

I M P A C

(Interactive Music Performance And Composition)

Update and advice

M. Hinton/P. Pignon/T. Ungvary

January 1983

IMPAC V1B (1)

Corrections:

1. >CS

In V1A densities up to 131000 are allowed here; this has been corrected in V1B to bring it into line with density limits elsewhere in the program (max. 2000).

2. Default value for graph Y-indicator changed to zero (from -2).

IMPAC V1B (2)New facilities

1. Non-numeric arguments are now possible in fields 2 and 3 of monitor commands. Used with the following commands:

a) file names

```
>KP NAME >WR NAME >MX NAME >RN NAME1 NAME2
>PL NAME >TM NAME >PF NAME >CN NAME
>PP NAME >ED NAME >GT NAME >PT NAME
(& :G NAME)
```

b) parameter names

```
>L PARNAM (list BLOCK-table) e.g. >L FG etc.
>SP PARNAM (set real-time parameter) e.g. >SP AT 50
```

c) defining dynamic parameters

```
>P1 P2 n
```

where P1 and P2 are parameter names (F1, F2, A1, A2, DE, DU), and n is an integer number.

This command means: P1 is to follow P2 with a relationship defined by ,n! E.g.

```
>F1 -1
RANDOM LIMITS: 100 800
SHAPE LIMITS:-9 9
>F2 F1 2000
```

Here F2 will be one octave higher ($F1 * 2000/1000$) than F1 throughout the BLOCK. Similarly:

>A2 -2

MIN, MAX, PERIOD, SHAPE: 240 330 6000 -1

>A1 A2 -20

Here A1 will be 20 amplitude units (5 dB) lower than A2 throughout the BLOCK.

N.B. 'n' is added to the original value if P1 and P2 are both amplitude parameters (A1/A2). Otherwise 'n' is taken as a multiplication factor (1000= *1.0, 2000= *2.0, 500= *0.5, etc).

Note also that P1 and P2 may be the same parameter name.

E.g. >DU DU 750

Here the existing DU values in the BLOCK table are multiplied by 0.75.

IMPAC V1B (3)

2. When 0 is specified as a file name, it is now accepted at face value. E.g.

>PL 0

means "play 0 BIN", not "play latest file".

However, >PL and >PL -1 function in the same way as in V1A.

Also, 0 is accepted as the second argument in >RN if it is stated explicitly.

>RN n 0

3. >I fn [iseg] (= INPUT)

is new command from program monitor. Reads in file 'fn BIN' to BLOCK table, starting at segment 'iseg'.

Note:

- a) reads in max. 50 segments - no error message if file contains more than 50 segments.
- b) FG, WF, GL & ND are set from first segment (iseg) only.
- c) Start values are set from activity 48 if there is one in segment 'iseg'; otherwise they are calculated from the values reached at the end of segment 'iseg-1'.
- d) If a record with activity 48 is found after segment 'iseg' it signals the end of the BLOCK; i.e. no more records are read into the Block table.
- e) 'fn' may naturally be a non-numeric file-name.

4. In CON files, reverberation time can be set in data words following function no 6. Format of data words: NTT, where N is reverberation unit no., and TT is time (0 - 15). E.g. 6 112 212.
5. In >ED, there are now no upper limits for the commands :F1 and :F2. (They were 8192 in V1A).
6. After >RM and >VM the address for reading/writing must be stated explicitly: Thus: >RM 0 or >WM n1 n2.
 >RM,
 and >WM,
 result in message ILLEGAL VALUE .
7. The screen is cleared and the cursor is moved to the top left hand corner when is stopped with SPACE .

