and down a chromatic scale is "interesting." You might want to play with this a bit and try changing "S1" to:

```
define S1 1 1 90
```

to see what the effect is of the notes overlapping.

25.2 Jungle Birds

Here's another use for SCALES. Someone (certainly not the author) decided that some jungle sounds would be perfect as an introduction to "Yellow Bird".

```
groove Rhumba
Begin Scale
    define S1 1 1 90
    define S32 S1 * 32
    Sequence S32
    ScaleType Chromatic
    Direction Random
    Voice BirdTweet
    Octave 5 6 4 5
    RVolume 30
    Rtime 2 3 4 5
    Volume pp pp ppp ppp
End
DefGroove BirdRhumba
```

The above is an extract from the *MrA* score. The entire song is included in the "songs" directory of this distribution.

A neat trick is to create the bird sound track and then add it to the existing Rhumba groove. Then define a new groove. Now one can select either the library "rhumba" or the enhanced "BirdRhumba" with a simple GROOVE directive.

Chapter 26

Frequency Asked Questions

This chapter will serve as a container for questions asked by some enthusiastic MtA users. It may make some sense in the future to distribute this information as a separate file.

26.1 Chord Octaves

I've keyed in a song but some of the chords sound way too high (or low).

When a real player plays chords he or she adjusts the position of the chords so that they don't "bounce" around between octaves. One way MtA tries to do the same is with the "Voicing Mode=Optimal" setting. However, sometimes the chord range of a piece is too large for this to work properly. In this case you'll have to use the octave adjustments in chords. For more details see page 70.

26.2 AABA Song Forms

How can one define parts as part "A", part "B" . . . and arrange them at the end of the file? An option to repeat a "solo" section a number of times would be nice as well.

Using MtA variables and some simple looping, one might try something like:

```
Groove Swing
// Set the music into a
// series of macros
mset A
  Print Section A
  C
  G
endmset
mset B
  print Section B
  Dm
  Em
endmset
mset Solo
  Print Solo Section $Count
  Am / B7 Cdim
endmset
// Use the macros for an
// "A, A, B, Solo * 8, A"
// form
$A
$A
$B
set Count 1
label a
  $solo
  inc COUNT
  if le $count 8
    goto A
  endif
$A
```

Note that the "Print" lines are used for debugging purposes. The case of the variable names has been mixed to illustrate the fact that "Solo" is the same as "SOLO" which is the same as "solo".

Now, if you don't like things that look like old BASIC program code, you could just as easily duplicate the above with:

```
Groove Swing
repeat
  repeat
    Print Section A
    C
    G
    If Def count
      eof
    Endif
    Endrepeat
    Print Section B
    Dm
    Em
    Set Count 1
    Repeat
      Print Solo $Count
      Am
      Inc Count
    Repeatending 7
  Repeatend
Repeatend
```

The choice is up to you.

26.3 Where's the GUI?

I really think that MiA is a cool program. But, it needs a GUI. *Are you planning on writing one? Will you help me if I start to write one?*

Thanks for the kind comments! The author likes MiA too. A lot!

Some attempts have been made to write a number of *GUI*s for *MtA*. But, nothing seemed to be much more useful than the existing text interface. So, why waste too much time? There is nothing wrong with graphical programming interfaces, but perhaps not in this case.

But, I may well be wrong. If you think it'd be better with a *GUI* . . . well, this is open source and you are more than welcome to write one. If you do, I'd suggest that you make your program a front-end which lets a user compile standard *MtA* files. If you find that more error reporting, etc. is required to interact properly with your code, let me know and I'll probably be quite willing to make those kind of changes.

26.4 Where's the manual index?

Yes,this manual needs an index. I just don't have the time to go though and do all the necessary work. Is there a volunteer?

Appendix A

Symbols and Constants

This appendix is a reference to the chords that *MMA* recognizes and name/value tables for drum and instrument names. The tables have been auto-generated by *MMA* using the -D options.

A.1 Chord Names

MMA recognizes standard chord names as listed below. The names are case sensitive and must be entered in uppercase letters as shown:

A	C♯	E♭
A♯	C♭	F
A♭	D	F♯
B	D♯	F♭
B♯	D♭	G
B♭	E	G♯
C	E♯	G♭

Please note that in your input files you must use a lowercase "b" or an "&" to represent a ♭ and a "#" for a ♯.

All "7th" chords are "dominant 7th" unless specifically noted as "major". A dominant 7th has a flattened 7th note (in a C7 chord this is a b♭; a C Major 7th chord has a b♮).

For a more detailed listing of the chords, notes and scales you should download the document `www.mellowood.ca/mma/chords.pdf.gz`.

The following types of chords are recognized (these are case sensitive and must be in the mixed upper and lowercase shown):

♯5	Augmented triad.
(♭5)	Major triad with flat 5th.
+	Augmented triad.
+7	An augmented chord (raised 5th) with a dominant 7th.

