



# FAIRLIGHT

COMPUTER MUSICAL INSTRUMENT

PAGE R  
REAL-TIME COMPOSER

F A I R L I G H T

- C M I -

Page R - Real Time Composer

OPERATION MANUAL

JULY 1983

by Michael Carlos and Tom Stewart

© Copyright 1983 by Fairlight Instruments Pty. Ltd., Sydney Australia.

This documentation, associated programs and displays are held copyright by Fairlight Instruments and may not be copied, altered, adapted, transferred or otherwise dealt with in whole or in part, without the express permission of Fairlight Instruments Pty Ltd., Sydney, Australia.

15 Boundary Street  
Rushcutters Bay  
SYDNEY AUSTRALIA 2011  
Telephone (02) 331 6333  
Telex AA 27998

REAL-TIME COMPOSER - TABLE OF CONTENTS

	Page
Introduction .....	1

PAGE R

Version and Revision Number .....	8
Setting up Page 3 Keyboards .....	8
LOAD a file .....	10
CREATE a new file .....	10
PLAY or RECORD .....	11
STOP playing or recording .....	13
SPEED control .....	13
CLICK track .....	13
SYNC - internal or external .....	14
UNALLOCATE patterns .....	17
ADD patterns .....	17
display used patterns X<return> ...	18

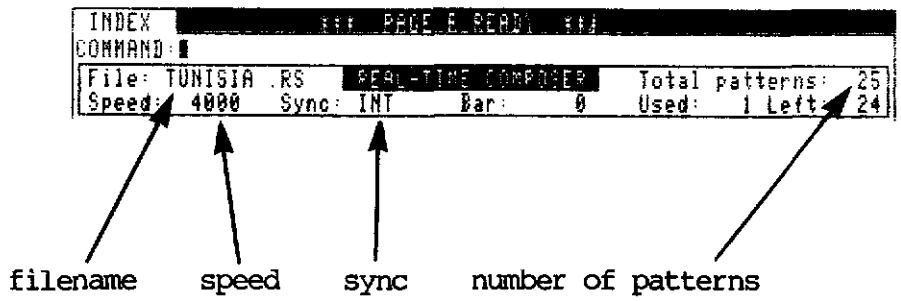
PATTERN EDITOR

editor selection E<return> .....	19
patterns .....	19
pattern number .....	20
OPEN a keyboard .....	20
timing resolution .....	21
note cursor .....	23
voice display .....	25
note editing table .....	25
- key and vel .....	26
- duration .....	28
KEY command .....	29
VEL and DUR commands .....	31
INSERT a note .....	32
DELETE a note .....	33
LOCK .....	35

	Page
PATTERN EDITOR (continued)	
INSERT-LOCK .....	35
DELETE-LOCK .....	35
FILL .....	36
GRAB .....	37
TIME SIGNATURE .....	37
COMMENT .....	38
RESET .....	38
COPY a pattern .....	39
BAR command .....	41
AUDIBLE .....	42
PATTERN EDITOR command summary ....	42
behaviour of SLAVE music keyboard .	42
SONG EDITOR	
song list .....	43
section list .....	43
song display control .....	43
section display control .....	44
steps .....	46
trace the song .....	46
block commands .....	47
escape .....	47
insert .....	48
overwrite .....	50
duplicate insert .....	51
duplicate overwrite .....	52
delete .....	52
end .....	53
make section .....	54
APPENDIX A - Messages and Errors .....	56
APPENDIX B - Hints .....	59
INDEX .....	62



When PAGE R is selected, the screen area just below the command line shows the name of the current file its SPEED and SYNC settings, and number of patterns available.



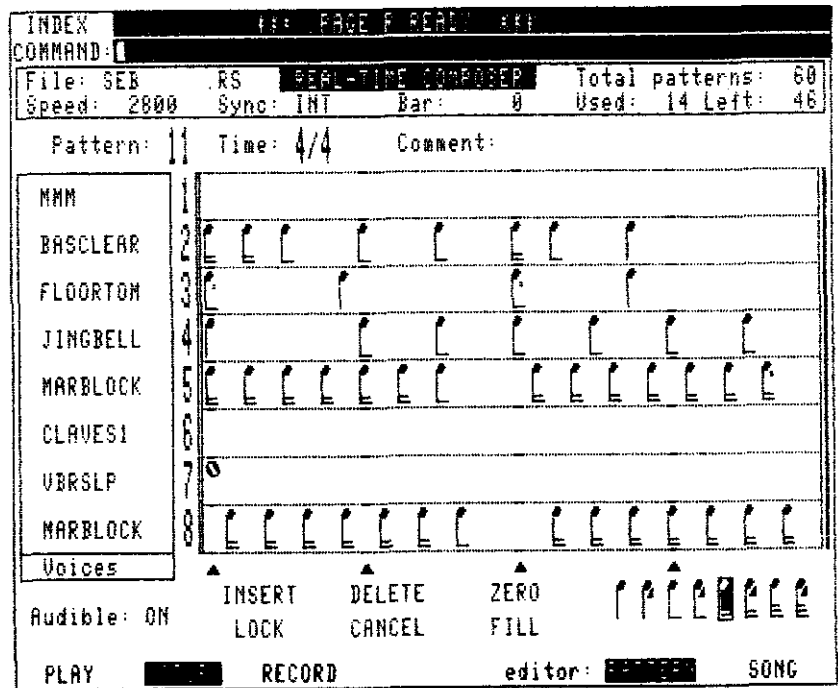
The appearance of the remainder of the screen is determined by which EDITOR is selected.

To select ...

PATTERN EDITOR

type: E<return>

lightpen:  
=><PATTERN>



To select ...

SONG EDITOR

type: E<return>

lightpen:  
=><SONG>

THE PATTERN EDITOR displays one complete pattern at a time.

When PAGE R is **STOPPED**, any pattern may be selected for viewing or editing.

When **PLAYING**, patterns are displayed automatically as they occur and may be edited in real-time.

The large numbers running down the screen are **KEYBOARD numbers** and identify the eight sequences within a pattern.

To the right of these numbers are displayed the **sequences**.

To the left is a **dual-purpose area** where you can display either ..

the **VOICES** allocated to the keyboards on PAGE 3,



or a note-editing table where  
 pitch (Key)  
 key-velocity (Vel)  
 duration-time (Dur)  
 of individual notes  
 can be controlled.

The screenshot shows the REAL-TIME COMPOSER interface. At the top, it displays 'INDEX' and '\*\*\* PAGE R READY \*\*\*'. Below that, a 'COMMAND:' line is visible. The main window shows 'File: FUGUE', 'RS REAL-TIME COMPOSER', 'Total patterns: 10', 'Speed: 4000', 'Sync: INT', 'Bar: 12', 'Used: 1 Left: 9'. A 'Pattern:' field is set to 1, 'Time:' is 4/4, and 'Comment:' is empty. A table on the left lists notes with their key, velocity, and duration:

Key	Vel	Dur
F#2	8	48
C#1	6	10
E#6	7	10
B#3	1	2
C#2	4	9
F#4	6	2
D#5	2	31
C#2	5	3

Below the table is a musical staff with notes corresponding to the table. At the bottom, there are control buttons: 'Audible: ON', 'INSERT', 'DELETE', 'ZERO', 'LOCK', 'CANCEL', 'FILL', 'PLAY', 'STOP', 'RECORD', 'editor: PATTERN', and 'SUNG'.

Notes may be inserted, modified, or deleted from the pattern using any combination of the alphanumeric keyboard, lightpen or music keyboard that is comfortable. The music keyboard can be used simply as a selection device for pitch and key velocity of individual notes, or performances can be RECORDED with automatic TIMING RESOLUTION adjustable to common rhythmic values.

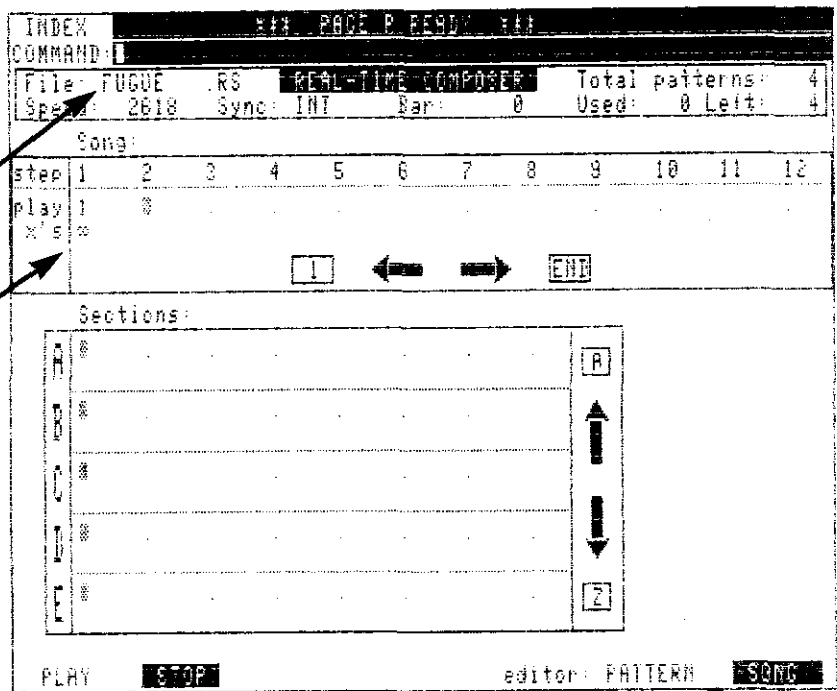
For making identical changes to multiple patterns, special commands are provided to modify the KEY, VEL or DUR for any or all of the keyboards in a range of patterns. Sequences can also be COPIED from one or more patterns to others.

THE SONG EDITOR provides various facilities to build, inspect and modify the SONG LIST.

Displayed in the upper area of the screen, the song list is basically a list of PATTERN numbers in the order in which they are to be played. It consists of 255 sequential STEPS, with each step containing two items: the number of the pattern ("play"), and how many times it is to be played ("x's").

This is the default appearance of the SONG EDITOR just after CREATING a new file.

The SONG is called FUGUE and consists of PATTERN 1 playing endlessly.



SONG editor

Song:							
step	1	2	3	4	5	6	7
play	14	15	16	59	#		
x's	2	2	1	8			

Annotations: END symbol (points to #), pattern number (points to 14, 15, 16, 59), repeat count (points to 2, 2, 1, 8). Navigation buttons: box with '1', left and right arrows.

The example above consists of four steps and would result in:

- pattern 14 played 2 times
- pattern 15 played 2 times
- pattern 16 played once
- pattern 59 played 8 times
- END (OMI stops playing)

Although only 12 steps of the song list are shown at one time, any desired region of the song list can be chosen. It is convenient to think of the display as a "window" which is MOVED right or left to reveal the desired range of steps (indicated by the line of step numbers).

REAL-TIME COMPOSER - Introduction (continued)

The R.T.C. features a unique method of breaking a piece down into smaller sub-units called **SECTIONS**.

In addition to the song list, there are 26 SECTION LISTS identified by the letters of the alphabet: A - Z. These are just the same as the song list, except that each section consists of EIGHT steps.

Five sections are displayed at a time in the lower area of the screen. This display is also a "window" - it can be moved up or down to reveal the desired range of sections.

Sections:

A	1	2	#	.	.	.	.	.	.	.	.	.	.	.	.	.	[A]
B	3	4	5	6	#	.	.	.	.	.	.	.	.	.	.	.	↑
C	A	B	#	.	.	.	.	.	.	.	.	.	.	.	.	.	↓
D	7	8	9	10	#	.	.	.	.	.	.	.	.	.	.	.	↓
E	1	1	1	1	#	.	.	.	.	.	.	.	.	.	.	.	[Z]

The song list can contain SECTION LETTERS instead of PATTERN NUMBERS.

Song:

step	1	2	3	4	5	6	7	8	9	10	11	12
play	A	17	A	18	#	.	.	.	.	.	.	.
x's	1	1	1	1								

[1] ← → [ENT]

Sections:

A	10	11	12	13	14	15	16	#	[A]
B	*	.	.	.	.	.	.	.	↑
C	*	.	.	.	.	.	.	.	↓
D	*	.	.	.	.	.	.	.	↓
E	*	.	.	.	.	.	.	.	[Z]

This example would result in:

- patterns 10-16 played once each (from section A)
- patterns 17 played once
- patterns 10-16 again (section A)
- pattern 18 played once




REAL-TIME COMPOSER

VERSION and REVISION NUMBER

The Real-Time Composer revision number is seen on Page 1.

The current revision number is R1.

<p>Fairlight</p>  <p>C. M. I.</p> <p>V3:05:R1:11</p>	<p>PAGE 7... CONTROL PARAMETERS</p> <p>PAGE 8... SOUND SAMPLING</p> <p>PAGE 9... SEQUENCER</p> <p>PAGE A... ANALOG INTERFACE</p> <p>PAGE C... COMPOSER</p> <p>PAGE D... WAVEFORM DISPLAY</p> <p>PAGE L... DISK LIBRARY</p> <p>PAGE R... REAL-TIME COMPOSER</p> <p>PAGE S... SCREEN PRINT</p> <p>USER NAME : Fairlight Australia</p>
---	---

↑  
revision number

The Real-Time Composer version number is seen on Page R by typing

?<return>.

