Studio 5LX

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Part Number: 110-0214-01

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WARNING

NOTE: This equipment has been type tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference to radio or television equipment 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
- Move the equipment away from the receiver
- Plug the equipment into an outlet on a circuit different from that to which the receiver is powered.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

***CAUTION:** Only equipment certified to comply with Class B (computer input/output devices, terminals, printers, etc.) should be attached to this equipment, and must have shielded interface cables.*

Finally, any changes or modifications to the equipment by the user not expressly approved by the grantee or manufacturer could void the users authority to operate such equipment.

ACKNOWLEDGMENTS

OMS, OMS Setup+Patches and Studio 5 Driver by Doug Wyatt.

Studio 5 firmware by Jarrell Irvin.

Manual written by Gregory A. Simpson.

Thanks to all our beta testers for their hard work, comments and suggestions.

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PART ONE:

Overview & Installation

1 Getting Started

OVERVIEW OF THE STUDIO 5

Opcode's Studio 5LX (hereafter called the "Studio 5") is a multi-port Macintosh MIDI interface and patchbay with a built-in SMPTE timecode generator and SMPTE-to-MIDI timecode converter.

MIDI features of the Studio 5 include:

- Fifteen independently addressable MIDI inputs and outputs—this allows access to 240 separate MIDI channels with programs that support either OMS or Mark of the Unicorn's MIDI Time Piece™.
- OMS Patch support—the Studio 5 has a built-in 16MHz 68000 microprocessor for processing OMS Patches. OMS Patches allows MIDI data to be split, transposed, modified and mapped in many useful ways.
- Storage for up to 128 OMS Patches—the Studio 5 has 64K of RAM for storing OMS Patches (expandable to 128K).
- Networking—connect up to a total of six Studio 5's for 1,440 separate MIDI channels.
- Standard (1MHz) and Fast communication speeds.
- Emulates either a standard MIDI interface or a MIDI Time Piece.
- A pair of MIDI activity indicators for each MIDI port.
- Patch number display and program change buttons.
- Front panel thru switches—these let you use external peripherals (such as printers or modems) without changing cables.
- Two assignable footswitch inputs and a foot controller input.

Timecode functions of the Studio 5 include:

- SMPTE Time Code generation (five frame rates).
- SMPTE-to-MIDI Time Code conversion.
- SMPTE-to-Direct Time Lock conversion (both DTL and DTLe).
- Jam Syncing (rewrites fresh SMPTE when locked).
- Flywheeling (remains locked despite dropouts or other short SMPTE errors).
- Audio input to create a MIDI trigger.

The Studio 5 uses the Open Music System (OMS) and the Studio 5 OMS driver software to configure all MIDI and timecode functions.

HOW TO READ THIS MANUAL

This manual does not attempt to teach fully the fundamentals of MIDI or SMPTE operation. A brief timecode overview is offered at the end of this chapter, but if you're new to either of these standards, you should read magazines specializing in music technology, or purchase basic MIDI and SMPTE books from your local bookstore or music dealer.

Also, you should be familiar with basic Macintosh operations. If you're not, please read the Macintosh manual before using the Studio 5.

This manual discusses how to connect, set up and use the Studio 5—it describes Studio 5 operations at the time of its printing. However, updates and changes may occur. Always look for hardware and software change information in the Read Me folder on your master program disk.

The Studio 5 uses the Open Music System (OMS) and the Studio 5 OMS driver software to program all mapping, channelizing, routing and timecode functions. If you're already familiar with OMS, you can read this manual straight through.

***NOTE:** If you have never used OMS, read the first three chapters in this manual, then read the OMS manual before installing OMS and reading Chapter 4. Pay particular attention to the OMS manual's discussions of installation, defining devices in your studio and creating a current OMS Studio Setup document.*

This manual is divided into four parts:

Part 1: Overview & Installation

(Chapters 1-4)—This part discusses the Studio 5's front and rear panels and will help you to integrate the unit into your studio. It concludes with a chapter describing software installation and setup.

Part 2: OMS Patches

(Chapters 5-11)—This part discusses OMS patch features, programming and use.

Part 3: Other Functions

(Chapters 12-15)—This part discusses the Studio 5's non-OMS Patch functions and includes chapters on MIDI interface emulation (both standard and MIDI Time Piece interfaces), SMPTE functions, networking, and menu commands.

Part 4: Appendices

This part includes a guide to using the Audio Input feature with Vision, a troubleshooting section, and the Studio 5 specifications.

THE STUDIO 5 PACKAGE

Your Studio 5 package contains the Studio 5, two serial cables, one power cable, a mounting kit (consisting of 2 rack ears, 6 screws, and 4 rubber feet), OMS and Studio 5 software, an OMS manual, this Studio 5 manual and your registration card.

STUDIO 5 SYSTEM REQUIREMENTS

To use the Studio 5, you'll need:

- a Macintosh Plus or better with at least one Megabyte of RAM (2 Meg recommended) and System 6.0.4 or higher.
- One or more MIDI devices.
- One or more MIDI cables to connect your MIDI device(s) to the Studio 5.
- Hard disk recommended.

REGISTERING YOUR STUDIO 5

Be sure to send Opcode your registration card. If we don't receive it, you won't be eligible for free technical support and various other services and products.

IMPORTANT: *Please write down your Studio 5 serial number here. The serial number is on the back of the Studio 5 by the power connector.*

S/N _____

Purchase Date _____

Once we receive your registration card, you're entitled to free technical support and information about upgrades, updates and new products. Also, you'll receive Opcode's periodic newsletter, which contains advanced tips, troubleshooting techniques and more.

Opcode technical support hours (Pacific Time) are:

- Monday through Friday: 9:00 a.m. to 6:00 p.m.
- Saturday: 11:00 a.m. to 5:00 p.m.

Call (415) 856-3331 for technical support, but *please* try to find the answer in this manual first.

NOTE: *Technical support hours are subject to change.*

TIMECODE BASICS

The operational portions of this manual assume you're familiar with SMPTE Time Code, MIDI Time Code, and Direct Time Lock. If you're not, you should read this section to develop a basic understanding of synchronization and the various timecode formats. Consult music technology magazines or introductory books if you need more information about any of these topics.

SMPTE Time Code

SMPTE Time Code is an international timecode standard created by the Society of Motion Picture & Television Engineers. It specifies a format for recording digital timing information onto magnetic tape; this timing information is divided into hours, minutes, seconds and frames. By using SMPTE Time Code (often referred to simply as "SMPTE"), you can synchronize the playback of separate audio decks, video decks and computers.

Using SMPTE requires two separate actions:

1. Generating the SMPTE Time Code and recording it onto tape (a process often referred to as "striping").
2. Reading the SMPTE Time Code off the tape and using it as a master timing source for synchronizing playback of other tape machines and computers.

There are two types of SMPTE Time Code: Longitudinal Time Code (LTC), and Vertical Interval Time Code (VITC). LTC is recorded on tape tracks that run linearly across the length of the tape. This format is recorded on audio tape or on the audio track of a video tape. VITC is recorded within the video portion of a video tape.

Since different video systems run at different speeds (or "frame rates"), the SMPTE format also specifies a number of different rates.

The Studio 5 will both generate and read SMPTE Time Code in the LTC format. If you have a tape striped with VITC, you'll need to use a VITC-to-LTC converter or a VITC-to-MTC converter.

The Studio 5 supports five SMPTE format/frame rates (hereafter referred to as simply "frame rates"). These frame rates are as follows:

- 24 Frames/second—Film frame rate.
- 25 Frames/second—EBU (European) television frame rate.
- 29.97 Drop Frame—NTSC (North American) color television frame rate. This format runs at 30 Frames/second, but drops the first two frames every minute, except at minutes 0, 10, 20, 30, 40, and 50.
- 29.97 Frames/second (Non-Drop)—Used to sync to NTSC color television without dropping frames. SMPTE time does not match real-time, but playback pitch is unaffected.
- 30 Frames/second (Non-Drop)—Original NTSC black and white television standard. Often used in audio-only situations since there are no dropped frames and the SMPTE time is equal to real time.

MIDI Time Code and Direct Time Lock

MIDI computer software cannot read SMPTE Time Code directly off a tape, so the code must be converted into a format that the computer can understand. This format is called MIDI Time Code (MTC). The converter then sends MTC (which retains SMPTE's hour/minute/second/frame timing information) to the computer to control the playback of MIDI sequencers. You use MIDI Time Code to synchronize your computer sequence to a master SMPTE timing source.

Direct Time Lock (DTL) and Enhanced Direct Time Lock (DTLe) are alternate MIDI synchronization formats developed by Mark of the Unicorn for their Performer sequencer. Very old versions of Performer require DTL to sync to tape. New versions of Performer use DTLe, which provides synchronization accuracy equal to MIDI Time Code.

The Studio 5 will convert SMPTE timecode (recorded at one of the five supported frame rates) to either MIDI Time Code or one of the Direct Time Lock formats.

2 Panel Descriptions

THE STUDIO 5 FRONT PANEL

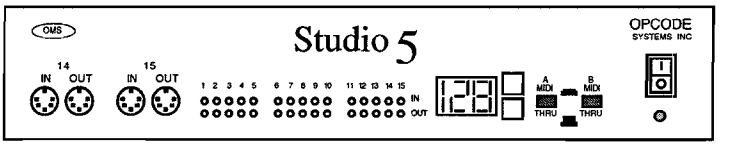


Figure 2-1: Studio 5 Front Panel

From left to right, the front panel ports, LED's and buttons are as follows:

MIDI Ports 14 and 15

These two pairs of MIDI ports are on the front panel to facilitate quick, temporary connection of synthesizers, controllers or other MIDI devices. MIDI ports are discussed in detail in "The Studio 5 Rear Panel" section later in this chapter.

MIDI port pairs 14 and 15 are in addition to the thirteen MIDI port pairs found on the rear panel.

MIDI Activity LEDs

These Light Emitting Diodes (LED's) indicate MIDI activity at any of the fifteen pairs of MIDI ports. The top row of red LED's indicate when MIDI data arrives at one or more of the Studio 5's fifteen MIDI In ports. The bottom row of green LED's indicate when MIDI data leaves one or more of the Studio 5's fifteen MIDI Out ports.

Patch Number Display

This three-digit display shows the Studio 5's current patch. It also displays error messages should the Studio 5 experience difficulty (see Appendix B). A zero (0) will be displayed when there are no OMS Patches stored in the Studio 5—this happens either the first time you turn on the interface or after you reset it.

Increment/Decrement Buttons

The increment/decrement buttons have three uses:

1. Primarily, they allow you to step through the Studio 5's internal patches as defined by the current patch document. Patch documents are discussed in Part Two of this manual. The Studio 5 is "smart" because it knows exactly how many patches you have defined. Assume, for example, that you have defined three patches numbered 1, 15 and 78. When you push the top (increment) button, you'll step from patch 1 to patch 15. Press it again, and you'll step to patch 78. The Studio 5 stores only as many patches as you have defined, thus expediting front-panel patch access. Hold down either button to increment or decrement continuously.
2. You can use the increment/decrement buttons to reset the Studio 5 and clear all OMS patches from its memory. To do this, hold in both buttons while turning on the Studio 5. You won't need to reset the Studio 5 unless it loses communication with the Macintosh and traditional methods (such as choosing **Re-establish Communication** from the **Studio 5** menu or switching the Studio 5 off and then on again) do not correct the problem.
3. When the Studio 5 is on, pushing the increment and decrement buttons simultaneously will act as a "panic button", silencing any MIDI devices that are connected to the Studio 5. The panic feature causes the Studio 5 to perform the following operations (in order):
    - First, it sends a Sustain Pedal Off MIDI control message to all 16 MIDI channels on all 15 MIDI Out ports.
    - Then, it sends a MIDI All Notes Off command to each channel on each port.
    - Finally, it sends MIDI Note Off commands for all 128 notes to each channel on each port. This is because some MIDI devices don't recognize the MIDI All Notes Off command.

Thru Switches (A & B)

These switches provide convenient access to printers, modems or other peripherals.

