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## **MIDI Companion User's Guide**

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## 1.0 Introduction

MIDI Companion is a desk accessory that is designed to be an indispensable companion to users of MIDI interfaces with Macintosh computers. Its primary function is manipulation of standard MIDI files. This manual presumes prior knowledge of Macintosh system software and user interface conventions. It also presumes some knowledge of MIDI equipment, the MIDI standard, currently available MIDI software for the Macintosh, and the MIDI file format.

You can use MIDI Companion to perform any of the following tasks.

- Record streams of MIDI data and store them as MIDI files whenever the Muse strikes without quitting the application you are in.
- Play back any MIDI file without quitting the application you are in.
- Patch MIDI input thru to MIDI output so that a keyboard controller will work even if you are in a non-MIDI application such as Professional Composer, MacPaint, or the Finder.
- Selectively play back and record data for one channel while ignoring data for another.

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Just to be safe, always save your application document before using MIDI Companion. The possibility for conflicts between applications and MIDI Companion over computer resources such as memory and the MIDI ports leaves open the possibility – however remote – that you may not be able to save it later.

## **2.0 How To Install MIDI Companion**

Installation of MIDI Companion is accomplished with the Font/DA Mover which is part of your system software from Apple. If you do not know how to use Font/DA Mover, consult the manual that came with your system software or consult your Apple dealer. For those of you who use resource managing utilities such as Suitcase and Master Juggler, MIDI Companion should work fine with these utilities.

## **3.0 MIDI File Format**

As mentioned in the Introduction, MIDI Companion uses the MIDI file format. This section gives a brief summary of what the MIDI file format is and the various types of MIDI file formats that exist and how MIDI Companion supports them.

The MIDI file format is the only standard file format for storing sequences of MIDI data that has been approved by the International MIDI Association. Almost every MIDI compatible application can read and/or write files in this

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format. Prior to its acceptance by the IMA as a universal standard, it went through six iterations in the hands of a commercial software developer and achieved fairly widespread use even then. These prior versions were mostly but not entirely upward compatible revisions. Older applications may generate slightly different data, but MIDI Companion is aware of all of these earlier revisions and can handle most of them.

There are three different “flavors” of MIDI files described in the specification. The first flavor consists of a single track of data that contains all note events, time change events, and any other events that there may be. This flavor is the least flexible but is the most universal because it goes back to the original pre-IMA specification document. In MIDI Companion this flavor is called **Single Track**. The second flavor of MIDI file consists of multiple tracks which are to be played simultaneously. Pre-IMA versions of the specification starting at 0.04 insist that the first track must consist entirely of time and meter changes so that the first track is essentially a barline template for the rest of the tracks. Versions prior to 0.04 do not contain this restriction although it is in 0.03 as a recommendation. MIDI Companion refers to this flavor as **Multiple Track**. The final flavor of MIDI file consists of multiple tracks which are independent and not to be played simultaneously. The specification calls these “patch files”. MIDI Companion refers to them as **Independent Track**.

MIDI Companion is able to read most files going back to pre-IMA version 0.02 of the specification. (One of the reasons the specification has gone through so many revisions is that earlier versions permitted combinations of events that were illogical. MIDI Companion may not be able to read an early revision file if it contains these illogical constructs.) MIDI Companion is able to write files that go back to version 0.04 and it is able to omit the now-mandatory tempo track in the **Multiple Track** flavor which means that it can write some 0.03 files as well. (The tempo track mandate was the primary difference between 0.03 and 0.04 although 0.04 added some event codes that if contained in your file will make it impossible to be written as a valid 0.03.)

**NOTE:** If you read in a 0.02 version file and then write it out, it will be saved as a 0.03 version file. MIDI Companion converts 0.02 files to 0.03 format as it reads them in.

Unfortunately there is no easy way to tell which revision of the specification your MIDI file conforms to, and your best bet is to contact your vendor. Almost all MIDI applications have or soon will have updates or upgrades to versions which support the IMA-approved MIDI file 1.0 specification.