The current version number is 1.30.

SETTING UP THE KEYBOARDS:

For Page R to function correctly all loaded voices would have an NPHONY of 1, and each register must have its own keyboard. Otherwise unpredictable results may occur.

Prior to loading voices Page 3 must be set up in the following way:

REGISTER	NPHONY	VOICE	MODE	OCT	SEMI	FINE	CHANNELS
A	1	1)	4	0	0	0	1.....
B	1	2)	4	0	0	0	2.....
C	1	3)	4	0	0	0	3.....
D	1	4)	4	0	0	0	4.....
E	1	5)	4	0	0	0	5.....
F	1	6)	4	0	0	0	6.....
G	1	7)	4	0	0	0	7.....
H	1	8)	4	0	0	0	8.....

KEYBOARD CONTROL			SELECTION	MASTER TUNING
KBD			1 : MASTER	PITCH: 128
1	A A A A A A	—	2 : SLAVE	SCALE: 12√2.00
2	B B B B B B			
3	C C C C C C			
4	D D D D D D			
5	E E E E E E			
6	F F F F F F			
7	G G G G G G			
8	H H H H H H			


Here is Page 3 with eight voices loaded and ready for Page R sequencing ...

INDEX		PAGE 3 READY					
COMMAND: [ ]							
REGISTER CONTROL							
REGISTER	NPHONY	VOICE	MODE	OCT	SEMI	FINE	CHANNELS
A	1	1) BDRUM	4	0	0	0	1.....
B	1	2) SNARE	4	0	0	0	..2.....
C	1	3) HHAT	4	0	0	0	...3.....
D	1	4) SYNBASS	4	0	0	0	....4....
E	1	5) MARIMBA	4	0	3	0	.....5...
F	1	6) GLOCK	4	0	0	25	.....6..
G	1	7) CELESTE	4	-2	0	0	.....7..
H	1	8) CHIME	4	0	0	0	.....8

KEYBOARD CONTROL								
KBD	SELECTION						MASTER TUNING	
1	A	A	A	A	A	A	1 : MASTER	PITCH: 128
2	B	B	B	B	B	B	2 : SLAVE	SCALE: $12\sqrt{2.00}$
3	C	C	C	C	C	C		
4	D	D	D	D	D	D		
5	E	E	E	E	E	E		
6	F	F	F	F	F	F		
7	G	G	G	G	G	G		
8	H	H	H	H	H	H		

Page R shows the corresponding 8 voices on Keyboards 1 to 8

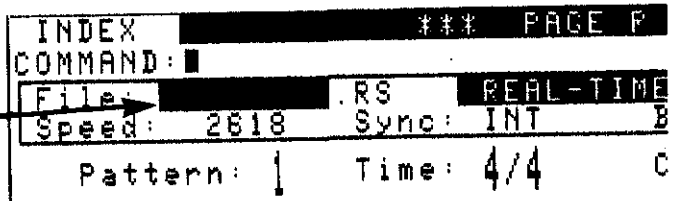
INDEX		PAGE R READY					
COMMAND: [ ]							
File:	FUGUE	.RS	REAL-TIME COMPOSER	Total patterns:	4		
Speed:	2618	Sync:	INT	Bar:	0	Used:	0 Left: 4
Pattern:	1	Time:	4/4	Comment:			
BDRUM	1						
SNARE	2						
HHAT	3						
SYNBASS	4						
MARIMBA	5						
GLOCK	6						
CELESTE	7						
CHIME	8						
Voices							
Audible:	ON	INSERT	DELETE	ZERO			
		LOCK	CANCEL	FILL			
PLAY	STOP	RECORD	editor:		ENTER	SONG	

REAL-TIME COMPOSER

To LOAD a previously created sequence:

TYPE: L(OAD),filename<return>

Alternatively move CURSOR to space opposite "File:" (press DOWN ARROW once) and TYPE: filename<set>.



A file must be **LOADED** before it can be **played**.

Page R files can also be loaded from Pages 1,2,3,4,5,6,8,D,L like other files.

TYPE: L,RS,filename<return> or L,filename.RS<return>.

To CREATE a NEW FILE:

TYPE: N(EW),filename,number of patterns<return>

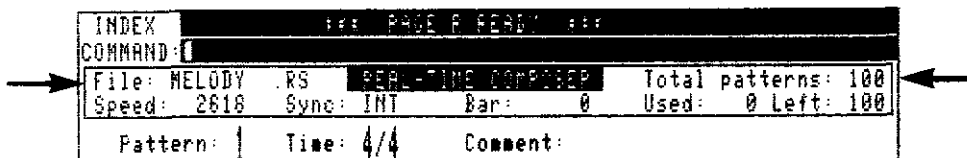
where: filename = 1-8 character filename, first character alphabetic  
number of patterns = 1-255

If the number of patterns is not specified then the CMI will allocate as many patterns as possible depending on the remaining FREE SPACE (Page 2) to a maximum of 255 patterns. 255 patterns require 3332 sectors of disk space; 28 sectors for the first pattern then 16 sectors per pattern.

If the number of patterns is is specified and is bigger than the remaining FREE SPACE on disk, the CMI will show you how many patterns are available and ask you if that is OK.

The total number of patterns available (used and unused) can be seen in the top right-hand corner of the display.

EXAMPLES:



N MELODY 100<return> - A new sequence called MELODY.RS is created and automatically SAVED. It has 100 patterns available - as yet unused. If there is only enough remaining FREE disk space for say, 80 patterns the CMI will respond with "SPACE for only 80 PATTERNS - OK (Y)?" Respond by typing Y<return>.

REAL-TIME COMPOSER

INDEX	FILE: CALYPSO .RS	REAL-TIME COMPOSER	Total patterns: 255
COMMAND:	Speed: 2618	Sync: INT	Bar: 8
	Used: 0	Left: 255	
Pattern:	Time: 4/4	Comment:	

NEW,CALYPSO<return> - A new sequence called CALYPSO.RS is created and automatically SAVED. The size (number of patterns) of the sequence depends on remaining FREE SPACE. In this case, a blank disk has been used and the maximum of 255 patterns is available.

A pattern is UNUSED (blank) until notes are put into the sequences or the default TIME SIGNATURE is changed.

A pattern is then USED. See also the "X" command.

Handling of disk files by the R.T.C. is slightly different to other display pages. There is no need for a "save" command since any modifications are automatically saved in the file whenever any of the major commands are used, or if another display page is selected.

PLAY or RECORD:

TYPE: P [LAY] [, <thing> [, <count>]] [, #<bar>] [;<options>] <return>  
 or  
 REC [ORD]

where: <thing> is one of these...

- \* - SONG
- A or B or ... or Z - SECTION
- ! - CURRENTLY DISPLAYED PATTERN
- 1 or 2 or ... 255 - PATTERN NUMBER

<count> is number from 0 to 127. 0 signifies infinity.

<bar> is the start bar number from 1 to 65535 of <thing>. Bar number defaults to 1 if not included in command. See also BAR command.

- <options>
- W - wait for any key on the alphanumeric keyboard to be hit before starting.
  - F - free-run mode - maximum timing accuracy. Used when finally recording onto tape. Use when EXT ernal syncing.

At least 3 letters of the word RECORD need to be typed.

If using the lightpen point to "PLAY" or "RECORD".

## REAL-TIME COMPOSER

The CMI features "default play-selection". This means that once the PLAY (or RECORD) mode is defined, it remains in effect for P<return>, REC<return> and the LIGHTPEN until a new play-selection is typed.

The very top line of the display shows what is being played.

### EXAMPLES:

**P \*,#<return>**  
Play whole SONG  
forever; start  
at bar 1.



Two arrows point to the top line of the display, which reads "Playing SONG". Below this is a table with the following data:

INDEX	Playing SONG			Total patterns:	4
COMMAND:				Used:	0 Left: 4
File:	FUGUE	.RS	REAL-TIME COMPOSER	Bar:	1
Speed:	2618	Sync:	INT		

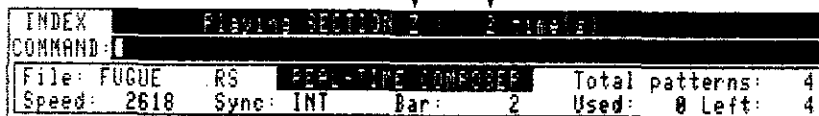
**P A #42<return>**  
play section A  
start at bar 42.



Two arrows point to the top line of the display, which reads "Playing SECTION A". Below this is a table with the following data:

INDEX	Playing SECTION A			Total patterns:	4
COMMAND:				Used:	0 Left: 4
File:	FUGUE	.RS	REAL-TIME COMPOSER	Bar:	42
Speed:	2618	Sync:	INT		

**P Z,2 #2<return>**  
play section Z  
twice; start at  
bar 2.



Two arrows point to the top line of the display, which reads "Playing SECTION Z". Below this is a table with the following data:

INDEX	Playing SECTION Z			Total patterns:	4
COMMAND:				Used:	0 Left: 4
File:	FUGUE	.RS	REAL-TIME COMPOSER	Bar:	2
Speed:	2618	Sync:	INT		

Other examples are ...

- REC 4;W<return> - record pattern 4 once; wait until any key on the alphanumeric keyboard is pressed.
- P \*;F<return> - play SONG once; ready for final recording.
- P<return> - play exactly what was previously played (same as using the lightpen).
- REC !<return> - record displayed pattern continuously.

The RECORD command is exactly the same as the PLAY command except that performances are recorded in real time.

REC<return> may be typed in the middle of a PLAY.

You would probably use the **P !<return>** and **REC !<return>** commands often to play or record one pattern over and over, in the development of a song.

Notes may be changed while playing or recording.

The command **P \*;FW<return>** would be used often when recording to tape.

It means "play the whole song for a final recording"

The "W" part of the command means that the CMI is cued up ready to play as soon as any key on the alphanumeric keyboard is hit.

REAL-TIME COMPOSER

STOP: TYPE: S(TOP)<return>  
 or <ctrl-esc> i.e., hold down <ctrl> press <esc>  
 or point lightpen at the word "STOP".

This command will stop playing or recording. Audible: ON

INSERT  
 LOCK

PLAY

RECORD

SPEED: TYPE: n<set> or n<add> or n<sub>.  
 where n is a number between 500 and 65535.  
 Default is 2618. (Crotchet = 120 M.M. beats/minute)

As a guide ...

M.M.	60	70	80	90	100	110	120	130	140	150
<u>SPEED</u>	5236	4488	3927	3491	3142	2856	2618	2417	2244	2094

This control sets the tempo of a song and behaves as on Page 9 and Page C.



A SPEED of 2000 will play twice as fast as a SPEED of 4000. Thus you may RECORD at a very slow SPEED and PLAY at normal SPEED without any pitch change.

EXAMPLE: A completed song has a SPEED of 5000 and is 35 seconds long. You want the song to be just 29 seconds long.

Speed up the song in the following way:

$$\frac{29 \text{ seconds}}{35 \text{ seconds}} \times 5000 \text{ (old speed)} = 4142 \text{ (new speed)}$$

To convert between CMI speed and beats/minute (m.m.):

$$\text{beats/minute} = \frac{314160}{\text{CMI speed}} \quad \text{and} \quad \text{CMI speed} = \frac{314160}{\text{beats/minute}}$$

CLICK: On Page R, the digital metronome CLICK facility is always ON and comes out of the rear of the CMI at

- 1) Pin 3 of the SYNC socket
- 2) Monitor Speaker output
- 3) Phones output

A click marker corresponds to the CLICK. Here is the click marker on the second beat ...



REAL-TIME COMPOSER

A click occurs for each beat in a pattern.

For a 3/4 pattern, 3 clicks occur.

Pattern: 10 Time: 3/4 Comment:

For a 6/8 pattern, 6 clicks occur. A 6/8 pattern is just as long as a 3/4 pattern but the click rate is double.

Pattern: 10 Time: 6/8 Comment:

For synchronizing between Page R and Page C, one crochet on Page R would be B=192 and CLICK=192 on Page C.

A blank pattern may be used as the very first pattern of a song to provide a "count-in" CLICK.

SYNC:

This selects the Page R replay synchronization mode either

- INT(ernal) - default
- or EXT(ernal).

When SYNC=INT the SPEED control defines the tempo of a song.

TYPE: INT<set>

When SYNC is in external mode the SPEED control is disabled.

The external SYNC mode is used to co-ordinate multi-track overdubbing of sequences by taping the SYNC tone and using the "sync-head" replay from the recorder to feed the external sync input of the CMI.

TYPE: EXT<set> or n<set>  
where n is a number between 2 and 255.

The tone can be any periodic waveform between 100 Hz and 5,000 Hz.

The tone should be around 1 volt peak-to-peak.