+7♭9♯11	Augmented 7th with flat 9th and sharp 11th.
+9	7th plus 9th with sharp 5th (same as aug9).
+9M7	An augmented chord (raised 5th) with a major 7th and 9th.
+M7	Major 7th with sharp 5th.
11	9th chord plus 11th (3rd not voiced).
11♭9	7th chord plus flat 9th and 11th.
13	7th (including 5th) plus 13th (the 9th and 11th are not voiced).
13♯11	7th plus sharp 11th and 13th (9th not voiced).
13♯9	7th (including 5th) plus 13th and sharp 9th (11th not voiced).
13♭5	7th with flat 5th, plus 13th (the 9th and 11th are not voiced).
13♭9	7th (including 5th) plus 13th and flat 9th (11th not voiced).
13sus	7sus, plus 9th and 13th
13sus♭9	7sus, plus flat 9th and 13th
5	Altered Fifth or Power Chord; root and 5th only.
6	Major tiad with added 6th.
6(add9)	6th with added 9th. This is sometimes notated as a slash chord in the form “6/9”.
69	6th with added 9th. This is sometimes notated as a slash chord in the form “6/9”.
7	7th.
7♯11	7th plus sharp 11th (9th omitted).
7♯5	An augmented chord (raised 5th) with a dominant 7th.
7♯5♯9	7th with sharp 5th and sharp 9th.
7♯5♭9	An augmented chord (raised 5th) with a dominant 7th and flat 9th.
7♯9	7th with sharp 9th.
7♯9♯11	7th plus sharp 9th and sharp 11th.
7♯9♭13	7th with sharp 9th and flat 13th.
7(omit3)	7th with unvoiced 3rd.
7+	An augmented chord (raised 5th) with a dominant 7th.
7+5	An augmented chord (raised 5th) with a dominant 7th.
7+9	7th with sharp 9th.
7-5	7th, flat 5.
7-9	7th with flat 9th.
7alt	7th with flat 5th and flat 9th.
7♭5	7th, flat 5.
7♭5♯9	7th with flat 5th and sharp 9th.
7♭5♭9	7th with flat 5th and flat 9th.
7♭9	7th with flat 9th.
7♭9♯11	7th plus flat 9th and sharp 11th.
7omit3	7th with unvoiced 3rd.
7sus	7th with suspended 4th, dominant 7th with 3rd raised half tone.
7sus2	A sus2 with dominant 7th added.
7sus4	7th with suspended 4th, dominant 7th with 3rd raised half tone.
7sus♭9	7th with suspended 4th and flat 9th.
9	7th plus 9th.
9♯11	7th plus 9th and sharp 11th.
9♯5	7th plus 9th with sharp 5th (same as aug9).

9+5 7th plus 9th with sharp 5th (same as aug9).
9-5 7th plus 9th with flat 5th.
9♭5 7th plus 9th with flat 5th.
9sus 7sus plus 9th.
M Major triad. This is the default and is used in the absense of any other chord type specification.
M13 Major 7th (including 5th) plus 13th (9th and 11th not voiced).
M13♯11 Major 7th plus sharp 11th and 13th (9th not voiced).
M6 Major tiad with added 6th.
M7 Major 7th.
M7♯11 Major 7th plus sharp 11th (9th omitted).
M7♯5 Major 7th with sharp 5th.
M7(add13) 7th (including 5th) plus 13th and flat 9th (11th not voiced).
M7+5 Major 7th with sharp 5th.
M7-5 Major 7th with a flat 5th.
M7♭5 Major 7th with a flat 5th.
M9 Major 7th plus 9th.
M9♯11 Major 9th plus sharp 11th.
add9 Major chord plus 9th (no 7th.)
aug Augmented triad.
aug7 An augmented chord (raised 5th) with a dominant 7th.
aug7♯9 An augmented chord (raised 5th) with a dominant 7th and sharp 9th.
aug7♭9 An augmented chord (raised 5th) with a dominant 7th and flat 9th.
aug9 7th plus 9th with sharp 5th (same as aug9).
aug9M7 An augmented chord (raised 5th) with a major 7th and 9th.
dim A dim7, not a triad!
dim3 Diminished triad (non-standard notation).
dim7 Diminished seventh.
dim7(addM7) Diminished tirad with added Major 7th.
m Minor triad.
m♯5 Minor triad with augmented 5th.
m♯7 Minor Triad plus Major 7th. You will also see this printed as “m(maj7)”, “m+7”, “min(maj7)” and “min♯7” (which *MtA* accepts); as well as the *MtA invalid* forms: “-(Δ7)”, and “min♮7”.
m(add9) Minor triad plus 9th (no 7th).
m(♭5) Minor triad with flat 5th (aka dim).
m(maj7) Minor Triad plus Major 7th. You will also see this printed as “m(maj7)”, “m+7”, “min(maj7)” and “min♯7” (which *MtA* accepts); as well as the *MtA invalid* forms: “-(Δ7)”, and “min♮7”.
m(sus9) Minor triad plus 9th (no 7th).
m+5 Minor triad with augmented 5th.
m+7 Minor Triad plus Major 7th. You will also see this printed as “m(maj7)”, “m+7”, “min(maj7)” and “min♯7” (which *MtA* accepts); as well as the *MtA invalid* forms: “-(Δ7)”, and “min♮7”.
m+7♯9 Augmented minor 7 plus sharp 9th.