When a Thru switch is in the MIDI position, the Studio 5 is in MIDI mode—transmitting MIDI data between your Macintosh and various studio devices.

When a Thru switch is in the THRU position, data from the Macintosh (as received on either the "A" or "B" input port) is passed through the Studio 5 to the "A Thru" or "B Thru" ports on the rear panel. Set a Thru switch to the THRU position when your Macintosh needs to communicate with an external peripheral (such as a printer or modem).

NOTE: The routing of MIDI INs to MIDI OUTs (as defined by the current OMS patch) is not affected by these switches since the Studio 5's internal patches can be used to implement MIDI thruing.

SMPTE/Power Indicator Light

This LED blinks when there is any SMPTE activity or when triggered by a signal at the Audio In jack. When no timecode is sent or received (or Audio In mode is not employed) the LED is lit as a power indicator.

Power Switch

When pushed in at the bottom ("0"), the power is OFF. When pushed in at the top ("1"), the power is ON. The SMPTE/Power LED should light when the switch is in the ON position if the power cord is connected to the Studio 5 and plugged in.

THE STUDIO 5 REAR PANEL

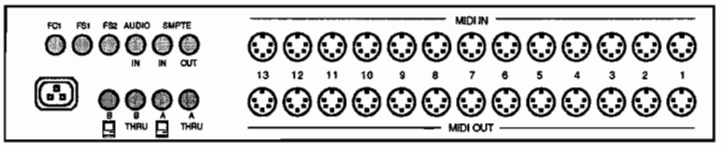


Figure 2-2: Studio 5 Rear Panel

Clockwise from the upper left, the Studio 5's rear panel connectors are as follows:

Footswitch Connectors

Use these 1/4" phone jacks to connect two momentary footswitches and a continuous foot pedal. Footswitches and foot pedals are available through Opcode Systems or your local music dealer.

FC1

Use this input to connect an optional continuous control foot pedal (Opcode's foot controller uses a 100k logarithmic taper). The Studio 5 reads the position of the pedal and interprets a MIDI value between 0 and 127. Foot controllers are ideal MIDI controllers for such effects as panning, portamento or volume control. You may turn the foot controller feature on or off within the OMS Setup+Patches application. See "The Studio 5 Menu" in Chapter 15 for details. FC1 normally transmits on Channel 15 and is assigned to MIDI controller number 15.

FS1 and FS2

Use these two inputs to connect optional momentary (on/off) footswitches. The Studio 5 sends a value of 127 when the foot pedal is depressed and a value of zero (0) when the foot pedal is released. FS1 is MIDI controller number 78; FS2 is number 79.

You can use either a normally open or normally closed footswitch—the Studio 5 recognizes the type upon powering up. You must plug in the footswitches prior to turning on the Studio 5—this will enable the unit to recognize the footswitches' polarity. Do not step on any footswitches while turning on the Studio 5 so that the correct polarity can be determined.

***NOTE:** The footswitches and foot controller will normally transmit on Channel 15. This channel can be changed when the footswitches and the foot controller are used in OMS patches or as Virtual Controllers. See "Studio 5 Footswitch Ideas" in Chapter 11.*

Footswitches make ideal MIDIKeys in Opcode's Vision sequencer — one switch could be used as the MIDIShift. The foot controller can also be used to control any of the faders.

Audio/SMPTE Connectors

These three connectors are used for SMPTE and audio synchronizing. They are unbalanced stereo connectors capable of accepting either 1/4" mono phone plugs or stereo tip/ring/sleeve connectors. Input impedance is 500 kΩ. SMPTE output impedance is less than 5 Ω.

Audio IN

This is an audio input that Vision or Studio Vision can use as a sync source. You can use any steady audio beat like a drum or bass as the timing source. This allows you to add synchronized virtual tracks to a tape that was recorded without using SMPTE timecode. See Appendix A for a tutorial on using the Audio IN feature with Vision and Studio Vision.

SMPTE IN

This jack receives SMPTE timecode from a tape deck or other SMPTE source. The Studio 5 converts the SMPTE input into the MIDI format specified by the Stripe SMPTE window (see Chapter 13).

SMPTE OUT

This jack outputs SMPTE timecode generated (or regenerated) by the Studio 5. It is normally connected to the line input of a tape deck. You may set the SMPTE output level in the Stripe SMPTE window (See Chapter 13).

MIDI IN Connectors

Connect these ports to the MIDI OUT ports of your MIDI devices. Two additional MIDI inputs are on the front panel.

MIDI OUT Connectors

Connect these ports to the MIDI IN ports of your MIDI devices. Two additional MIDI outputs are on the front panel.

Computer Ports and Thru Ports

The Studio 5 does not implement the traditional Macintosh MIDI interface concept of a "Printer port" and a "Modem port". Older interfaces have a limit of 32 addressable MIDI channels; 16 on the Printer port and 16 on the Modem port. The Studio 5, however, can address up to 240 separate MIDI channels spread across its two serial inputs. These input ports are labeled "A" and "B". The inputs (with the little Macintosh icons) connect to the Macintosh using standard 8-pin mini-DIN "System Peripheral-8" cables (supplied by Opcode with the Studio 5).

It doesn't matter whether the "A" or "B" ports are connected to the Macintosh's Modem or Printer ports—only that you remember which way you did it.

IMPORTANT: *If you are using only one Studio 5 port, it must be the A port, regardless of whether it is connected to the Macintosh's Modem or Printer port.*

Attach external peripherals (such as a printer or modem) to the "A THRU" and/or "B THRU" ports on the Studio 5. You can use these peripherals without disconnecting the Studio 5 from the Macintosh. Simply use the corresponding front panel Thru switch to route data arriving at one of the Studio 5 computer ports to its corresponding THRU port (see "Thru Switches" earlier in this chapter, and "Computer Connections" in Chapter 3).

Power Cord Connector and Fuse

The factory supplied 3-prong power cord plugs into this socket. Note that units are shipped from the factory configured for either 110V or 220V and are supplied with the appropriate cables. Check that you have the correct model for the voltage in the country where you will be using your unit. Should your Studio 5 ever require a change in voltage, it can be modified by a qualified technician.

The Studio 5 uses a 1 amp/250V fast blow fuse. It should be replaced *only* with the same type and rating.

ABOUT THE INTERFACE CABLES

The Studio 5 comes with standard 8-pin mini-DIN cables. If you are using cables other than the ones supplied with the Studio 5, please be certain they are equivalent to 8-pin mini-DIN cables such as Apple's System Peripheral-8 cable.

You should use only high quality shielded MIDI and audio cables when operating your Studio 5 or any other professional audio equipment.

3 Hardware Installation

Rack ears are provided for rack mounting the Studio 5. If you wish to rack mount your Studio 5, connect these ears to both sides of the unit with the screw (provided). See Figure 3-1.

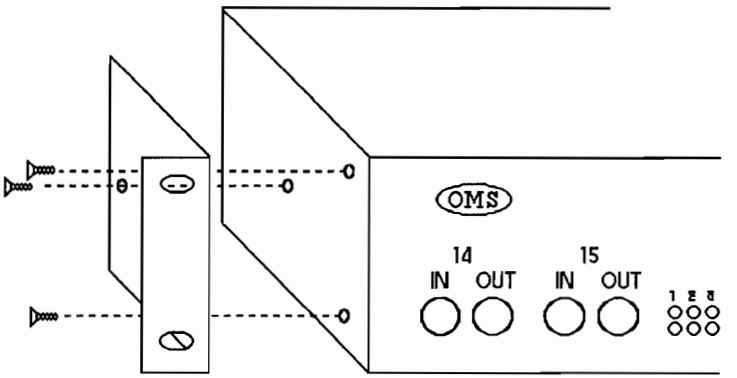


Figure 3-1: Installing Rack Mount Ears

Use the rack mounting screws (provided) to mount the Studio 5 in a standard 19" equipment rack (as shown in Figure 3-2) with the 13 pairs of MIDI connectors facing rearward. When rack mounting, you should leave at least 1" clearance above and below the Studio 5.

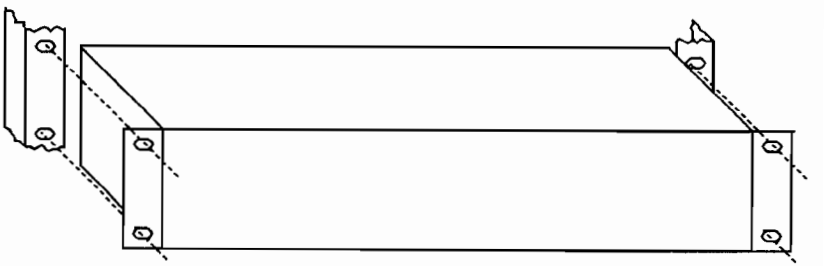


Figure 3-2: Rack Installation

If you do not wish to rack mount the Studio 5, it can rest on a steady surface. Attach the four rubber feet (provided in this package) to the bottom of the unit to prevent it from sliding.

***NOTE:** To avoid interference with your monitor, the Studio 5 should be located at least two feet away from your computer's video display.*

COMPUTER CONNECTIONS—ONE STUDIO 5

You may connect the Studio 5 to either the Macintosh's Modem port, Printer port, or to both. Connect the supplied serial cables between the Studio 5 and the Macintosh as discussed in the following sections.

Single Port Connection

Single port connections are useful if you frequently use a Macintosh serial port for non-MIDI purposes (such as printing) while running MIDI applications. You can use the spare Macintosh serial port without using the Studio 5's front panel MIDI/THRU switch.

Figure 3-3 illustrates a common single port connection. You can connect either the Macintosh's Printer port or Modem port to the "A" port on the Studio 5.

***IMPORTANT:** If you are using only one Macintosh serial port for MIDI (either Modem or Printer), that port must be connected to the Studio 5's "A" port.*

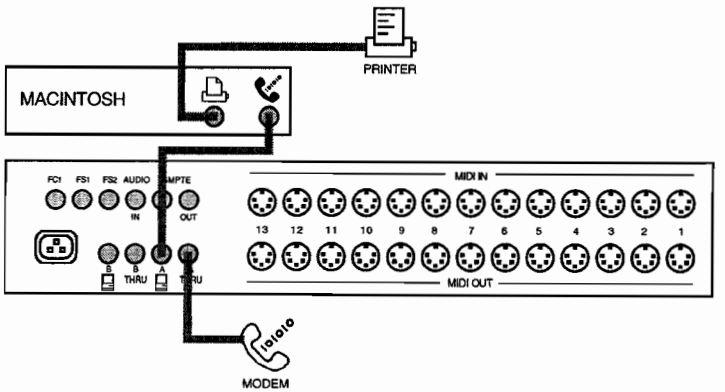


Figure 3-3: Single (Modem) Port Connection

The example shown in Figure 3-3 uses only the Macintosh Modem port for communicating with the Studio 5. You can connect an external peripheral (such as a printer, in this example) directly to the Macintosh Printer port. You can connect an additional peripheral (such as a modem) to the "A THRU" jack on the Studio 5 and switch it in or out with the front panel's corresponding MIDI/THRU switch.

Dual Port Connection

Use a dual port connection if you need increased MIDI "throughput" (for example, your MIDI data is densely packed with notes, continuous controls, system exclusive messages and MIDI Time Code). It's a good idea to *always* use a dual port connection when you're synchronizing MIDI playback with SMPTE timecode.

You may connect the Studio 5's "A" port to either Macintosh serial port. Similarly, you may connect the "B" port to either the Modem or Printer port.

Figure 3-4 illustrates a dual port connection. Connect both Macintosh serial ports to the Studio 5, and attach any external peripherals to the Studio 5 THRU jacks. You can switch between the Studio 5 and the external peripherals by using the corresponding THRU switch on the front panel.