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#### **4.0 MIDI Companion Metronome**

There is a subtle but important distinction between the metronome markings in MIDI Companion and those that musicians normally use. The metronome markings in MIDI Companion represent the speed of the MIDI beat rather than the beat of the music. For this reason, only thirty-second notes through whole notes are available, and no dotted notes are available.

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Normally, the MIDI beat and the musical beat are identical, but sometimes they are not. For instance, suppose the music is in 6/8 time and the musical beat is dotted-quarter equals 60. There are two ways the MIDI metronome could be set. The most standard way is MIDI quarter equals 90. However, the MIDI file format also allows a relationship between the MIDI beat and the musical beat to be established such that the MIDI quarter coincides with the actual musical beat, and files of this type would have a metronome marking in MIDI Companion of quarter equals 60. *In either case, the musical playback is identical.* It is just the relationship between the musical beat and the MIDI beat that is different, and MIDI Companion always shows the MIDI beat.

## 5.0 MIDI Companion Menus

In addition to manipulating MIDI files, MIDI Companion allows you to control your MIDI system directly. You can broadcast certain System Common messages and Real Time messages as well as channel messages to change your mode or patches. These broadcast messages are available through the System Messages submenu and the Channel Messages submenu. MIDI Companion also provides a universal patch thru capability so that users of MIDI-only controllers can now play their MIDI instruments from within non-MIDI applications such as word processors and graphics programs.

### 5.1 Main Menu

**About MIDI Companion** brings up a copyright and version number dialog box. This dialog box will also appear the first time you open MIDI Companion.

**New, Open, Close, Save, Save As, and Revert** work just like their counterparts in the File menu that most applications have. Choosing **Open** will bring up the standard file opening dialog, and only MIDI format files will be available for opening. Choosing **Save As** will bring up the standard file saving dialog, and if you save the file it will be saved as a MIDI format file. Choosing either **New** or **Open** will bring up the MIDI Companion Window (see section 6.0 below).

**Do Patch Thru** allows the Patch Thru option from the MIDI Setup window to be enabled without opening a file or the MIDI Companion window.

**NOTE:** When **Do Patch Thru** is enabled, if you try to send a MIDI file and play at the same time, you will get unpredictable results. The patch thru here is a true low level patch thru that indiscriminately patches all data it sees

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through to the outbound side as soon as it receives it.

**System Messages** points to the System Messages submenu. See section 5.2 for more on the System Messages menu.

**Channel Messages** points to the Channel Messages submenu. See section 5.3 for more on the Channel Messages submenu.

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**MIDI Port Select** brings up the MIDI Select window. See section 7.1 for more on the MIDI Select window.

**Configuration** brings up the MIDI Companion Configuration window. See section 7.2 for more on the MIDI Companion Configuration window.

**Format Conversion** is not implemented in this version of MIDI Companion. When it is implemented it will allow conversion between different types of MIDI format files, including collapsing multi-track files into a single track file, selecting a track in a multiple or independent track file to become the new single track file, and extracting a multi-track file from a single track based on the **Split Channels** or **Tracks** option in the MIDI Companion Configuration window.

**Add Track** adds a track to the current file. It is not valid for files of the Single Track format. Once added, a track may not be deleted. You can, however, use the **Revert** option to go back to your original file, and that will have the original number of tracks.

**Quit** performs exactly the same function as clicking in the go away box of the MIDI Companion window. It closes any open files and windows (giving you a chance to save any changes), closes the selected MIDI ports, and removes the MIDI Companion menu from the menu bar.

## 5.2 System Messages Submenu

**Tune Request** is a MIDI System Common message that goes to all channels. Its effect is specific to the particular MIDI instrument you are using. Check your MIDI implementation chart to see if your instrument supports it.

**Start** is a MIDI System Real Time message that starts a song or sequence on a remote computer, instrument, or sequencer. The remote device must be slaved to external sync and waiting for the Start command.

**Continue** is a MIDI System Real Time message that continues a song or sequence on a remote computer, instrument, or sequencer. The remote device must be slaved to external sync and waiting for the Continue command.