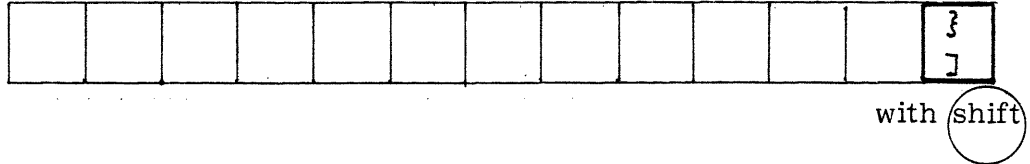
IMPAC V1B (4)

8. When a submonitor is waiting for a number (after '!') carriage return is no longer equivalent to zero. Now the program writes '!' again, and waits for the number.
9. 18 scales can now be defined and accessed.
 Defined with: >SC n (1 - 18)
 Accessed with:
 PITCH
 MODE → 1 - 9 for scales 10 - 18
 |
 ○ shift
 Scales 1 - 9
 reached as before.
- Default scales 10-18 are single notes (octaves); when untransposed:
 10/G, 11/A, 12/B^b, 13/B, 14/C, 15/D^b, 16/D, 17/E^b, 18/F.
10. Scale patterns are transposed upwards n 1/4-tone steps after:
 TRANSP → 1-9
 |
 ○ shift
11. Default values altered.

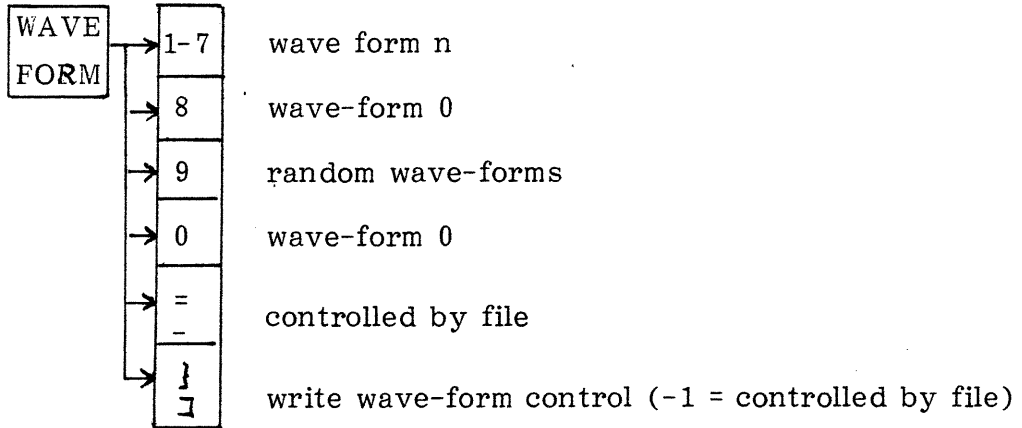
a) AD-table ranges	b) PAR-table values
F1 16 3000	DE 1.0
F2 16 3000	AT 0.0
VS 30 1000	VS 0.0
	VD 0.0

c) Maximum value for VD is now 2000. (1000 in V1A).

12. Wave-form controllable in real-time. On manual 1



with shift



IMPAC V1B (5)

13. FREEZE
PAR is now an on/off switch.

First pressing saves current AD connections & then freezes them.
 Second pressing restores former AD connections.

Other key-pressings which cause all parameters to be frozen are interpreted as first pressings of FREEZE
PAR

E.g. SAVE
PAR → =
- (all parameters to default & freeze)

FREEZE
PAR will then restore the connections which were frozen.

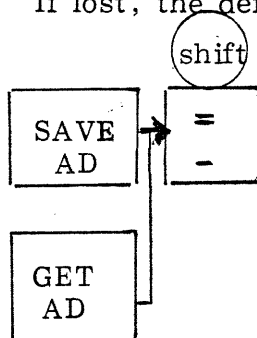
N.B. When playing is started, the first FREEZE
PAR functions always as a first pressing.

14. FREEZE
SOUND is as before, except that everything is now altered: circulation of devices and parameters, input and output of analog devices and BLOCK file data, etc.

15. SHIFT = EVEN
RANDOM density distribution.

16. the graphical display of parameters functions as described in the original manual.