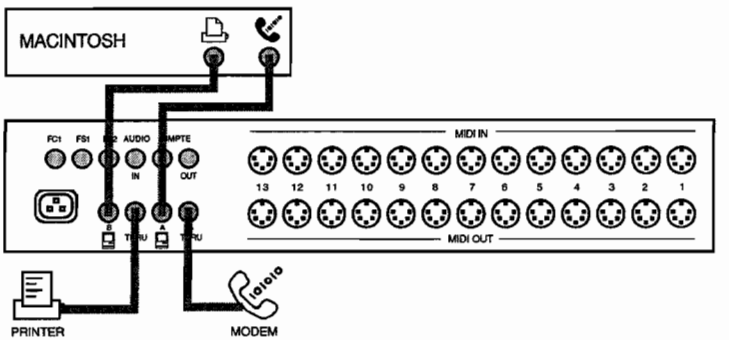


Figure 3-4: Dual Port Connection

NOTE: *In a dual port connection, such as shown in Figure 3-4, OMS balances data sent from the Macintosh to the Studio 5 as equitably as possible. Specifically, when data is sent from the Studio 5 to the Macintosh, all MIDI data originated by the Studio 5 (timecode, Studio 5 footswitch, Studio 5 foot controller, Audio In note events) will be sent out the Studio 5's "B" port. All other data coming from MIDI devices connected to the Studio 5 is sent out the Studio 5's "A" port. This keeps the Studio 5 timecode accurate by preventing it from merging with MIDI data from other devices.*

COMPUTER CONNECTIONS—NETWORKING

A network is defined as the connection of one or more Studio 5's to a single Macintosh serial port. The Macintosh has two serial ports, so it can support two networks. You may connect up to six Studio 5's to a single Macintosh (two networks of three Studio 5's) for a total of 90 MIDI ports and 1,440 MIDI channels. See Chapter 14 for information.

AUDIO CONNECTIONS

The Studio 5 has three audio jacks on its rear panel. The SMPTE IN jack is used to receive a tape sync signal. The SMPTE OUT jack sends SMPTE time code as specified in the Stripe SMPTE window discussed in Chapter 13. If the Studio 5 is receiving SMPTE at its SMPTE IN jack, it will duplicate the timecode and send it to the SMPTE OUT jack. The AUDIO IN is used to receive an audio trigger signal.

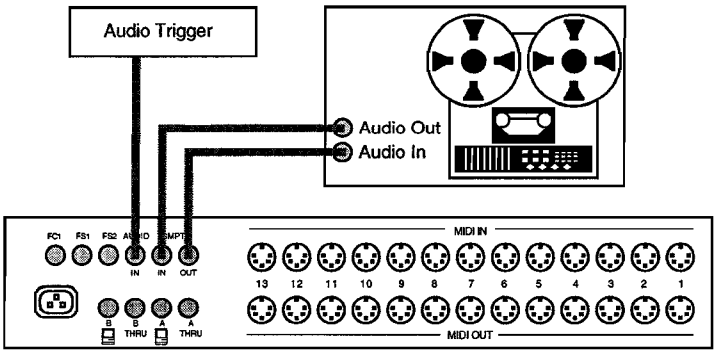


Figure 3-5: Audio Connections

To use the Studio 5 as a synchronization device, connect a pair of shielded audio cables between the Studio 5 and a multi-track tape deck. Connect the SMPTE OUT jack to the audio input of a tape deck for SMPTE striping (usually the last track). Connect the SMPTE IN jack of the Studio 5 to the audio output of the multi-track's SMPTE track. Connect the Studio 5 directly to the tape deck, bypassing the mixing console, equalizer, or any other signal processing equipment.

To use the Studio 5 as a tempo controller, connect its AUDIO IN jack to the output of any audio device that provides a rhythmic pulse (such as a bass drum, bass guitar, click track, etc.). Vision version 1.1 (or later) will sync to an audio trigger received at this input. See Appendix A for a tutorial on using Vision and Studio Vision with the Audio Input feature.

MIDI CONNECTIONS

Connect a MIDI device's MIDI input to a MIDI OUT port on the Studio 5. Connect the like-numbered Studio 5 MIDI IN port to the device's MIDI output. Figure 3-6 shows some typical MIDI connections.

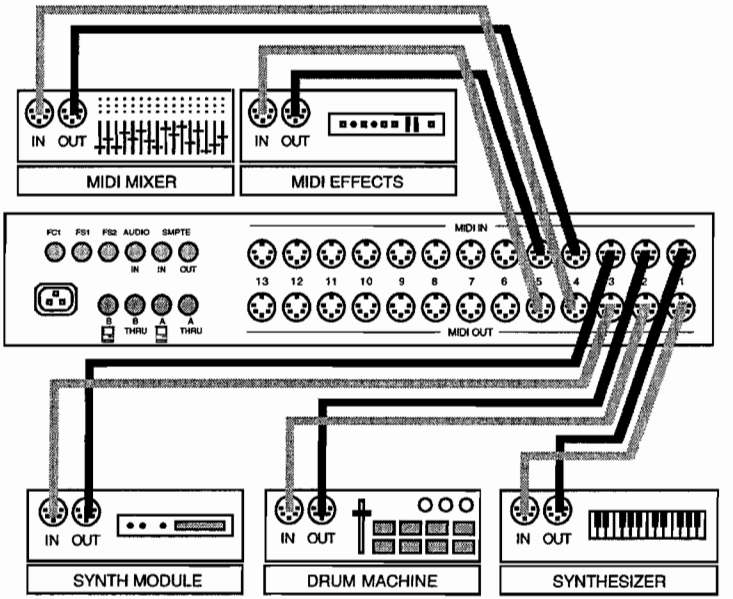


Figure 3-6: MIDI Connections

NOTE: *If you wish to load patches from a device into Opcode's Galaxy program, you must connect that device's MIDI In and Out ports to identically-numbered ports on the Studio 5 (as shown in Figure 3-6).*

FOOTSWITCH CONNECTIONS

You may connect two optional footswitches (FS1 and FS2) and an optional foot pedal (FC1) to the Studio 5. These footswitches can perform numerous programmable functions depending on the Macintosh software being used. For more information, see the "Footswitch Connectors" section in Chapter 2, "Studio 5 Footswitch Ideas" in Chapter 11, or consult your Vision manual for information about using footswitches as MIDIKeys.

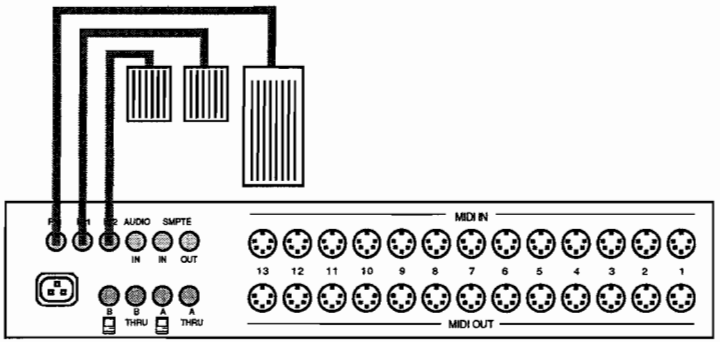


Figure 3-7: Footswitch Connections

4 Software Installation and Setup

INSTALLING OMS AND THE STUDIO 5 SOFTWARE

NOTE: If you have never used OMS, you should stop and read the OMS manual before continuing with the Studio 5 manual.

The Studio 5 uses both an enhanced OMS setup application called OMS Setup+Patches and the Studio 5 OMS driver to control all mapping, channelizing, routing and timecode functions.

- Insert the OMS Setup+Patches installation disk.
- Open the Read Me folder and read the installation instructions.
- Use the Insaller to install all OMS files, the OMS Setup+Patches application and the Studio 5 OMS driver. The Installer will also update any OMS files and drivers that might already be on your hard disk.

NOTE: If you experience a crash when running the OMS Installer, remove any virus-checking extensions from your System folder, restart your Macintosh and run the Installer again.

What's Installed

The Installer places all the necessary OMS and Studio 5 files onto your hard disk automatically. After running the Installer and restarting your Macintosh, you can begin to use OMS and your Studio 5.

NOTE: You must install the Studio 5 OMS driver to use the Studio 5.

See the OMS manual to learn about the various OMS files and where they're installed.

The Studio 5 package includes some additional files that aren't part of basic OMS:

- **OMS Setup+Patches**—This application is an advanced version of the OMS Setup application discussed in your OMS manual. As its name implies, the OMS Setup+Patches application performs all the functions of OMS Setup plus it adds the ability to create OMS patches. OMS patches are discussed in Part Two of this manual. The Studio 5 does not come with OMS Setup since its functions are duplicated and exceeded by OMS Setup+Patches.
- **OMS Program Changes**—This driver allows you to change OMS patches from Macintosh applications and is installed in the OMS Folder within the System Folder. See "Sequencing Patch Changes" in Chapter 5 for more information.
- **Studio 5 OMS Driver**—This driver allows OMS to operate with your Studio 5 and is installed in the OMS Folder within the System Folder.

If you had been using OMS prior to installing the Studio 5, your previous Studio Setup documents will be read by the new OMS Setup+Patches application.

CAUTION: *Do not relocate or rename any files or folders that the Installer places in the System Folder. You may delete unnecessary files, but some files are essential for OMS operation. See the Software Definitions section of your OMS manual for more information.*

Although the Studio 5 works with non-OMS applications, all programming and setup of the Studio 5 is handled by OMS. If you have never worked with OMS, please read the OMS manual before continuing with the Studio 5 manual.

POWERING UP THE STUDIO 5

When you power up the Studio 5, it goes through a process called network synchronization. During this time, the Studio 5 examines both of its serial ports to see what is connected. As this is done, you'll see it display the number "1" in the middle of its display for one second, and then display the current patch number. The "1" indicates that the Studio 5 is connected to a Macintosh. The current patch will be "0" the first time the unit is turned on. Later, as patches are defined and stored, the Studio 5 will remember the last patch selected prior to shutting down.

NOTE: *Networked Studio 5's, when powered up, will display their network number for one second before displaying the current patch number. See Chapter 14 for networking details.*

LAUNCHING THE OMS SETUP+PATCHES APPLICATION

By now you should have connected the Studio 5 to your Macintosh, installed the OMS software and turned on the Studio 5. The next step is to launch the OMS Setup+Patches application.

- Double-click the OMS Setup+Patches icon.

OMS Setup+Patches

If you have never used OMS, or if you haven't defined a current Studio Setup document, you will need to open and create a new Studio Setup document. Your OMS manual describes this procedure in detail, but highlights are included in the next section, "Creating a New Custom Studio Setup Document".

If you are already an OMS user and have defined a current Studio Setup document, you will need to update your setup to work with the Studio 5. This is described in "Updating an Old Studio Setup Document", later in this chapter.

Creating a New Custom Studio Setup Document

If you do not have a current OMS Studio Setup document, you will be asked to create one when you double-click the OMS Setup+Patches application.

Figure 4-1: Configure OMS Dialog Box

- Click the **Custom Studio Setup** button or hit the return key (you cannot use the Minimal Studio Setup document with the Studio 5).

  A dialog box appears (as shown in Figure 4-2). There is a check box for each Macintosh serial port. You should check only those ports that are connected to the Studio 5 or any other MIDI interface you wish to appear in your Studio Setup document.

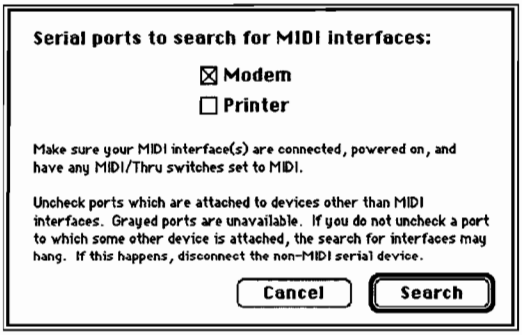


Figure 4-2: Interfaces Dialog Box

- Click the **Search** button or hit the return key.

  The Macintosh searches the checked serial ports for MIDI interfaces. It also looks for any NuBus cards that have an OMS driver installed. When it finds all interfaces and cards, it creates a new, untitled Studio Setup document. The Studio Setup document contains an icon for each Studio 5 and OMS driver object found.

