MIDICalc
"The MIDI Musician's Calculator"
Version 1.0
© 1991 by Jeffrey K. Morris

What Is MIDICalc?

MIDICalc is the essential utility for the MIDI musician. As a **Sequencing Calculator**, it accepts entries in either "ticks" (a.k.a. "pulses" or "clicks") or in "Measure:Beat:Ticks" format and seamlessly performs calculations between the two. At the "press of a button" MIDICalc will convert between these two formats, as well as supply you with Run Time in Hours:Mins:Secs, Seconds, or Milliseconds. You can enter your data in ANY of these formats or mix them up in a single calculation--MIDICalc will handle all necessary conversions in the background. As a **Real Time Calculator**, MIDICalc makes all necessary conversions between seconds, minutes and hours to provide accurate calculations of times. And, of course, MIDICalc can handle ordinary numeric calculations like a standard calculator.

Features:

- True sequence calculations based on user-selectable settings for Tempo, Meter (Time Signature), and PPQ (Pulses Per Quarter Note).

- Converts between Ticks and Meas:Beat:Tick format.

- Supplies Run Time for any entry or result, based on user-set Tempo and PPQ, and converts back to Ticks or Meas:Beat:Ticks.

- Easy calculation of Delays by converting any entry or result to milliseconds, based on user-set Tempo and PPQ, and converts back to Ticks or Meas:Beat:Ticks.

- User selectable settings for PPQ, Tempo, and Meter.

- Performs calculations for real times and will convert real times to Ticks, Meas:Beat:Ticks, Seconds, or Milliseconds.

- "Note Pad" for quick entry of whole, half, 1/4, 1/8, 1/16, 1/32, and 1/64 note lengths.

- Entry "button" for dotted note lengths.

- Entry button to convert note lengths to their triplet value.

- Accepts entries as Ticks, Meas:Beat:Tick, Seconds, Hour:Min:Secs and matches results to entry.

- Allows for mixed format calculations: enter the numbers in any allowed format and all necessary conversions are performed automatically in the background.

- (Registered Version Only): Will save and recall whatever defaults you set for PPQ, Tempo, and Meter.

MIDICalc Is SAREWARE:

MIDICalc is NOT free, nor is it part of the Public Domain. It is copyrighted software which may not be altered in any way, and which may be used only with the license of **SoundIdeas Productions**. In order to try it and see if it fits your needs, you are given a temporary 30-day license. If you continue to use MIDICalc beyond this period, you are required to register it. In addition to providing you with a legal license to use MIDICalc, registration will put an end to those pesky registration reminder messages and will also enable you to Save and Recall your favorite settings for Tempo, PPQ, and Meter.

How To Register: To register MIDICalc, print out and complete the registration/order form (REGISTER.TXT) and send with your check or money order for $25 (US) to:

> Jeffrey K. Morris
> SoundIdeas Productions
> P.O. Box 991
> College Park, MD 20741

Once received, you will be given (via mail, BBS, or phone) a personal key-code that need be entered into MIDICalc only once. As long as you do not overwrite the MIDICALC.KEY file, your key will be retained even if you upgrade MIDICalc version 1 (depending on the number of additions or the extent of changes, future versions will be offered to registered members for a minimal upgrade fee).

Requirements:

MIDICalc requires MicroSoft Windows 3.0 (running in Standard or Enhanced Mode) and MicroSoft VBRUN100.DLL.

Packaging List:

MCALCxxx.ZIP should contain the following files:

MIDICALC.EXE	-	The MIDICalc Program
MIDICALC.DEF	-	Default Settings and other needed data
MIDICALC.WRI	-	This Documentaton File
REGISTER.TXT	-	Registration Form
README.1ST	-	Text file of changes and instructions

If any of these files is missing, you may have a corrupted version of MIDICalc. Please download another copy, inform your SysOp, and/or contact us directly.

Running MIDICalc:

No Installation is required to run MIDICalc. However, VBRUN100.DLL must be placed in a directory that is named in your path statement. We recommend that you copy VBRUN100.DLL to your Windows directory. MIDICALC.EXE and MIDICALC.INI may be placed in the directory of your choice, but must be kept together in the same directory.