It is necessary to record a SYNC tone on an unused track of tape so that Page R can follow variations in the tape speed for perfect synchronization.

## REAL-TIME COMPOSER

The SYNC tone should be a constant pitch derived from:

- a tone generator
- an audio oscillator
- a synthesizer
- a CMI channel

When using a CMI channel, create a MODE 4 voice, **FILL** it with a Page 5 derived **sinewave**.

On Page 7 insert a **LOOP**, switch the **SLUR ON**, set **LEVEL** to 255 and **ATTACK** to **ZERO**. **PORTAMENTO** may be incorporated for smooth changes in tempo. Playing the music keyboard will change pitch and hence speed; a doubling of speed for each octave higher.

The SYNC tone should **NOT** be a **CLICK**.

The CMI plays music with a resolution in the order of milliseconds and needs an **AUDIO** tone between 1000Hz and 5,000Hz for such high resolution, rather than a **CLICK** which has a resolution of between .2Hz and 10Hz.

The CMI can provide its own synchronized **CLICK**.

The CMI detects the very beginning of the SYNC tone and uses that as its starting point.

If the pitch of the SYNC tone **rises** the CMI will play **faster**.  
If the pitch of the SYNC tone **falls** the CMI will play **slower**.

The procedure is as follows:

- 1) The Page R sequencers will play at the speed determined by the precise frequency of the SYNC tone.  
To find out the correct frequency, connect the oscillator directly into Pin 2 of the SYNC connector at the rear of the CMI.  
The **CLICK** will come out Pin 3 of the same connector.

Any oscillator with a variable frequency output in the range 1000Hz to 5,000 Hz can be used for a SYNC tone. The shape of the waveform is irrelevant, however a smooth waveform such as a **SINEWAVE** or **TRIANGLE** wave is to be preferred over, say a **SQUAREWAVE**, which tends to "spill" somewhat onto other tracks of a multi-track.

- 2) Select **EXTERNAL SYNC** on Page R by tabbing to **SYNC** and typing **EXT<set>**.  
For greater synchronizing accuracy set **SYNC=4** or higher. This will mean that the external tone is **divided** by 4.  
**PLAY** some Page R patterns. Varying the **PITCH** of the oscillator will vary the play speed of the sequence. Make sure the CMI is getting enough level from the oscillator.  
Select a suitable speed or range of speeds.

- 3) Connect the audio oscillator to the tape recorder input associated with the track which is to carry the SYNC tone. SYNC tracks are usually physically positioned at the other end of the record head to minimise "spill".  
  
 EXAMPLE            If music is to be recorded onto tracks 1-5 of an 8-track machine, then the SYNC track should be track 8.
  
- 4) Connect the appropriate output of the tape recorder to the SYNC input of the CMI (Pin 2 of the SYNC connector). This is a single-ended (unbalanced) input, requiring a minimum level of 1 volt P-P for reliable operation.
  
- 5) Record the SYNC track **BY ITSELF** while monitoring the sequence. Differences in the position of the RECORD head and the PLAYBACK head on the multi-track means that if the SYNC tone and the sequences are recorded simultaneously then subsequent recordings will be out of synchronization by the amount of time it takes for the tape to move from the RECORD head to the REPLAY head. Otherwise take the SYNC tone directly from the RECORD head. Make sure that the start of the SYNC tone is clean and is preceded by a few seconds of silence. Page R will start replaying as soon as the tone starts. It is possible to vary the speed of the piece dynamically by varying the oscillator frequency while recording the SYNC track. For this purpose it is necessary to be MONITORING the Page R sequence in EXTERNAL SYNC mode while recording the SYNC track. Let the SYNC track run for a few seconds longer than the total time for the piece.
  
- 6) From now on, all sequences will faithfully follow this SYNC track (unless SYNC=INT is re-selected). Record each group of sequences on a separate tape track, making sure that the PLAY is executed with SYNC=EXT.

For equal tempo between external and internal sync when SYNC=EXT:

$$\text{SPEED} = \frac{2010.5}{\text{EXT. SYNC in KHz}} \qquad \text{EXT. SYNC in KHz} = \frac{2010.5}{\text{SPEED}}$$

EXAMPLE: An EXTERNAL SYNC tone of 1000Hz is equivalent to an INTERNAL speed of 2010.

When SYNC is set to a number it means the tone is divided by that number. This gives greater synchronizing accuracy. When using external synchronization, it is advisable to always set SYNC to at least 4. The higher the number the more timing resolution.

EXAMPLE: SYNC=4<return> means that if an external tone of 2000Hz was used, the CMI would divide that tone by 4 and replay as if SYNC=EXT and a tone of 500Hz was used.

REAL-TIME COMPOSER

To UNALLOCATE unused patterns:

TYPE: UN(ALLOCATE),number of unused patterns<return>

At least 2 letters of the UNALLOCATE command must be typed.

When a composition has been completed, unused patterns represent wasted disk space. The UNAllocate command allows you to dispose of unused patterns, thereby recovering the disk space. In other words, you can get rid of excess unused patterns.

Only do this if you are sure you wont need any more patterns  
- usually when a song is complete.

Typing UN,Ø<return> will not dispose of any patterns, but it will move any unused patterns to the end of the file (possibly reducing disk activity when playing).

UNALLOCATE is the converse of ADD. UNUSED patterns can always be UNALLOCATED i.e., given back as FREE SPACE.

EXAMPLE:

Before ...

After TYPING: UN,3Ø<return>

Total patterns: 100
Used: 20 Left: 80

Total patterns: 70
Used: 20 Left: 50

In the development of a song, some patterns will be used as "scratchpads" for practice and experimentation. To dispose of patterns which have been used but are no longer needed for the song, RESET a redundant pattern - type RES<return>.

This makes the patten **UNUSED**.

**COPY** the reset pattern to whichever patterns no longer required. Then use the UNAllocate command as described.

To ADD extra patterns to a currently loaded sequence:

TYPE: AD(D),number of extra patterns<return>

At least 2 letters of the ADD command must be typed.  
Total number of patterns (used and unused) cannot exceed 255.

EXAMPLE:

Before ...

After TYPING: AD,5<return>

Total patterns: 20
Used: 20 Left: 0

Total patterns: 25
Used: 20 Left: 5

REAL-TIME COMPOSER

The ADD command should be used if the Page R file is too small. Therefore when creating (with NEW command) a Page R file make it as large as may be needed.

Any file saved after the creation of a Page R file will restrict the size of that Page R file.

Here, voice file FLUTE has been saved after Page R file TUNE.RS.

Space allocation on sounds disk



TUNE.RS is effectively "sandwiched" between BASS.VC and FLUTE.VC. TUNE.RS cannot be made bigger here.

The message ...

"NOT ENOUGH DISK SPACE"

will appear if you try to ADD more patterns to TUNE.RS.

In this case, go to Page 2, TRANSFER the Page R file onto a blank disk. You may now ADD extra patterns on the transferred file up to the maximum of 255.

DISPLAY USED PATTERNS: TYPE X<return>

This will change the complete display to show which patterns out of the 255 possible pattern numbers are USED. This is useful when pattern numbers are not chosen sequentially.

Here we have patterns 1 to 10 used and pattern 99 used.

	Pattern									Index	* = used								
	1	2	3	4	5	6	7	8	9		1	2	3	4	5	6	7	8	9
0	*	*	*	*	*	*	*	*	*	10	*	.	.	.	.	.	.	.	.
20	.	.	.	.	.	.	.	.	.	30	.	.	.	.	.	.	.	.	.
40	.	.	.	.	.	.	.	.	.	50	.	.	.	.	.	.	.	.	.
60	.	.	.	.	.	.	.	.	.	70	.	.	.	.	.	.	.	.	.
80	.	.	.	.	.	.	.	.	.	90	.	.	.	.	.	.	.	.	*
100	.	.	.	.	.	.	.	.	.	110	.	.	.	.	.	.	.	.	.
120	.	.	.	.	.	.	.	.	.	130	.	.	.	.	.	.	.	.	.
140	.	.	.	.	.	.	.	.	.	150	.	.	.	.	.	.	.	.	.
160	.	.	.	.	.	.	.	.	.	170	.	.	.	.	.	.	.	.	.
180	.	.	.	.	.	.	.	.	.	190	.	.	.	.	.	.	.	.	.
200	.	.	.	.	.	.	.	.	.	210	.	.	.	.	.	.	.	.	.
220	.	.	.	.	.	.	.	.	.	230	.	.	.	.	.	.	.	.	.
240	.	.	.	.	.	.	.	.	.	250	.	.	.	.	.	.	.	.	.

pattern 99 used

To return to the previous display TYPE: <clear>.

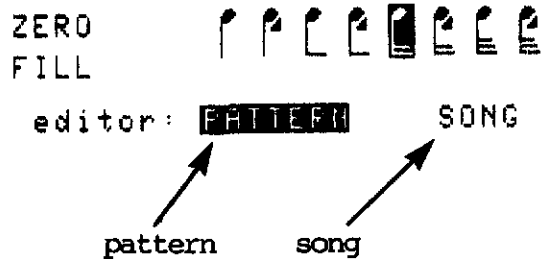
REAL-TIME COMPOSER - Pattern Editor

EDITOR SELECTION:

To select **PATTERN** or **SONG EDITOR** ...

Type:           E<return>

lightpen ==> <PATTERN> or  
              ==> <SONG>



PATTERNS:

Up to 255 different patterns are available in any one Page R song.

Pattern 1 is the default pattern initially displayed.

Patterns can be USED in any order, that is patterns 20 to 30 can be used without having to use patterns 1 to 20.

Use the X<return> command to see which patterns are USED.

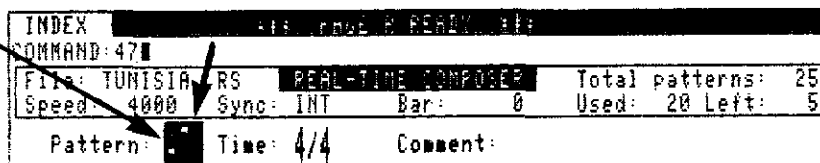
PATTERN NUMBER:

There are **three** ways to select a pattern for display:

- 1) TYPE: P=n<return> where: n is any pattern number (1 to 255)
- 2) Move the CURSOR to the number opposite the word Pattern (either press down-arrow key three times or use lightpen).

TYPE: n<set> where n is a pattern number from 1 to 255 or use the <add> and <sub> keys to in/decrement number by one.

Pattern 47



- 3) Use the BAR command.

OPEN a keyboard:

One of the 8 keyboards must be **OPEN** before notes can be inserted or deleted or RECORDED.

When a keyboard is open, it is illuminated.

There are **three** ways to OPEN a keyboard ...

- 1) TYPE: Kn<return> where n = 1 to 8 as on all other CMI pages e.g., K4<return> will open Keyboard 4.
- 2) Press the down arrow key repeatedly until the cursor reaches the keyboard area.
- 3) Point the lightpen at the voice names or one of the big numbers 1 to 8 to the left of the actual note area.



TIME RESOLUTION may be changed in two ways:

- 1) by pointing the light-pen at the collection of eight notes in the bottom right-hand corner of the screen.



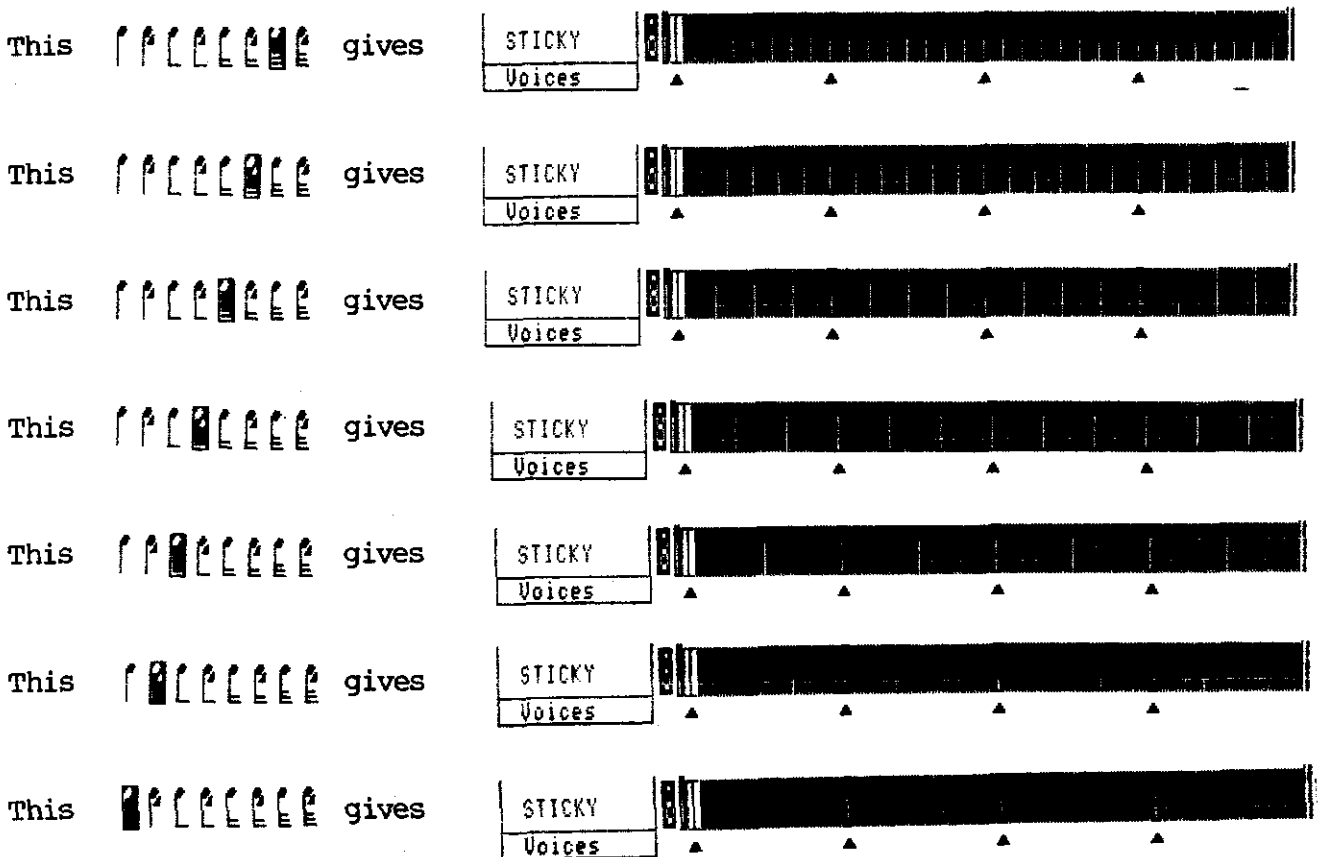
Notes with triangles signify "triplets" i.e., three notes played in the time of two.

