PC MIDI Card
Installation Guide

Music Quest, Inc.

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Overview

Congratulations on your purchase of a PC MIDI Card, the most cost-effective MPU-401 compatible MIDI interface available! This Installation Guide will help you install the card in your computer music system so you get the most out of its use.

The PC MIDI Card is designed to work properly in all IBM PC/XT/AT and compatibles, up to and including the latest '386 and '486 computers, which have a standard ISA or EISA bus.

To use this product, you will need MIDI sound equipment, music software, and standard MIDI cables.

Your PC MIDI Card package should include the following:

- PC MIDI Card circuit board
- MIDI adapter cable
- Diagnostics and Utilities diskette
- User registration card

Please take the time now to fill out and mail the registration card. It will help us in the event you require service on your interface, and put you on our mailing list to receive new product and update information.

The remainder of this guide is organized as follows:

Installation describes physical installation and setup of the PC MIDI Card in your computer.

Using the PC MIDI Card describes many of the card's features and how they are used.

Diagnostics and Utilities describes usage of a set of programs found on the Diagnostics and Utilities diskette that came with your PC MIDI Card. These programs are used to access some features on the card, and may prove useful in diagnosing problems in your MIDI system.

Finally, *In Case of Difficulty* discusses the most common installation and operational problems and possible causes.

Before commencing installation, please read this guide in its entirety. While installation is a straightforward process, there are certain pitfalls of which you should be aware so as to eliminate potential problems. You should also read the file README found on the Diagnostics and Utilities diskette for information not included in this guide.

Installation

Installation and connection of your PC MIDI Card is accomplished as follows:

1. Setting the I/O address and interrupt at which the PC MIDI Card is to reside;

2. Physically installing the card inside the computer; and

3. Connecting external equipment to the card.

Please refer to Figure 1 to familiarize yourself with the PC MIDI Card circuit board.

When handling the PC MIDI Card, be careful not to damage delicate electronic components, and take precautions not to subject it to static discharge. Touch the computer's case before you touch the card, and pick up the card only by the edges of the circuit board itself.

Setting I/O Address and Interrupt

This section tells you how to set up your PC MIDI Card so it communicates properly with your music software. The default settings for I/O address and interrupt established at the factory are appropriate for the majority of installations. However, some users will have to change these settings for proper operation in their computer. Please read this section to select the right I/O address and interrupt for your PC MIDI Card.
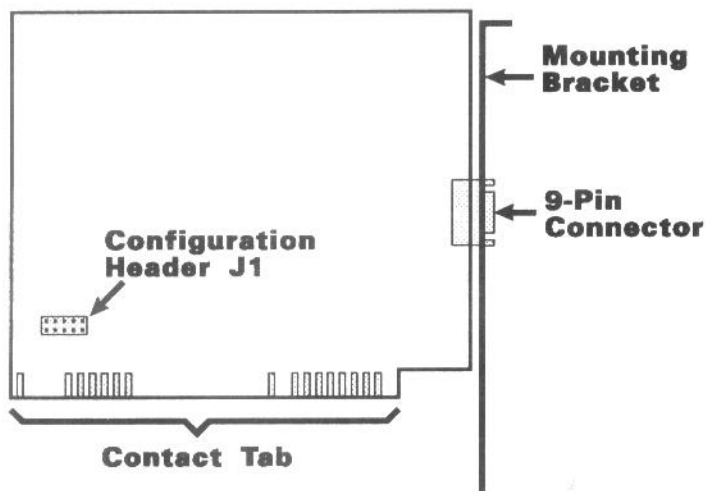

Figure 1. PC MIDI Card circuit board component location

PC MIDI Card I/O Address

Your music software writes MIDI information to and reads MIDI information from the PC MIDI Card's I/O address. The PC MIDI Card is assigned a default I/O address of 330 at the factory, and this is the address that your software expects. It is possible, however, that this address is not appropriate for your computer, and there is provision on the card to handle such cases.

> Make certain that the I/O address used by the PC MIDI Card is not used by another device in your computer. Malfunction may result otherwise.

I/O address conflicts with the PC MIDI Card are fairly rare, and are most likely to occur with a "special" expansion card not found on most computers, and with some SCSI hard drive controllers. Most standard expansion card functions - COM ports, printer ports, video adapters, etc. - will not conflict with the PC MIDI Card's default I/O address.