Once you have copied the files, you may install MIDICalc's icon in the Program Manager (using File/New), or run it using Program Manager's RUN command, or by double-clicking MIDICALC.EXE in the File Manager. To run from the DOS prompt, type:

> WIN MIDICALC   or
> WIN /S MIDICALC

The first time that you run MIDICalc, or after you move it to a new directory, you will be prompted to enter the drive and path where MIDICalc and its associated files may be found.   MIDICalc will record its start-up directory in your WIN.INI file and will access this information each time it is loaded. Therefore, MIDICalc need not be located in a directory stated in your path.

USING MIDICalc

Like any calculator, MIDICalc's operation is designed around it's buttons. Therefore, understanding MIDICalc is as simple as becoming familiar with the operation of it's buttons.   To access a button with a mouse, position the mouse pointer (an arrow) over the button and click the left mouse button once. For fastest entry, however, you will likely want to use your computer's keyboard. Following the descriptions of what each button does, you will find instructions on how to access the button from your keyboard.

The Numeric Keypad:

Located near the center of MIDICalc is the Numeric Keypad, which operates identically to that of a standard calculator.   Use the numbered buttons (0 through 9) to enter numerical data, the operator buttons (+, -, *, /, and %) to perform mathematical operations, the = button to end an operation and display the final result, the **C** button to Clear all entries and operations in progress, and the **CE** button to cancel only the numerical portion of the last entry (any operator already entered will remain in effect). You do not have to press the = button for each operation -- you may chain your operations together and MIDICalc will calculate them in sequence. For example, you may enter

5 + 5 * 2 - 1 =

As operations are calculated in sequence, the result would be 19 (5 + 5 = 10 * 2 = 20 - 1 = 19).

> ***Keyboard Entry:***   Use your keyboard's Numeric Keypad. **Make sure that NumLock is on.** Use the <ENTER> key for the equals button. Type the letter C for the Clear All (**C**), and the letter E for the Cancel Entry (**CE**) button.

The Note Keypad:

Located on the left side of MIDICalc is the NoteKeypad, a group of buttons that allow quick entry of the values of common note-lengths: half, quarter, eigth, sixteenth, thirty-second, and sixty-forth notes. Click the desired note-key once to enter its value. For the value of a full measure click on the   **1 Measure** button. If you wish the note to be "dotted", click the **Dot** key following the selected note key. For example, to enter the value of a dotted quarter-note, click **1/4** then **Dot**. If you need the triplet value of a note, follow the desired note-key with a click on the **Trpl** button. For example, if you need the length (in "ticks" or "pulses") of a series of three eigth-note triplets, enter:

<p align="center">1/8   Trpl   * 3 =</p>

<u>Note</u>: Depending upon which calculation mode MIDICalc is operating, note-length values will be expressed in either Ticks (also known as "Pulses" or "Clicks") or Seconds. Regardless, you may continue to perform whatever operation you wish. See "The MODE Button," below, for more information on MIDICalc's operating modes.

> ***Keyboard Entry:***   Pressing the <ALT> key converts your keyboard's numeric keypad into the Note KeyPad. Note that in the MIDICalc window the layout of buttons for the Note KeyPad is identical as for the Numeric KeyPad. Thus, the <ALT> key "overlays" or "masks" the Note KeyPad onto your keyboards Numeric KeyPad, as follows:
>
> <u>without <ALT> key</u>   <u>with <ALT> key</u>
>
> ```
> [ 7 ]   [ 8 ]   [ 9 ]        [ 1/8 ]    [ 1/4 ]    [ 1/2 ]
> [ 4 ]   [ 5 ]   [ 6 ]        [1/64]    [1/32]    [1/16]
> [ 1 ]   [ 2 ]   [ 3 ]        [ Dot ]   [     ]    [Trpl]
> [ 0          ]   [ . ]        [ 1 Measure   ]   [  :  ]
> ```
>
> <u>Note</u>:   The middle key on the second row (normally the "2" key) is not accessed in the Note KeyPad--pressing it will have no effect. The colon (:) key is used to enter data in Measure:Beat:Tick and Hour:Minutes:Seconds format (see below).