- 2) by OPENING a keyboard and then repeatedly pressing "+" or "-" on the alphanumeric keyboard to lower or raise timing resolution.



When this is selected, maximum time resolution is

Similarly,



REAL-TIME COMPOSER - Pattern Editor (continued)

Time resolution is also related to time signature in a more general sense.

In a 3/4 or 4/4 bar the range of note lengths is



In a 1/4 or 2/4 bar the range of note lengths is



For double resolution, two 2/4 bars may be used instead of one 4/4 bar. This is rarely necessary.

In an 5/4, 6/4, 7/4 or 8/4 bar  
the range of note lengths is



To hold a note over 2 patterns, use one 8/4 bar in place of two 4/4 bars.

Time signature is expressed as

$n/b$  where  $n$  is number of beats in bar  
 $b$  is the beat value

If "n" is less than or equal to half of "b"  
e.g., 1/4, 2/4 then this is the resolution ...



If "n" is more than half or equal to "b"  
e.g., 3/4, 4/4 then this is the resolution ...



If "n" is more than "b" e.g., 5/4, 6/4, 7/4, 8/4  
then this is the resolution ...



NOTE CURSOR:

The note cursor is related to TIME RESOLUTION.

OPEN a Keyboard.

A gap in the illuminated band of light is the NOTE CURSOR.

The note cursor can be moved left or right to the next available "time-slot". This is the actual focal point for inserting and deleting notes.

In a 4/4 pattern, at maximum TIME RESOLUTION (demi-semiquaver triplets) there are 48 time-slots for the note cursor.

REAL-TIME COMPOSER - Pattern Editor (continued)

There are **three** ways to move the note cursor, once a keyboard is open:

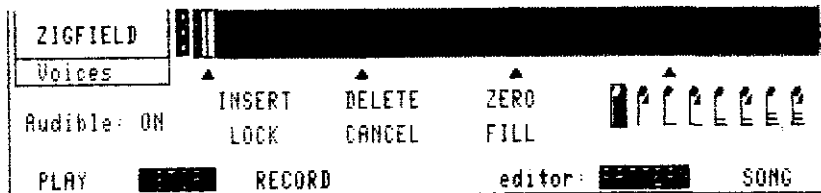
- 1) move the light-pen along the note area of the relevant Keyboard. The lightpen can point to notes on any other keyboard and the note cursor will follow in its keyboard.
- 2) TYPE:     >     to shift the note cursor right  
              <     to shift the note cursor left

The note cursor "wraps around", that is when at extreme right (end) of pattern, typing > will move it to the extreme left (beginning) of display.

- 3) put the CMI in the RECORD mode. The note cursor follows music keyboard performance in real time.

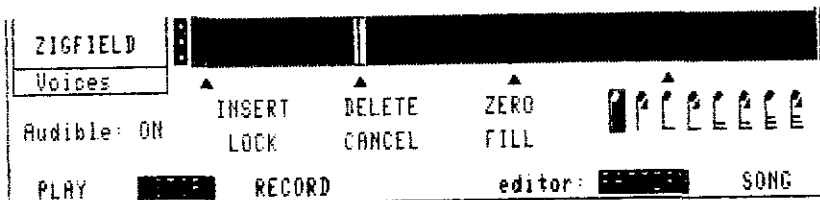
EXAMPLE:

Here is Keyboard 8 open with note cursor on the first beat of the pattern. There are **four** time slots available.

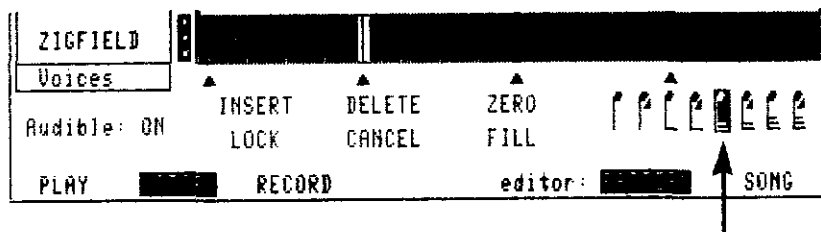


Type: >

Note cursor moves **right** to next available time-slot.

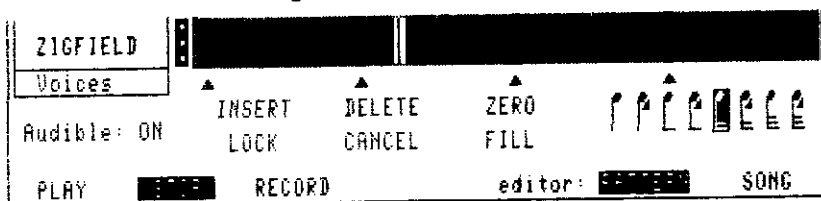


Change note resolution to semi-quavers either with lightpen or by typing the minus sign - four times.



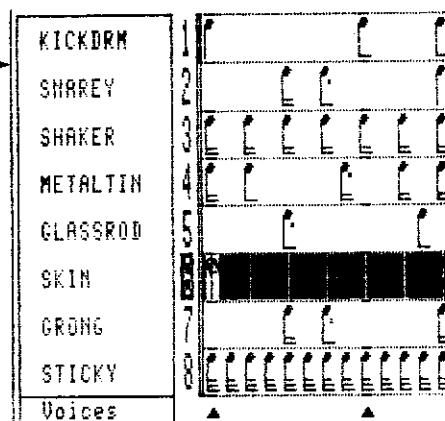
Type: >

Note cursor moves right to next available time-slot.



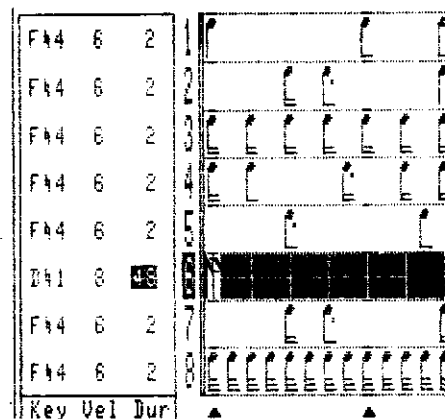
VOICE display:

To the left of the screen is the **voice display** showing which voices are loaded into the eight sequencers. The voice display also contains the **NOTE EDITING TABLE**.



The **NOTE EDITING TABLE** is "behind" the voice names. **OPEN** any Keyboard.

By pointing the light-pen at any voice-name or pressing the left-arrow key, the voice names will change showing **KEY** (pitch), **VEL**(ocity), and **DUR**(ation).

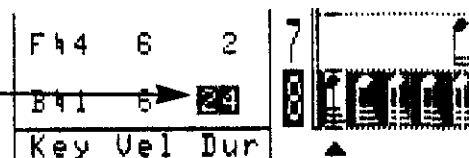


Playing the keyboard will show a corresponding change in **KEY** and **VEL**. This area should be thought of as a "scratch-pad" where **note dynamics** are adjusted before insertion.

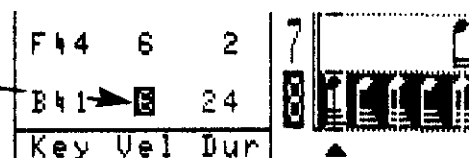
Changes can be made to **KEY**, **VEL** and **DUR** and **INSERTED** in the pattern.

Depending on the position of the cursor within the Note Editing Table, the <add> or <sub> keys function as a convenience by raising or lowering values for **KEY**, **VEL** and **DUR** by one.

Here, the cursor is on Dur(ation) for Keyboard 8 (voice 8)



Press **left arrow** key or point lightpen to "6". Cursor is now on **Vel** value. 8 is loudest volume/quickest attack 1 is quietest volume/slowest attack This will set **LEVEL** or **ATTACK** of a note if corresponding patch has been made on Page 7.



REAL-TIME COMPOSER - Pattern Editor (continued)

```

INDEX          VOICE: 8
COMMAND:      STICKY

CONTROL PARAMETERS

CONTROL FILE:  STICKY .CO

MODE = 4      GLISSANDO = OFF    LOOP CNTRL = OFF
EXP = OFF     PORTAMENTO = OFF    LOOP START = 1
LEVEL = KEYVEL SPEED = 0         LOOP LGTH = 1
FILTER = 8    CONST TIME = ON    START SEC = 1

DAMPING = 400  VIB DEPTH = 0     SLUR = OFF
ATTACK = 0     VIB SPEED = 0     SUSTAIN = OFF

VOICES:
  KICKDRM  SNAREY  SHAKER  METALIN
  GLASSROD SKIN   GRONG   STICKY

CNTRL:  1  2  3  4  5  6    SWTCH:  1  2  3  4  5
ON  OFF  ZERO
  
```

Voice 8

Page 7 LEVEL patch

Back to Page R ...

Press left arrow key  
or point lightpen to "B41".  
Cursor is now on Key (pitch) value.

F44	6	2
<b>B41</b>	6	24
Key	Vel	Dur

7  
8  
9  
0  
INSRT

Key shows black notes as flats.

To show black notes as sharps, TYPE: <ctrl>S<return>

Vel ranges from 1 to 8.

- 8 is loudest volume/quickest attack.
- 1 is quietest volume/slowest attack.

It's good practice to patch KEYVEL to all Voice LEVELS and/or ATTACKS on Page 7 to fully utilize Page R voice dynamics.

There are three ways to change Key and Vel.

1) Play the music keyboard.

Key will reflect the pitch of the last note played.  
Vel will reflect how hard the keyboard was played.

New value is temporary until the INSERT command is given.

If in the RECORD mode, INSERT is automatic.  
Previous values are overwritten.

- 2) If the cursor is on Key, type the part(s) of the pitch (note-letter A to G, accidental, octave 1 to 7) that you wish to change - then press <set>.

The parts that you do NOT type will remain unchanged.

To get accidentals   <ctrl>S is **sharp**  
                           <ctrl>F is **flat**  
                           <ctrl>D is **natural**.

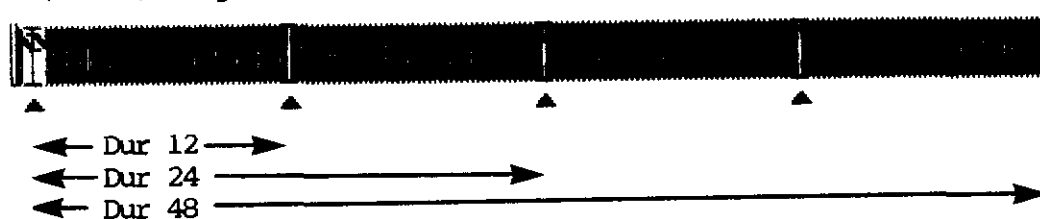
If the cursor is on Vel

TYPE:    n<set> to set velocity where n = 1 to 8.  
           8 is **loudest** volume/**quickest** attack.  
           1 is **quietest** volume/**slowest** attack.

- 3) Use the KEY or VEL commands to change a pattern or groups of patterns at once, rather than changing notes individually.

Dur(ation) ranges from  $\emptyset$  (minimum - staccato)  
                           to 48 (maximum - legato).

Dur(ation) lengths ...