**Stop** is a MIDI System Real Time message that stops a song or sequence on a remote computer, instrument, or sequencer. The remote device must be slaved to external sync and waiting for the Stop command.

**System Reset** is a MIDI System Real Time message that resets all devices to their



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initialized, power-up condition. The response to this message by MIDI devices is different for each device. Caveat emptor.

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### 5.3 Channel Messages Submenu

All the messages sent by this submenu are channel-specific messages and will be sent only on specified channels.

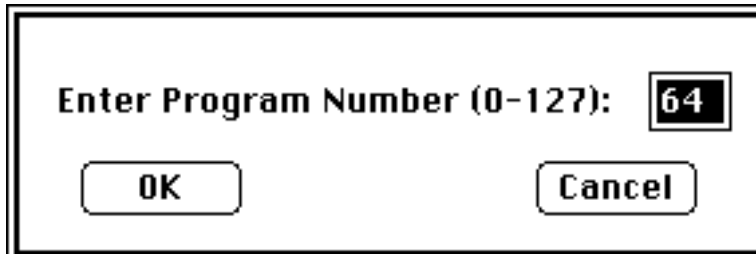
**Channels Out** allows you to control which channels the messages in this submenu should go out on. MIDI Companion remembers these settings across calls to MIDI Companion.

The screenshot shows a dialog box titled "Channels Out". It contains a grid of 16 checkboxes, numbered 1 through 16. The checkbox for channel 1 is checked, while all others are unchecked. Below the grid, there are two input fields: "Basic Channel:" with the value "1" and "Number of Mono Channels:" with the value "0". At the bottom of the dialog are two buttons: "OK" and "Cancel".

- **1 thru 16** These numbers allow you to specify the channel numbers on which to send the channel messages.
- **Basic Channel** Entering this number specifies the channel on which to send Mode messages. The MIDI specification only allows Mode messages to be sent on the basic channel, which is set in the receiver either by “hard wiring”, by panel controls, or by System Exclusive messages. Setting Basic Channel to zero will cause MIDI Companion to send Mode messages on all the selected channels.
- **Number of Mono Channels** Entering this number specifies the number of channels to assign to mono mode, starting with the receiver’s basic channel. Specifying zero causes the receiver to assign as many channels as it can to mono mode, starting with its basic channel and never exceeding 16.

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**Program Change** sends an immediate patch change to all channels assigned by Channels Out.



- Enter Program Number** Enter the patch number you wish send here.
- OK** Clicking here causes the patch change to be sent on all channels assigned in Channels Out.
- Cancel** Clicking here aborts the Program Change request.

**Reset All Controllers** is a MIDI Channel Mode message that – if supported by the receiver – resets all controllers, both continuous and switch controllers, to the receiver’s preferred initialized state. Receivers ignore this message if they are in Modes 1 or 2 (e.g. Omni On).

**Local Control On** is a MIDI Channel Mode message that engages the keyboard (or other manual controls) with the audio circuitry in the receiver. This is the normal power up state.

**Local Control Off** is a MIDI Channel Mode message that disengages the keyboard (or other manual controls) from the audio circuitry in the receiver. This allows you to control the receiver’s sound capabilities remotely but still use it to generate MIDI data for yet other devices.

**All Notes Off** is a MIDI Channel Mode message that tells the receiver to turn off all its notes. Unfortunately, it is not supported in all devices. Check your MIDI implementation sheet to see if your particular instrument supports it.

**Omni On Poly** is a combination of MIDI Channel Mode messages that puts the receiver in MIDI mode 1.

**Omni On Mono** is a combination of MIDI Channel Mode messages that puts the receiver in MIDI mode 2.

**Omni Off Poly** is a combination of MIDI Channel Mode messages that puts the

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receiver in MIDI mode 3.

**Omni Off Mono** is a combination of MIDI Channel Mode messages that puts the receiver in MIDI mode 4.

**NOTE:** The differences between the various MIDI modes is beyond the scope of this document. The most comprehensive explanation is in the *MIDI 1.0 Detailed Specification* which is published by the International

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MIDI Association. Contact them at 5316 W. 57th St., Los Angeles, CA, 90056, USA.