17. If lost, the default AD table can be restored. Press

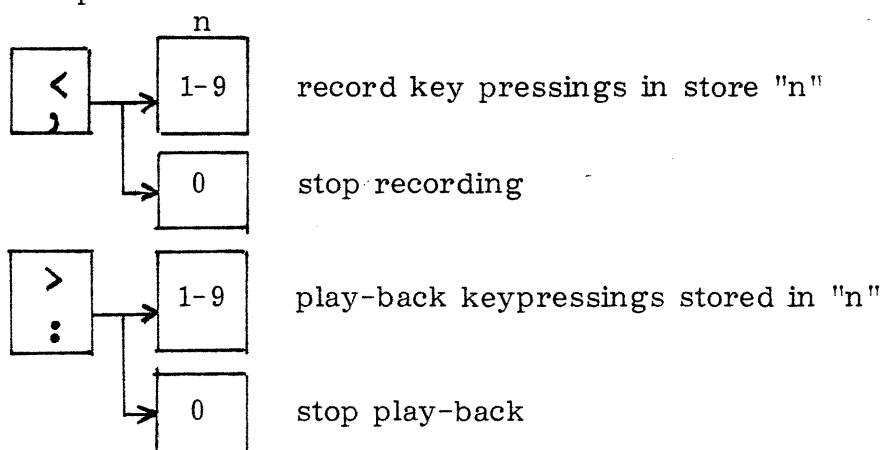


18. If you run IMPAC on TT (decwriter), the functions of EOT are performed by CTRL D.

19. Key_store

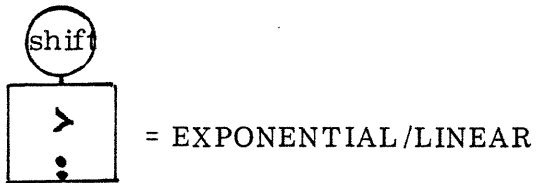
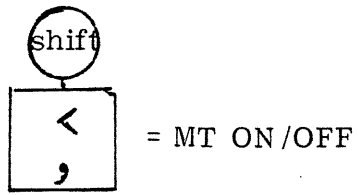
The pressing of every key on the whole keyboard can be stored in nine memory banks. Each memory bank can store 63 key pressings. Together with the time (i.e. number of studio samples) between each pressing.

The time between successive key pressings should not exceed 1023 samples.



The memory banks of the keystore function are stored on IMP files (with the command PT).

20. Because of the new key store facility the MT ON/OFF and the EXPONENTIAL/LINEAR switches can be accessed by



21. To enable moving sound on four channels, two new parameters SX and SY replace MS and RV on the keypad. RV key replaces the function XX.

New starting parameters

- MI modulation index
- MF modulation frequency as ratio
- SS starting scale

can now be defined and stored on BLOCK FILES like other starting parameters (i.e. curve-start parameters). They cannot be assigned curves, i.e. they remain constant throughout a simple BLOCK FILE, also called BIN file. The last three words of activity 48 contains this information on the BIN file.

time

1	2	3	4	5	6	7	8	9	10	11	
TIME		48	LF	HF	LA	HA	DS	MI	MF	SS	start values
TIME		41	F1 to shape		F2 to shape		A1 to shape		A2 to shape		curve information
TIME		40	DE to shape		DU	FG1	FG2	WF	GL	ND	parameters & music

SS is defined just by

- >SS n 0= <n >= 18
- >F or new file is created with this SS

Procedure for assigning an MI and/or MF to a file

>SP MF

MF current value displayed

:n

"n" the new integer value or EOT to keep old value.

>SP MI M

where "M" is the new value (or to see the old value, do as above, for MF).

NOTE! EOT before CR will abort the command, i.e. leave MI or MF as it was.

>F

creates new file with specified MF, MI, SS.

N.B. An SP (set parameter) command freezes the parameter specified.

This means that whatever file you play next

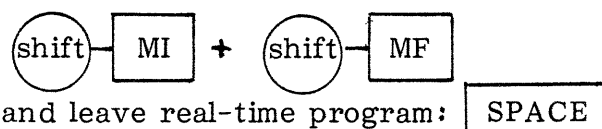
>PL n

or

>PL

the sounds will have the last specified MF and MI values, not the ones in the file being played, until you unfreeze MF and MI in one of the following ways:

- 1) >AD 0
 :MF
 :MI
 :
- 2) >AD -1 unfreeze all parameters
- 3) in real-time program
 >PL anything to start



Note. As you cannot reach activity 48 to change values of it with >ED, it is best to follow the advice given in "working scheme with KEEP files "