m+7♭9 Augmented minor 7 plus flat 9th.
m+7♭9♯11 Augmented minor 7th with flat 9th and sharp 11th.
m11 9th with minor 3rd, plus 11th.
m11♭5 Minor 7th with flat 5th plus 11th.
m13 Minor 7th (including 5th) plus 13th (9th and 11th not voiced).
m6 Minor 6th (flat 3rd plus a 6th).
m6(add9) Minor 6th with added 9th. This is sometimes notated as a slash chord in the form "m6/9".
m69 Minor 6th with added 9th. This is sometimes notated as a slash chord in the form "m6/9".
m7 Minor 7th (flat 3rd plus dominant 7th).
m7♯9 Minor 7th with added sharp 9th.
m7(♯9) Minor 7th with added sharp 9th.
m7(add11) Minor 7th plus 11th.
m7(add13) Minor 7th plus 13th.
m7(♭9) Minor 7th with added flat 9th.
m7(omit5) Minor 7th with unvoiced 5th.
m7-5 Minor 7th, flat 5 (aka 1/2 diminished).
m7♭5 Minor 7th, flat 5 (aka 1/2 diminished).
m7♭5♭9 Minor 7th with flat 5th and flat 9th.
m7♭9 Minor 7th with added flat 9th.
m7♭9♯11 Minor 7th plus flat 9th and sharp 11th.
m7omit5 Minor 7th with unvoiced 5th.
m9 Minor triad plus 7th and 9th.
m9♯11 Minor 7th plus 9th and sharp 11th.
m9♭5 Minor triad, flat 5, plus 7th and 9th.
mM7 Minor Triad plus Major 7th. You will also see this printed as "m(maj7)", "m+7", "min(maj7)" and "min♯7" (which *MtA* accepts); as well as the *MtA invalid* forms: "-(Δ7)", and "min♮7".
mM7(add9) Minor Triad plus Major 7th and 9th.
maj13 Major 7th (including 5th) plus 13th (9th and 11th not voiced).
maj7 Major 7th.
maj9 Major 7th plus 9th.
m♭5 Minor triad with flat 5th (aka dim).
min♯7 Minor Triad plus Major 7th. You will also see this printed as "m(maj7)", "m+7", "min(maj7)" and "min♯7" (which *MtA* accepts); as well as the *MtA invalid* forms: "-(Δ7)", and "min♮7".
min(maj7) Minor Triad plus Major 7th. You will also see this printed as "m(maj7)", "m+7", "min(maj7)" and "min♯7" (which *MtA* accepts); as well as the *MtA invalid* forms: "-(Δ7)", and "min♮7".
omit3(add9) Triad: root, 5th and 9th.
omit3add9 Triad: root, 5th and 9th.
sus Suspended 4th, major triad with the 3rd raised half tone.
sus2 Suspended 2nd, major triad with the major 2nd above the root substituted for 3rd.
sus4 Suspended 4th, major triad with the 3rd raised half tone.
sus9 7sus plus 9th.

In modern pop charts the "M" in a major 7th chord (and other major chords) is often represented by a "Δ". When entering these chords, just replace the "Δ" with an "M". For example, change "GΔ7" to "GM7".

A chord name without a type is interpreted as a major chord (or triad). For example, the chord "C" is identical to "CM".

MtA has an large set of defined chords. However, you can add your own with the DEFCHORD command, see page 74.

A.1.1 Octave Adjustment

Depending on the key and chord sequence, a chord may end up in the wrong octave. This is caused by *MtA*'s internal routines which create a chord: all of the tables are maintained for a "C" chord and the others are derived from that point by subtracting or adding a constant. To compensate you can add a leading "-" or "+" to the chordname to force the movement of that chord and scale up or down an octave.

For example, the following line will move the chord up and down for the third and fourth beats:

```
Cm Fm -Gm +D7
```

The effect of octave shifting is also highly dependent on the voicing options in effect for the track.

You'll have to listen to the *MtA* output to determine when and where to use this adjustment. Hopefully, it won't be needed all that much.

If you have a large number of chords to adjust, use the CHORDADJUST command (page)70.

A.1.2 Altered Chords

According to *Standardized Chord Symbol Notation* altered chords should be written in the form $\text{Cmi}^{7(\flat 9}_{\sharp 5)}$. However, this is pretty hard to type (and parse). So, we've used the convention that the altered intervals should be written in numerical order: Cm♯5♭9. Also, note that we use "m" for "minor" which appears to be more the conventional method than "mi".

A.1.3 Diminished Chords

In most pop and jazz charts it is assumed that a diminished chord is always a diminished 7th . . . a diminished triad is never played. *MtA* continues this, sometimes erroneous assumption.[1] You can change the behaviour in several ways: change the chord notes and scale for a "dim" from a dim7 to a triad by following the instructions on page 74; use the slightly oddball notation of "m♭5" which generates a "diminished triad"; or use the more-oddball notation "dim3".

[1] Sometimes a reliable source agrees with us ... in this case *Standardized Chord Symbol Notation* is quite clear that "dim" is a Diminished 7th and a diminished triad should be notated as $\text{mi}^{(\flat 5)}$.

Notational notes: In printed music a “diminished” chord is sometimes represented with a small circle symbol (eg. “F^{O}”) and a “half-diminished” as a small slashed circle (e.g., “C^{Ø}”).

A half-diminished chord in *MtA* is specified with the notation “m7♭5”.

A.1.4 Slash Chords

Charts sometimes use *slash chords* in the form “Am/E”. This notation is used, mainly, to indicate chord inversions. For example, the chord notes in “Am/E” become “E”, “A” and ”C” with the “E” taking the root position. *MtA* will accept chords of this type. However, you may not notice any difference in the generated tracks due to the inversions used by the current pattern.