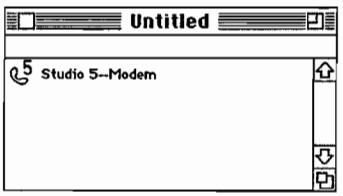


Figure 4-3: Untitled Studio Setup Document

- Add MIDI devices and connect them as discussed in your OMS manual.

  Each device that you connect to the Studio 5 will have a port number in its path. You must set MIDI port numbers in the Studio Setup document to reflect the actual Studio 5 port numbers to which devices are connected.

Updating an Old Studio Setup Document

If you already have a current Studio Setup document, but it doesn't reflect your current studio configuration (for example, you had a standard interface, but are now using the Studio 5), you'll need to update it.

When you double-click the OMS Setup+Patches icon, your current Studio Setup document opens.

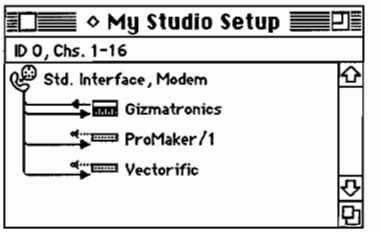


Figure 4-4: Standard Interface Studio Setup Document

- Choose the **Interfaces** command in the **Studio** menu to open the Update Setup dialog box.

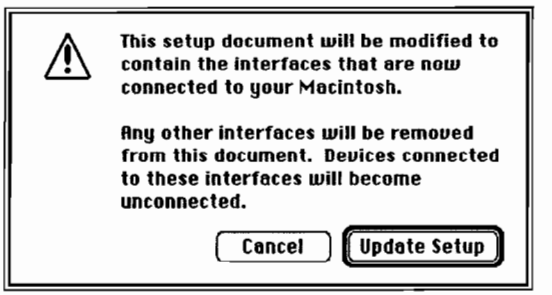


Figure 4-5: Update Setup Dialog Box

- Click the **Update Setup** button or hit the return key.

  A dialog box appears. There is a check box for each Macintosh serial port. You should check only those ports that are connected to the Studio 5 or any other MIDI interface you wish to appear in your Studio Setup document.

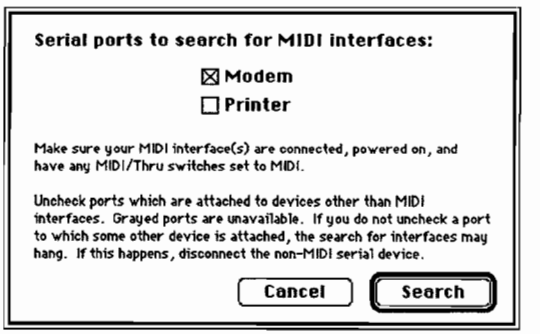


Figure 4-6: Interfaces Dialog Box

- Click the **Search** button or hit the return key.

  Your old interface disappears from your Studio Setup document and is replaced with a Studio 5 icon. Any devices that were attached to old interfaces appear unconnected in the updated Studio Setup document.

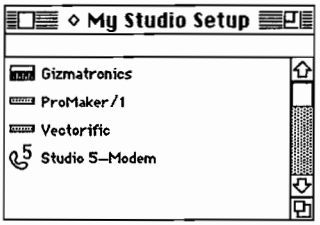


Figure 4-7: Unconnected Setup Document

- Connect the device icons to the Studio 5 icon using techniques discussed in the OMS manual. Each device that you connect to the Studio 5 will have a port number in its path. You must set MIDI port numbers in the Studio Setup document to reflect the actual Studio 5 port numbers to which devices are connected.

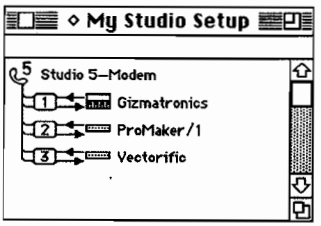


Figure 4-8: Updated Studio Setup Document

- Save your Studio Setup document.

STUDIO 5 ICONS IN A STUDIO SETUP DOCUMENT

The Studio 5 icons that appear in your Studio Setup document depend on the number of Studio 5's and how they're connected to the Macintosh. Each Studio 5 is given its own icon and shows the name of the Macintosh serial port to which it is connected. If the words "2 cables" appear, it indicates that two connecting cables are used.

If you have only one Studio 5 connected to your Macintosh when you search the serial ports, then your Studio Setup document will contain one Studio 5 icon. Figure 4-9 shows the possible ways to connect a Studio 5 to a Macintosh and the Studio Setup icons that result.

If you have more than one Studio 5, see Chapter 14 for more information.

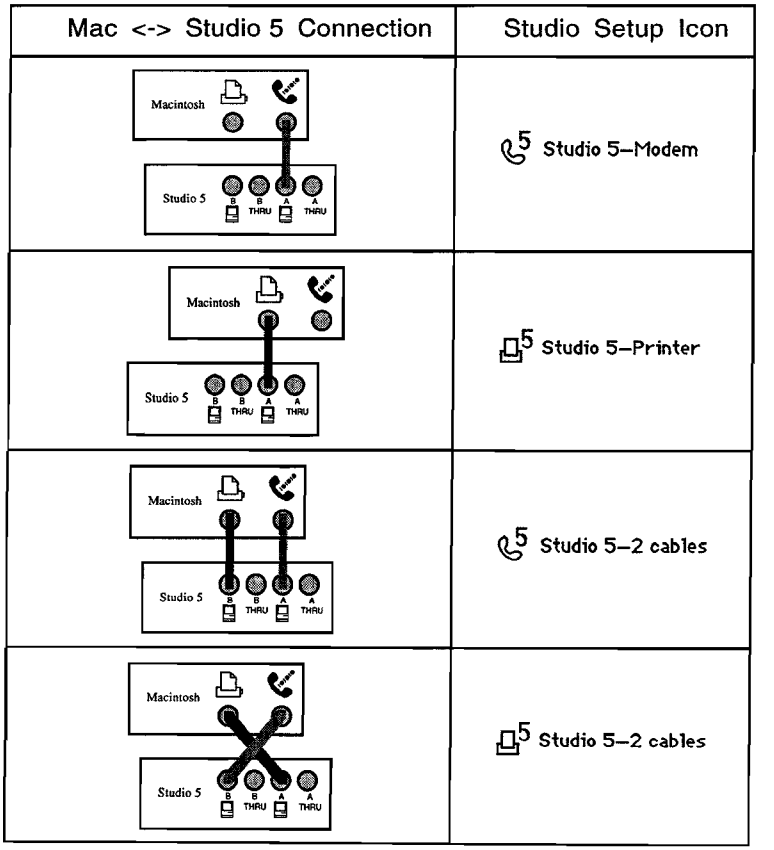


Figure 4-9: Studio Setup Icons—One Studio 5

Notice that when both serial ports are connected to a single Studio 5, there is only one icon. When a standard MIDI interface is connected to both serial ports you see two icons; one representing the Modem port and the other the Printer port. The Studio 5 appears as a single interface because OMS allocates MIDI data automatically to each of the serial ports (as discussed in the "Computer Connections" section of Chapter 3.

RENAMING STUDIO 5'S

You can rename one or more of your Studio 5's in the Studio Setup document. To do so, simply click the name to the right of the Studio 5 icon and type in a new name. The name you choose appears in place of the default Studio 5 name anywhere that the interface name appears.

In the following example, Figure 4-10 shows a Studio Setup document with the default Studio 5 name and a pop-up menu listing the Studio 5 as a selection. Figure 4-11 shows a Studio Setup document with a custom Studio 5 name and the same pop-up menu listing the renamed Studio 5 as a selection.

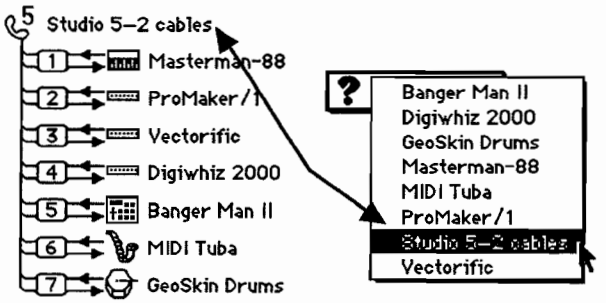


Figure 4-10: Default Studio 5 Name

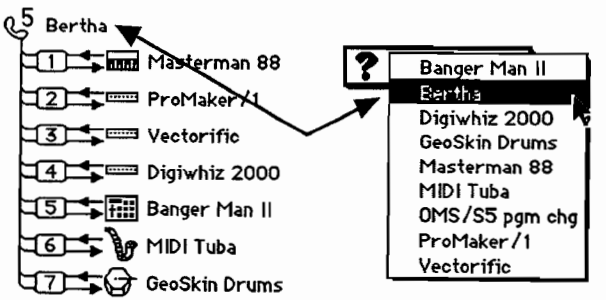


Figure 4-11: Custom Studio 5 Name

OTHER ICONS IN A STUDIO SETUP DOCUMENT

Your Studio Setup document also displays icons for any other interfaces, NuBus cards or devices connected directly to your Macintosh.

Interface icons and NuBus card icons are discussed in your OMS manual.

SETTING A COMMUNICATION SPEED

You can choose the speeds at which your Macintosh and Studio 5 communicate with each other. Generally, most applications will work with the default values. If you get overrun messages, or if you wish to increase MIDI throughput, you can change the communication speeds.

- Choose **Fast Mode Communication Speed** from the **Studio 5** menu to open the Communication Speed dialog.

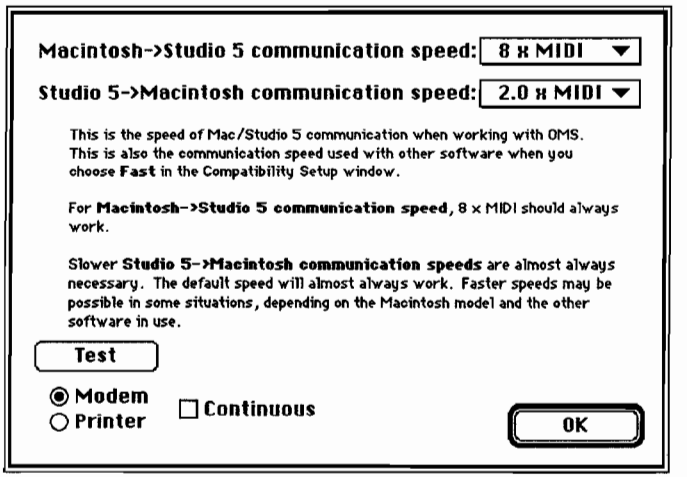


Figure 4-12: Communication Speed Dialog

Use this dialog to set a communication speed between the Macintosh and the Studio 5. Greater data throughput is obtained by transferring data at speeds faster than the MIDI standard. This can result in an increase in the number of simultaneous MIDI channels as well as improved timing—particularly in sequences with a dense MIDI data stream (e.g. numerous chords, 16th notes, timing information, and continuous controllers).

A Macintosh->Studio 5 communication speed of 8 x MIDI should work in most instances, as should a Studio 5->Macintosh speed of 2.0 x MIDI. It may be possible to increase the Studio 5->Macintosh speed on some computers (depending on what software is running), allowing more simultaneous MIDI data to be transmitted to the Macintosh (e.g. playing multiple controllers). If you see messages stating that overrun errors occurred, you'll need to decrease the Studio 5->Mac communication speed.

To test the Studio 5->Macintosh communication speed, choose a serial port, check the **Continuous** check box, then click the **Test** button. The Studio 5 will begin to send about 4K of MIDI at the current speed settings. Click the mouse to stop continuous testing—any data loss will be reported.

USING THE STUDIO 5 WITH OMS-COMPATIBLE APPLICATIONS

Unless you use the Studio 5 strictly for live performance, you'll probably use it with sequencers, librarians and other MIDI applications. These programs require you to enable MIDI input devices within them—that is, you need to tell the application which MIDI device(s) you'll use to input MIDI data.