## 5.4 Changing Command Key Equivalents

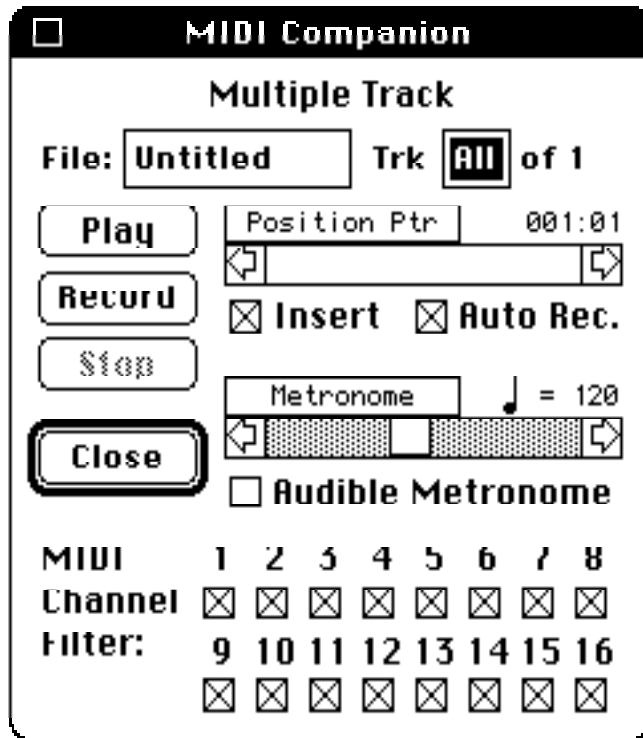
Many of MIDI Companion's commands have command key equivalents to allow you direct access to them from the Macintosh keyboard. Unfortunately, due to the nature of Desk Accessories, these command key equivalents do not always work. They often conflict with those in the application you are running. It is possible to change or remove the command key equivalents in MIDI Companion using ResEdit or any other resource editing program. However, the procedure is somewhat different than for applications.

Rather than storing the data for the menus in resources of type 'MENU', MIDI Companion has all of its menu data in a single resource of type 'STR#'. I recommend that you make a copy of the original file that you got MIDI Companion on and edit that copy. If you edit a file containing other Desk Accessories besides MIDI Companion, you will have to guess which STR# resource it is. If the file you are editing contains only MIDI Companion, then the resource id of the STR# resource will probably be -16000. The reason for the uncertainty is that Font/DA Mover can change the id's of a DA's resources whenever it moves it from one file to another.

You will be able to recognize the correct STR# resource because the first string in it is the name of the MIDI Companion window, '»MC«', and the subsequent strings are the options in MIDI Companion's menu and submenus, respectively. You will see each menu option separated by a semicolon. The command key equivalents are specified using a slash. To change the command key equivalent, change the letter following the slash. To remove the command key equivalent, delete the letter *and* the slash.

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## 6.0 MIDI Companion Window



The text at the top of the window (in this case, **Multiple Track**) shows the current file format. It will either say **Single Track**, **Multiple Track**, or **Independent Tracks**.

- File** The name here is the name of the current file that MIDI Companion has open. Only one file may be open at a time. You can change the name of the file by typing in a new file name, and if the previous file existed the new file name will be saved in the old file's folder when you select Save from the MIDI Companion menu.
- Trk** This box displays the current track that is selected for playing or recording. You can change this by typing either the number of the new track or "All" for all tracks. The **of 1** in this case indicates that this file currently has only one track. Tracks may be added using the Add Track menu command or by configuring for more than one track in the Configuration window.
- Position Pointer** This scroll control shows where MIDI Companion is in the file, showing the measure number and the beat number separated by a colon. By using the scroll bar you can change the value of the **Position Pointer**.
- Play** This button initiates playback from the current value of the **Position Pointer**.

