

DM-D Documentation

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1. USE OF BLOCKNOTE

-BlockNote It is a external HTML editor program, complementary to DM-D. Its use is very intuitive, as any text editor, and has a good internal help information to clarify any doubts. However, we offer some indications for a more comfortable and immediate use:

1 - It is preferable to disable the View - Show Layout option, since when it is active reference lines appear which incommode the view of the tables.

2 - It is also recommended that you disable all the Toolbar (View option in menu), as are not used with DM-D, and reduce the space for editing in the window.

3 - Adding rows to tables is not very intuitive, and is a required action in DM-D to add generators or calculations. Although it is documented in the help of BlockNote, we describe how it is done:

To add or insert a row into a table, you must click with the mouse to the right of the previous row outside of the table. The cursor is positioned just over the outside line of the table. Pressing <enter> a row is added below.

2. DM-D MENU OPTIONS

- The following describes the functions of DM-D Menu:

- PROJECT:

-**New**: Deletes all files in the Working Folder and loads the template ones, empty and ready to start a new project.

-**Open**: Deletes all files in the Working Folder, and transfer the files in the Project Folder to the Working Folder.

-**Save**: Transfer files from the Working Folder to the Project Folder.

-**Exit**: closes DM-D.

- OPTIONS:

-**Edit Information:** opens the file "infor.txt" in the editor, to include comments about de current project.

-**Edit Harm. Options:** opens the file "conar.txt" in the editor, to edit the Harmonizing configuration options.

-**Folders:** Allows to set the 3 folders that DM-D uses.

-**Open Midifile:** if this option is selected, when finishing the compilation of Composer or Harmonizer it is automatically opened the generated MidiFile. This is very useful if MidiFile files are associated with a score editor, because the effect is that the score is automatically opened when DM-D complete its work.

-**Language:** allows you to choose the language to show DM-D information and messages. Currently English and Spanish.

- OTHER FUNCTIONS:

-**Composer:** Activates the Composer module, doing the full compilation and generating the "outco.mid" file.

-**Harmonizer:** Activates the Harmonizer module, doing the full compilation and generating the "outar.mid" file.

-**All:** activates the Composer module and, at the end of that, the Harmonizer module.

-**Stop:** allows you to interrupt the Harmonizer module. It is very useful as, when certain configurations, the operation of this module can slow down excessively.

-**Erase:** deletes the contents of the DM-D screen.

-**Help:** Allows access to DM-D documentation.

-**WFolder:** opens a file explorer window for the Working Folder.

-**PFolder:** Allows you to select the working folder.

3. SYNTAX OF COMPOSER

3.1 CONFIGURATION TABLE

- **Total Measures** : maximum number of measures that DM-D will generate. Also depends on the activity duration of each generator.

- **Tempo:** Indication of tempo in beats per minute.

- **Beats per Measure:** number of beats per measure, for defining time signature.

- **Beat Duration:** also for defining time signature, and according to the usual convention.

-Clicks per Beat: If this value is set to 0, the program assigns a value by default (96 if the beat is a half, 48 if a quarter, 24 if an eighth, etc..) that corresponds with 12 clicks each sixteenth. If the value is different from 0, it is assigned directly to the beat. Using 48 clicks per quarter allows to work well with triplets and sixtuplet.

With different groups of notes it is interesting to change the value. In the <divisions> field, in XML sequence file, it is indicated the number of clicks that we should introduce in that case. As maximum number, which ensures any group, you can enter 1024 (which is the maximum that uses the XML format for <divisions>), although perhaps, and due to the high value, some program bug could occur.

-Seed: used to initialize the random numbers. It can be between 0 and 65000. If it is 0, seed generation is done by the program, if not, it is used as seed value.

3.2 VARIABLES

- They are defined in the first column of the tables (calculations and generators names), and store the output value of such calculation or generator.
- They may have up to 29 characters, only letters and numbers.
- The first character cannot be a number.
- The generators are automatically complemented with other 2 variables:
 - Name + i = trigger value.
 - Name + u = duration value.

3.3 COMMENTS

-Same as c++: any expression preceded by // , at any table cell, will not be processed.