With OMS-compatible applications (such as Vision and Galaxy) you need only make sure the input is enabled within the application in order to route data from the device, through the Studio 5 and into the application. When you enable input devices within OMS-compatible applications, OMS tells the Studio 5 driver which inputs are enabled. The Studio 5 driver then tells each Studio 5 in your network which inputs to route to the Macintosh.

In OMS-compatible applications, if you choose the Studio 5 as a MIDI input, only data generated by the Studio 5 (timecode, footswitches and audio events) is sent to the application—other types of MIDI data from devices attached to the Studio 5 are not sent. Select devices by name (rather than selecting the interface) if you want to use them as MIDI inputs.

For example, look at Figure 4-13.

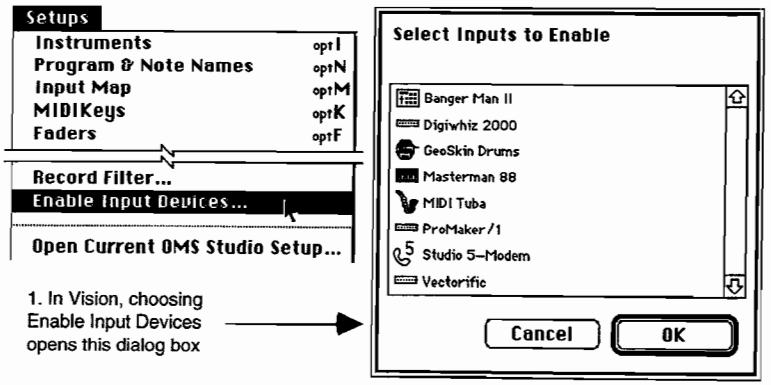


Figure 4-13: Enabling Inputs in Vision

In this example, the GeoSkin Drums, Masterman 88 and MIDI Tuba are enabled as input devices in Vision (they are highlighted). Vision "sees" MIDI data only from these devices. Data from other devices connected to the Studio 5 is not sent to Vision.

See your OMS-compatible application manuals for more information.

USING THE STUDIO 5 WITH NON-OMS APPLICATIONS

If you will be using the Studio 5 with non-OMS applications, see Chapter 12.

PART TWO:

OMS Patches

5 OMS Patch Introduction

The Studio 5 contains internal memory for up to 128 patches (although it may only have enough memory for fewer than 128 patches depending on their complexity). OMS Patches connect the MIDI devices defined in your current Studio Setup document and may include many forms of optional MIDI processing. You design OMS Patches within the Macintosh using OMS, and you store them in patch documents. The Macintosh can store an unlimited number of patch documents, each containing up to 128 patches. You can open any patch document, make it current, and send its contents to the Studio 5 at any time. Each patch document may contain:

- Up to 128 patches (as limited by memory)
- Any number of Virtual Controllers (as limited by memory)
- Any number of Virtual Instruments (as limited by memory)
- Any number of Program Change Sources (as limited by memory)
- One patch chain

Virtual Controllers and Virtual Instruments are extremely powerful features of OMS Patches. A Virtual Controller is the output of a MIDI device plus some form of MIDI processing. A Virtual Instrument is some form of MIDI processing routed to one or more MIDI devices. Virtual Controllers and Virtual Instruments can be valuable aids for both sequencing and live performance. They're discussed in Chapter 7.

Program Change Sources allow you to specify various ways to change OMS patches. They're discussed in Chapter 8.

Patches are strictly real-time, live-playing MIDI connections; they do not actually affect the MIDI data that an application sends or receives. A patch cannot send MIDI data to an application, nor can it receive MIDI data from an application. MIDI applications will always receive from the sources to which they are connected and be able to send to any destinations, regardless of what the current patch does.

IMPORTANT: *Patches are a feature of OMS and the driver software, not just the Studio 5. This means devices that aren't attached to a Studio 5 (such as a SampleCell card) can still be used in patch documents. It's important to recognize that the Studio 5 is not a self-contained box—it's designed to function as part of a larger OMS system. You must be using at least one Studio 5 (or a Studio 4) to work with patch documents.*

NOTE: *OMS patch processing occurs in addition to any processing performed by your sequencing application. Since most sequencers control MIDI thruing from within the application, you may wish to keep OMS patch #1 an an "empty" or "do nothing" patch for use with sequencer programs.*

PATCH DOCUMENTS

This section discusses the terminology and techniques for working with patch documents.

Opening a New Patch Document

- Open a new patch document by choosing **New Patch Document** from the **File** menu (or type ⌘N).

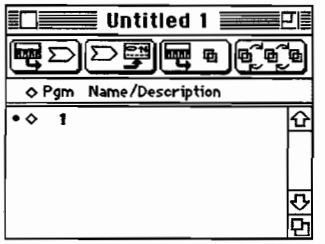


Figure 5-1: Patch Document Window

Patch Document Window Terminology

When you open a new patch document window, you'll see four buttons under the title bar. From left to right these represent Virtual Controllers, Virtual Instruments, Program Change Sources, and Patch Chains. Each of these buttons will be defined later in this manual. Below the buttons is a line for the first patch in the document. This line consists of a selector dot, a diamond to indicate the current patch, the program (or patch) number and a Name/Description field that can hold as much text as needed to describe the operation of that patch.

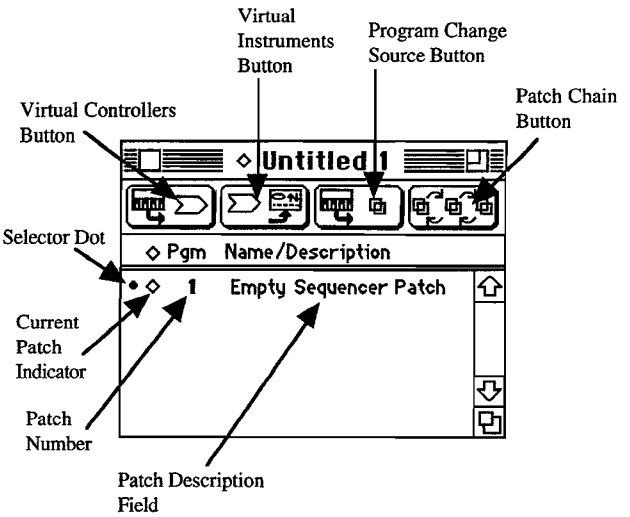


Figure 5-2: Anatomy of a Patch Document Window

You can have any number of patch documents open at one time, but only one document can be the *current* patch document. The current patch document is indicated by a diamond next to its name.

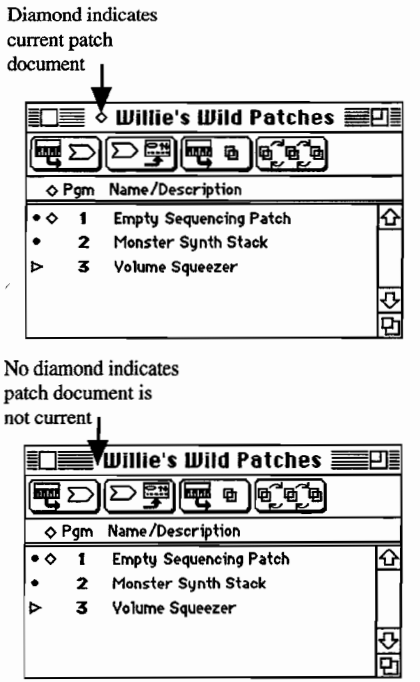


Figure 5-3: Indicating Current Patch Document

The current patch document always reflects the exact state of your Studio 5. Any changes made to a current patch document are reflected immediately in the Studio 5, and any time that a patch document is made current, the Patches in that document are sent immediately to the Studio 5.

Patch documents are based on the devices defined in the current Studio Setup document. If you make a different Studio Setup document current, your current patch document may not know about the devices in the new Studio Setup document. Similarly, the new Studio Setup document may not know about the devices referenced by the current patch document.

NOTE: *If you create two identical Studio Setup documents, with identical names for identical instruments on identical ports, OMS will see the devices as different unless you copy and paste the devices between the two documents.*

Making Patch Documents Current

- Choose **Save And Make Current** from the **File** menu.

You'll see a standard Macintosh Save As dialog box. Save the file in the same folder as your OMS Setup+Patches application. A diamond appears next to the patch document's name indicating that it is now the current patch document.

***NOTE**: If a patch document has already been saved, the **Save And Make Current** command becomes a **Make Current** command.*

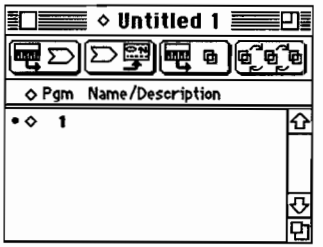


Figure 5-4: Current Patch Document

Adding Patches to a Patch Document

- Choose **New Patch** from the **Patch** menu, or type ⌘**P** to add a new patch to the document.

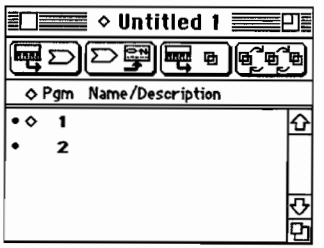


Figure 5-5: Adding a Patch

Selecting Patches

Unselected patches have a bullet dot to their far left. This is the patch selector dot. Selected patches have a small triangle instead of a bullet dot.

- Click a patch's selector dot to select a patch; the bullet will turn into a triangle.

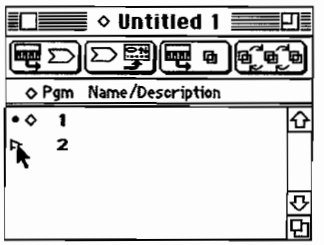


Figure 5-6: Selecting a Patch

- Shift-click other selector dots to select additional patches.

Making Patches Current

The diamond to the right of the selector dot is the current patch indicator. You make a patch current by clicking in the column where the diamond would appear, or by selecting a patch and choosing **Recall Patch** (⌘R) from the **Patch** menu.

- Click in the column to the right of Patch #2's selector dot.

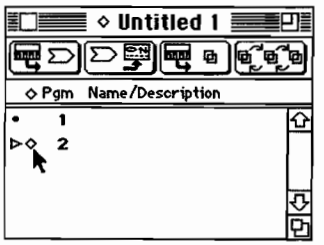


Figure 5-7: Making a Patch the Current Patch

Patch #2 becomes the current OMS patch (as indicated by the small diamond next to its number). The current patch is the patch that is being used by OMS and the Studio 5.

Copying and Pasting Patches

You can copy and paste whole patches to new locations. If, in the following example, you wanted to copy patch #3 as the basis for building a new patch, you would:

- Click Patch #3's selector dot to select it.
- Choose **Copy** (⌘C) from the **Edit** menu.

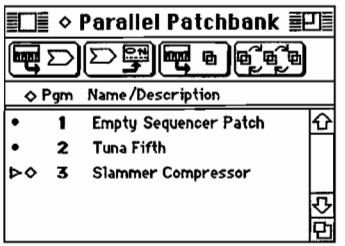


Figure 5-8: Selecting a Patch for Copying

- Choose **Paste** (⌘V) from the **Edit** menu.

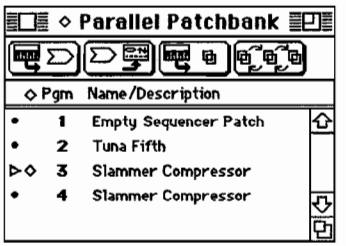


Figure 5-9: Pasting a Patch

Patch #3 is copied to the next available patch location which, in this case, is Patch #4. Patch #4 is now an exact duplicate of Patch #3.

NOTE: *When a patch document window is active, the* ***Paste*** *command always pastes a patch to the first undefined patch. You cannot paste a copied patch to an existing patch.*

Patches can also be cut to the Clipboard or cleared.

Changing Patch Order

You can rearrange patches by option-click-dragging a patch to a new location. In Figure 5-10, the patch document shown in A is re-ordered by option-clicking Patch 3 (as shown in B), dragging it between Patches 8 and 10 (as shown in C), and releasing the mouse (as shown in D).