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•**Record** This button initiates recording of MIDI data at the current **Position Pointer**. If the **Insert** box is checked, the data will be inserted into the

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file, causing any data after the current **Position Pointer** to be pushed aside to make room for the new data. If the **Insert** box is not checked, then data after the current **Position Pointer** will be overwritten with the new data.

**NOTE:** MIDI Companion is not designed to replace your sequencer software, so these various recording techniques may yield mixed results.

- Auto Rec.** This check box is only meaningful when an external device or program is sending MIDI Start and MIDI Stop commands. If **Auto Rec.** is checked then a MIDI Start command has the same effect as clicking the **Record** button. If it is not checked then a MIDI Start command has the same effect as hitting the **Play** button.

- Stop** This button stops recording or playback.

- Done** This button stops recording or playback, closes the currently open file, and closes the MIDI Companion window. The MIDI Companion menu remains active. This is different than clicking the close box of the window, which does everything the **Done** button does, but gets rid of the menu as well.

- Metronome** This area shows the current playback and record speed of the MIDI metronome. Clicking on the small note will change the note to the next note type (e.g. clicking on the quarter note changes it to an eighth; clicking on the eighth note changes it to a sixteenth, etc.). You can change the number by moving the scroll bar. Changing the value of **Metronome** does not affect the metronome data stored in the file. However, changing it sets an internal indicator that tells MIDI Companion to ignore tempo changes in the file. This allows you to control the playback of the file at any tempo you choose. To have MIDI Companion automatically do the tempo changes in the file after you have gone into this manual mode, simply close the file and reopen it.

- Audible Metronome** Clicking this box causes an audible clicking to occur on metronome pulses during record and playback.

**NOTE:** Some programs, such as Performer, take over the Macintosh sound driver, and the **Audible Metronome** feature will not work while you are in these programs.

- MIDI Channel Filter** These boxes control which MIDI channels MIDI Companion will respond to. If the box for a particular channel is not checked, data on that channel will be ignored both for playback and record. This feature does *not* affect the Patch Thru option. The Patch Thru option echoes all MIDI data from input to output.



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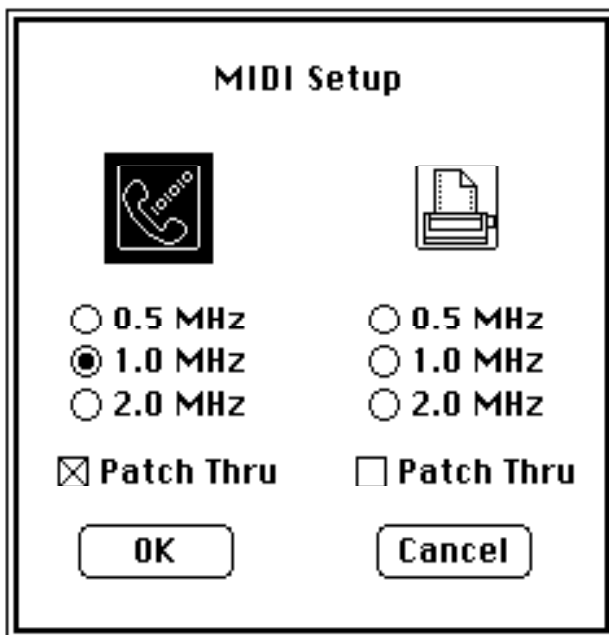
## **7.0 Configuration Options**

All of the MIDI Companion configuration options, along with the settings of Insert, Auto Rec., Audible Metronome, the MIDI Channel Filter, and the MIDI Setup window are remembered by MIDI Companion even when you reboot. That way you only need to set them once and then you can forget about them.

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**NOTE:** For the technically minded, this is accomplished by storing the data in a resource of type 'MCCF'. If you do not shut down normally or if your System file is locked, these options may not be successfully saved.