Changing the PC MIDI Card's I/O Address

If you suspect that another device in your computer is set for address 330, then you should either change that device's address, or that of the PC MIDI Card.

To change the PC MIDI Card's I/O address, first locate configuration header J1 on the circuit board as shown in Figure 1. The leftmost pair of pins on J1, at position "P", are used for setting the I/O address. You will notice that a jumper is installed on the pins at "P"; this jumper selects the default I/O address, 330. You can remove the jumper at position "P" to change the PC MIDI Card's I/O address to 300. The jumper is removed by lifting it up from the pins it connects. If you remove the jumper, keep it in a safe place for possible re-use.

Address 330, default

Address 300, jumper removed

P
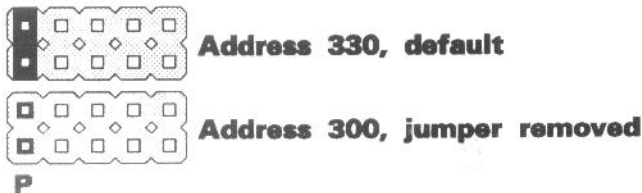
Figure 2. PC MIDI Card I/O address selection

> If you change the PC MIDI Card's I/O address, you must tell your music software about the new address.

The means for changing the I/O address that your software expects will vary from one program to the next. Consult the program's user manual, or contact the developer for details. Some music programs can only use address 330. If this is true of your software, change the address of the other conflicting device rather than for the PC MIDI Card.

PC MIDI Card Interrupt

The PC MIDI Card also uses an interrupt to communicate with your music software. The card is assigned a default interrupt of IRQ2 (often called IRQ9 for '286, '386, and '486 computers) at the factory, and this is the interrupt that your software expects. It is possible, however, that this interrupt is not appropriate for your computer, and there is provision on the card to handle such cases.

Make certain that the interrupt used by the PC MIDI Card is not used by another device in your computer. Malfunction may result otherwise.

Such interrupt conflicts are fairly common in IBM compatible computers as there are only a limited number of interrupts available. Several types of equipment will use the PC MIDI Card's default interrupt, IRQ2. Expansion cards which often cause interrupt conflicts include bus mice, some EGA and VGA video cards, network cards, scanners, some SCSI hard drive controllers, and some clock chips on PC and XT (8088) style computers. Additionally, a few brands of computers are known to use IRQ2 on the motherboard - these include several Tandy 1000 models and the Leading Edge Model D computer.

Beware of certain informational programs that display interrupt usage in your system. These work well in detecting interrupts for certain types of equipment, but may not provide reliable information for other types of equipment.

Changing the PC MIDI Card's Interrupt

If you suspect that another device in your computer is set for interrupt IRQ2, you should either change that device's interrupt or that of the PC MIDI Card.

To change the PC MIDI Card's interrupt, first locate configuration header J1 as shown in Figure 1. Figure 3 shows how a jumper is placed on one of positions 3,5,7 or 2 of header J1 to select interrupt IRQ3, IRQ5, IRQ7, or IRQ2, respectively. Note that a jumper was installed at the factory on position 2 on J1; this
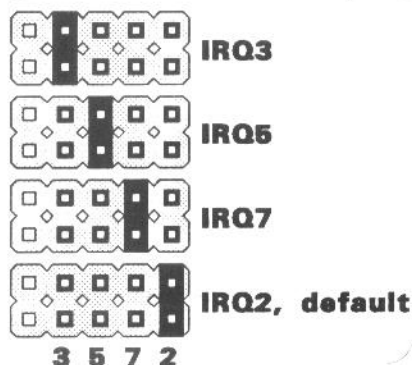
Figure 3. PC MIDI Card Interrupt Selection

selects the default interrupt IRQ2. To change the interrupt, simply remove the jumper from the pins at position 2 and place it on the pins at the position corresponding to an interrupt that doesn't conflict with other equipment in your computer. IRQ7 is usually the best alternate choice for PC and XT computers; IRQ5 is the best alternate for '286, '386, and '486 machines. Use IRQ3 as an alternate only if you do not have a second COM port.

While IRQ7 and IRQ5 are reserved for printer ports, most printing software will not enable their use. They can therefore serve as good alternate choices for the MIDI card if IRQ2 is not available.