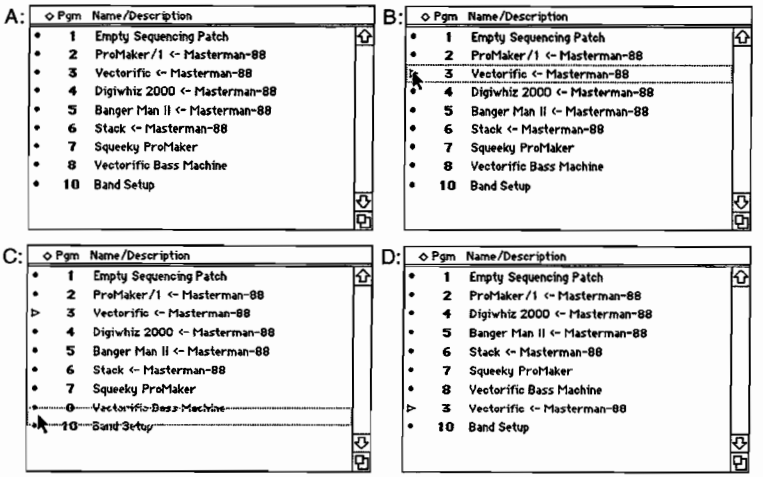


Figure 5-10: Re-ordering Patches

If you want to view your patch document in numerical order, select the **Sort by Patch Number** option from the **Patch** menu. This places a check mark to the left of the option. Patches will *always* be displayed in numerical order as long as **Sort by Patch Number** is checked. Selecting the command again will uncheck it. Patches can be displayed in *any* order when **Sort by Patch Number** is unchecked.

SEQUENCING PATCH CHANGES

You can sequence OMS Patches from an OMS-compatible MIDI sequencer.

If your OMS Folder contains an OMS Program Changes driver and the Macintosh finds a connected Studio 4 or Studio 5, OMS adds an invisible device called "OMS/S5 pgm chg" to your Studio Setup document. You can send program changes to this device on MIDI channel 16 to change the current OMS patch. The main purpose of the "OMS/S5 pgm chg" device is to let you sequence OMS Patch changes from a sequencer. To do so:

- Launch an OMS-compatible sequencer.
- Choose the "OMS/S5 pgm chg" device as the record sequence's MIDI destination.
- Record MIDI program changes into the sequencer.
- Play back the sequence. OMS Patches will change with each MIDI Program change.

PATCH EDITING WINDOW

This section discusses the terminology and techniques for working with patch editing windows.

Opening a Patch Editing Window

- Select a patch and choose **Edit Patch** from the **Patch** menu, or double-click its selector dot. A patch editing window will open.

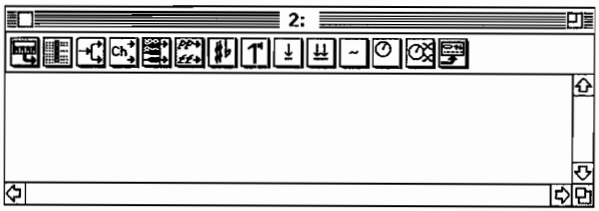


Figure 5-11: Empty Patch Editing Window

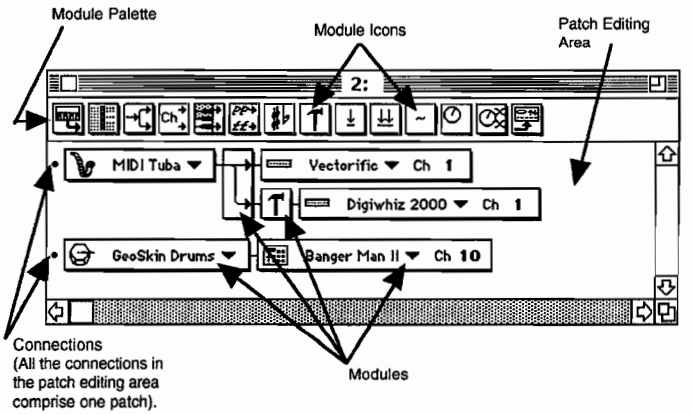


Figure 5-12: Anatomy of a Patch Editing Window

Figure 5-12 illustrates a basic patch editing window. The window contains a row of module icons across the top of the screen. Each of these icons represents a MIDI Source, MIDI Destination, or MIDI Processing module. The row of module icons is called a module palette. The patch editing area contains "connections", each of which comprises a MIDI Source module and all modules connected to its right. Any amount of MIDI processing can be applied to any connection. An OMS patch is made up of all the connections in the patch editing area.

IMPORTANT: *Since most sequencers control MIDI thruing from within the application, it's useful to keep patch #1 as an "empty" or "do nothing" patch for use with sequencer programs.*

Creating Connections

This section discusses the techniques needed to create connections. Don't worry if you don't understand the function of each module; they'll be discussed in the next chapter.

- Click the leftmost module icon in the module palette.

This is the MIDI Source (or controller) icon. When you click it, its name is shown to the right of the module palette.

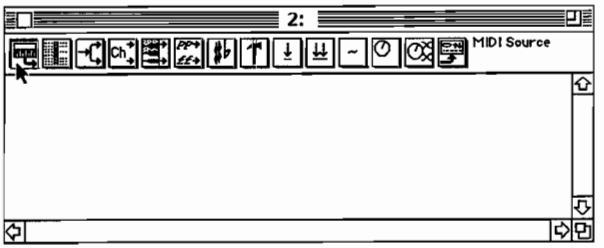


Figure 5-13: Click the MIDI Source Icon

- Move the cursor into the patch editing area.

The cursor will become a MIDI Source module icon.

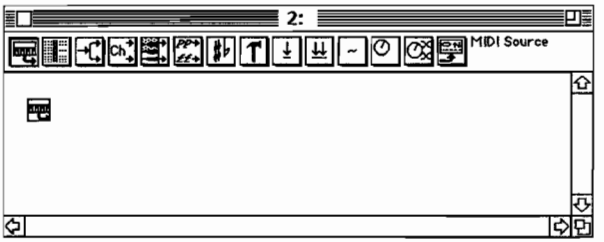


Figure 5-14: Cursor Becomes a Module Icon

- Click in the patch editing area to create an undefined connection.

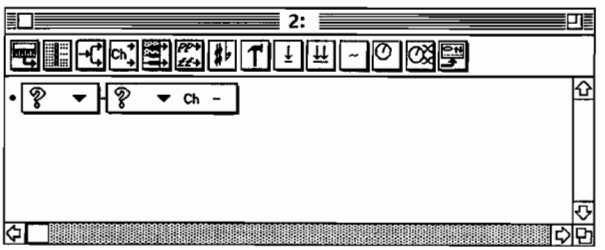


Figure 5-15: Creating an Undefined Connection

A connection appears as a selector dot along with some number of connected modules. Every connection needs both a MIDI Source and a MIDI Destination module (MIDI Source and MIDI Destination modules will be explained in the next chapter). When a MIDI Source module is first placed in the patch editing area, both an undefined MIDI Source module *and* an undefined MIDI Destination module appear. Each module contains a question mark until you choose a device from each module's pop-up menu.

- Click anywhere to the right of the MIDI Source module's question mark to see a pop-up menu of the devices defined in your current Studio Setup document.

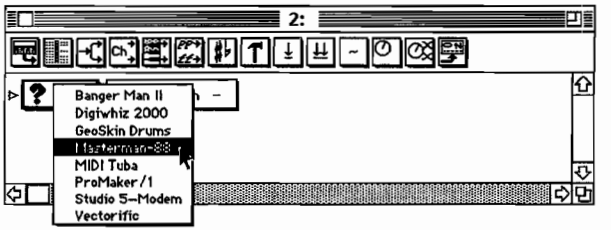


Figure 5-16: The Pop-Up Device Menu

- Select a device from the pop-up menu.

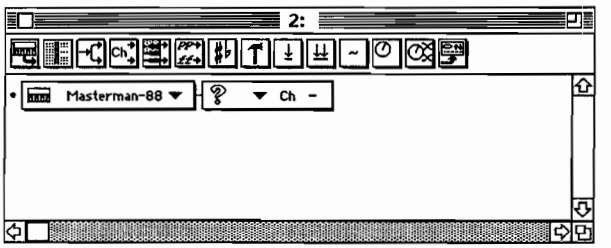


Figure 5-17: Defining a MIDI Source Device

- Click the pop-up menu triangle in the MIDI Destination module and choose a destination device.

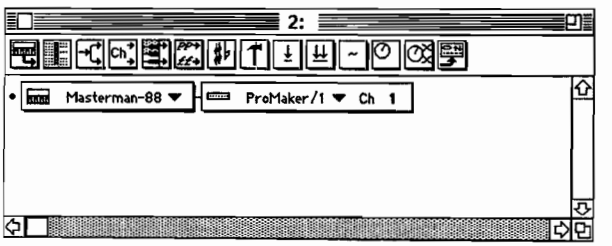


Figure 5-18: Defining a MIDI Destination Device

You've created a simple connection; the Masterman-88 sends MIDI data directly to Channel 1 of the ProMaker/1. When you play the Masterman-88, the ProMaker/1 will play on MIDI Channel 1.

Adding MIDI Processing

Use MIDI processing modules to filter, split, transpose, modify or map MIDI data in a variety of ways. In the following example, you'll add a Velocity Modifier module to your connection. Velocity Modifier modules (and other MIDI processing modules) are discussed in the next chapter.

- Click the Velocity Modifier Module icon (the little hammer) in the module palette. Its name is shown to the right of the module palette.

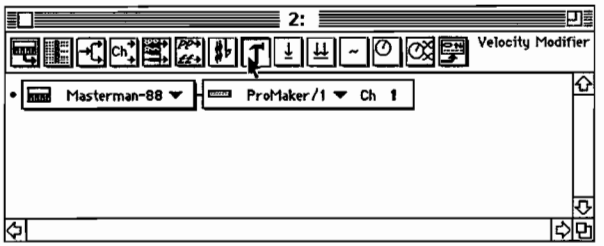


Figure 5-19: Click the Velocity Modifier Icon

- Move the cursor into the patch editing area. The cursor will become a Velocity Modifier module icon (little hammer).
- Position the cursor over the space between the MIDI Source and MIDI Destination modules. The area becomes highlighted.

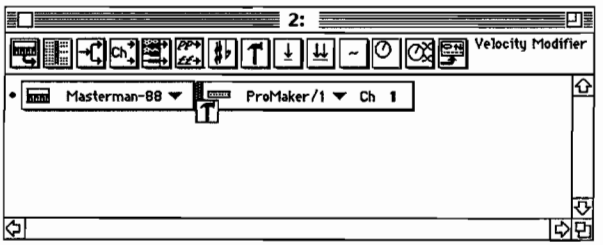


Figure 5-20: Positioning a Processing Module

- Click the mouse to insert the module.

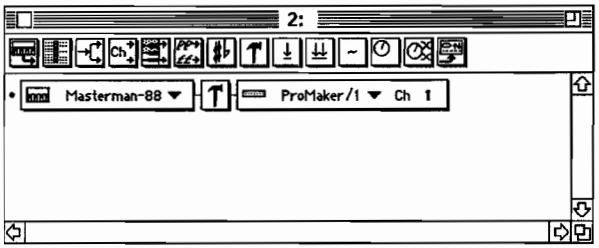


Figure 5-21: Inserting a Processing Module

Selecting Modules and Connections

You can select a module or group of modules for cutting, copying, or pasting. To select a module, click anywhere within it. A selected MIDI Source or MIDI Destination module will have a thick border. A selected MIDI processing module becomes highlighted.

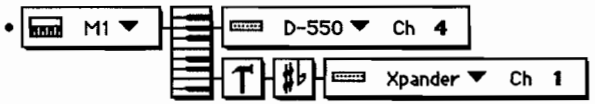


Figure 5-22: Unselected Modules

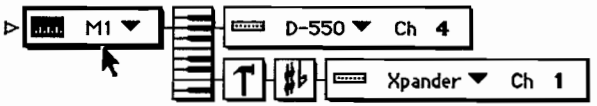


Figure 5-23: Single Selected Module

Shift-clicking a second module when one is already selected will select the second module *and* all modules between it and the first one.