## 7.1 MIDI Setup Window



By clicking on the modem and printer icons, you can enable or disable the respective port for MIDI use. Click on the **0.5 MHz**, the **1.0 MHz**, or the **2.0 MHz** button to set up the port for your interface. (Check your MIDI interface owner's manual for the proper setting. If you can't find it in your owners manual, try **1.0 MHz** first, because it is the most common clocking speed.)

**NOTE:** If you activate both ports, then MIDI Companion will merge the incoming data on each (at the MIDI message packet level) and treat them as if they had come in order on a single port. MIDI Companion duplicates outbound data and sends them out both ports, including MIDI synch and Start/Stop commands.

•**Patch Thru** This option enables a patch thru from MIDI In to MIDI Out. When this option is checked, MIDI Companion echoes all data coming in the MIDI In immediately, before even looking at what they are. (For technical readers, the incoming characters are buffered for output during the input character interrupt

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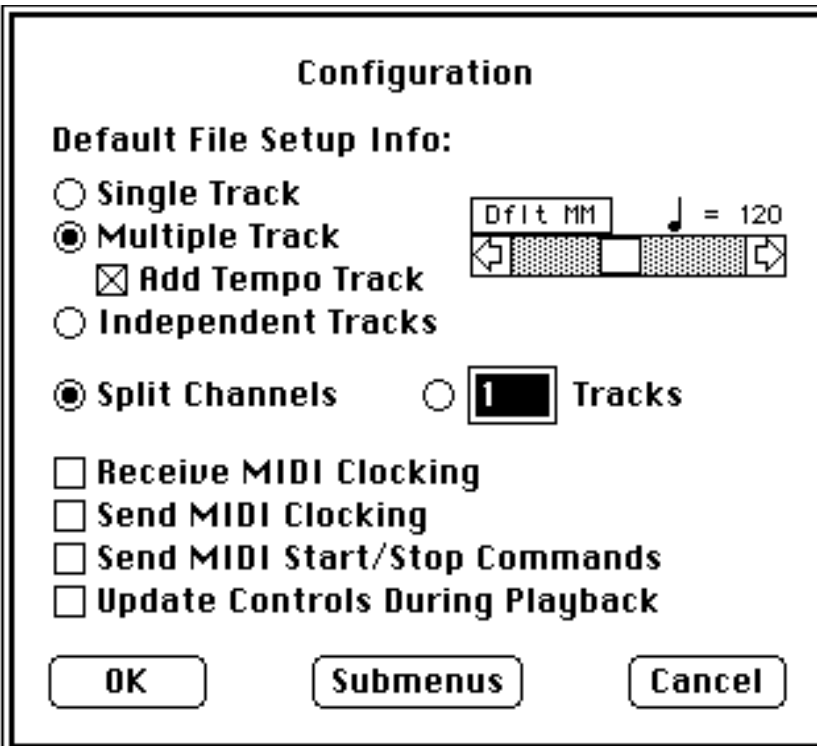
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(processing in order to insure true and complete patch through of data.)

**NOTE:** Since the **Patch Thru** option takes effect at a very low level, it is inadvisable to try to send data out on a patched port while data are

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coming in on the same port. The characters will be merged together in random order, causing bizarre and unpredictable results. (Some synthesizers with poor error recovery, such as Casio CZ's, might even have to be turned off and on to wake them up after this occurs.) Furthermore, the MIDI Channel Filter has no effect on the Patch Thru option. Channel data are patched through regardless of the MIDI Channel Filter settings.

## 7.2 Configuration Window



•**Default File Setup Info** This area of the window controls how MIDI Companion creates new MIDI files. You can select **Single Track**, **Multiple Track**, or **Independent Track** (the three flavors of MIDI file). If you select **Multiple Track**, then checking **Add Tempo Track** will cause MIDI Companion to insert an extra track at the beginning with tempo and metronome data in it. The metronome data are controlled by the **Dflt MM** scroll bar, and both its note value and its numeric value can be changed the same way in which the Metronome value on the main MIDI Companion window can.