If you change the PC MIDI Card's interrupt, you must tell your music software about the new interrupt.

The means for changing the interrupt that your software expects will vary from one program to the next. Consult the program's user manual, or contact the developer for details. Some music programs can only use the card's default interrupt. If this is true of your software, change the interrupt of the other conflicting device rather than for the PC MIDI Card.

Figure 4. Overhead view of inside of computer

Installing the Card in Your PC

Referring to Figure 4, follow the steps below to physically install the PC MIDI Card in your computer:

1. Turn off all power to your computer.

2. Position the computer system unit with the rear panel facing you. Find and remove the cover mounting screws (there are usually five of them).
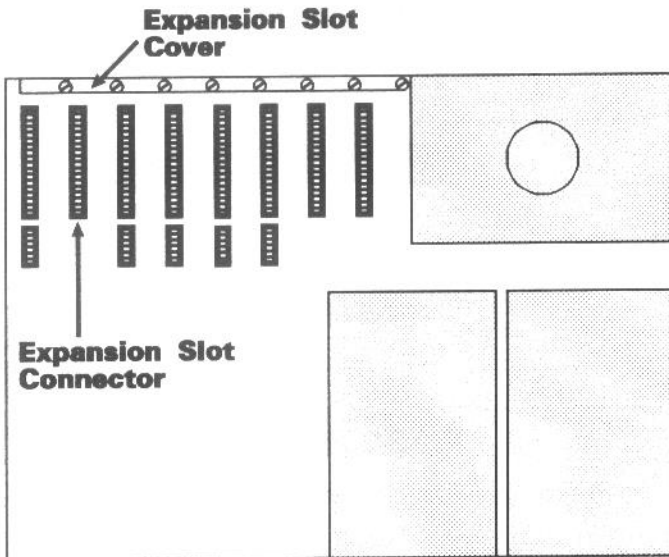
3. Slide the cover forward, away from the rear panel.

4. Locate an expansion slot in your computer that does not have a card already installed. It generally does not matter which slot you use so long as the slot is long enough to accommodate the PC MIDI Card circuit board. You can use either an 8- or 16-bit slot; there is no advantage in using a 16-bit slot. Remove the screw that holds the expansion slot cover in place, and retain for later replacement. Remove the expansion slot cover.

5. Referring to Figure 1, locate the PC MIDI Card's contact tab. Grasp the PC MIDI Card by its top edge and insert it into the computer so the contact tab goes into the expansion slot connector, with the card's metal bracket replacing the expansion slot cover that you removed in step 4.

Make sure that the card's contact tab is firmly seated, and all the way down, in the expansion slot connector. Improper seating of the card in the expansion slot connector is one of the most common causes of installation failure.
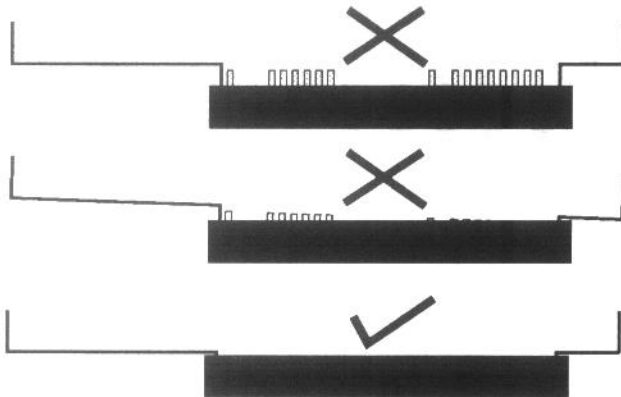
Figure 5. Seating of PC MIDI Card in expansion slot connector

6. Attach the card's metal bracket to the chassis with the screw that you removed in step 4.

7. Replace the computer's system unit cover and fasten to the rear chassis panel with the screws you removed in step 2.

Connecting to External Equipment

Refer again to Figure 1 to familiarize yourself with the PC MIDI Card circuit board. Locate the board's 9-pin D-sub connector, which now extends through the rear chassis panel. Attach the included adapter cable to this 9-pin connector, securing with the captive screws on the adapter cable's mating connector. Then, using standard MIDI cables, connect the other ends of this adapter cable to your MIDI equipment, making sure that MIDI IN's are connected to MIDI OUT's.