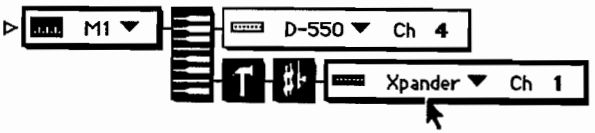


Figure 5-24: Shift-Clicking a Second Module

You can also select multiple modules by clicking in the white space around them and dragging out a rectangle. All modules that intersect the rectangle become selected.

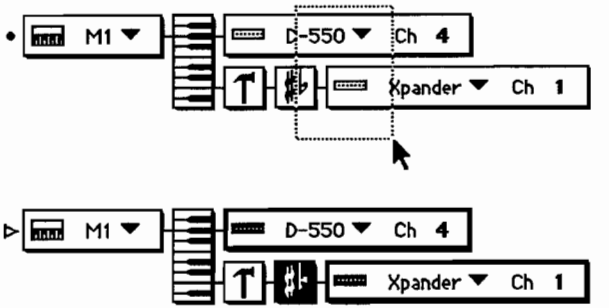


Figure 5-25: Dragging to Select Modules

You can select all modules in a connection by clicking the selector dot to the left of the modules.

Figure 5-26: Selecting All Modules

Command-clicking modules (⌘-click) will either add or remove them from the selection. An unselected module becomes selected. A selected module becomes deselected. In the example, below, ⌘-click the Velocity Modifier module to deselect it.

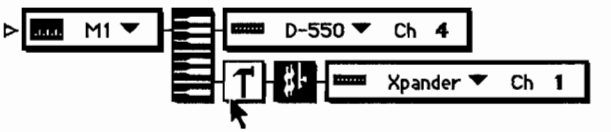


Figure 5-27: Command-Click to Deselect Modules

Copying/Pasting Modules and Connections

You may cut, copy, or clear selected modules. You cannot, however, cut or clear a Splitter module if it has more than one output. To remove a Splitter module, you must first remove either all or all but one of its outputs.

You can paste a cut or copied module to a new location by clicking the desired location and selecting the **Paste** command. The contents of the Clipboard are inserted into the selected space.

In the following example, copy the Velocity Modifier module to the Clipboard by clicking it, then choosing **Copy** from the **Edit** menu.

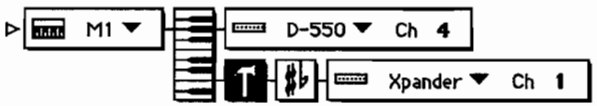


Figure 5-28: Selecting and Copying a Module

- Place an insertion point between the Splitter module and the D-550 Destination module by clicking the blank space between them (the space becomes highlighted).

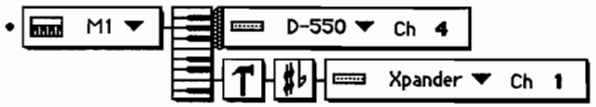


Figure 5-29: Selecting a Paste Location

- Choose **Paste** from the **Edit** menu to paste a copy of the Velocity Modifier module and all of its parameters.

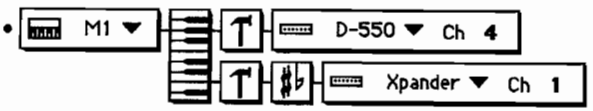


Figure 5-30: Pasting a Module

You may copy and paste entire connections without selecting a paste destination. The pasted connection appears below all other connections in the patch editing area.

You may also clear selected modules and connections, or cut them to the Clipboard.

Changing Connection Order

You can rearrange the patch editing area by option-dragging any connection's selector dot.

- Option-click the top connection's selector dot.

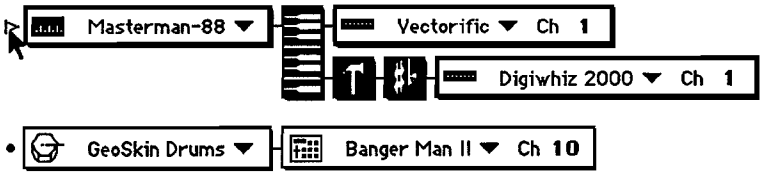


Figure 5-31: Selecting a Connection

- While still holding the mouse button, drag the entire connection below the lower connection. Release the mouse button to see the new connection order.

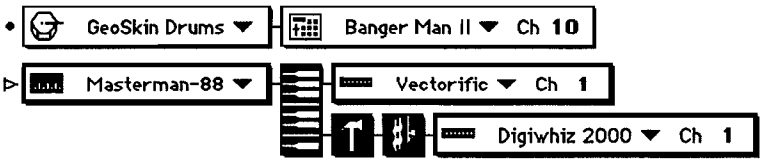


Figure 5-32: Option-Dragging a Connection

Source/Destination Muting

You can mute any number of MIDI Source or Destination modules. Muting Source and Destination modules allows you to concentrate only on specific sections of complex OMS patches.

To mute a MIDI Source module or MIDI Destination module, double-click its device icon. The module is greyed out. To un-mute the module, double-click its device icon, again.

As an example, suppose you have the connection shown in Figure 5-33.

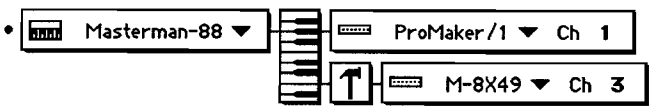


Figure 5-33: Simple Connection

- Double-click the M-8X49 device icon to mute the module. When you play the Masterman-88, you will hear only the ProMaker/1.

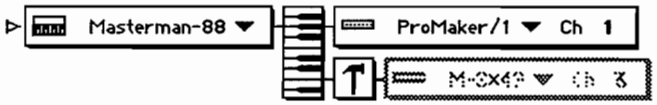


Figure 5-34: Muted Destination Module

- Double-click the M-8X49 device icon to enable the module, then double-click the Masterman-88 device icon to mute that MIDI Source module. Anything you play or do on the Masterman-88 will be ignored by the ProMaker/1 and M-8X49 modules.

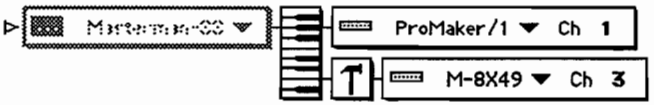


Figure 5-35: Muted Source Module

***NOTE**: To mute a source or destination, be sure to double-click the device icon, not the device name.*

6 Patch Modules

This chapter describes how to configure and use each of the modules in the Module Palette.

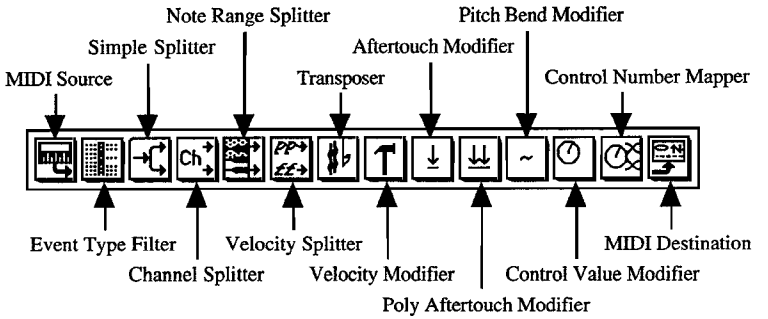


Figure 6-1: Anatomy of a Module Palette

MODULE EDITING BASICS

You can edit a module once it's part of a connection. Adding modules to connections was discussed in the previous chapter. To access the editing window of any module (except the MIDI Source module, MIDI Destination module, or Simple Splitter module) simply double-click the module in a connection.

You can edit most modules using numerical editing techniques (as discussed in your OMS manual). You can also edit the following parameters from a MIDI controller:

- control number selection in any highlighted control number pop-up menu
- Transposer map note numbers
- Note numbers in a Note Range Splitter module
- Velocity levels in a Velocity Splitter module

Select the device (or devices) you'll use for MIDI editing by choosing **Controllers for MIDI Editing** from the **Patch** menu. This produces a dialog containing a list of all devices defined in your current Studio Setup document. Select (highlight) those items you wish to enable for MIDI data entry. If you don't plan to use a MIDI controller to edit patches, it's best to disable all controllers. That way you can't accidentally edit a module by playing your MIDI controller.

The following sections discuss each module in detail.

Figure 6-2: MIDI Source Module

As its name implies, a MIDI Source module represents a source of MIDI data. Use the MIDI Source module to choose which device's MIDI output you wish to route to other devices. When you first insert a MIDI Source module, a question mark appears. To define a MIDI Source module:

- Click anywhere to the right of the question mark to open a pop-up source menu. This menu contains all sources as defined in the current Studio Setup document. It also contains any Virtual Controllers that are defined in the current patch document (Virtual Controllers are discussed in Chapter 7).
- Choose a device from the pop-up menu to define the MIDI Source module.

The Studio 5 can also be a source of MIDI data. Timing information (MTC, DTL, DTLe), footswitches (FS1, FS2), and foot controller data (FC1) are sent from the Studio 5. Also, the Studio 5 is a note source when Audio In is enabled and in use. Select the Studio 5 as the MIDI source if you wish to use timing data, footswitches, the foot controller, or Audio Input in an OMS patch.

You can change the device assigned to a MIDI Source Module at any time by clicking the device name and choosing a new device from the pop-up menu.

Referencing Non-Current Studio Setup Documents

MIDI Source modules reference the devices in the current Studio Setup document. If the device name in a MIDI Source module is italicized, then the current patch document probably references a non-current Studio Setup document. You can re-define the module by:

a) making the old Studio Setup document current, or

b) selecting a different device for every module that is italicized.

If you want to use the current patch document with your new current Studio Setup document, copy the devices from your original Studio Setup document into your current Studio Setup document.

NOTE: If you create two identical Studio Setup documents, with identical names for identical instruments on identical ports, OMS will see the devices as different unless you copy and paste the devices between the two documents.

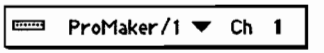


Figure 6-3: MIDI Destination Module

A MIDI Destination module represents the device that is the final recipient of MIDI data. When you first insert a MIDI Destination module, a question mark appears. To define a MIDI destination:

- Click anywhere to the right of the question mark to open a pop-up destination menu. This menu contains all destinations as defined in the current Studio Setup document. It also contains any Virtual Instruments that are defined in the current patch document (Virtual Instruments are discussed in Chapter 7).
- Choose a device from the pop-up menu to define the MIDI Destination module.

You can change the device assigned to a MIDI Destination Module at any time by clicking the device name and choosing a new device from the pop-up menu.

Use the MIDI Destination module's channel numerical to channelize MIDI data. Set it to a value of 1-16 to channelize the incoming MIDI data. Set it to "–" if you do not want to change the incoming MIDI channel number. Figure 6-4 illustrates use of the MIDI channel numerical.

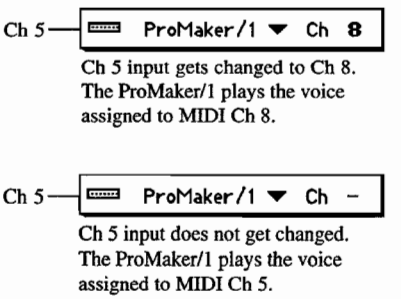


Figure 6-4: Destination Module Channelizing Example

MIDI Destination modules, like MIDI Source modules, reference the current Studio Setup document. If device names are italicized, the MIDI Destination module probably references a non-current Studio Setup document. See "Referencing Non-Current Studio Setup Documents" in the previous section for more details.

Figure 6-4: Event Type Filter Module

An Event Type Filter module removes various types of MIDI events from the data stream. Double-click its icon after inserting it into the connection. You'll see a dialog box similar to the one shown in Figure 6-5.