You may also encounter slash chords where the slash-part of the chord is *not* a note in the chord. Consider the ambiguous notation “Dm/C”. The composer (or copyist) might mean to add a “C” bass note to a “Dm” chord, or she might mean “Dm7”, or even an inverted “Dm7”. *MtA* will handle these . . . almost perfectly. When the “slash” part of the chord indicates a note which is *not* a note in the chord, *MtA* assumes that the indicated note should be used in the bass line. Since each chord generated by *MtA* also has a “scale” associated with it for use by bass and scale patterns this works. For example, a C Major chord will have the scale “c, d, e, f, g, a, b”; a C Minor chord has the same scale, but with an e♭. If the slash note is contained in the scale, the scale will be rotated so that the note becomes the “root” note.

A warning message will be printed if the note is not in both the chord and the scale.

Another notation you may see is something like “Dm/9”. Again, the meaning is not clear. It probably means a “Dm9”, or “Dm9/E” . . . but since *MtA* isn’t sure this notation will generate an error.

Please note that for fairly obvious reasons you cannot have both slash notation and an inversion (see the next section).

For more details on “slash chords” your favorite music theory book or teacher is highly recommended!

A.1.5 Chord Inversions

Instead of using a slash chord you can specify an inversion to use with a chord. The notation is simply an “>” and a number between -5 and 5 immediately following the chord name.

The chord will be “rotated” as specified by the value after the “>”.

For example, the chord “C>2” will generate the notes G, C and E; “F>-1” gives C, F and A.

There is an important difference between this option and a slash chord: in inversions neither the root note nor the associated scale are modified.

A.2 MIDI Voices

When setting a voice for a track (IE Bass Voice NN), you can specify the patch to use with a symbolic constant. Any combination of upper and lower case is permitted. The following are the names with the equivalent voice numbers:

A.2.1 Voices, Alphabetically

5thSawWave	86	EnglishHorn	69	Organ2	17
Accordion	21	Fantasia	88	Organ3	18
AcousticBass	32	Fiddle	110	OverDriveGuitar	29
AgogoBells	113	FingeredBass	33	PanFlute	75
AltoSax	65	Flute	73	Piano1	0
Applause/Noise	126	FrenchHorn	60	Piano2	1
Atmosphere	99	FretlessBass	35	Piano3	2
BagPipe	109	Glockenspiel	9	Piccolo	72
Bandoneon	23	Goblins	101	PickedBass	34
Banjo	105	GuitarFretNoise	120	PizzicatoString	45
BaritoneSax	67	GuitarHarmonics	31	PolySynth	90
Bass&Lead	87	GunShot	127	Recorder	74
Bassoon	70	HaloPad	94	ReedOrgan	20
BirdTweet	123	Harmonica	22	ReverseCymbal	119
BottleBlow	76	HarpsiChord	6	RhodesPiano	4
BowedGlass	92	HelicopterBlade	125	Santur	15
BrassSection	61	Honky-TonkPiano	3	SawWave	81
BreathNoise	121	IceRain	96	SeaShore	122
Brightness	100	JazzGuitar	26	Shakuhachi	77
Celesta	8	Kalimba	108	Shamisen	106
Cello	42	Koto	107	Shanai	111
Charang	84	Marimba	12	Sitar	104
ChifferLead	83	MelodicTom1	117	SlapBass1	36
ChoirAahs	52	MetalPad	93	SlapBass2	37
ChurchOrgan	19	MusicBox	10	SlowStrings	49
Clarinet	71	MutedGuitar	28	SoloVoice	85
Clavinet	7	MutedTrumpet	59	SopranoSax	64
CleanGuitar	27	NylonGuitar	24	SoundTrack	97
ContraBass	43	Oboe	68	SpaceVoice	91
Crystal	98	Ocarina	79	SquareWave	80
DistortonGuitar	30	OrchestraHit	55	StarTheme	103
EPiano	5	OrchestralHarp	46	SteelDrums	114
EchoDrops	102	Organ1	16	SteelGuitar	25

Strings	48	SynthVox	54	TubularBells	14
SweepPad	95	TaikoDrum	116	Vibraphone	11
SynCalliope	82	TelephoneRing	124	Viola	41
SynthBass1	38	TenorSax	66	Violin	40
SynthBass2	39	Timpani	47	VoiceOohs	53
SynthBrass1	62	TinkleBell	112	WarmPad	89
SynthBrass2	63	TremoloStrings	44	Whistle	78
SynthDrum	118	Trombone	57	WoodBlock	115
SynthStrings1	50	Trumpet	56	Xylophone	13
SynthStrings2	51	Tuba	58		