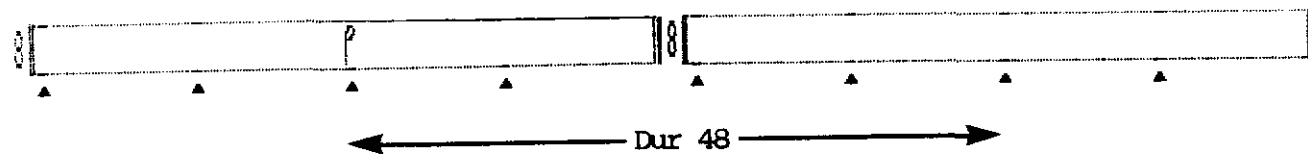
Any note that is inserted to occur before the duration of a previous note has expired will cut off the previous note.

If the note is near the end of a pattern and duration is longer than the rest of the pattern the note will carry over into the next pattern.

Long Dur(ation) carries over into next bar ...

Time signature 4/4

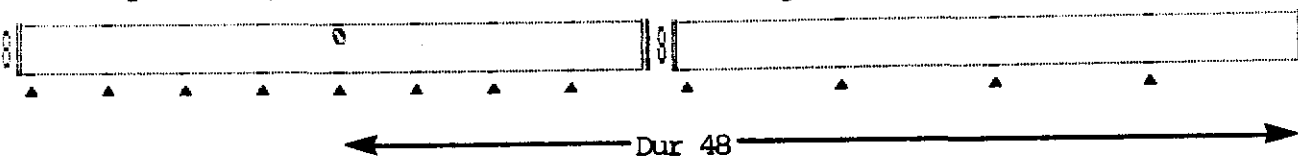
Time signature 4/4



Note that a Dur(ation) of 48 (longest) in a pattern with 8/4 time signature will last 8 crotchets.

Time signature 8/4

Time signature 4/4



There are three ways to change Dur(ation) ...

- 1) Put the CMI into the RECORD mode.

As the music keyboard is played, length of note is recorded as duration.

INSERT is automatic. Previous values are overwritten.

- 2) Move cursor to duration value.

TYPE:    n<add> to increase duration by n  
          n<sub> to decrease duration by n  
          n<set> to set duration to n  
          where n = 0 to 48

- 3) Use the DUR command to change a pattern or groups of patterns at once, rather than changing notes individually.

This is useful when making all note durations equal.

Page 7 DAMPING will have some bearing on note length. That is to say a voice with a long DAMPING value (above 500) will not play short durations.

Shorten the DAMPING value to between 10-200 for staccato notes.

Similarly, a slow ATTACK (above 100) will make rapid series of notes much quieter or not sound at all.

Shorten the ATTACK time to below 100 for rapid note passages or use KEYVEL.

ATTACK and DAMPING values are in milliseconds.

REAL-TIME COMPOSER - Pattern Editor (continued)

KEY command:

This command will transpose pitch relatively, selected keyboards over current pattern or range of patterns.

TYPE: KE(Y),offset,pattern range,(keyboard mask)<return>

where: at least 2 letters of KEY must be typed.

offset is -71 to +71 semitones. Can leave + out.

range of patterns is from 1 to 255 (if available)  
If not specified default to 1.

(keyboard mask) is from 1 to 8. If preceded by a - sign those keyboards are excluded. Must be surrounded by round brackets ( and ).

If not specified all 8 keyboards are transposed.

Note that the Key command "wraps around". Thus if the lowest G on the keyboard is transposed down an octave, it becomes the highest G on the keyboard.

EXAMPLES:

KEY,1	transpose up 1 semitone, currently displayed pattern, all keyboards.
KE,12,8	transpose up 1 octave (12 semitones), pattern 8 all keyboards.
KE -3,4,(678)	transpose down 3 semitones, pattern 4 keyboards 6, 7, and 8 only.
KE -36 16-31 (-12)	transpose down 3 octaves, patterns 16-31 but exclude keyboards 1 and 2.
KEY +4 (8)	transpose up 4 semitones, current pattern only keyboard 8.

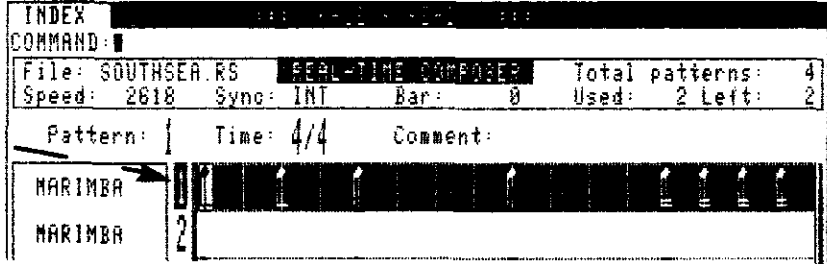
REAL-TIME COMPOSER - Pattern Editor (continued)

The Key command, used in conjunction with the GRAB command allows you to rapidly construct harmony lines and octave doubling.

EXAMPLE: Double Keyboard 1 melody into Keyboard 2 an octave higher.

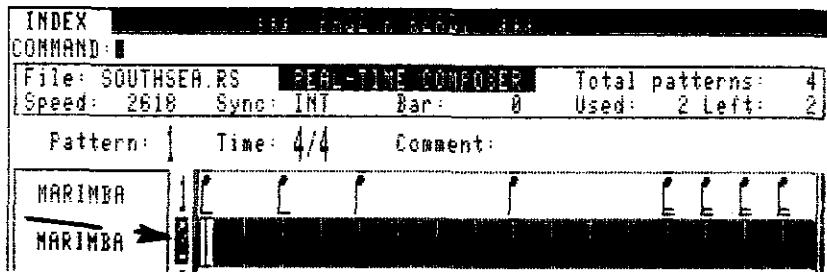
Original pattern.

Keyboard 1 open.



Open Keyboard 2.

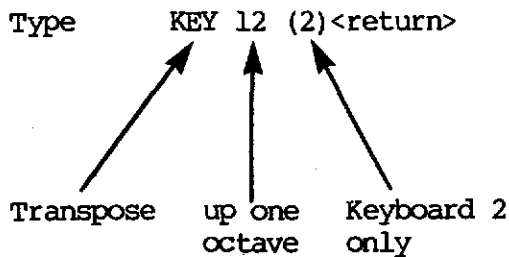
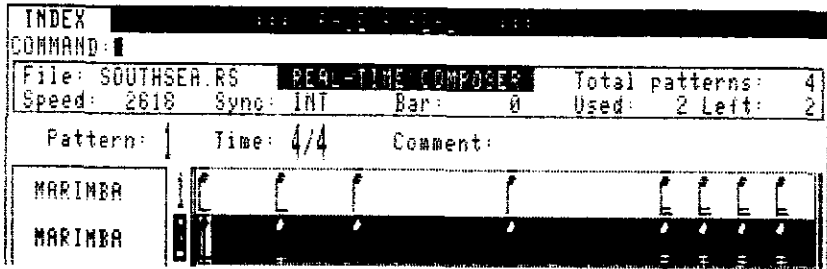
Point lightpen here or press down-arrow key.



GRAB Keyboard 1

Type G 1<return>

Keyboard 1 is copied into Keyboard 2



VELOCITY and DURATION commands

These commands allow relative modification of Vel or Dur for selected keyboards over current pattern or range of patterns.

TYPE: VE (LOCITY) ,offset, pattern range, (keyboard mask) <return>  
or  
DU (RATION)

where: at least 2 letters of Vel or Dur must be typed.

offset is -7 to +7 for Vel. Can leave + out.  
-48 to +48 for Dur. Can leave + out.

range of patterns is from 1 to 255 (if available)  
If not specified default to 1.

(keyboard mask) is from 1 to 8. If preceded by a - sign those keyboards are excluded. Must be surrounded by round brackets ( and ) .

If not specified all 8 keyboards are modified.

Vel and Dur do not "wrap around".  
Once a maximum or minimum is reached, further increases or decreases make no change.

EXAMPLES:

VE,1	increase Vel by 1, current displayed pattern, all keyboards.
DUR,12,8	increase Dur by 12, pattern 8 all keyboards.
VELOC 7,4,(678)	increase Vel by 7 (to the maximum), pattern 4 keyboards 6, 7, and 8 only.
DU -48 16-31 (-12)	reduce Dur by 48 (to the minimum), patterns 16-31, exclude keyboards 1 and 2.
DURATION 4 (8)	increase duration by 4, current pattern only keyboard 8.

REAL-TIME COMPOSER - Pattern Editor (continued)

EXAMPLE:

You want all notes in keyboards 7 and 8 to have a Vel of 5 over patterns 16-24.

The method is to reduce all Vel values to the minimum value (1) regardless of previous values, then increase to desired value.

Type VEL -7 16-24 (78)<return> Subtract 7 from Vel of all notes in Patterns 16-24, keyboards 7 and 8.  
If Vel previously 8, it is now 1.  
If Vel previously 2, it is now 1.

Type VEL 4 16-24 (78)<return> Increase Vel by 4  
Keyboards 7 and 8 now have a Vel value of 5.

To similarly set duration to 12 over same pattern range and keyboards ...

Type DUR -48 16-24 (78)<return> All durations to zero.

Type DUR 11 16-24 (78)<return> All durations to 12.

INSERT:

<b>INSERT</b>	DELETE	ZERO
LOCK	CANCEL	FILL

A Keyboard must be OPENED and the NOTE CURSOR positioned.

If there are any changes in the NOTE EDITING TABLE (by typing or playing the music keyboard) a box will appear around the word INSERT thus ...

Audible: ON	<b>INSERT</b>	DELETE
	LOCK	CANCEL
PLAY	<b>INSERT</b>	RECORD

This means that the change is temporary until actually **INSERTED**.

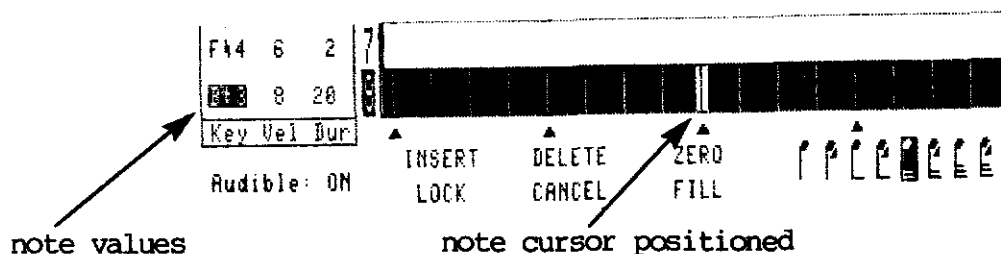
The KEY (pitch), VEL(ocity) and DUR(ation) information in the NOTE editing table will be inserted into the current NOTE CURSOR position, overwriting any previous note.

There are **three** ways to insert notes into patterns:

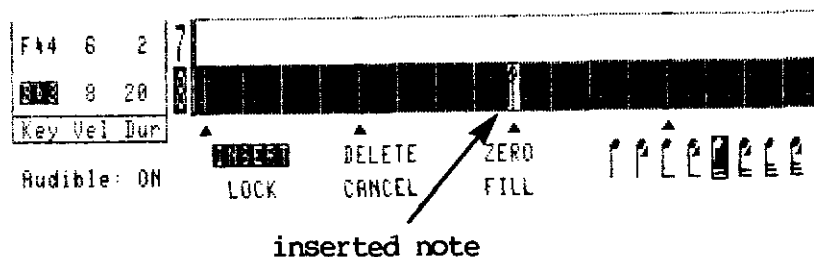
- 1) TYPE: I<return>
- 2) point the light pen at the word "INSERT".
- 3) put the CMI into RECORD. Insert is automatic while the music keyboard is played.

1) and 2) are the best ways to correct isolated mistakes and to give each note individual expression.

Before INSERT:



After INSERT:



DELETE:

INSERT      **DELETE**      ZERO  
 LOCK      CANCEL      FILL

Opposite of INSERT.

A note will be deleted from the current NOTE CURSOR position.

See ZERO and RESET also.

There are **two** ways to delete a note in a pattern after positioning the note cursor:

- 1) TYPE: D<return>
- 2) point the light pen at the word "DELETE".

This is a good way to carefully delete one note from a cluster.

EXAMPLE:

Use INSERT and DELETE to put a note slightly ahead of beat.

Select note.

Note editing table shows the values for that note.

Select time resolution.

Move note-cursor left (ahead of beat)

The note editing table temporarily stores note values when the note cursor is moved to a position unoccupied by a note.

Type I<return> or lightpen =>INSERT

Move note cursor right

Type D<return> or lightpen =>DELETE

Note is now slightly ahead of beat.

LOCK:

Will lock **INSERT** or **DELETE** on until **CANCELLED**. See below.

CANCEL:

TYPE: C<return>  
or  
lightpen =>CANCEL

INSERT	DELETE	ZERO
LOCK	<b>CANCELLED</b>	FILL

Cancel the **LOCK**. Opposite of **LOCK**.

Release **INSERT** or **DELETE** from being ON.

INSERT-LOCK:

TYPE: I,L<return>  
or  
lightpen =>LOCK then lightpen =>INSERT

<b>INSERT</b>	DELETE	ZERO
<b>LOCK</b>	CANCEL	FILL

Insert is locked ON.