Scales on file

The scale table can be stored on file with the command

>PT name 1

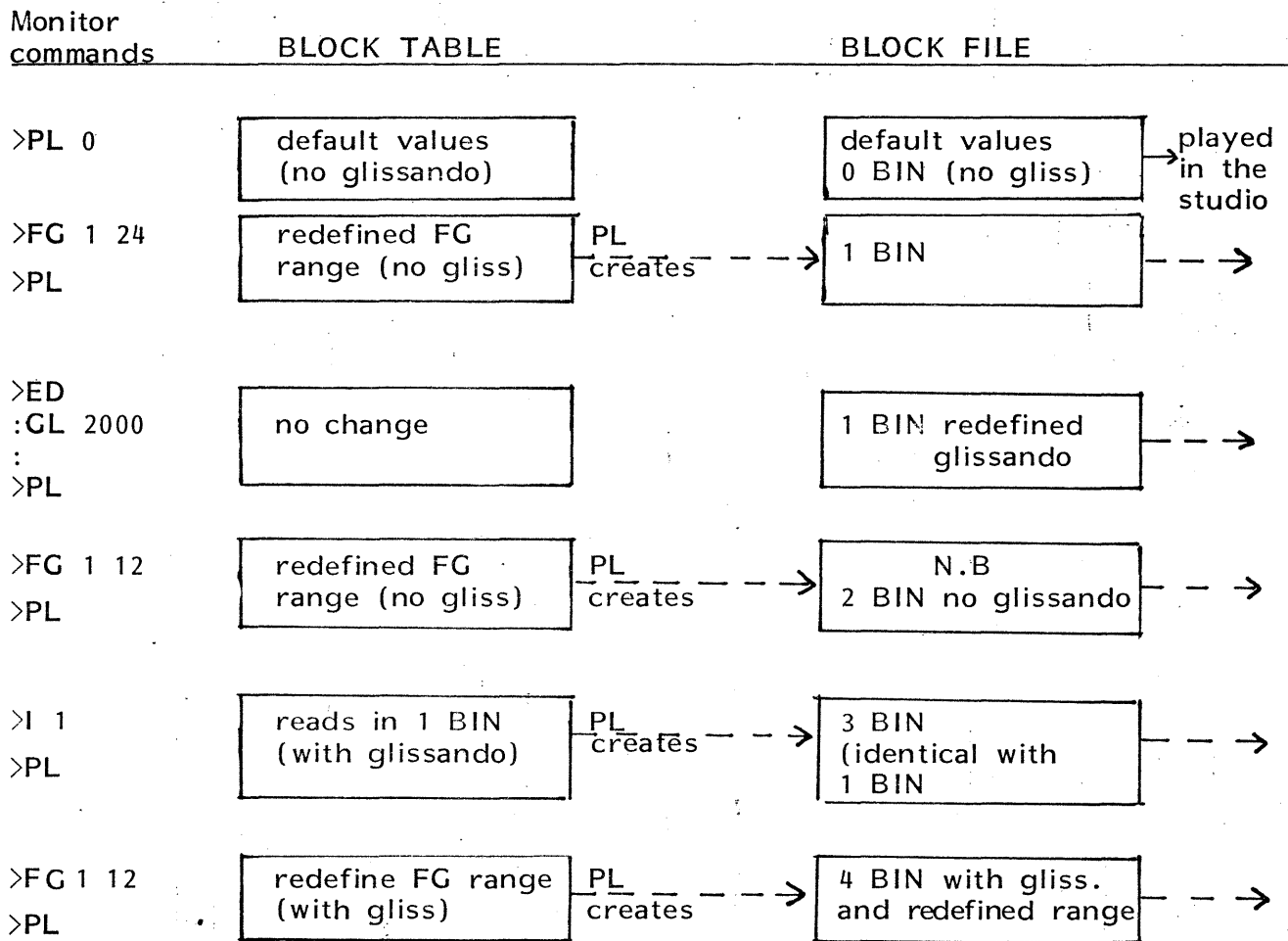
The scale files stored on disk are automatically given extension SCA and can be accessed by:

>GT name 1

Understanding the difference between editing a BLOCK TABLE and a BLOCK FILE.

Remember!