A.2.2 Voices, By MIDI Value

0	Piano1	28	MutedGuitar	56	Trumpet
1	Piano2	29	OverDriveGuitar	57	Trombone
2	Piano3	30	DistortonGuitar	58	Tuba
3	Honky-TonkPiano	31	GuitarHarmonics	59	MutedTrumpet
4	RhodesPiano	32	AcousticBass	60	FrenchHorn
5	EPiano	33	FingeredBass	61	BrassSection
6	HarpsiChord	34	PickedBass	62	SynthBrass1
7	Clavinet	35	FretlessBass	63	SynthBrass2
8	Celesta	36	SlapBass1	64	SopranoSax
9	Glockenspiel	37	SlapBass2	65	AltoSax
10	MusicBox	38	SynthBass1	66	TenorSax
11	Vibraphone	39	SynthBass2	67	BaritoneSax
12	Marimba	40	Violin	68	Oboe
13	Xylophone	41	Viola	69	EnglishHorn
14	TubularBells	42	Cello	70	Bassoon
15	Santur	43	ContraBass	71	Clarinet
16	Organ1	44	TremoloStrings	72	Piccolo
17	Organ2	45	PizzicatoString	73	Flute
18	Organ3	46	OrchestralHarp	74	Recorder
19	ChurchOrgan	47	Timpani	75	PanFlute
20	ReedOrgan	48	Strings	76	BottleBlow
21	Accordion	49	SlowStrings	77	Shakuhachi
22	Harmonica	50	SynthStrings1	78	Whistle
23	Bandoneon	51	SynthStrings2	79	Ocarina
24	NylonGuitar	52	ChoirAahs	80	SquareWave
25	SteelGuitar	53	VoiceOohs	81	SawWave
26	JazzGuitar	54	SynthVox	82	SynCalliope
27	CleanGuitar	55	OrchestraHit	83	ChifferLead

84 Charang
85 SoloVoice
86 5thSawWave
87 Bass&Lead
88 Fantasia
89 WarmPad
90 PolySynth
91 SpaceVoice
92 BowedGlass
93 MetalPad
94 HaloPad
95 SweepPad
96 IceRain
97 SoundTrack
98 Crystal
99 Atmosphere
100 Brightness
101 Goblins
102 EchoDrops
103 StarTheme
104 Sitar
105 Banjo
106 Shamisen
107 Koto
108 Kalimba
109 BagPipe
110 Fiddle
111 Shanai
112 TinkleBell
113 AgogoBells
114 SteelDrums
115 WoodBlock
116 TaikoDrum
117 MelodicTom1
118 SynthDrum
119 ReverseCymbal
120 GuitarFretNoise
121 BreathNoise
122 SeaShore
123 BirdTweet
124 TelephoneRing
125 HelicopterBlade
126 Applause/Noise
127 GunShot

A.3 Drum Notes

When defining a drum tone, you can specify the patch to use with a symbolic constant. Any combination of upper and lower case is permitted. In addition to the drum tone name and the MIDI value, the equivalent "name" in *superscript* is included. The "names" may help you find the tones on your keyboard.

A.3.1 Drum Notes, Alphabetically

Cabasa	69^{A}	LongLowWhistle	72^{C}	OpenSudro	86^{D}
Castanets	84^{C}	LowAgogo	$68^{A\flat}$	OpenTriangle	81^{A}
ChineseCymbal	52^{E}	LowBongo	$61^{D\flat}$	PedalHiHat	$44^{A\flat}$
Claves	$75^{E\flat}$	LowConga	64^{E}	RideBell	53^{F}
ClosedHiHat	$42^{G\flat}$	LowTimbale	$66^{G\flat}$	RideCymbal1	$51^{E\flat}$
CowBell	$56^{A\flat}$	LowTom1	43^{G}	RideCymbal2	59^{B}
CrashCymbal1	$49^{D\flat}$	LowTom2	41^{F}	ScratchPull	$30^{G\flat}$
CrashCymbal2	57^{A}	LowWoodBlock	77^{F}	ScratchPush	29^{F}
HandClap	$39^{E\flat}$	Maracas	$70^{B\flat}$	Shaker	$82^{B\flat}$
HighAgogo	67^{G}	MetronomeBell	$34^{B\flat}$	ShortGuiro	$73^{D\flat}$
HighBongo	60^{C}	MetronomeClick	33^{A}	ShortHiWhistle	71^{B}
HighQ	$27^{E\flat}$	MidTom1	47^{B}	SideKick	$37^{D\flat}$
HighTimbale	65^{F}	MidTom2	45^{A}	Slap	28^{E}
HighTom1	50^{D}	MuteCuica	$78^{G\flat}$	SnareDrum1	38^{D}
HighTom2	48^{C}	MuteHighConga	62^{D}	SnareDrum2	40^{E}
HighWoodBlock	76^{E}	MuteSudro	$85^{D\flat}$	SplashCymbal	55^{G}
JingleBell	83^{B}	MuteTriangle	$80^{A\flat}$	SquareClick	$32^{A\flat}$
KickDrum1	36^{C}	OpenCuica	79^{G}	Sticks	31^{G}
KickDrum2	35^{B}	OpenHiHat	$46^{B\flat}$	Tambourine	$54^{G\flat}$
LongGuiro	74^{D}	OpenHighConga	$63^{E\flat}$	VibraSlap	$58^{B\flat}$