•**Split Channels** If this option is checked, MIDI Companion will split incoming data

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into separate tracks based on which channel they come in on. Thus if data were coming in on channels 2, 3, 5, 12, and 16, then MIDI Companion would create a five track file (possibly adding a sixth for tempo and metronome data) and split the data on channel 2 into the first track, the

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data on channel 3 into the second, the data on channel 5 into the third, and so forth.

This option is only meaningful if the default file type is not Single Track.

**NOTE:** In the example just cited, if one of the channels (say channel 12) were not checked in the MIDI Channel Filter then it would be as if no data had been sent on channel 12, and only a four track file would be created.

•**Tracks** If this option is selected, then a file with the specified number of tracks is created (possibly adding another for tempo and metronome data), and all incoming data go to the current recording track (specified in the Trk edit item in the MIDI Companion window). If the Trk item is set to “All”, MIDI Companion duplicates all incoming data in every track.

•**Receive MIDI Clocking** Checking this option causes MIDI Companion to recognize and respond to external MIDI synchs.

•**Send MIDI Clocking** Checking this option causes MIDI Companion to transmit MIDI synchs. They are transmitted whenever MIDI Companion is playing or recording data.

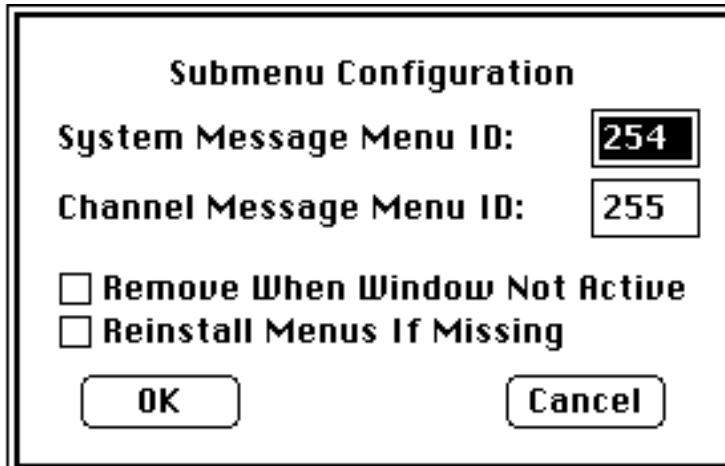
•**Send MIDI Start/Stop Commands** Checking this option causes MIDI Companion to send a MIDI Start or Continue command whenever the Record or Play button is pressed and to send a MIDI Stop command whenever the Stop or Done button is pressed. If the Position Pointer is at measure 1 beat 1 when you click Play or Record, MIDI Companion sends a MIDI Start. Otherwise it sends a MIDI Continue.

•**Update Controls During Playback** Normally during playback the Position Pointer and the Metronome controls in the MIDI Companion window are inaccessible. If you wish to see them update as the music plays back, turn on this option. Be warned, however, that the playback will be degraded if the file contains sections with large numbers of tempo changes or if it is in a fast tempo with lots of notes. If you have the Metronome in manual mode, then the negative effects of turning this option on are greatly diminished.

•**Submenus** Clicking this button brings up the Submenu Configuration window. (See section 7.3 for more on the Submenu Configuration window.)

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### 7.3 Submenu Configuration Window



The Macintosh standard only provides for a limited number of possible submenus for Desk Accessories. For this reason, it is quite possible that MIDI Companion's submenu id's will conflict with those in other DA's that you may use. If you seem to be having problems accessing another DA's submenus or MIDI Companion's submenus, try changing the numbers in **System Message Menu ID** and **Channel Message Menu ID**. These are the id numbers that MIDI Companion uses for its submenus. They must be between 236 and 255, inclusive, and they must not be the same number.

- Remove When Window Not Active** Clicking this option causes MIDI Companion to remove the submenus from its menu whenever the MIDI Companion window is not present. Apple's publication, *Inside Macintosh V*, says that a Desk Accessory should only have submenus active while its window is open. Clicking this option causes MIDI Companion to comply with this requirement. Otherwise, MIDI Companion will flaunt the requirement and leave its submenus there all the time. This is the preferred state because it gives you access to all your System and Channel messages all the time, but it may cause compatibility problems with some applications or other DA's.