- 1) When commands OL or PP are given, a check is made first to see if any values in the BLOCK TABLE have been changed since the last time PL or PP was done.
- 2) >ED edits last created file unless file name is specified.



Some facts about BLOCK FILE editing (>ED)

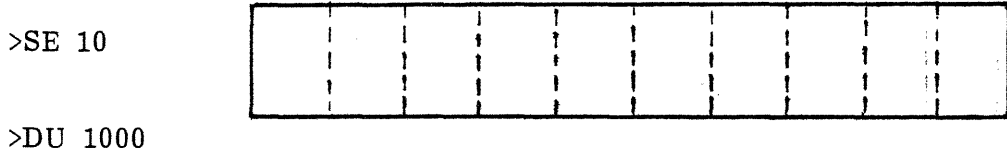
- After
- : SE n
- : some edit command affecting only segment "in"
- : a carriage return causes the editing to be executed and the program writes
- : awaiting further commands. It also advances the segment pointer to "n+1". If you do not write any further SE, then all subsequent editing commands (except :D) will change all segments from and including "n+1" to the end of the file.

- If you fail to do an extra carriage return (empty line) after any command except D (delete segment), the command will not be executed.
- In the case of
 - : SE n
 - : D the deletion is already executed after one CR, the segment pointer moves automatically to "n+1", and another
 - :D delete command will delete segment "n+1"
 - : One extra CR after :D will exit from the EDIT program.

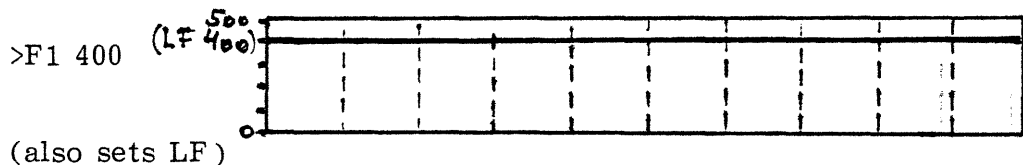
Two Methods of creating complex Block File curves with automatic functions

- A. create separate Block Files, combine them with
 - 1) horizontal mixing (>KP)
 - 2) file-editor (>ED :G n1 n2)

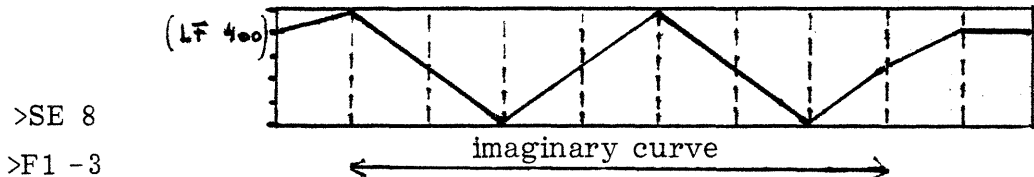
- B. 1) define max. no. of segments and durations



- 2) start to fill with curve, first with curve for the last segment.



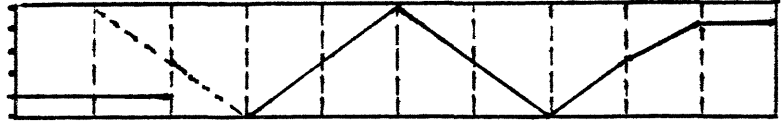
- 3) redefine curve, keeping current value for segments 9 & 10.



MIN, MAX, PERIOD, SHAPE: 0, 500, 4000, 0
 (LF is kept)

4) redefine curve keeping current values for segment 3 - 10.

>SE 2
>F1 100



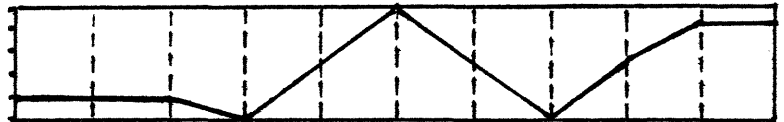
(also sets LF)

>L

if you list the BLOCK-TABLE you will see only the first two segments, but the values you have already defined are intact in the memory.

5) the final resultant curve is

>SE 10
>L



you can see
the values of
all 10 segments.