A.3.2 Drum Notes, by MIDI Value

27	HighQ$^{E\flat}$	37	SideKick$^{D\flat}$	47	MidTom1^{B}
28	Slap^{E}	38	SnareDrum1^{D}	48	HighTom2^{C}
29	ScratchPush^{F}	39	HandClap$^{E\flat}$	49	CrashCymbal1$^{D\flat}$
30	ScratchPull$^{G\flat}$	40	SnareDrum2^{E}	50	HighTom1^{D}
31	Sticks^{G}	41	LowTom2^{F}	51	RideCymbal1$^{E\flat}$
32	SquareClick$^{A\flat}$	42	ClosedHiHat$^{G\flat}$	52	ChineseCymbal^{E}
33	MetronomeClick^{A}	43	LowTom1^{G}	53	RideBell^{F}
34	MetronomeBell$^{B\flat}$	44	PedalHiHat$^{A\flat}$	54	Tambourine$^{G\flat}$
35	KickDrum2^{B}	45	MidTom2^{A}	55	SplashCymbal^{G}
36	KickDrum1^{C}	46	OpenHiHat$^{B\flat}$	56	CowBell$^{A\flat}$

57 CrashCymbal2^{A}
58 VibraSlap$^{B\flat}$
59 RideCymbal2^{B}
60 HighBongo^{C}
61 LowBongo$^{D\flat}$
62 MuteHighConga^{D}
63 OpenHighConga$^{E\flat}$
64 LowConga^{E}
65 HighTimbale^{F}
66 LowTimbale$^{G\flat}$
67 HighAgogo^{G}
68 LowAgogo$^{A\flat}$
69 Cabasa^{A}
70 Maracas$^{B\flat}$
71 ShortHiWhistle^{B}
72 LongLowWhistle^{C}
73 ShortGuiro$^{D\flat}$
74 LongGuiro^{D}
75 Claves$^{E\flat}$
76 HighWoodBlock^{E}
77 LowWoodBlock^{F}
78 MuteCuica$^{G\flat}$
79 OpenCuica^{G}
80 MuteTriangle$^{A\flat}$
81 OpenTriangle^{A}
82 Shaker$^{B\flat}$
83 JingleBell^{B}
84 Castanets^{C}
85 MuteSudro$^{D\flat}$
86 OpenSudro^{D}

A.4 MIDI Controllers

When specifying a MIDI Controller in a MIDISEQ or MIDIVOICE command you can use the absolute value in (either as a decimal number or in hexadecimal by prefixing the value with a "0x"), or the symbolic name in the following tables. The tables have been extracted from information at `http://www.midi.org/about-midi/table3.shtml`. Note that all the values in these tables are in hexadecimal notation.

Complete reference for this is not a part of *MIA*. Please refer to a detailed text on MIDI or the manual for your synthesizer.

A.4.1 Controllers, Alphabetically

AllNotesOff	7b	Ctrl15	0f	Ctrl79	4f
AllSoundsOff	78	Ctrl20	14	Ctrl85	55
AttackTime	49	Ctrl21	15	Ctrl86	56
Balance	08	Ctrl22	16	Ctrl87	57
BalanceLSB	28	Ctrl23	17	Ctrl88	58
Bank	00	Ctrl24	18	Ctrl89	59
BankLSB	20	Ctrl25	19	Ctrl9	09
Breath	02	Ctrl26	1a	Ctrl90	5a
BreathLSB	22	Ctrl27	1b	Data	06
Brightness	4a	Ctrl28	1c	DataDec	61
Chorus	5d	Ctrl29	1d	DataInc	60
Ctrl102	66	Ctrl3	03	DataLSB	26
Ctrl103	67	Ctrl30	1e	DecayTime	4b
Ctrl104	68	Ctrl31	1f	Detune	5e
Ctrl105	69	Ctrl35	23	Effect1	0c
Ctrl106	6a	Ctrl41	29	Effect1LSB	2c
Ctrl107	6b	Ctrl46	2e	Effect2	0d
Ctrl108	6c	Ctrl47	2f	Effect2LSB	2d
Ctrl109	6d	Ctrl52	34	Expression	0b
Ctrl110	6e	Ctrl53	35	ExpressionLSB	2b
Ctrl111	6f	Ctrl54	36	Foot	04
Ctrl112	70	Ctrl55	37	FootLSB	24
Ctrl113	71	Ctrl56	38	General1	10
Ctrl114	72	Ctrl57	39	General1LSB	30
Ctrl115	73	Ctrl58	3a	General2	11
Ctrl116	74	Ctrl59	3b	General2LSB	31
Ctrl117	75	Ctrl60	3c	General3	12
Ctrl118	76	Ctrl61	3d	General3LSB	32
Ctrl119	77	Ctrl62	3e	General4	13
Ctrl14	0e	Ctrl63	3f	General4LSB	33

General5	50	Pan	0a	Resonance	47
General6	51	PanLSB	2a	Reverb	5b
General7	52	Phaser	5f	SoftPedal	43
General8	53	PolyOff	7e	Sostenuto	42
Hold2	45	PolyOn	7f	Sustain	40
Legato	44	Portamento	05	Tremolo	5c
LocalCtrl	7a	Portamento	41	Variation	46
Modulation	01	PortamentoCtrl	54	VibratoDelay	4e
ModulationLSB	21	PortamentoLSB	25	VibratoDepth	4d
NonRegLSB	62	RegParLSB	64	VibratoRate	4c
NonRegMSB	63	RegParMSB	65	Volume	07
OmniOff	7c	ReleaseTime	48	VolumeLSB	27
OmniOn	7d	ResetAll	79		