As for all MIDI devices, the PC MIDI Card MIDI IN should be connected to MIDI OUT of a transmitting device, and the PC MIDI Card MIDI OUT should be connected to MIDI IN of a receiving device. This is by MIDI convention.

If you have more than one MIDI instrument that you wish to play back to, connect the MIDI THRU of one instrument to the MIDI IN of the next so that each receives MIDI data from the card. You can usually chain three or four instruments together in this fashion.

Using the PC MIDI Card

This section describes the important features of the PC MIDI Card and how best to use them in your system. Consult user manuals for your software for most basic operations.

MIDI Input

To use the MIDI input, just connect it to the MIDI output of your MIDI controller (normally a keyboard). Your music software will then be able to receive MIDI data from this device.

MIDI IN Channel Remapping

The PC MIDI Card can change channel numbers on incoming MIDI data. This can be very useful if you have a MIDI controller that transmits only on fixed channel numbers. Changed channels will then be reflected on data received by your software, and if enabled, data echoed to the MIDI outputs. This feature only works with software which uses the card's "intelligent" mode of operation. See *Diagnostics and Utilities* for information on setting up this feature.

MIDI Echoing

Although many MIDI interfaces can echo MIDI input, this feature merits special attention since it will be important to many users. By default, all MPU-401 compatible interfaces will echo incoming MIDI IN data back to MIDI OUT. Echoing allows, for example, a master controller to transmit MIDI information to a music program via the interface's MIDI IN, and at the same time drive a tone module or other sound generator connected to the interface's MIDI OUT. While MIDI echoing can thus be very valuable in certain systems, it can be quite troublesome in others in leading to the ubiquitous "MIDI loop" problem. The echoing can be disabled by your software if desired. This feature only works with software which uses the card's "intelligent" mode of operation.

> Make certain you understand the effects of MIDI echoing. It can lead to undesirable effects in many MIDI systems.

If you have connected a keyboard synthesizer to both MIDI IN and MIDI OUT of the interface while echoing is enabled, you may hear a distortion in sound. As you play notes on the keyboard, its sound generator will sound the notes you play. At the same time, note information sent from the keyboard is received at the interface's MIDI IN. Echoing causes this note data to be retransmitted back through the interface's MIDI OUT and received at your keyboard's MIDI IN. This is problematical because the sound generator in many MIDI instruments cannot tolerate receiving the *same* MIDI note data at MIDI IN as is being played locally on the keyboard. Distortion or an apparent shifting in pitch may result.

Echoing can also result in "stuck" notes (notes that turn on but never turn off) or a possible loss of notes. Consider the polyphony of a keyboard synthesizer - this is the total number of notes that it can play at the same time. Each note message received by the synthesizer counts in this total. This includes notes received at MIDI IN *as well as any notes which may be sent by the local keyboard.* The synthesizer will never process more than its maximum capacity of notes, so some note information is discarded once that capacity is exceeded. Hence, some notes may be ignored, or, if a "note off" message is discarded, a stuck note may result.

You should determine whether echoing is needed in your system. If not, either tell your software to disable the echoing or put your MIDI keyboard in a mode in which the echoing is not offensive. Depending on the circumstance, you may find it necessary to 1) cause the keyboard's internal synthesizer not to respond to notes played on the keyboard; 2) cause the keyboard not to send out MIDI data when notes are played on the keyboard; or 3) cause the keyboard's internal synthesizer not to respond to note information received at MIDI IN. The easiest action, of course, is to direct your software to tell the MIDI interface not to echo.

MIDI Output

To use the PC MIDI Card's MIDI output, just connect it to the MIDI input of your MIDI sound generator. Your music software will then be able to send MIDI data to this device. If you have more than one MIDI instrument that you wish to play back to, connect the MIDI THRU of one instrument to the MIDI IN of the next so that each receives MIDI data from the card. You can usually chain three or four instruments together in this fashion.

MIDI Metronome

The PC MIDI Card provides a unique MIDI metronome which you can use as a beat reference with many music programs. The MIDI Metronome causes user-specified MIDI note data to be sent to your MIDI equipment on beat boundaries. You can thus use as a beat reference any sound which your MIDI equipment can produce. This feature only works with software which uses the card's "intelligent" mode of operation. See *Diagnostics and Utilities* for information on setting up this feature.