Notes will be inserted wherever **NOTE CURSOR** moves in note area.  
**KEY**, **VEL** and **DUR** values derived from **NOTE EDITING TABLE**.

A good way to quickly insert many notes of the same pitch  
(as in percussion fills).

Remember if **INSERT-LOCK** is on, notes will be inserted wherever  
the **NOTE** cursor moves until **CANCELLED**.

REAL-TIME COMPOSER - Pattern Editor (continued)

DELETE-LOCK:

TYPE: D,L<return>  
or  
lightpen =>LOCK then lightpen =>DELETE

INSERT	<b>DELETE</b>	ZERO
<b>LOCK</b>	CANCEL	FILL

Delete is locked ON.

Notes will be deleted wherever NOTE CURSOR moves in note area.

Many notes can be selectively deleted quickly.

Remember if DELETE-LOCK is on, notes will be deleted wherever the NOTE cursor moves until CANCELLED.

ZERO:

TYPE: Z<return>  
or  
lightpen =>ZERO

INSERT	DELETE	<b>ZERO</b>
LOCK	CANCEL	FILL

Delete all notes from open keyboard. Converse of FILL.

FILL:

TYPE: F<return>  
or  
lightpen =>FILL

INSERT	DELETE	ZERO
LOCK	CANCEL	<b>FILL</b>

Fill all notes on open keyboard of a pattern.

Note value comes from current value in NOTE EDITING TABLE.

Number of notes depends on TIMING RESOLUTION selected.

EXAMPLE:

The image shows two examples of the Pattern Editor interface. Each example consists of a control panel on the left and a note editing area on the right. The control panel includes a 'CN1 8' display, a 'Key Vel Dur' section, and an 'Audible: ON' indicator. Below the control panel are three columns of controls: 'INSERT LOCK', 'DELETE CANCEL', and 'ZERO' (with 'ZERO' highlighted in a black box in the first example and 'FILL' highlighted in the second). The note editing area is a horizontal bar with a grid of notes. In the first example, the notes are sparse, and an arrow labeled 'time resolution' points to the grid. In the second example, the notes are dense, and an arrow labeled 'time resolution' points to the grid. An arrow labeled 'note value' points to the 'CN1 8' display in both examples.

GRAB:

TYPE: G(RAB),n<return> where n is a keyboard number from 1 to 8.

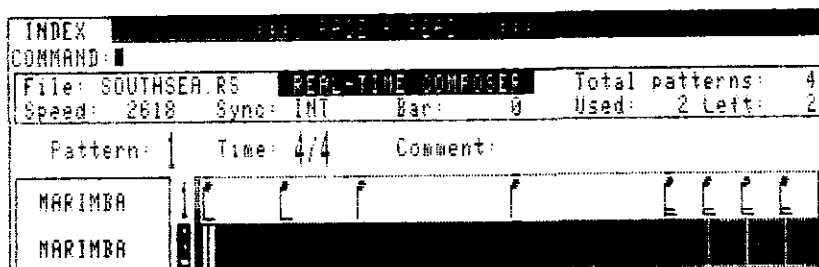
Notes in keyboard n are copied to the currently OPEN keyboard.  
Previous contents are overwritten.

When used in conjunction with the **KEY** command,  
voice doubling and harmonies may be rapidly generated.

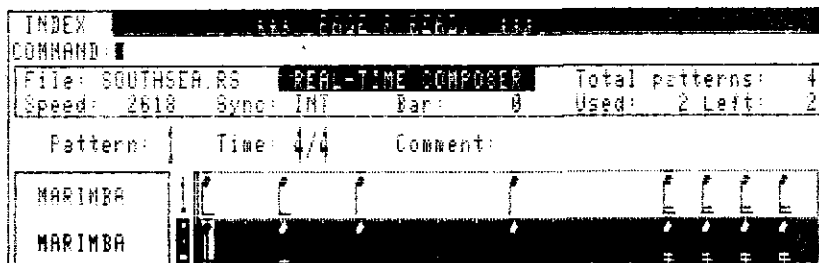
This command may be used while playing or recording.

EXAMPLE: G 1<return> - Copy contents of keyboard 1 to  
currently open keyboard.

Keyboard 2  
is open



G 1<return>



TIME SIGNATURE:

The default time signature is 4/4.

This can be modified to any **default** time signature  
e.g., 1/2, 3/4, 11/8, 31/16 etc.

The **TIME SIGNATURE** command is usually only used once, when the  
file is first created.

Only **UNUSED** patterns are affected.

This command may not be used while playing (or recording).

TYPE: TI (ME),n/b<return>

where: n = no. of beats in bar (range 1 to twice beat value)  
b = beat value (2,4,8,16)  
and / can be a comma, space, slash etc.

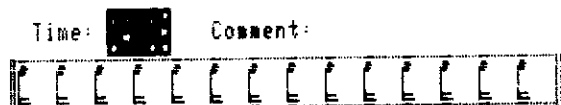
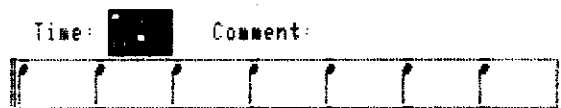
At least 2 letters of the **TIME** command must be typed.

REAL-TIME COMPOSER - Pattern Editor (continued)

To change an individual pattern time signature, move cursor to time signature and type:

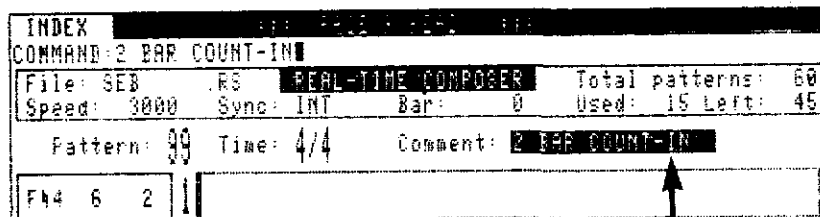
n/b<set>

This only affects the displayed pattern.



COMMENT: TYPE: (a maximum of any 16 characters)<set>

This 16 character area to the right of the time signature allows you to put a relevant comment for your own use.



↑  
comment

RESET: TYPE: RES (RT) <return>

At least 3 letters of the RESET command must be typed.

Deletes all notes in the current pattern, blanks out the COMMENT area, changes the TIME SIGNATURE to the default value and returns the pattern being USED to UNUSED (left). This is reflected in the top right-hand corner of the screen.

RESET is not available for the light-pen because of its major effect.

Many patterns may be RESET (UNUSED) by COPYING a reset pattern into used patterns.

COPY command:

This command allows copying blocks of patterns into other patterns, selectively including or excluding keyboards. The only restriction is that the range of patterns being copied cannot include any of the destination patterns. That is, the 'from' and 'to' ranges may not overlap.

TYPE: C(OPY), from pattern(s), to pattern(s), (kbd. mask) <return>

where: from pattern(s) range from 1 to 255

to pattern(s) range from 1 to 255  
(if not specified default is displayed pattern)

OMI will give a message if pattern blocks overlap

(keyboard mask) is from 1 to 8. If preceded by a - sign those keyboards are excluded. Must be surrounded by round brackets ( and ) .

If not specified all 8 keyboards are copied.

EXAMPLES:

C,2 Copy pattern 2 to currently displayed pattern  
all keyboards.

C 3-6 Copy patterns 3 to 6 to currently displayed pattern  
all keyboards.  
If current pattern was 7 then 3 into 7, 4 into 8  
5 into 9 and 6 into 10. If current pattern was 4  
then blocks would overlap and error message result.

COPY 12 20 Copy pattern 12 into pattern 20, all keyboards.

CO,12 20-23 Copy pattern 12 into patterns 20 to 23  
all keyboards.

C 4 (12347) Copy pattern 4 into currently displayed pattern  
only keyboards 1, 2, 3, 4 and 7.

C 1-3 8-13 Copy pattern 1 into 8, 2 into 9, 3 into 10,  
1 into 11, 2 into 12 and 3 into 13.

C,1 (-36) Copy pattern into currently displayed pattern  
but exclude keyboards 3 and 6.

C 1-4 2-5 **Invalid.** Patterns 2, 3 and 4 overlap.

Consider changing Pattern 2.

A good idea would be to COPY Pattern 2 to a "scratchpad"  
pattern, say Pattern 255.

Type C,2,255<return>

Now work on Pattern 255. When you are happy with Pattern 255,  
COPY it back to Pattern 2.

Type C,255,2<return>

If you inadvertently "mess up" Pattern 255, you just re-copy  
Pattern 2 into Pattern 255 and have another go.

REAL-TIME COMPOSER - Pattern Editor (continued)

EXAMPLE:

Here is pattern one ...

Type:

C 1,2 (256)<return>

Copy pattern 1  
into pattern 2  
keyboards 2,5,6  
only.

REAL-TIME COMPOSER - Pattern Editor (continued)

BAR command: TYPE: B(AR),n<return> where n=1 to 65535.

This displays the bar number related to the linking of patterns in the SONG EDITOR.

The bar number corresponds to the number of patterns, including repeats up to that point.

In the pattern editor, the pattern for bar "n" is displayed.

Here is the pattern for bar 72.

Type:  
B 72<return>

In the song editor, the cursor is positioned to the point where bar "n" occurs, either in the song list or the section list.

Here is the SONG EDITOR showing where bar 72 occurs in the song.

The bar command is often used in conjunction with the PLAY/RECORD command.

EXAMPLE:

- B 9<return> Look at the ninth bar in the song.
- REC !<return> Record that bar continuously.
- B 12<return> Look at bar 12.
- P \* #10<return> Play the song from two bars before bar 12.

AUDIBLE:

TYPE: ON<set>  
or OFF<set>

Audible: ON  
Default is ON. →  
PLAY [ ] RECORD  
INSERT  
LOCK

This gives you audible feedback for KEY (pitch) and VEL(ocity) of notes whenever:

- 1) the NOTE CURSOR is made to pass over a note either with the lightpen or by typing > or <.
- 2) KEY, VEL or DUR are changed in the NOTE EDITING TABLE.

PATTERN EDITOR COMMAND SYNTAX

Commands that require at least 2 letters: AD D  
UN ALLOCATE  
KE Y  
VELOCITY  
DU RATION  
TI ME

Commands that require at least 3 letters: RES ET  
REC ORD

BEHAVIOUR of SLAVE Music Keyboard:

If the OPEN (illuminated) keyboard on Page R is the one to which the SLAVE keyboard is assigned (on Page 3) then the slave keyboard will work just like the master keyboard; otherwise it remains independent.

# REAL-TIME COMPOSER - Song Editor

## SONG EDITOR:

Integral to the linking of patterns and sections with the song-editor is the ability to change the position of the "windows" through which different steps or sections are displayed.

song list

section list

step	1	2	3	4	5	6	7	8	9	10	11	12
play	1	2	3	4	5	6	7	8	9	10	11	12
x's	1	1	1	5	2	1	1	2	1	2	1	4

Sections:	1	2	3	4	5	6	7	8	9	10
A	1	1	#							
B	3	4	5	6	#					
C	7	8	9	10	#					
D	1	1	1	1						
E	9	10	#							

PLAY STOP editor: PATTERN SONG

## SONG-DISPLAY control:

There are **two** ways to move the song list window:

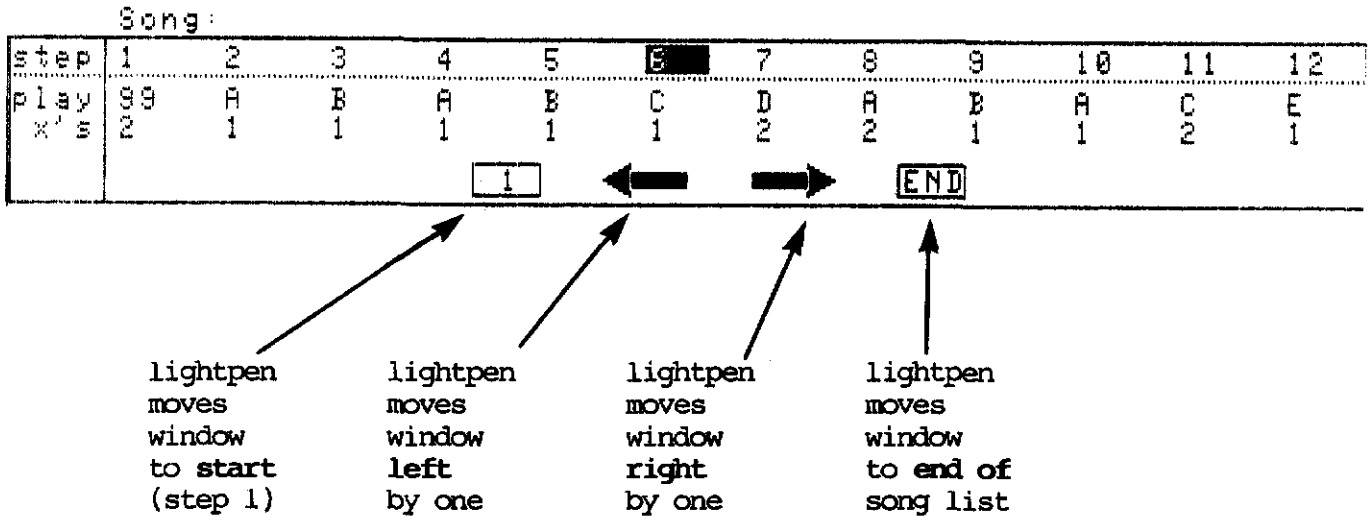
1) Use the lightpen to point to the large horizontal **right** or **left** arrows. The window will shift accordingly.