6) redefine segment 1 & 2 with random values:

>SE 2
>F1 -1

(LF 100)



RANDOM LIMITS: 100, 400

SAMPLE LIMITS: 0,0

NOTE! LF is unchanged: it retains the value assigned in 4) above.

Working sheme with KEEP files and starting parameters stored
within activity 48.

Suppose you have 3 files to mix horizontally, FIL1, FIL2 and FIL3. You "Keep" the files

```
>KP FIL1
>KP FIL2
>KP FIL3
(>AD 0          unfreeze parameters if you have set
:MF             them before.
:MI
:
>SS 0
>PL 999
'KP' FILE: 1000 BIN
```

"keep file" 999 is played in the studio, whereupon it becomes "keep file" 1000.

Suppose you are not satisfied with MI (mod.index stored as starting parameter in activity 48) in FIL2. Call FIL2 into BLOCK-TABLE (i.e. into memory)

```
>I FIL2      give new value
>SP MI 1111  change modulation index (if frozen)
>F           create new file
n BIN OK     new file with name n BIN is created
>RN n FIL2   rename it
>KP FIL1     mix the three files again
>KP FIL2
>KP FIL3
>AD 0       unfreeze modulation index
:MI
:
>PL 999
```

"Keep file" 999 is played in the studio, whereupon it becomes "keepfile" 1001'

NOTE! If you write >FP 1 1000 FILE POINTER
>PL 999

"Keepfile" 999 is played whereupon it becomes 1000 BIN (as before). In this way you save disk space.

A word of warning!

Rename your keepfiles before starting work again!

When terminating a run, rather than saving (to DEC-tape) your KEEP files, it is better to save the individual component files from which you made them. Next time you start work, you can very quickly reassemble KEEP files from them, AND you can call any of these component files into BLOCK-TABLE for unlimited further modification.

6.1	Connections and other formalities	>CN [n] CONNECT "n CON" >RV n1 n2 REVERBERATION time (0-15) & level (0-400) >CL CLEAR STUDIO >EX EXIT from IMPAC >IN INITIALIZE (Warning! It deletes BIN files)
6.2	BLOCK definition	
6.2.1	<u>Structural parameters</u>	>SE n SEGMENTS 1 50 >DU DURATION input as for dynamic parameters 10 131000
6.2.2	<u>Dynamic parameters</u> Input format: 1) >DE n (positive) same value in all segments 2) >DE 0 (zero) individual values 3) >DE -n automatic	>DE DENSITY 0 2000 >F1 FREQUENCY 1 0 15999 >F2 FREQUENCY 2 0 15999 >A1 AMPLITUDE 1 0 400 >A2 AMPLITUDE 2 0 400 -1 Random RANDOM LIMITS: SHAPE LIMITS: -2 Sinus -3 Triangle -4 Sawtooth MIN, MAX, PERIOD, SHAPE: -5 Square in milliseconds -6 Curve
IMPAC V1B	4) >DE DE 750 or >F2 F1 2000	existing DE values multiplied by 0,75 F2 will be one octave higher than F1 throughout the BLOCK
6.2.3	<u>Curve-start parameters</u>	>DS n DENSITY START 0 2000 >LF n LOW FREQUENCY 0 15999 >HF n HIGH FREQUENCY 0 15999 >LA n LOW AMPLITUDE 0 400 >HA n HIGH AMPLITUDE 0 400
6.2.4	<u>Static parameters</u> Input format: 1) >WF n same value throughout 2) >WF -n automatic	>FG n1 n2 FREQUENCY GENERATORS 1 40 >WF n WAVE-FORM 0 7 >GL n GLISSANDO 0 8192 >ND n NOTE-DURATION 10 131000
IMPAC V1B	<u>Real-time parameters</u> on BLOCK FILE	>SS n START SCALE 0 18 >SP MI n set parameter MODULATION INDEX >SP MF n set parameter MODULATION FREQU.
6.2.5	<u>Non-file parameters</u>	>SA n SAMPLING TIME 1 65536 >SC n SCALE - submonitor - EOT completes input 1 9
6.2.6	<u>BLOCK-table functions</u>	>L [pn] LIST BLOCK-table or named parameter "pn" e.g. >L DE >CS n CHANGE SEGMENT EOT keeps old value 1 50
IMPAC V1B		>I fn [iseg] INPUT of file "fn BIN" to BLOCK-table starting at segment "iseg"