A.4.2 Controllers, by Value

00 Bank	19 Ctrl25	32 General3LSB
01 Modulation	1a Ctrl26	33 General4LSB
02 Breath	1b Ctrl27	34 Ctrl52
03 Ctrl3	1c Ctrl28	35 Ctrl53
04 Foot	1d Ctrl29	36 Ctrl54
05 Portamento	1e Ctrl30	37 Ctrl55
06 Data	1f Ctrl31	38 Ctrl56
07 Volume	20 BankLSB	39 Ctrl57
08 Balance	21 ModulationLSB	3a Ctrl58
09 Ctrl9	22 BreathLSB	3b Ctrl59
0a Pan	23 Ctrl35	3c Ctrl60
0b Expression	24 FootLSB	3d Ctrl61
0c Effect1	25 PortamentoLSB	3e Ctrl62
0d Effect2	26 DataLSB	3f Ctrl63
0e Ctrl14	27 VolumeLSB	40 Sustain
0f Ctrl15	28 BalanceLSB	41 Portamento
10 General1	29 Ctrl41	42 Sostenuto
11 General2	2a PanLSB	43 SoftPedal
12 General3	2b ExpressionLSB	44 Legato
13 General4	2c Effect1LSB	45 Hold2
14 Ctrl20	2d Effect2LSB	46 Variation
15 Ctrl21	2e Ctrl46	47 Resonance
16 Ctrl22	2f Ctrl47	48 ReleaseTime
17 Ctrl23	30 General1LSB	49 AttackTime
18 Ctrl24	31 General2LSB	4a Brightness

4b DecayTime
4c VibratoRate
4d VibratoDepth
4e VibratoDelay
4f Ctrl79
50 General5
51 General6
52 General7
53 General8
54 PortamentoCtrl
55 Ctrl85
56 Ctrl86
57 Ctrl87
58 Ctrl88
59 Ctrl89
5a Ctrl90
5b Reverb
5c Tremolo
5d Chorus
5e Detune
5f Phaser
60 DataInc
61 DataDec
62 NonRegLSB
63 NonRegMSB
64 RegParLSB
65 RegParMSB
66 Ctrl102
67 Ctrl103
68 Ctrl104
69 Ctrl105
6a Ctrl106
6b Ctrl107
6c Ctrl108
6d Ctrl109
6e Ctrl110
6f Ctrl111
70 Ctrl112
71 Ctrl113
72 Ctrl114
73 Ctrl115
74 Ctrl116
75 Ctrl117
76 Ctrl118
77 Ctrl119
78 AllSoundsOff
79 ResetAll
7a LocalCtrl
7b AllNotesOff
7c OmniOff
7d OmniOn
7e PolyOff
7f PolyOn

Appendix B

Bibliography and Thanks

I've had help from a lot of different people and sources in developing this program. If I have missed listing you in the `CONTRIB` file shipped with the *MtA* distribution, please let me know and I'll add it right away. *I really want to do this!*

I've also had the use of a number of reference materials:

Craig Anderson. *MIDI for Musicians.* Amsco Publishing, New York, NY.

William Duckworth. *Music Fundamentals.* Wadsworth Publishing, Belomnt, CA.

Michael Esterowitz. *How To Play From A Fakebook.* Ekay Music, Inc. Katonah, NY.

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Victor López. *Latin Rhythms: Mystery Unraveled.* Alfred Publishing Company. These are handout notes from the 2005 Midwest Clinic 59th Annual Conference, Chicago, Illinois, December 16, 2005. A PDF of this document is available on various Internet sites.

Carl Brandt and Clinton Roemer. *Standardized Chord Symbol Notation.* Roerick Music Co. Sherman Oaks, CA.

And, finally, to all those music teachers my parents and I paid for, and the many people who have helped by listening and providing helpful suggestions and encouragement in my musical pursuits for the last 40 plus years that I've been banging, squeezing and blowing. You know who you are—thanks.

Appendix C

Command Summary

TRACK **Accent** <beat adj> *Adjust volume for specified beat(s) in each bar of a track.* **92**

AdjustVolume <name=value> *Set the volume ratios for named volume(s).* **93**

AllTracks <cmds> *Applies cmds(s) to all active tracks.* **132**

TRACK **Articulate** <value> ... *Duration/holding-time of notes.* **133**

Author <stuff> *A specialized comment used by documentation extractors.* **148**

AutoSoloTracks <tracks> *Set the tracks used in auto assigning solo/melody notes.* **62**

BarNumbers *Leading <number> on data line (ignored).* **49**

BarRepeat *Data bars can repeat with a "* nn"* **50**

BeatAdjust <beats> *Adjust current pointer by <beats>.* **82**

Begin *Delimits the start of a block.* **146**

TRACK **ChShare** <track> *Force track to share MIDI track.* **115**

TRACK **Channel** <1..16> *Force the MIDI channel for a track.* **114**

TRACK **ChannelPref** <1..16> *Set a preferred channel for track.* **115**

ChordAdjust <Tonic=adj> *Adjust center point of selected chords.* **70**

Comment <text> *ignore/discard <text>.* **134**

TRACK **Compress** <value> ... *Enable chord compression for track.* **71**

TRACK **Copy** <source> *Overlay <source> track to specified track.* **133**

[TRACK] **Cresc** <[start] end count> *Decrease volume over bars.* **95**

[TRACK] **Cut** <beat> *Force all notes off at <beat> offset.* **85**

Debug <options> *Selectively enable/disable debugging levels.* **135**

Dec <name> [value] *Decrement the value of variable <name> by 1 or <value>.* **105**