- Reinstall Menus If Missing** Clicking this option causes MIDI Companion to check all the time to be sure its menu is still installed on the Menu Bar. Some applications modify their menu bar, and this can cause MIDI Companion's menu to disappear. There are two disadvantages to this option, however. One is that it adds to the overhead tasks that MIDI Companion must perform, and the other is that under certain circumstances, depending on how you terminate MIDI

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Companion, you can end up with a MIDI Companion menu when MIDI Companion is not active. The safest way out of this dilemma, if you encounter it, is to quit your application and relaunch it.



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## 8.0 Licensing Information

MIDI Companion is provided on a shareware basis. The modest \$15 shareware fee helps me recover the cost of the equipment, software, documentation, and time needed for development and testing. You may distribute copies to friends and acquaintances as you see fit. You may NOT sell it for profit, nor may you charge for distributing it. I hope that with your shareware fee you will send in comments and suggestions. I make no promises about future releases, but if the interest is there I can certainly be persuaded. Here are some ideas I have had for future releases.

- Implement MIDI File Format Conversion** I originally conceived this feature prior to the adoption of the MIDI file format by the IMA. I envisioned a world of applications that partially conformed to a spec that was only a partial standard. Being able to easily convert from, say, Multi Track to Single Track, (or back using channel splitting), would have given the user maximum flexibility in porting from one application to another. Now that the IMA has adopted the MIDI file spec, I don't see the benefit in this feature that it might have had.
- Add A Manual Option To The Metronome** Currently the Metronome is in automatic mode until you change it, and then it switches to manual mode. At that point the only way to return to automatic mode is to close and reopen the file. With a large file, this can take some time. It would be better to include an option in the MIDI Companion window that allowed you to switch it back to automatic without having to close the file.
- Use A Smarter Patch Thru** It seems to me that MIDI Companion could provide a real benefit if you could play back a MIDI file and play on your keyboard at the same time. I see MIDI Companion having maximum utility as a doodling tool rather than as a serious sequencer, and this ability would enhance its doodlability.
- Improve MIDI Timing Resolution** MIDI Companion currently uses the Macintosh tick count for its MIDI timing, and in fast passages with a lot of notes, this technique is woefully inadequate. There is another way to do it that is much better, but I have not had the time to research it. (Frankly, at this point I'm not sure what it is, but it is clear from their performance that serious MIDI programs use a better timing technique than mine. If someone out there knows and is willing to share it, by all means do so.)
- Support Apple's MIDI Manager** I know nothing more about the proverbial Apple MIDI Manager than that I have read the name, but if it is what I hope it is, it is long overdue. Currently, every MIDI program has to manipulate the Macintosh communications hardware directly. This causes two problems. One is that there is no guarantee that future Apple gear will use the same hardware. The second

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more serious problem is that there is no way to arbitrate between applications and DA's that wish to share this hardware. Imagine a system running MultiFinder that has modem communication software, a print spooler, a MIDI sequencer program, MIDI Companion, and a MIDI patch editor all running at the same time. Every one of these programs is vying for one or both of your precious communication ports. Apple has provided almost nothing in the way of an

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intermediary to sort these conflicts out. There is no way to even find out if another program is using a communication port. The result is that unless you are extremely careful *and* you know very well what you are doing, you are almost certain to stomp on yourself with the usual result being bomb city. Although I don't know that it is, I hope that the MIDI Manager is a solution to at least the MIDI part of this problem. I hope that it will permit multiple MIDI applications to share the same MIDI ports, and I hope that it will remove hardware dependency from MIDI applications. If the MIDI Manager is what I hope it is, then MIDI Companion is a natural to use it.

These are my ideas for possible future enhancements. Please send me yours. Also, if you find any features of MIDI Companion to be particularly beneficial or irritating, let me know these as well. I will attempt fix bugs as they are reported, so updates may be available. I plan to release any updates on CompuServe and Genie, so keep your eyes peeled.

Send comments and shareware fees to:

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