Diagnostics and Utilities

The Diagnostics and Utilities diskette contains programs which may be used
when initially installing the PC MIDI Card and in certain special situations. Of
particular interest is the program MQDIAG.EXE. This program can be very
valuable in helping to troubleshoot problems in your MIDI system. The diskette
also includes several other utility programs. For a description of these, you may
view or print the file README found on the diskette.

Programs on the Diagnostics and Utilities diskette are not required for basic op-
eration of the PC MIDI Card. Only the MIDI Metronome and MIDI IN Channel
Remapping require use of these programs.

Installing Diagnostics and Utilities Programs

You should follow the steps in this section to install the Diagnostics and Utilities
programs on your system.

1. First, make a working copy of the Diagnostics and Utilities diskette using the
DOS DISKCOPY command. Store the original diskette in a safe place, and use
the working copy in what follows. All command entries below should be
terminated by pressing the ENTER key.

2. If you have a hard drive, put the working copy made in step 1 in drive A,
and make A your current drive by typing at the DOS prompt:

    A:

Then, to install on drive C, type:

    INSTALL C:

or, for drive D installation:

    INSTALL D:

Necessary files are then copied to your hard drive in a directory named MQ.
Proceed with *Configuring Your PC MIDI Card* below.

3. If you have a floppy-based system, put the working copy made in step 1 in
drive B, and your boot diskette in drive A. Files will be written to your boot
diskette, so make sure you have a backup of that diskette as well. Make B your
current drive by typing at the DOS prompt:

    B:

Then type:

    INSTALL A:

Configuring Your PC MIDI Card

INSTALL will ask you a few questions when installing the PC MIDI Card in order to set up the card's MIDI Metronome and MIDI IN Channel Remapping. You will specify the information described below so that these features are properly set every time you start your computer. Programs which do not use the card's "intelligent mode" of operation will not be able to use these features.

Interface Model
Choose PC MIDI Card.

I/O Address
Give the I/O address at which you installed the card. Normally this is 330.

Metronome Setup
The PC MIDI Card's MIDI Metronome feature instructs your MIDI equipment to automatically sound notes (via MIDI data sent by the PC MIDI Card) for a beat reference when running your music software. To set up the metronome, you will specify its characteristics and test its sound on your MIDI equipment. Make sure your MIDI equipment is turned on and properly connected to the PC MIDI Card so that you may audition the metronome sound. You will supply the information below to set up the metronome. The responses you give should be terminated by pressing the ENTER key. (MIDI Metronome parameters can be modified at a later time using the MQDIAG program included on the Diagnostics and Utilities diskette).

Channel - Specify the channel number you want to use for sending MIDI notes as a beat reference. The default is channel 10, which works well for many Roland instruments. Many users will have to change to a different channel. Consult your MIDI instrument's user manual for program number information.

Send program change at reset - Answer "yes" if you wish the card to automatically choose a selected program (patch) on your instrument when your software starts up.

Program change number - If you selected "yes" above, provide the progam number for the instrument sound you desire. Consult your MIDI instrument's user manual for program number information.

Note - Enter the note number to use for beats. Higher numbers represent increasing pitch.

Velocity - Enter the note velocity you want to use. For many MIDI instruments, increasing velocity results in increased volume.

Duration - Enter the duration of beat reference notes, in 1/32 note units. A value of 1 is usually most desirable.

MIDI IN Channel Remapping

Next you will be asked whether to change channel designations on incoming MIDI messages. When remapping is enabled, all MIDI messages received for a given channel are changed to reflect the channel to be remapped to. For example, if you remap channel 1 to channel 2, all MIDI channel 1 messages received will be changed to channel 2. This is effected for all such messages to be sent to your software, and, most significantly, for messages to be echoed to MIDI OUT via the MIDI echoing feature. Most users will not need Channel Remapping; in this case just remap each channel back to the same channel - this is the card's default condition. (Channel Remapping can be modified at a later time using the MQDIAG program included on the Diagnostics and Utilities diskette).

Modifying AUTOEXEC.BAT

You will finally be asked if INSTALL should modify your AUTOEXEC.BAT file. You would want to do this if you want the MIDI Metronome and MIDI IN Channel Remapping to be automatically set up every time you boot your computer. If you don't need these features, tell INSTALL not to modify AUTOEXEC.BAT.