[TRACK] **Decresc** <[start] end count> *Increase volume over bars.* **95**

DefChord <name notelist scalelist> *Define a new chord.* **74**

DefGroove <name> [Description] *Define a new groove.* **40**

TRACK **Define** <pattern> *Define a pattern to use in a track.* **22**

TRACK **Delete** *Delete specified track for future use.* **136**

TRACK **Direction** [Up | Down | BOTH | RANDOM] ... *Set direction of runs in Scale, Arpeggio and Walk tracks.* **136**

MIDIMark [offset] Label *Inserts Label into the MIDI track.* **122**
TRACK **MIDIPan** <0..127> *Set MIDI pan/balance for track.* **122**
TRACK **MIDISeq** <Beat Controller Data> options> ... *Set MIDI controller data for a track.* **123**
MIDISplit <channel list> *Force split output for track.* **125**
TRACK **MIDITName** <string> *Assigns an alternate name to a MIDI track.* **125**
TRACK **MIDIVoice** <Beat Controller Data> *Set "one-time" MIDI controller command for track.* **126**
TRACK **MIDIVolume** <1..128> *Set MIDI volume for track.* **127**
TRACK **Mallet** <Rate=nn | Decay=nns> *Set mallet repeat for track.* **137**
MmaEnd <file> *Set filename to process after main file completed.* **156**
MmaStart <file> *Set file to include before processing main file.* **155**
Mset <name> <lines> *Set <variable> to series of lines.* **104**
MsetEnd *End of a "Mset" section.* **104**
NewSet <name> <stuff> *Set the variable <name> to <stuff>.* **103**
TRACK **NoteSpan** <start> <end> *set MIDI range of notes for track.* **73**
TRACK **Octave** <0..10> ... *Set the octave for track.* **138**
TRACK **Off** *Disable note generation for specified track.* **138**
TRACK **On** *Enable note generation for specified track.* **138**
Print <stuff> *Print <stuff> to output during compile. Useful for debugging.* **139**
PrintActive *Print list of active tracks to output.* **139**
PrintChord <name(s)> *Print the chord and scale for specific chord types.* **76**
TRACK **RSkip** <Value> ... *Skip/silence random percentage of notes.* **140**
TRACK **RTime** <Value] ... **140**
TRACK **RVolume** <adj> ... *Set volume randomization for track.* **96**
TRACK **Range** <value> *Set number of octaves used in Scale and Arpeggio tracks.* **74**
Repeat *Start a repeated section.* **99**
RepeatEnd [count] *End a repeated section.* **99**
RepeatEnding *Start a repeat-ending.* **99**
TRACK **Riff** <pattern> *Define a special pattern to use in track for next bar.* **46**
RndSeed <Value> ... *Seed random number generator.* **139**
RndSet <variable> <list of values> *Randomly set variable.* **104**
TRACK **ScaleType** <Chromatic | Auto> ... *Set type of scale. Only for Scale tracks.* **141**
Seq *Set the sequence point (bar pattern number).* **141**
[TRACK] **SeqClear** *Clears sequence for track (or all tracks).* **36**
[TRACK] **SeqRnd** <On/Off/Tracks> *Enable random sequence selection for track (or all tracks).* **37**
[TRACK] **SeqRndWeight** <list of values> *Sets the randomization weight for track or global.* **39**

SeqSize <value> *Set the number of bars in a sequence.* **39**

TRACK **Sequence** <pattern> ... *Set pattern(s) to use for track.* **34**

Set <name> <stuff> *Set the variable <name> to <stuff>.* **103**

SetAutoLibPath <path> *Set the Auto-Include file path.* **152**

SetIncPath <path> *Set the path for included files.* **154**

SetLibPath <path> *Set the path to the style file library.* **152**

SetMIDIplayer <program> *Set the MIDI file player program.* **152**

SetOutPath <path> *Set the output filename.* **153**

ShowVars *Display user defined variables.* **105**

StackValue <stuff> *Push <stuff> onto a temporary stack. Remove with special macro $_StackValue.* **107**

TRACK **Strum** <value> ... *Set the strumming factor for Chord tracks.* **142**

SwingMode <on/off> *Set swing mode timing.* **88**

Synchronize <START | END> *Insert a start/end synchronization mark.* **142**

Tempo <rate> *Set the rate in beats per minute.* **80**

Time <count> *Set number of beats in a bar.* **81**

TimeSig <nn dd> *Set the MIDI time signature (not used by MMA).* **81**

TRACK **Tone** <Note> ... *Set the drum-tone to use in a sequence.* **29**

Transpose <value> *Transpose all tracks to a different key.* **143**

UnSet <name> *Remove the variable <name>.* **105**

[TRACK] **Unify** <On | Off> ... *Unify overlapping notes.* **143**

Use <file> *Include/import an existing .mma file.* **154**

VExpand <on/off> *Set variable expansion.* **105**

TRACK **Voice** <instrument> ... *Set MIDI voice for track.* **144**

VoiceTr *<old=new> ... - translates MIDI instrument <old> to <new>.* **129**

VoiceVolTr *<voice>=<adj> ... - adjusts volume for specified voice.* **130**

TRACK **Voicing** <options. *Set the voicing for a chord track.* **67**

[TRACK] **Volume** <value> ... *Set the volume for a track or all tracks.* **94**