3.4 ARITHMETIC OPERATORS

+	sum
-	subtraction
*	multiplication
/	division
&&	logical And
	logical Or
>	greater than
<	less than
>=	greater than or equal to
<=	less than or equal to
==	equal to
!=	different

3.5 CONDITIONAL

(a > b ? v1: v2)
(a < b ? v1: v2)
(a >= b ? v1: v2)
(a <= b ? v1: v2)
(a == b ? v1 : v2)

(a != b ? v1: v2)

Where a, b, v1 and v2 can be expressions.
Output value: v1 if the condition is true, v2 instead.

3.6 MATHEMATICAL FUNCTIONS

int(x)	whole part in x
frac(x)	fractional part in x
abs(x)	absolute value of x
exp (x)	number e raised to x
log(x)	logarithm of x
pow(x,y)	x raised to the power of y
sqrt(x)	square root of x
sin(x)	sine of x
cos(x)	cosine of x

nrand (x) random integer value between 0 and x.

itp(x1,y1,x2,y2,x) interpolates values linearly, according to the linear equation. Taking as input 2 pairs of points that define the line, a given X value returns Y.

li(a, b) and lv(c,v) functions to be used together for defining lists of values. li(a,b) is only a initializer and always returns 0. lv(c,v) returns v if c=a and b!= 0. They are used as: li(a, b) + lv(c1, d1) + lv(c2, d2)... etc.

lr(c,d,v) inclusion in range function, similar to lv(), to be used together with li(a, b). lr(c,d,v) returns v if a is in the c-d range (c<=a<=d) and b!= 0.

3.7 MIDI NOTE CONSTANTS

- In the Composer functions you can use a simplified naming for MIDI note values.

- The MIDI system establishes values from 0 to 127 for the pitch of notes. In that way is interpreted in the OUTPUT table to build the MidiFile. The reference value is the central do in the piano, which has a value of 60.

-To make easier writing MIDI notes, Composer edit sheet supports a 3-letter nomenclature as explained:

1st Letter: name of the note, A to G.

2nd letter: octave from 0 to 9

3rd letter: modifier. It must be one of these three:

n - natural

b - flat

- raised

Thus, by example, **C4n** is the central do piano, which has the midi value 60. The following table shows the MIDI values for the different octaves.

	0	1	2	3	4	5	6	7	8	9
C	12	24	36	48	60	72	84	96	108	120
C#	13	25	37	49	61	73	85	97	109	121
D	14	26	38	50	62	74	86	98	110	122
D#	15	27	39	51	63	75	87	99	111	123
E	16	28	40	52	64	76	88	100	112	124
F	17	29	41	53	65	77	89	101	113	125
F#	18	30	42	54	66	78	90	102	114	126
G	19	31	43	55	67	79	91	103	115	127
G#	20	32	44	56	68	80	92	104	116	---
A	21	33	45	57	69	81	93	105	117	---
A#	22	34	46	58	70	82	94	106	118	---
B	23	35	47	59	71	83	95	107	119	---

3.8 PERFORMANCE OF COMPOSER

- For each temporary click, calculations are evaluated, by default, following the order:

- Calculations table.
- Wave generators table.
- Sequence generators table.
- Output table.

- And within each table rows (generators) are evaluated by default in order descending, and cells from left to right.

- However, it can be altered the order of evaluation of the different generators (even among generators of various types) through the priority value. Generators with lower values for this field are evaluated before. With equal values, it follows the criteria described above.

3.9 WAVE GENERATORS

- Meaning of each configuration column:

- **Computing time:** 0 - Generator values are always calculated, 1 - only at the beginning of each period of the wave, 2 - only when a note ends.
- **Start measure:** moment when generator begins its activity. Numbering starts at measure 1.
- **Start clicks:** value added to the previous one (Start measure). Numbering starts at 0. Each measure has a total of ((clicks per part) * (parts per measure)). (Clicks per part usual value = 48).
- **Wave period measures.**
- **Wave period, clicks:** added to the previous value (Wave period measures).
- **Period between notes:** specified in clicks.
- **Activity time measures:** how long is the generator activity, in measures.
- **Activity time clicks:** are added to the the previous value.
- **Note duration,** in clicks.
- **Wave shape:** 1-Sine, 2-Square, 3-Ascending sawtooth, 4-Descending sawtooth, 5-Triangle.