Point to the word "END" and the **end** of song list will appear.  
Point to the number "1" and the **beginning** of song list will appear.

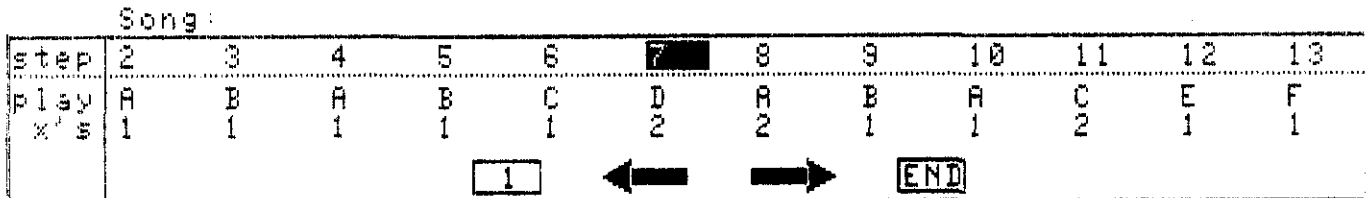
REAL-TIME COMPOSER - Song Editor (continued)

2) Move the cursor to any of the step numbers.

TYPE:            <add>    Move window right by one.  
                  <sub>    Move window left by one.  
                  255<add> Move to END.  
                  255<sub> Move to START.  
                  nnn<set> Move window to step nnn (1 to 255).



Song window from above example has been moved right by one ...



SECTION-DISPLAY control:

There are **two** ways to move the section list window.

1) Use the lightpen to point to the large vertical **down** or **up** arrows.

Point to the letter "Z" and the last five section lists (V to Z) will appear. Point to the letter "A" and the first five section lists (A to E) will appear.

2) Move the cursor to any of the big section letters.

TYPE: <add> to move the window **down**.

<sub> to move the window **up**.

X<set> to move the window to section letter X (A to Z)

Sections:

A	1	2	3	4	5	6	7	8	A
	1	1	1	1	2	2	1	1	
B	9	10	11	12	13	14	15	16	↑
	1	1	1	1	1	1	1	1	
C	17	18	19	20	21	22	23	24	↓
	1	1	1	1	1	1	1	1	
D	25	26	27	28	*	.	.	.	
	1	1	1	1					
E	29	30	31	32	33	34	35	36	Z
	1	1	1	1	2	2	1	1	

lightpen moves window to Section A

lightpen moves window up by one

lightpen moves window down by one

lightpen moves window to Section Z

Section window from above example has been moved down by one.

Sections:

B	9	10	11	12	13	14	15	16	A
	1	1	1	1	1	1	1	1	
C	17	18	19	20	21	22	23	24	↑
	1	1	1	1	1	1	1	1	
D	25	26	27	28	*	.	.	.	↓
	1	1	1	1					
E	29	30	31	32	33	34	35	36	
	1	1	1	1	2	2	1	1	
F	37	38	39	40	41	42	43	44	Z
	1	1	1	1	1	1	1	1	

STEPS:

Each step has two items in it:

Song:						
step	1	2	3	4	5	6
play	1	2	3	4	1	∞
x's	1	1	1	1	∞	

← pattern or section  
← repeat count

1

 ←

Repeats may range from 1 to 127 or infinity.

Whenever infinity is encountered, playing repeats endlessly at that point.

To get the infinity symbol, type: ∞<set>

Zero is equivalent to infinity.

By moving the cursor around with the up, down, left and right arrow keys and by using the <add>, <sub> and <set> keys in the usual way, pattern numbers and repeats can be put into the song list and section list.

The ∞ symbol signifies the end of the song or section list.

Sections:			
A	1	3	4 → ∞
B	2	2	12

Typing END<set> will end a song or section list.

SONG EDITOR TRACE FUNCTION:

Whenever the cursor is positioned within the SONG list or the SECTION list it will automatically trace the progress of the song during <PLAY>.

No tabbing or assignments are allowed.

To escape from this (e.g., to change SPEED) press <home> key.

The BAR command also positions the cursor, to the relevant bar.

BLOCK COMMANDS:

In addition to using the <add>, <sub>, and <set> keys to modify STEP values one at a time, there are several commands which operate on a BLOCK, or consecutive group of steps within the SONG or SECTION lists.

These block editing commands enable the linking of many patterns or sections, and take effect from the **CURRENT CURSOR POSITION**.

SUMMARY of song editor block commands:

- > **ESCAPE** function.
- > **INSERT** one or more steps with specified values.
- > **OVERWRITE** one or more steps with specified values.
- > **DUPLICATE** one or more steps, **INSERTING** new step(s).
- > **DUPLICATE** one or more steps, **OVERWRITING** existing step(s).
- > **DELETE** one or more steps.
- > **MAKE** a section.
- > **END**

ESCAPE function:

ESCAPE reverses the effect of the commands to be described i.e., INSERT, OVERWRITE, DELETE, DUPLICATE, END and MAKE.

To "escape" from an editor operation press the <esc> key.

This message will appear:

"ESCAPE FROM LAST OPERATION - (Y)??"

To un-do the last thing you just did, TYPE: Y<return>.

Otherwise just press <return> or <ctrl-esc>, that is hold down <ctrl> key, press <esc> key.

INSERTION versus OVERWRITING

An understanding of these two concepts is crucial for effective use of block commands.

When INSERTING, existing step values are NOT wiped out instead, new steps are effectively created by "bumping" existing values along to make room for the new values.

When OVERWRITING, existing STEP VALUES are wiped out and replaced with new values.

Using the <add>, <sub> and <set> keys also results in overwriting.

INSERT:

TYPE: I (INSERT) [,list of step values]<return>

One or more steps may be inserted from the CURSORED step.

Ranges of values may be specified for the insertion of sequentially incrementing (or decrementing) blocks of either pattern numbers or section letters with repeats.

If insufficient steps exist then nothing will change. A warning will be given.

This would most likely occur when inserting into SECTIONS where a maximum of **eight** steps may exist.

REAL-TIME COMPOSER - Song Editor (continued)

EXAMPLES:

To set up the OMI to play straight through the first 100 patterns of the SONG without repeating any patterns (like a tape recorder):

TYPE:

I 1-100<return>

The first 12 steps of the song list will look like this ...

Song:												
step	1	2	3	4	5	6	7	8	9	10	11	12
play	1	2	3	4	5	6	7	8	9	10	11	12
x's	1	1	1	1	1	1	1	1	1	1	1	1

[1] ← → [END]

The last few steps of the song list ...

Song:												
step	95	96	97	98	99	100	101	102	103	104	105	106
play	95	96	97	98	99	100						
x's	1	1	1	1	1	1						

[1] ← → [END]

If the cursor position is at step 4, then the following commands will have the following effects:

I,40<return> - insert pattern 40 with 1 (default) repeat.

cursor

Song:												
step	1	2	3	4	5	6	7	8	9	10	11	12
play	1	2	3	40	4	5	6	7	8	9	10	11
x's	1	1	1	1	1	1	1	1	1	1	1	1

[1] ← → [END]

existing values "bumped" along →

IN 8-11:6<return> - insert patterns 8 to 11 with 6 repeats.

cursor

Song:												
step	1	2	3	4	5	6	7	8	9	10	11	12
play	1	2	3	8	9	10	11	4	5	6	7	8
x's	1	1	1	6	6	6	6	1	1	1	1	1

[1] ← → [END]

I F-H:127 1:2<return> - insert sections F to H, 127 repeats, then pattern 1, 2 repeats.

cursor

Song:												
step	1	2	3	4	5	6	7	8	9	10	11	12
play	1	2	3	F	G	H	1	4	5	6	7	8
x's	1	1	1	127	127	127	2	1	1	1	1	1

[1] ← → [END]

REAL-TIME COMPOSER - Song Editor (continued)

I 9-6 Z-X<return> - insert patterns 9 to 6 (decreasing), sections Z to X (decreasing).  
1 (default) repeat each.

cursor

Song:												
step	1	2	3	4	5	6	7	8	9	10	11	12
play	1	2	3	9	8	7	6	Z	Y	X	4	5
x's	1	1	1	1	1	1	1	1	1	1	1	1

I ← → END

Commands behave similarly in the **SECTION** list.

Before ...

cursor

Sections:												
A	1	2	3	4	*							
	1	1	1	1								
B	*											

After typing

I 100-103:2<return>

Insert patterns 100 to 103 with two repeats each.

cursor

Sections:												
A	1	2	100	101	102	103	3	4				
	1	1	2	2	2	2	1	1				
B	*											

Eight step values are the maximum for each section.

EXAMPLE: I 1-12<return> would not fit into a section, giving the error message "TOO BIG - WILL NOT FIT".

**OVERWRITE:** TYPE: O(VERWRITE) [,list of step values]<return>

One or more steps may be overwritten from the **CURSORED** step.

Ranges of values and repeats are the same as for the **INSERT** command.

If insufficient steps exist then nothing will change. A warning will be given.

This would most likely occur when inserting into **SECTIONS** where a maximum of **eight** steps exist.

EXAMPLES:

Original song list:

Song:												
step	1	2	3	4	5	6	7	8	9	10	11	12
play	1	2	3	4	5	6	7	8	9	10	11	12
x's	1	1	1	1	1	1	1	1	1	1	1	1

[1] ← → [END]

O,4θ<return> - overwrite cursor position with pattern 4θ.

cursor

Song:												
step	1	2	3	4	5	6	7	8	9	10	11	12
play	1	2	3	4θ	5	6	7	8	9	10	11	12
x's	1	1	1	1	1	1	1	1	1	1	1	1

[1] ← → [END]

existing values stay put

O 8-1θ:6<return> - overwrite patterns 8 to 1θ, 6 repeats.

cursor

Song:												
step	1	2	3	4	5	6	7	8	9	10	11	12
play	1	2	3	8	9	10	7	8	9	10	11	12
x's	1	1	1	6	6	6	1	1	1	1	1	1

[1] ← → [END]

DUPLICATE INSERT command:

TYPE: D(UPLICATE)I(NSERT) [,section A to Z] [,step range]<return>  
 or [pattern 1 to 255]  
 or (song \*) (default)

A range of one or more steps may be duplicated, starting at the CURRENT CURSOR POSITION, inserting new values and "bumping" existing values to the right.

The range of steps to be duplicated may be selected from the SONG list or any SECTION list. An error message will be given if more than a total of 8 values will occur in a section.

EXAMPLES:

- DI,8 - insert step 8 of song
- D I \*8-12 - insert steps 8-12 of song
- D I \* - insert entire song
- DI A - insert section A
- D I C4 - insert step 4 of section C



REAL-TIME COMPOSER - Song Editor (continued)

EXAMPLE:

Before...

Song:

cursor

step	1	2	3	4	5	6	7	8	9	10	11	12
play	1	2	3	4	5	6	7	8	9	10	11	12
x's	1	1	1	1	1	1	1	1	1	1	1	1

1 ← → END

After typing D,10<return> Delete 10 step values.

Song:

step	1	2	3	4	5	6	7	8	9	10	11	12
play	11	12	13	14	15	16	*					
x's	1	1	1	1	1	1						

1 ← → END

existing values fill space

In the section list:

before ...

Sections:

cursor

A	1	2	3	4	8	9	10	11		
B	1	4	1	4	1	3	1	3		
C	6	7	8	9	10	11	12	13		
	1	1	1	1	1	1	1	1		

After typing D 8<return>

Sections:

A	1									
B										
C	6	7	8	9	10	11	12	13		
	1	1	1	1	1	1	1	1		

END:

TYPE: END<set>

This command deletes all step items, from the current cursor position. End of SONG or SECTION.

It may be used to reset the song or section list.

Equivalent to D(DELETE) 255<return>

REAL-TIME COMPOSER - Song Editor (continued)

EXAMPLE:  
Before...

Song:

step	1	2	3	4	5	6	7	8	9	10	11	12
play	5	7	8	9	15	16	17	18	*			
x/s	2	1	6	3	1	1	1	1				

[I] ← → [END]

After typing

END<set>

Song:

step	1	2	3	4	5	6	7	8	9	10	11	12
play	5	7	8									
x/s	2	1										

[I] ← → [END]

Before...