6.3 BLOCK-file manipulations

6.3.1	Playing and creating BLOCK- files IMPAC V1B	<pre>>PL [fn] PLAY "fn BIN" >PP [fn] PLAY PART of "fn BIN" SEGMENTS:n1 n2 >PF [fn] PART FILE : create new file from SEGMENTS:n1 n2 part of existing one >RN fn1 fn2 RENAME : fn1 old name fn2 new name >WR [fn] WRITE "fn BIN" >TM [fn] TIME: write dutation of "fn BIN"</pre> <p>"fn" can be both numeric and non-numeric file name</p> <hr/> <pre>>F ↙ FILE : create new file named according to the current file pointer (see >FP)</pre>
6.3.1	Internal FILE EDITOR Submonitor - Parameter commands - Other operations	<pre>>ED [n] EDIT BLOCK-file "n BIN" :DU n) 0 131071 :DE n) 0 131071 :F1 n) } multiplication factor :F2 n) 0 8192 :A1 n) } addition factor :A2 n) -400 400 :FG n1 n2) } :WF n) } new value :GL n) 0 8192 :ND n) 10 131000 : empty line = perform editing :SE n SEGMENT :D DELETE one segment :G fn n2 GET file "fn BIN" n2 = 0 : smooth transition :AB ABORT - ORIGINAL FILE KEPT ;[EOT] ABORT " " "</pre>
6.3.3	Horizontal mixing	<pre>>KP [n1 [n2]] KEEP "n1 BIN" n2 0 : smooth transition</pre>
6.3.5	Numbering of files	<pre>>FP n1 n2 FILE POINTER default n1 = 0 BLOCK files 1 BIN = 1 KEEP files 1000 BIN = 4 REAL-TIME STORE files 1 IMP n2 is number of next file to be created.</pre>

6.4.1	<u>AD-table submonitor</u> - Parameter ranges	<p>>AD n ANALOGUE DEVICE connect to device n</p> <p>:ND n1 n2 10 131000 :GL n1 n2 0 8192 :MI n1 n2 0 4095 :MF n1 n2 0 2000 :F1 n1 n2 0 15999 :F2 n1 n2 0 15999 :A1 n1 n2 0 400 :A2 n1 n2 0 400 :DE n1 n2 0 2000 :AT n1 n2 0 131000 :MS n1 n2 15 18 or 19 22 :RV n1 n2 0 400 :SI n1 n2 0 2880 :VS n1 n2 0 2880 :VD n1 n2 0 1000</p> <p>- Other operations</p> <p>:L LIST AD-table :S n SAVE table to AD-store 1 9 :G n GET table from AD-store 1 9 :AD n ANALOGUE DEVICE 1-9: connect to device and define range 0: connect to BLOCK-file (no range definition) -1: put all parameter/device connections to zero 10: alter ranges only (no connections) empty line returns to program monitor.</p>
6.4.2 IMPAC V1B	<u>Fixed values on real-time parameters</u>	<p>>SP pn [n] SET PARAMETERS "pn" with value "n"</p> <p>pn → ND GL MI MF F1 F2 A1 A2 DE AT SX SY SI VS VD RV</p> <p>"n" must be legal value as in AD above MS: 0 to 1000 If "n" is undefined, negative or zero, current value printed - define new value or EOT to keep ol one.</p>
6.4.3	<u>Real-time store save and get</u>	<p>>PT [fn] PUT current AD-store, PAR-store, joystick - and Key-store on to a file named by the current file pointer or "fn IMP"</p> <p>>GT n GET file "n IMP" or "fn IMP" created or >GT fn with PT into real-time stores</p> <hr/> <p>>PT fn 1 PUT current SCALE-table on to file "fn SCA"</p> <p>>GT fn 1 GET file "fn SCA" in to SCALE TABLE</p>
6.5	<u>Memory inspect and modify</u>	<p>>RM n READ MEMORY - 32 words, starting at octal address "n", are printed : carriage return= continue : EOT = return to program monitor</p> <p>>VM n1 n2 WRITE MEMORY - octal value n2 is put into word at octal address n1.</p>