Details of Configuration (for the technically inclined)

After copying files to your hard disk if one is present, INSTALL runs a program SETUP.EXE to collect the metronome and remapping information, which is subsequently stored in a file MQSETUP.PRO. MQDIAG likewise can be used to make changes in this information, and thus modify MQSETUP.PRO. MQSETUP.EXE is run to send information stored in MQSETUP.PRO to the PC MIDI Card so that it can properly implement the metronome and remapping functions. MQSETUP.EXE and MQSETUP.PRO are both stored in the root directory of the boot drive. So that the MIDI Metronome and Channel Remapping features are set up when the computer boots, a call to MQSETUP.EXE, with MQSETUP.PRO as a parameter, is placed in AUTOEXEC.BAT.

MQDIAG

The MQDIAG program can be used as an aid in the troubleshooting of installation and operational problems in your MIDI system. For example, when the program first starts up, it attempts communication with the PC MIDI Card as a gross check of proper installation. MQDIAG functions are described briefly below, by menu title. Note that some of these functions are applicable to other Music Quest interfaces, but not for the PC MIDI Card. For operational details of MQDIAG, consult the next section, *Using MQDIAG*.

Trace

This menu provides functions to allow viewing of incoming MIDI data from a device attached to the card's MIDI input. Use these to see that your MIDI equipment is transmitting properly to the computer.

Interpreted Trace shows English-like descriptions of MIDI messages received.

Hex (raw) shows hexadecimal codes for these messages.

Hex + pass thru operates like Hex (raw), but also echoes incoming MIDI messages to MIDI OUT.

Options

Rec/Play setup sets various options for use with MQDIAG's Sequencer.

Channel remap is used to cause the PC MIDI Card to change channels for received MIDI data. This is particularly valuable when using a keyboard that transmits only on one channel.

Metronome is used to set up or change the PC MIDI Card's MIDI Metronome.

Channel Split is not used for the PC MIDI Card.

Sequencer

Use these functions to verify general operation of the PC MIDI Card in your system.

Record allows you to record a simple sequence from your MIDI keyboard.

Playback will play back the sequence you recorded with Record.

SMPTE

Functions in this menu are not used for the PC MIDI Card.

ChaseLock

Functions in this menu are not used for the PC MIDI Card.

Program

Quit is used to exit MQDIAG.

EPROM level shows the version number of your PC MIDI Card.

Help path is used to set the directory path to help screen data for MQDIAG.

Using MQDIAG

To start MQDIAG, proceed as follows: (Be sure to terminate all entries with the ENTER key).

1. First, make current the directory which holds the utility programs. If you have a hard disk and you installed the Diagnostics and Utilities programs, you would type at the DOS prompt:

        CD \MQ

If you have a floppy-based system, place your working copy of the Diagnostics and Utilities diskette in drive A, and at the DOS prompt, type:

        A:

2. Start MQDIAG by typing:

    MQDIAG /A*ppp* /I*n*

where *ppp* designates the I/O address at which the card is installed, and *n* the interrupt number chosen. The /A*ppp* entry is mandatory if you are using other than I/O address 330. The /I*n* entry is optional; if omitted, MQDIAG will try to automatically locate the interrupt you have selected. As an example, if you installed your card at I/O address 330 and interrupt 2, you would type:

    MQDIAG /A330 /I2

You will then see an informational screen which you should read and bypass by pressing the ENTER key.

3. A new screen should show that MQDIAG has found your card at a given I/O address and interrupt. (If this is not the case, please see *In Case of Difficulty*). You will also see a description of the present status of interrupt usage in your computer, which may prove useful in case you have an interrupt conflict. Press the ENTER key to go to the main screen of MQDIAG.

You can move from one menu to the next by positioning the block cursor with your keyboard cursor keys. Choose a particular menu item by moving the cursor to the desired selection and then pressing the ENTER key.

MQDIAG help is available by pressing the Alt-h key combination. The Help path must be set properly for this to work. To exit MQDIAG, use the Quit function in the Program menu.

In Case of Difficulty

If you are having difficulty with your MIDI setup, first make sure that you have installed the PC MIDI Card per the instructions given. A re-reading of this Installation Guide may be helpful in uncovering a subtle problem when installing the card. You should also try running MQDIAG to see what it reports. Check the following information for possible solutions.