- **Wave Maximum value:** value between 0 and 127.
- **Wave Minimum value:** value between 0 and 127. (If the minimum value is greater than the maximum value, the wave is reversed).
- **Discrete output:** discretize the output which, instead being continuous, will jump if this value is different from 0. (For example, if the value is 2 output it is 0, 2,4,6, etc...)
- **Priority** (see operation in PERFORMANCE). It can take any value between 0 and 64000.

3.10 SEQUENCE GENERATORS

- The sequences must be encoded in XML language.
- They are separated by a double simple bar (not final bar).
- If there are several simultaneous staves (for example, like 2 staves for piano) it is taken the whole content in all of them as the content of the sequence.

- Meaning of each configuration column:

- **Computing time:** 0 - generator values are always calculated, 1 - only at the beginning of the sequence, 2 - only when a note ends (performing of option 2 is not verified).
- **Sequence number:** numbering starts at 0.
- **Start measure:** moment when generator begins its activity. Numbering starts at measure 1.
- **Start clicks:** value added to the previous one (Start measure). Numbering starts at 0. Each measure has a total of ((clicks per part) * (parts per measure)). (Clicks per part usual value = 48).
- **Augmentation:** beats added to or subtracted to the sequence duration (for calculation, if the sequence starts at anacrusis, also previous silences are taken). Although you introduce offsets at the beginning or the end of the sequence, the augmentation is always estimated in respect the total sequence.
- **Start Note:** beginning note in the sequence. The first is numbered as 1 (default). If the value is less than 1, 1 is taken.
- **Notes removed at the end:** number of notes that is shortened the sequence by the end. The default value is 0 (not removed any).
- **Final silence:** in sixteenths.
- **Activity time measures:** how long is the generator activity, in measures.
- **Activity time clicks:** are added to the the previous value.
- **Type of Movement:** 1-Direct; 2-Opposite; 3-Retrograde; 4-Opposite and retrograde.
- **High level Transport:** semitones added or removed (negative values) to the upper limit of the sequence.
- **Low level Transport:** semitones added or removed to the lower limit of the sequence. A positive value makes ascend the lower limit. If negative, the opposite.
- **Continuous output:** If this value is 1, the output value between note and note is interpolated from between the 2 adjacent notes. If 0, the value of the last generated note is kept.
- **Priority** (see operation in PERFORMANCE). It can take any value between 0 and 64000.

3.11 OUTPUT TABLE

- The first column is used to disable output. If you enter any character in this column, the output of the row is disabled.

- If the Instrument column is empty, it is taken 1 as instrument number by default. It can take any value from 1 to 16 (MIDI channels). Any number outside them turn off the output.
- If the Value column is empty, this output will be disabled.
- If the Velocity column is empty, it is taken 100 as value by default.

4. HARMONIZER CONFIGURATION

- Is performed editing "conar.txt" file. It can be accessed through of the menu: Options --> Edit Harm. Options.
- At any time you can enter a comment. Inside "conar.txt", DM-D takes as a comment any expression that begins with a character other than letter.

Music Configuration

Music Source	Origin of music information: 0: inmus.xml 1: outco.cpd 2: inarm.xml 3: outco.mid
First Music Ins	Staff (or MIDI channel) where the reading of the music file begins (the 1st is 1)
Last Music Ins	Staff (or MIDI channel) where the reading of the music file stops

Harmony Staves and Instruments

First Harm Ins	Staff number where harmony info begins (the 1st is 1). (If it is -1, harmony is read just where music info ends, in the case that both information types use a single file)
Harm Ins NUM	Total number of staves that are read for harmony. The 1st is for scales. A very high value means that everything is read.
Mel Ins	Instrument of melody. Works similarly to the bass.
Bass Ins	Bass instrument. Possibilities: >= 0: Instrument number for the bass -1: Automatic detection of bass -2: Do not want bass treatment for any instrument

Notes

Divided Notes	Flag to indicate whether long notes affected by harmonics changes are splitted. 1 if splitted, 0 otherwise.
Min notes In Line	Minimum note number that can form a line
Harm Unit Note Limit	Maximum note number that can form a harmonization unit. As maximum, the program sets a limit of 100. It is useful to decrease it (to 8 or 10) if the harmonies remain many compasses, because accelerates much harmonization.
Hole For Line	Maximum gap between notes, in sixteenths, to consider them a line
Opening Int	Maximun distance, in semitones, allowed for displacement of harmonized notes from the original ones