Sections:

12	13	14	15	21	22	23	24	[A]
2	2	2	2	1	1	1	1	↑
*								↓
*								■

After typing

END<set>

Sections:

12								[A]
*								↑
*								↓

MAKE SECTION command:

TYPE: M(AKE), (section A to Z), [step count], <return>.  
(default 8)

This single command combines the functions of several other commands in a single common operation - the creation of a section list.

Starting at the CURRENT CURSOR POSITION, a block of from 1 to 8 steps is duplicated in the desired section list.

The original block is then deleted, and a single step inserted which calls the new section.

REAL-TIME COMPOSER - Song Editor (continued)

If the specified section is not empty then an abort - option message will appear -

"OVERWRITE SECTION - (Y)??". Reply Y<return> to proceed.

The original block may be within another section but not the section being MADE.

EXAMPLE:

Before...

cursor

Song:												
step	1	2	3	4	5	6	7	8	9	10	11	12
play	1	2	3	4	5	6	7	8	9	10	11	12
x's	1	1	1	1	1	1	1	1	1	1	1	1
					[1]	←	→					END

TYPE: M,A 8<return> - make section A from the next 8 (default) steps beginning at the current cursor position.

After ...

Song:												
step	1	2	3	4	5	6	7	8	9	10	11	12
play	1	2	3	4	A	13	14	15	16	*		
x's	1	1	1	1	1	1	1	1	1			
					[1]	←	→					END

and section A contains ...

Sections:												
A	5	6	7	8	9	10	11	12				[R]
B												↑
C												↑

From section to section ...

Before ...

cursor

Sections:												
A	5	6	7	8	9	10	11	12				[R]
B												↑

After typing M B 4<return> - make section B from the next 4 steps beginning at the current cursor position.

Sections:												
A	5	6	7	8	9	10	11	12	*			[R]
B		8	9	10	11	12						↑

REAL-TIME COMPOSER - Appendix A - MESSAGES and ERRORS

The following is a summary of responses from the CMI when using the REAL-TIME COMPOSER.

Responses common to other pages (e.g., number must be between 1 and 255) are not included.

MESSAGES encountered in both PATTERN and SONG EDITOR ...

"Playing SONG : ( 1 to 255 ) time(s)" - Appears in response to  
(or infinity) PLAY or RECORD command.

"Playing SECTION (A to Z) : ( 1 to 255 ) time(s)" - Appears in  
(or infinity) response to  
PLAY or RECORD  
command.

"Playing PATTERN (1 to 255) : ( 1 to 255 ) time(s)" - Appears in  
(or infinity) response to  
PLAY or RECORD  
command.

"REAL-TIME COMPOSER : Version 1.30" - Type ?<return> to see  
the version number.

"Revising <filename.RS>, please wait..." - CMI updates a file  
created from a pre-release  
version of the  
REAL-TIME COMPOSER.

MESSAGES encountered in the PATTERN EDITOR ...

"SPACE for only N PATTERNS - OK (Y)?" - You have asked for more  
patterns than are avail-  
able as free space on  
the disk. For maximum  
number of patterns (255)  
insert a blank disk.

ERRORS encountered in the PATTERN EDITOR ...

"Type at least 2 letters of command word" - that is AD D  
UN ALLOCATE  
KE Y  
VE LOCITY  
DU RATION  
TI ME

REAL-TIME COMPOSER - MESSAGES and ERRORS (continued)

- "CANNOT LOAD PATTERN N" - The sounds disk has been removed while the song is playing (never do this!)
- Pattern N has somehow been corrupted. Either the disk has been damaged or exposed to intense heat or magnetic field.
- "CANNOT SAVE PATTERN N" - Faulty disk as described above.
- "NO UNUSED PATTERNS" - You have tried to **UNALLOCATE** unused patterns. There are no unused patterns.
- "FILE FULL - CAN'T ALLOCATE PATTERN N" - There are no UNUSED patterns left.  
Use the **ADD** command.
- "NOT ENOUGH DISK SPACE" - You have tried to ADD extra patterns. See explanation on Page 18.  
On PAGE 2, **TRANSFER** file to a **blank** disk. Extra patterns may then be added.
- "SORRY, N/N OUT of RANGE" - Time signature is not musically valid.
- "ENTER TIME as "#/#" - press <set>" - Time signature must consist of two valid numbers seperated by a delimiter (comma, space, slash etc.)  
See Page 37.

MESSAGES encountered in the SONG EDITOR ...

- "OVERWRITE SECTION (A to Z) - (Y)?" - Some values are already in the section referred to.
- "ESCAPE FROM LAST ACTION - (Y)?" - Typing <esc> will reverse the effect of  
INSERT  
OVERWRITE  
DELETE  
DUPLICATE  
DELETE  
MAKE  
and END

ERRORS encountered in the SONG EDITOR ...

"INVALID SECTION LETTER" - Section letter must be a letter  
between A and Z.

"TOO BIG - WILL NOT FIT" - Song list may contain a maximum of  
255 steps.  
Section list may contain a maximum of  
8 steps.

"SECTION NESTING TOO DEEP in SECTION (A to Z)" - Example:  
Section A plays  
Section B which plays  
Section A which plays  
Section B and so on.  
In other words, an  
endless loop.

"INVALID STEP NUMBER or RANGE" - Step number must be between 1 and 255.  
Range must be between 1 and 127  
or infinity ( ∅ <set> ).

"ERROR: SECTION (A to Z) CANNOT CALL ITSELF" - Section A cannot play  
itself.

"CAN'T SAVE <filename>, RE-INSERT CORRECT DISK" - You have changed  
disks while working  
on a song.

"TRAP CODE : inform your distributor." - Inform your distributor.

REAL-TIME COMPOSER - Appendix B - Hints

\*\*\* Develop a systematic method of working.

\*\*\* When creating a new Page R song, be liberal with the number of patterns allocated.

The reasons are... 1) you can always **UNALLOCATE** unused patterns back to **FREE SPACE** on disk  
2) you will almost always need more patterns than originally envisaged  
3) having extra patterns as a scratch-pad area allows you to copy blocks of patterns for experimentation without losing the original patterns

\*\*\* For recording with multi-track and live musicians, have a blank two-bar click-track count-in. No-one is then caught by surprize.

\*\*\* Avoid repetitive typing. Familiarise yourself with all the Page R facilities and commands. There is nearly always a command which shortcuts repetition. Let the CMI do the work.

\*\*\* Patch **KEYVEL** to either **ATTACK** or **LEVEL** on Page 7 for all voices to utilize Page R note dynamics. Avoid patching both **LEVEL** and **ATTACK** to **KEYVEL** for a voice. This would result in a voice having a slower **ATTACK** for a lower **LEVEL**.

\*\*\* A combination of music keyboard, alpha-numeric keyboard and lightpen can be the most convenient way to **INSERT** many notes

\*\*\* To convert between CMI speed, beats per minute (m.m.) and external synchronization, use the following relationships:

$$\text{CMI speed} = \frac{31416\emptyset}{\text{beats per minute}}$$

$$\text{CMI speed} = \frac{2\emptyset1\emptyset.5}{\text{EXTERNAL sync tone in KHz}}$$

$$\text{beats per minute} = \frac{31416\emptyset}{\text{CMI speed}}$$









$$\text{beats per minute} = \frac{\text{EXTERNAL sync tone in KHz}}{156.26}$$

$$\text{EXTERNAL sync tone in KHz} = \frac{2\emptyset1\emptyset.5}{\text{CMI speed}}$$

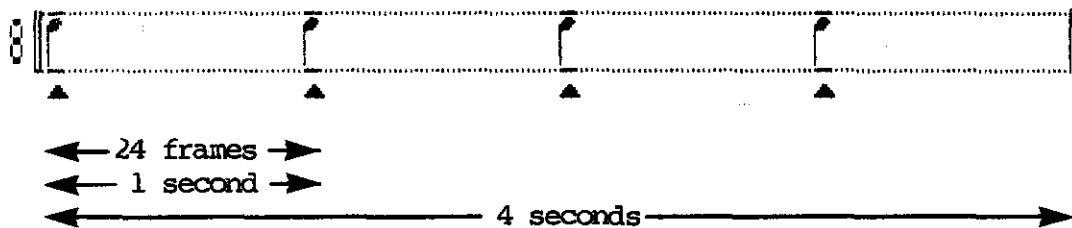
$$\text{EXTERNAL sync tone in KHz} = \frac{\text{beats per minute}}{156.26}$$

\*\*\* When synchronizing cue points for video and cinema, the following time relationships apply:

at 24 frames/second,

SPEED	5236 - 60m.m.	2618 - 120m.m.
	24 frames	12 frames
	16 frames	8 frames
	12 frames	6 frames
	8 frames	4 frames
	6 frames	3 frames
	4 frames	2 frames
	3 frames	1.5 frames
	2 frames	1 frame

At a SPEED of 5236 and time signature 4/4 ...



\*\*\* Observe that a pattern with time signature 8/4 is equivalent to two 4/4 patterns. Thus a note can be made to hold for the equivalent of two 4/4 bars. To make a note hold longer use **SLUR** on Page 7.

\*\*\* If you are going to use a completed song as the basis for a new one but do not want to lose the original, then the following example will be helpful.

EXAMPLE:

You have finished a Page R song in which you have used up all eight voices, and you want to make another similar Page R song to externally synchronize with the first or use as the basis of a new song. You want to keep the original rhythm sequences, melody sequence and pattern structure as a reference in developing the new song.

Original song called **NEWTUNE.RS**.

On Page 2, **TRANSFER** **NEWTUNE.RS** to another sounds disk.

Insert the sounds disk with the copy of **NEWTUNE.RS** into right-hand disk drive.

On Page 2, change the name of **NEWTUNE.RS** to **NEWTUNE1.RS**.

**LOAD** **NEWTUNE1.RS**.

On Page R, you see that the song consists of say 100 patterns, and you only want to keep Keyboard sequences 1 - **BASSDRUM**,  
2 - **SNARE**,  
and 8 - **MELODY** as a  
guide to developing the new song.

Therefore you will want to **ZERO** out Keyboard sequences 3,4,5,6 and 7 over the 100 patterns.

Select an **UNUSED** (empty) pattern, say pattern 255.

Type **P=255<return>**

If there are no **UNUSED** patterns, type **AD,1<return>**. This adds one empty pattern.

Copy pattern 255, keyboards 3,4,5,6 and 7 into patterns 1 to 100.

Type **C 255 1-100 (34567)<return>**

So now Page R file **NEWTUNE1.RS** is identical to **NEWTUNE.RS** except Keyboard sequences 3,4,5,6 and 7 are empty.

accidentals .....	27
add extra patterns .....	17
audible .....	42
bar command .....	41
block editing commands .....	47
cancel lock .....	35
click .....	13
comment .....	38
copy patterns .....	39
create a new file .....	10
damping .....	28
delete lock on .....	36
delete note .....	33
delete steps .....	52
display used patterns .....	18
duplicate insert .....	51
duplicate overwrite .....	52
duration (dur) .....	4,25,27
duration command .....	31
editor	
- description .....	2
- pattern .....	19
- selection .....	19
- song .....	43
end	
- command .....	53
- symbol .....	46
errors .....	56
escape function .....	47
external sync .....	14
- equal internal tempo .....	16

filename .....	2
files .....	1
fill .....	36
flats .....	26
grab command .....	30,37
hints .....	59
infinity .....	46
insert lock on .....	35
insert note .....	32
insert patterns .....	48
introduction .....	1
keyboard mask .....	39
keyboard numbers .....	3,9
key command .....	29
key-velocity .....	4
level patch .....	26
load a file .....	10
lock cancel .....	35
lock delete on .....	36
lock insert on .....	35
make a section command .....	54
messages .....	56
not enough disk space .....	18
note - cursor .....	23,34
- delete .....	33
- editing table .....	4,25,32
- insert .....	32
number of patterns .....	2

open a keyboard .....	20
overwrite .....	50
page 3 .....	8
pattern	
- command summary .....	42
- definition .....	1
- editor .....	1,2,19
- insert .....	48
- number .....	20
pitch .....	4,29
play	
- command .....	11
- default .....	12
record	
- command .....	11
- default .....	12
repeats .....	46
reset .....	38
revision number .....	8
save .....	11
section	
- description .....	6
- display .....	44
- end .....	53
- insert .....	48
- list .....	43
- make command .....	54
sequences .....	3
sharps .....	26
slave music keyboard .....	42
slightly ahead of beat .....	34
song	
- display .....	43
- editor .....	1,3,5,43
- end .....	53
- list .....	43
- trace .....	46

speed .....	2,13
steps	
- definition .....	46
- delete .....	52
- duplicate insert .....	51
- duplicate overwrite .....	52
- insert .....	48
- overwrite .....	50
stop .....	13
sync .....	2,14
time signature .....	37
timing resolution .....	21
trace function .....	46
transpose .....	29
triplets .....	22
typical song list .....	7
unallocate patterns .....	17
unused patterns .....	11
used	
- patterns .....	11
- display .....	18
vel .....	4,25,27
vel command .....	31
version number .....	8
voice display .....	25
voices .....	3
window .....	43-45
X<return> display used patterns ...	18
zero .....	36