Where to Start

The first action to take when experiencing difficulty is to isolate the problem to a specific set of circumstances so that extraneous variables can be eliminated. For example, disconnect or swap cables and various pieces of MIDI equipment to see if any of these seem directly related to the problem. If you have several music programs, try them out to determine if a problem is common to all or unique to one in particular. If you suspect a possible conflict between the MIDI card and other boards in the computer, you can try temporarily removing some of these to see if they are sources of conflict. These are but a few examples. This basic process will help speed resolution of a problem by reducing the number of potential causes as quickly as possible. With this in mind, consult the following list of common problems and possible causes suggestive of a solution.

Software Doesn't Recognize Interface

Improper seating of card in expansion slot connector. Interrupt or I/O address conflict. Software interrupt or I/O address settings don't match those on the MIDI card. Bad MIDI cable. (Also try running MQDIAG or other music software to see if the interface is recognized.).

Software Recognizes Interface, But Neither Records Nor Plays Back

MIDI IN's not connected to MIDI OUT's. Interrupt conflict. Software interrupt setting doesn't match that used by the MIDI card. Adapter or MIDI cables not securely connected.

MIDI Card Doesn't Fit Properly In Computer

You have a "Microchannel" style computer. (MIDI card will not work in these). MIDI card not properly seated in expansion slot connector. Back panel of computer chassis not prefectly perpendicular to chassis bottom plate (it may be slightly bent).

Diagnostics Program Screens Not Readable

Using monochrome monitor with color video card. (Use DOS command "MODE BW80").

Software Does Not Record, But Plays Back OK

MIDI IN's not connected to MIDI OUT's. Interrupt conflict. Software interrupt setting doesn't match that used by MIDI card. MIDI keyboard not transmitting status bytes (turn off, and then back on, MIDI keyboard and then try to record). Bad MIDI cable. Adapter or MIDI cables not securely connected.

Keyboard Sounds Distorted When Recording

MIDI echoing problem.

Keyboard Loses Notes on Playback While Also Recording

MIDI echoing problem.

Keyboard Has "Stuck" Notes On Playback While Also Recording

MIDI echoing problem.

Channel Remapping Does Not Work

Software does not use MIDI card's "intelligent" mode of operation.

Software Does Not Play Back, But Records OK

MIDI IN's not connected to MIDI OUT's. Interrupt conflict. Software interrupt setting doesn't match that used by MIDI card. Bad MIDI cable. Adapter or MIDI cables not securely connected. Receiving device not set to receive on MIDI channel transmitted.

MIDI Delays Or Bad Timing On Playback

Song too dense for computer speed. (Programs running on an older 4.77 MHz computer may have difficulty keeping up with very dense music).

MIDI Equipment Shows "MIDI Data Error"

Bad MIDI cable.

MIDI Equipment Shows "MIDI Buffer Full"

Bad MIDI cable.

MIDI Light Flashes On MIDI Equipment Even When Not In Playback

Normal. (MIDI card always outputs MIDI clocks except when told not to).

Drum Machine Starts Unexpectedly

Drum machine responds to simple MIDI clocks. (Set it to wait for MIDI start).

MIDI Metronome Does Not Work

Software does not use MIDI card's "intelligent" mode of operation. Software's metronome selection not enabled. AUTOEXEC.BAT file does not properly execute MQSETUP.EXE.

> If you are unable to get the PC MIDI Card to work properly in your system, please call our technical support personnel at (214)881-7408. We can usually help you find a quick solution. The vast majority of installation problems can be remedied over the telephone. If you have a modem, you can also call our bulletin board at (214)881-7311.

FCC Radio Frequency Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference; and

- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause interference to radio communications.

These limits are designed to provide reasonable protection against such interference in a residential situation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna of the affected radio or television.

- Increase the separation between the equipment and the receiver.

- Connect the equipment and the affected receiver to outlets on separate circuits.

- Consult the dealer or an experienced radio/TV technician for help.

Modifications

Changes or modifications not expressly approved by Music Quest, Inc. could void the user's authority to operate the equipment.

Shielded Cables

Shielded cables must be used with this equipment to maintain compliance with FCC regulations.

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