The MODE Button:

Located just to the right of the %-key, the Mode Button is used to toggle between MIDICalc's two calculation modes--Sequencer Time and Real Time. It also displays the mode that MIDICalc is currently using. To switch modes, simply click on the MODE button once. Click on it again to switch back to the former mode.

> ***Keyboard Entry:***   Use either the F5 key or type M (with or without the Shift-key) to toggle Modes.

When first loaded, MIDICalc begins in **Sequencer Mode** where conversions depend upon the current settings for PPQ (Pulses Per Quarter Note), Meter (time signiture) and, at times Tempo (expressed in Beats per Minute). While in Sequencer Mode, you may still convert between sequence and run times. However, MIDICalc will convert all entries to their sequenced equivalents when performing any operations on them. You should set MIDICalc to Sequence Mode whenever you are working with sequencer calculations (Ticks or Meas:Beat:Ticks) or whenever you wish to use MIDICalc as a standard calculator.

Use **Real Time Mode** when you wish to work with hours, minutes, seconds, or milliseconds. Real Time Mode should be used primarily when you want to perform mathematical operations on times, such as totaling the run times of several songs or calculating delay times.

The CONVERSION Buttons:

Located to the right of the mathematical operators (CE, - , /, and %) are a column of Conversion Buttons which are used to convert entries or results to a different format: Measures:Beats:Ticks, Ticks, Hours:Minutes:Seconds, Seconds, or Milliseconds. When you first load MIDICalc these buttons will be labled **M:B:T, H:M:S,** and **mSec.**

> ***Keyboard Entry:***   With the <ALT> key held down, the -, +, and <ENTER> keys of your keyboard's numeric keypad will be converted into the conversion buttons.

The M:B:T/Tick Button: The M:B:T/Tick button is used to convert to and from Ticks or Measure:Beat:Tick format. When you first load MIDICalc, or whenever the display indicates that data is in "Ticks", the M:B:T/Tick Button will be labled **M:B:T**, indicating that clicking on it (or pressing <ALT> -) will convert the entry or result to Measures:Beats:Ticks.   Whenever the display indicates that data is in M:B:T format, the button will be labled **Ticks**, indicating that its use will convert the entry or result to the total number of Ticks.

> **Sequence Mode**. When used in sequence mode, the M:B:T/Tick button will calculate conversions based on the current settings for PPQ and meter. For example, in 4/4 time with PPQ = 120, 480 ticks would be converted to 2:01:000. With a meter of 3/4, however, 480 ticks would equal 2:02:000.

> **Real Time Mode**. When used in Real Time Mode, the M:B:T/Tick button will calculate the number of ticks (or measures:beats:ticks) that would be needed to fill the time entered. The conversion depends on PPQ, Meter, and Tempo. For example, in 4/4 time with PPQ = 120 and a tempo of 100 Beats per Minute, 480 seconds (8 minutes) would be converted to 96,000 ticks or the first beat of the 201st measure.

> ***Keyboard Entry:***   While holding the <ALT> key, press the - (minus) key on your keyboards numberic keypad.

NOTE: Whereas "Ticks" is a value, "M:B:T" is a point in time, expressing where in a sequence the next event will occur.   It should be read as the number of ticks into the Nth beat of the Nth measure. For example, 01:01:000 is zero ticks into the first beat of the first measure -- that is, no time has past. Converting M:B:T to Ticks results in the total number of Ticks that will have passed up to the M:B:T time. Thus, the result of converting 01:01:000 to Ticks will be zero.   Similarly, converting a tick value to M:B:T will result in the time that the <u>next</u> event will occur. If, for example, you press the **1 Measure** button and then use the **M:B:T** button, the result will not be the last tick of the last beat of one measure, but will be zero ticks into the first beat of two measures. This may take some getting used to, but it assures accuracy in conversions and in relating to sequencers.

The H:M:S/Secs Button: The H:M:S/Secs button is used to convert to and from Seconds or Hour:Minute:Seconds format. When you first load MIDICalc, or whenever the display indicates that data is in Seconds, the H:M:S/Secs button will be labled **H:M:S**, indicating that its use will convert the entry or result to Hours:Minutes:Seconds format. Whenever the display indicates that data is already in H:M:S format, the button will be labled **Secs,** indicating that its use will convert the entry or result into Seconds.