Themt Contour Coef DF Themt Contour Coef 00 Themt Contour Coef BA Themt Contour Coef ME	Modification of rating coefficients for thematic contour. They are adjustable for each instrument (DF: default, 00-01-02-etc: instrument number, BA: bass, ME: melody). The default is 100. The list is: father, linked, deviation, opposite, second-unison, bass, melody.
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Nonharmonic Tones

Non Harm Tone Dur	Maximum duration of non harmonic tones, in sixteenths. This value is very important because also controls the maximum separation between non harmonic tones. The appoggiatura is an exception, and can last up to twice this value.
Non Harm Tones Sort DF Non Harm Tones Sort 00 Non Harm Tones Sort BA Non Harm Tones Sort ME	Types of allowed non harmonic tones on each instrument (DF: default, 00-01-02-etc: No.) (instrument, BA: bass, ME: melody) It is set with one row of 1 or 0. The fields are: [an dn ap dp ua da ae de]. Each pair is: Neighbor, Passing, Appoggiatura, Escape.

Linking

Link Limit	Limit of units which are concatenated: 0: No concatenation (1 unit used and it only harmonises one a harmony) 1: One concatenation (it uses 2 units and makes one concatenation between them) Very high value: the concatenation limit is determined by the existing unit number, defined by UDAR
Limit Notes Third In	Limit of notes in the 3rd unit and successive to concatenate with previous unit
Limit Notes Third BM	Same as Limit notes Third In, but if the line is Bass or Melody
No Link Act	In case there are no concatenation (Link Limit = 0) acts as well: 0: Override father notes 1: Will force the last note is real in all the lines
Limit One Link	If it is 1 sets a limit when we have a single concatenation (Link Limit = 1). It makes a concatenation limited between od0 and od1 with the VENTANA first od1 notes.

Other

Clicks Quarter	Number of clicks used per quarter (not to be confused with Composer, which uses clicks per beat), when the source of music is the XML file (if not, the value is taken from the cpd file). If not specified, a 1024 value is set by default to ensure the correct treatment of all tuplets.
Debug	If it is 1, generates Debug files. If 0, not.
Show Line Info	If it is 1, displays detailed line information during harmonization.

5. FILE MANAGEMENT

5.1 FOLDERS

- **Template folder.** Contains the template for "incom.htm", a default setting of "conar.txt", and an empty file "infor.txt".
- **Working folder.** Contains all the files with which DM-D is currently working.
- **Project folders.** Folders where projects developed with DM-D are saved. Its name (NAME) joins to the file names when saving them from the Working folder. Reversely, when a work is retrieved from a Project folder to the Working folder, the name of the source folder (NAME) is deleted.

The folder information is saved in the file "dmdfolders.cpd", that remains in the same folder as the executable.

5.2 FILES

-The part "-NAME" in file names appears only when saving to a Project folder. It don't exist in working files.

Description:

"**infor-NAME.txt**" -- Text file for saving a Project description (it may also have ".cpd" extension. In the case that there are 2 files with the 2 possible extensions, DM-D reads only the ".cpd")

Composer:

"**incom-NAME.htm**" -- HTML input file (it can also have the extension ".htc". If there are 2 files with 2 possible extensions, DM-D reads only the ".htc")
"**insec-NAME.xml**" -- Input sequences XML file
"**outco-NAME.mid**" -- Midi output file
"**outco-NAME.cpd**" -- Output text file

Harmonizer:

"**conar-NAME.txt**" -- The Harmonizer configuration file (it can also have the extension ".cpd". If there are 2 files with 2 possible extensions, DM-D reads only the ".cpd")
"**inmus-NAME.xml**" -- Music (input) XML file
"**inarm-NAME.xml**" -- Harmony (input) XML file
"**outar-NAME.mid**" -- Midi output file

5.3 FILE MANAGEMENT

1 - NEW PROJECT:

- Deletes all files in the Working Folder and the contents of the Template Folder are copied to the Working Folder.

2 - OPEN PROJECT:

- All the files found in the Project Folder are copied to Working Folder. "-NAME" part is removed in file names.

3 - SAVE PROJECT:

- All the files in the Working Folder are saved to the Project Folder. "-NAME" is inserted before the extension.