SCALES (10-18) or TRANSPOSITION upwards

EVEN/RND
density

WAVEFORM
control

JOYSTICK X	JOYSTICK Y	DIGITIZER X	DIGITIZER Y	KEY- BOARD	RANDOM	SINE	SQUARE	TRI- ANGLE	FILE	INVERT or Complement	FREEZE UNFREEZE ALL PARAMETERS	LIST

SCALES (1-9) or TRANSPOSITION downwards

Stop keystore
Stop keyplay

PARA- METER RANGE	AD TABLE SAVE	TABLE GET	PAR TABLE SAVE	TABLE GET	REVERB TIME	GRAPHIC DISPLAY	PITCH MODE	SCALE TRANS- POSITION	DEVICE INVER- SION	JOYSTICK DELAY	STORE RECORD	PLAY- BACK	SAMP- LING		

MANUAL 3: KEYBOARD (DEVICE 5)

shift
lock

--	--	--	--	--	--	--	--	--	--	--	--	--	--

shift



										EXPON- ENTIAL / LINEAR	M/T ON/OFF	FREEZE SOUND	ND	GL	MI	MF
RANDOM GEN. CONTROL	SQUARE WAVE CONTROL	TRIANG WAVE CONTROL	RIGID FLUID	CLEAR SCREEN	ZERO DENSITY ON/OFF	JOYSTICK STORE	KEY STORE	KEY PLAY	DENSITY TRIGGER				F1	F2	A1	A2
													DE	AT	SX	SY
													SI	VS	VD	RV
													(SX)		(VS)	

STOP PLAYING

About some mysteries of Horizontal Mixing, i.e. splicing in IMPAC. (R. 1.)

by Tamas Ungvary.

To understand some of the mysteries of IMPAC, one has to understand the roles of the different records on the BLOCK FILE, especially of the record which contains code 48, which will be called simply activity 48 or header. Every BLOCK FILE starts with a header, with activity 48. Even the BLOCK TABLE starts with it. A BLOCK FILE may contain several activity 48 records but the BLOCK TABLE may NOT. That is why you cannot read into BLOCK TABLE (the command >I fname) a file which has been created by appending several files to each other (e.g. with the command >KP) , however you can play them. There is a possibility however to circumvent this limitation as explained below.

Supposed, you have two files each of them 2 segments long. You want append file BB to file AA without to have the header of BB in the resulting file.

```
>ED AA          open file AA to edit
:SE 2          set segment pointer to segment 2
:              type one extra CR to move pointer after segment 2
:G BB 1       GET file BB with transition type 1
:              CR to accomplish editing
AA BIN OK     the program signals the result
>I AA         read it into BLOCK TABLE
>L            look at it to see the result
>PL AA        play if you wish...
```

What is important within this scheme above is the TYPE of transition of order >G . It must be 1. If it is zero, the header of file BB will be kept within the resulting file. (It is obvious that the program interpreting 1 as smooth transition , opposed to the manual).

It is perhaps obvious, that in the above case the parameters of the header of file BB (MI (modulation index), MF (modulation frequency) and SS (start scale)) disappear. Thus if you absolutely need them, you must plan your horizontal mixing carefully .

We have another mystery, with files which has been created with the order >PF (Part file). The problem (IQPS 0 , PDP15 stop) occurs only if you extracted a part from segment 1 to segment X. Do not do that. If you want extract the first 3 segments of a file, there is another methods to use :

```
>I CC          reads in CC BIN into BLOCK TABLE
>SE 3
>PL           the new file which will be created automatically
              will contain 3 segments only
```

It is good to know also, that in case you want to expand your file which contains 5 segments to 10 segments, the following happens.

```
>I DD          reads in DD containing 5 segments
>SE 10
>PL           the new file which will be created automatically
              will contain 10 segments, however the values of
              segment 6-10 will get the default values of the
              program, i.s : DURATION =131000 / DENSITY = 1 /
              F1= 16 / F2 = 3000 / A1 = 280 / A2 = 320
```