> **Real Time Mode:**   When used in Real Time Mode, the H:M:S/Secs button will convert between Seconds and H:M:S format.

> **Sequence Mode:**   When used in Sequence Mode, the H:M:S/Secs button will convert the number of Ticks or Measures:Beats:Ticks to the equal amount of time, based on Tempo, Meter, and PPQ. In other words, Using the H:M:S/Secs button in Sequence Mode will calculate Run Time.

> ***Keyboard Entry:***   While holding the <ALT> key, press the + (plus) key of your keyboard's numeric keypad.

The mSec Button: The mSec button is used to convert to and from Milliseconds. Clicking (or pressing) it once will convert the entry or result to milliseconds. Clicking it again will convert from milliseconds to seconds.

> **Real Time Mode:**   When in Real Time Mode, the mSec button will convert from H:M:S or seconds to Milliseconds, and then from Milliseconds to seconds.

> **Sequence Mode:**   When in Sequence Mode, the mSec button will provide Run Time first in milliseconds, then in seconds (based on PPQ, Tempo, and Meter).

> ***Keyboard Entry:***   While holding the <ALT> key, press the <Enter> key.

The SETTINGS Buttons:

Just to the right of the Conversion buttons are a column of buttons used to change the current settings for PPQ, Tempo, and Meter. To change the values for any of these settings, use the Setting button of the same name and enter the desired value. The new value will be retained until you exit MIDICalc, change the setting again, or Recall default settings (see "Save and Recall Buttons," below).

> ***Keyboard Entry:***   Holding the <CTRL> key converts the - , + , and <ENTER> keys of your keyboard's numeric keypad to the Settings buttons. Use <CTRL> - to change PPQ settings; <CTRL> + to change Tempo, and <CTRL><ENTER> to change Meter.

The SAVE and RECALL Buttons: (Registered Versions Only)

Located on the right-hand side of the calculator, these buttons are used to Save or Recall settings for PPQ, Tempo, and Meter. The Save button will write the current settings to the file MIDICALC.DEF. Once saved PPQ, Tempo, and Meter will be returned to these values whenever you first load MIDICalc, or whenever you use the Recall button.

> ***Keyboard Entry:***   To Save your settings, use either the F9 key or, while holding the <SHIFT> key, press the - (minus) key in your keyboard's numeric keypad.
>
> To Recall your settings, use either the F10 key or, while holding the <SHIFT> key, press the + (plus) key in your keyboard's numeric keypad.

The <- Button:

Located on the right-hand side of the calculator, the Backspace button will erase the last digit, decimal point, or colon entered. It does not cancel a mathematical operation already entered.

> ***Keybaord Entry:***   Use the backspace key. (Do NOT use the Left cursor key.)

The ? Button:
The ? button is the Help button.

> ***Keyboard Entry:*** Use either the F1 key or, while holding the <SHIFT> key, press the ? key on your keyboard. Although you may use this method to call for Help, you may not use the keyboard to select a Help Topic.

After clicking or pressing the ? button, MIDICalc will display brief instructions on using Help, and the mouse pointer will change to an upward facing arrow -- indicating that your next click will select a Help topic but will not affect any entries or calculations already in progress. If you want Help on a specific topic, click on one of MIDICalc's buttons. You MUST use the mouse, not the keyboard, to select Help topics. For Help on Using Help, click on the ? button. To view the manual from the beginning, click in the Help Instructions display. Or, to terminate Help without viewing the manual, press the <ESC> key on your keyboard before clicking on another button.

Once you select a Help topic, the MIDICalc Manual will be opened in Windows Write, and it will be searched for the topic you chose. This can take a couple of seconds, especially if the manual is currently closed. If you like, prior to returning to MIDICalc you may look at other portions of the manual using Write's regular commands.

When you are ready to return to MIDICalc, click on any portion of its window if it is visible. Otherwise, hold <ALT> and press <ESC> to move the Manual to a background window, minimize the Manual, or close it. If you plan on using Help later in your MIDICalc session, it is suggested that you do not close the manual. Leaving the Manual in an open window in the background or minimizing it will speed things up the next time you call for Help.

Entering Data:

Data may be entered into MIDICalc in Ticks, Measures:Beats:Ticks, Seconds, or Hours:Minutes:Seconds. You may enter data in any of these formats--MIDICalc will make any necessary conversions to complete the calculation. You can even mix formats in a single calculation--MIDICalc doesn't care.

Ticks. Ticks may be entered in Sequence Mode simply by using the number buttons and, if needed, the decimal button. In Sequence Mode, MIDICalc defaults to Tick entry.

Meas:Beat:Ticks.   In Sequence Mode, MIDICalc interprets a colon as indicating that an entry is in Meas:Beat:Ticks format. When no colon is present, MIDICalc interprets the entry as Ticks, with one colon, the entry is read as Beats:Ticks, and with two colons, the entry is interpreted as Meas:Beats:Ticks. Therefore, you do not necessarily have to enter both colons. Entering 2, for example, would mean 2 ticks, whereas 2: would mean the 2nd beat and 2::: would mean the 2nd measure. So, you could enter the 2nd beat of the first measure in any of the following ways:

> 01:02:000
> 1:2:
> 2:

Each of these entries would be interpreted as the same value. Furthermore, as can be seen in the second example above, you do not necessarily need two or, for that matter, even one digit between or after colons--MIDICalc is quite flexible. You could enter the first beat of the 3rd measure as 03:01:000, but why bother? 3:1: means the same thing as does 3:: for even quicker entry. **Note:** There is no such thing as Measure zero or Beat zero, so MIDICalc interprets zeros, blanks, or no entry in these places as 1. Also, if you enter 1: or 1::, MIDICalc will return a 0.

Seconds.   Seconds may be entered in Real Time Mode simply by using the number keys and, if needed, the decimal key. MIDICalc defaults to seconds entry when in Real Time Mode.

Hours:Minutes:Seconds.   In Real Time Mode, MIDICalc interprets a colon as indicating that an entry is in Hours:Minutes:Seconds format. With no colon present, MIDICalc interprets the entry as seconds, with one colon the entry is read as Minutes:Seconds, and with two colons the entry is read as Hours:Minutes:Seconds. Thus, 2 minutes may be entered as

                            00:02:00.000
                            :02:
                            2:

Adding a second colon to the last entry -- 2:: -- would change it to 2 hours.

Keyboard Entry: You may type a colon (with or without Shifting). For faster entry, use the decimal (.) key on your keyboard's numeric keypad while holding either <ALT> or <CTRL>.

SOME FUNCTIONAL TIPS:

O.k. Now you know what all the buttons do and how to enter numbers. So what can you do with MIDICalc? MIDICalc will perform just about all the calculations that MIDI musicians routinely require without having to remember all the conversions, and without having to reak havoc trying to find that ordinary calculator amidst all your gear. Here are just a few examples of common problems and how to solve them quickly and easily using MIDICalc.

Note Durations.   You have a note that begins on the 2nd beat of the 3rd measure and you want it to sustain through the 4th beat of the 5th measure. So, how many ticks should you give the note duration? Simple. In MIDICalc enter:

<div align="center">

5:4: - 3:2: =

</div>

...then press **Ticks** to convert to ticks. The answer will, of course, depend on the PPQ and Meter setting. For example, at 120 PPQ in 4/4 the answer is 1200 ticks, whereas in 6/8 the answer would be 840 ticks. So check those PPQ, Meter, and Tempo settings.

Adding Rests.   You're at the 2nd beat of the 15th measure and you want two and 1/2 measures rest before continuing. Quick. Where should you start again? In MIDICalc enter:

<div align="center">

1 Meaure x 2.5 + 15:2: =

</div>

That's it, the correct Meas:Beat:Tick on which to pick up will be displayed (the value depending on your current settings for PPQ and Meter).

Getting a Run Time.   Your sequence is 85 measures long. How many minutes is it? In MIDICalc enter:

<div align="center">

85 x 1 Measure   =   and click **H:M:S**

-OR-

86:: and click **H:M:S**

</div>

Either way, you'l get the time you want. Why 86:: instead of 85::? Think about it. 86:: is in M:B:T format, so it means zero ticks into the 1st beat of the 86th measure. Well, if you haven't started the first beat of the 86th measure, you just finished the 85th! Remember, M:B:T indicates the point at which the next sequenced event will occur -- not how much has passed. It takes a little getting used to, but it makes for accurate calculations.

Calculating Delays. You have a killer tune for which you want a killer delay (echo). You want the delay to match the beat (4/4) perfectly but your F/X box only speaks millieseconds and knows diddly about note lengths. You could play with the settings for a few hours or you could whip out that ordinary calculator and hope you remember how to calculate a delay. Or you can set the PPQ, Meter, and Tempo settings in MIDICalc and use the Note Pad buttons to make this simple two-click calculation in about half a second:

                1/4   and **mSec**

That's it!

Totaling Song Times. Need to know how long your demo tape is -- and I don't mean in seconds but in Hours:Minutes:Seconds? Worse yet, the time for one song is in seconds (say 194), for another it's in minutes (say 3:02.45), and for the third you just have the total number of measures and beats (say it ends on the first beat of the 92nd measure)? No problem. Let's do it backwards. After entering the correct settings for PPQ, Tempo, and Meter, enter the following:

        In Sequence Mode: 92:1:   then **H:M:S**
     Switch to Real Time Mode: + 3:2.45
                                    + 194
                       and   =   or

<ENTER>

You're done. If you're set to 120 PPQ, 100 Beats Per Minute, and 4/4 time, the answer would be 9 minutes, 54.85 seconds (not too bad for a demo).

There are several dozen other situations that MIDICalc can handle with equal ease. But I don't want to spoil your fun.

So, what can you do with MIDICalc? More likely, what can't you do with MIDICalc and how did you used to manage without it? If you agree and find MIDICalc a useful tool in your sequencing or recording work, please remember to register it -- it won't break you, it's the right thing to do, and you'l feel a whole lot better without the Shame and the Guilt.

Making Contact:
If you have any questions, concerns, comments or suggestions about MIDICalc, you can contact the author by writing to:

        Jeffrey K. Morris
        Sound Ideas Productions

P.O. Box 991
College Park, MD 20741

If you subscribe to GEnie, leave a message on the MIDI Round Table BBS (*MIDI). Use Category 2 "MIDI Computers" and look for the topic "MIDICalc for Windows". Or, leave private GE-mail addressed to J.MORRIS42.

If you have a Modem, drop me a message (addressed to Jeffrey Morris) on any of these MIDILink BBS's (the MIDILink also has some great discussions regarding MIDI and related issues):

MIDILink

BBS Name	Location	Phone
Wash. MIDI Users	Falls Church, VA	703-532-7860
Sound Management	Mundelien, IL	708-949-MIDI
Taste	Brooklyn, NY	718-252-4529
MIDI User's Group	St. Louis, MO	314-973-4073
Union Lake	Millville, NJ	609-327-5553
HyperLinc West	Moraga, CA	415-376-3632
A-V Sync	Atlanta, GA	404-320-6202
Fleming	Peterboro, ONT	705-749-5538
Black Hole	Orange, CA	714-282-7523
H-O-T BBS	Nashville, TN	615-890-8715
MIDIMaze BBS	Manchester, TN	615-723-1867
MIDI Matrix	Dayton, OH	513-438-8376
	(After 11/1/91)	513-228-7136
Randy's Basement	Anthony, NM	505-589-0317
AmerIServe	New York, NY	212-876-5885
MIDI Clef BBS	Riverside, CA	714-688-2658
Question Mark	Helsinki, FIN	011-358-0-728-2272
E.Coast Circuit Bd	Morristown, NJ	201-605-8117
Cats	Lisbon, PORT	351-1-352-6422
Stargate	Wellington, NZ	6404 666-728
Second Sanctum	Dallas, TX	817-784-1178
A-BBS	Cove, AR	501-387-3225
Music Quest	Dallas, TX	214-881-7311
Mind Image	Minneapolis, MN	612-781-1720
MystMagical MIDI	Omaha, NB	402-293-0451
PGH-MIDI Music	Pittsburg, PA	412-882-3703