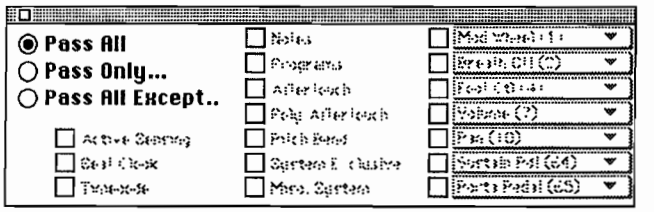


Figure 6-5: Event Type Filter Edit Window

The three radio buttons control whether the filter will **Pass All** events (useful for temporarily disabling the filter), **Pass Only** certain types of events, or **Pass All Except** certain events.

Checked boxes remove those event types when **Pass All Except** is chosen. Checked boxes pass those event types through the filter when **Pass Only** is chosen.

In the following example, only notes are passed through the Event Type Filter module. All other MIDI events are filtered out.

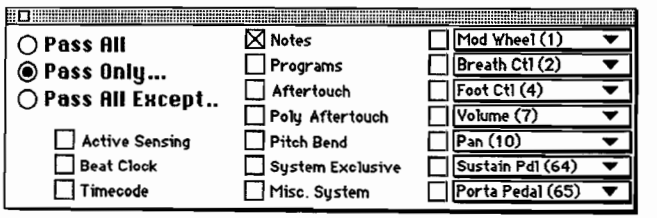


Figure 6-6: Passing Only Notes Through Filter

You can filter up to seven MIDI continuous controls; choose them from the pop-up menus next to the rightmost column of check boxes.

Most message types are self-explanatory. "Beat Clock" includes Song Position Pointer, Song Select, Timing Clock, Start, Stop, and Continue messages. "Misc. System" includes Tune Request, System Reset, and undefined MIDI status bytes 0xF4, 0xF5, 0xF9, and 0xFD.

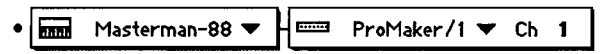
TIP: The Event Type Filter module is useful for "thinning" the MIDI data stream prior to sending it to a Splitter module (discussed in the following section). A Splitter module can and often does increase the amount of MIDI data, so it's desirable to remove unwanted data before it's duplicated by a Splitter module.

NOTE: DTL, DTLe, Full Messages and User Bits messages will not pass properly through an Event Type Filter unless System Exclusive events are allowed to pass. Also, DTL and DTLe will not pass through unless clock is also passed.

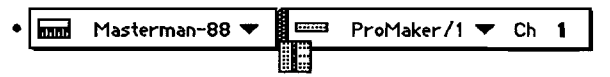
Event Type Filter Module Example

Assume that you want your Masterman-88 keyboard to play the ProMaker/1, but that you don't want the ProMaker/1 to respond to polyphonic aftertouch data.

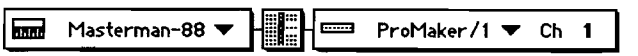
- Choose **New Patch** from the **Patch** menu.
- Double-click the new patch's selector dot to open a blank patch editing window.
- Click the MIDI Source module, then move the cursor into the patch editing area and click. You will create an undefined connection.
- Choose the Masterman-88 from the pop-up MIDI source menu and the ProMaker/1 from the pop-up MIDI destination menu (obviously, these synthesizers won't be in your Studio Setup document, but are presented here as an example).



- Click the Event Type Filter module, and move the cursor between the Source and Destination modules. The area becomes highlighted.



- Click the mouse to insert the Event Type Filter module.



- Double-click the Event Type Filter module to open its edit window.
- Choose **Pass All Except** and check the **Poly Aftertouch** box to pass all MIDI events except polyphonic aftertouch through to the ProMaker/1 sound module.

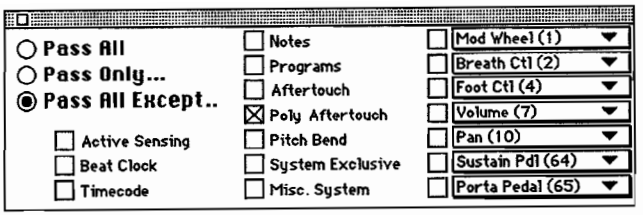


Figure 6-7: Filtering Poly Aftertouch

- Choose **Save** from the **File** menu.

In the future, when you need to play the ProMaker/1 with polyphonic aftertouch data filtered out, you can select this patch.

SPLITTER MODULES

Figure 6-8: Splitter Module Group

A Splitter module takes a single MIDI source and sends it to multiple destinations. There are four kinds of Splitter modules:

1) Simple
2) Channel
3) Note Range
4) Velocity

If any Splitter module routes two or more of its outputs to the same channel of the same device, OMS ensures that the destination device and channel does not receive duplicate MIDI data. If, however, you modify one of the splitter output's MIDI data streams, then the destination device and channel receives two MIDI data streams.

For example, if you simply split a MIDI data stream into two separate streams then route both streams to the same device and channel, OMS ensures that only one stream reaches the destination. But, if you modify one of the streams (such as transposing a stream up an octave) before routing both streams to the same device and channel, OMS allows both MIDI data streams to reach their destination since they are no longer identical. In this example, notes and polyphonic aftertouch events are both affected by transposition and are both sent to the destination; other events (such as sustain pedal or pitch bend) are sent to the destination only once.

If, for any reason, you wish to send duplicate MIDI events to the same channel of the same device, split the controller into two Virtual Controllers and route them separately. Virtual Controllers are discussed in Chapter 7.

This discussion on Splitter modules will first cover common Splitter editing techniques and then describe each of the four Splitter modules in detail.

Adding Outputs to a Splitter Module

When you first insert a Splitter module into a connection, it doesn't perform as a splitter since it has only one output. However, you may still use it to limit the range of notes, velocities or channels sent to a single device.

Figure 6-9: Note Range Splitter With One Output

To create a second output from the Splitter module:

- Click any module icon in the palette (except the MIDI Source module icon).
- Position the cursor below the Splitter module to highlight the area.

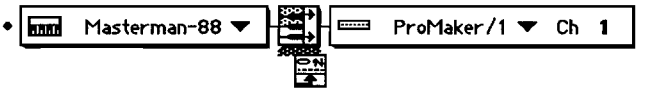


Figure 6-10: Adding Additional Splitter Outputs

- Click the mouse and the connection looks as shown in Figure 6-11.

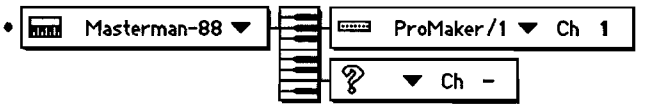


Figure 6-11: Splitter With Two Outputs

- Choose a device for the second destination module.

You can add as many outputs as necessary underneath the splitter using the same techniques.

Editing Splitter Modules

You can edit Channel, Note Range, and Velocity Splitter modules. You cannot edit Simple Splitter modules.

- Double-click anywhere within an editable Splitter module to open its editing window.

Splitter module editing windows contain one line for each output of the splitter. In Figure 6-12, the top keyboard edits the note range of the ProMaker/1 (the top MIDI Destination module) and the bottom keyboard edits the note range of the Vectorific (the bottom MIDI Destination module).

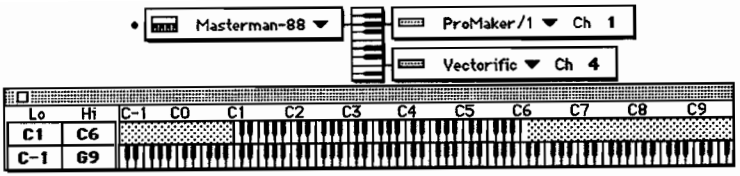


Figure 6-12: Note Range Splitter Module

- Move the cursor over an editing line to highlight that splitter output in the connection.

Notice, in Figure 6-13, that the top splitter output is highlighted when the cursor is over the top editing line, and that the bottom splitter output is highlighted when the cursor is over the bottom line. This makes it easy, when an input is split into many outputs, to keep track of which splitter output you are editing.

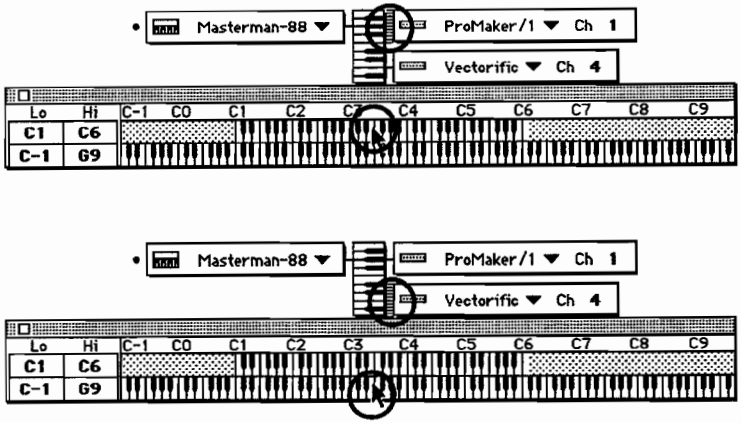


Figure 6-13: Highlighting a Splitter Segment

***NOTE:** A splitter module must have something connected to its output in order to be edited.*

Editing Note Range and Velocity Splitters with MIDI

You can use a MIDI controller to set note numbers in a Note Range Splitter module or to set velocity levels in a Velocity Splitter module.

Assume, for example, that your Studio Setup document looks like the one shown in Figure 6-14, and that you want to edit Note Range Splitter modules and Velocity Splitter modules using either your Masterman-88 keyboard or your MIDI Tuba.

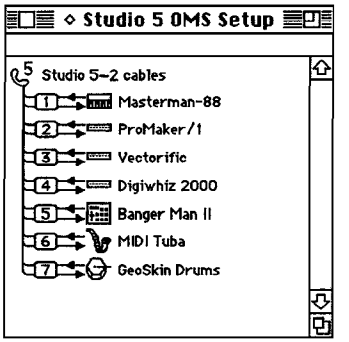


Figure 6-14: Sample Studio Setup Document

- Choose **Controllers for MIDI Editing** from the **Patch** menu to produce a dialog containing a list of all devices defined in your current Studio Setup document.

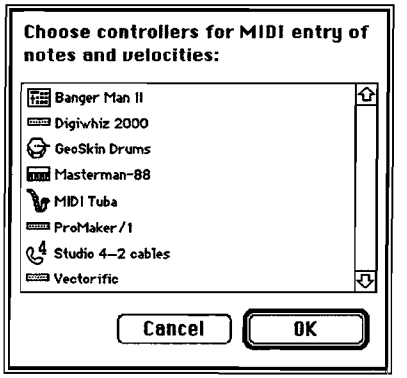


Figure 6-15: MIDI Entry Controller Selection Window

- Choose the Masterman-88 and the MIDI Tuba by clicking them. Highlighted devices are enabled for MIDI entry of notes and velocities. Non-highlighted devices are not enabled.

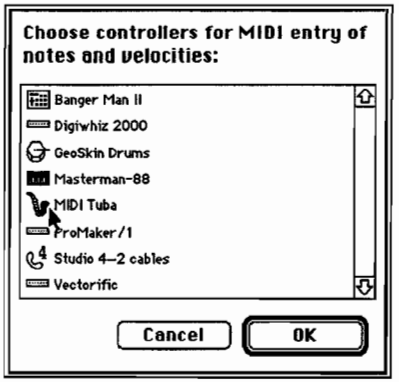


Figure 6-16: Selecting Controllers for MIDI Entry of Notes and Velocities

You can now use either the Masterman-88 or the MIDI Tuba to enter note and velocity data into patch editing modules. Simply highlight a note or velocity numerical and hit a note on either controller—this will set the numerical to the MIDI value generated by the master controller.

Gang Editing Note Range and Velocity Splitters

In both the Note Range and Velocity splitter modules, you can edit multiple outputs simultaneously by holding down the shift key while you make changes to one of the outputs. This is called "gang editing". Gang editing affects those outputs that are either equal to or within a value of "1" from the edited output. This makes gang editing particularly useful for editing one splitter output's high limit by the same amount as the other output's low limit.

Suppose, for example, that you have designed the patch shown in Figure 6-17, but that the velocity split point (set at 63/64) is too low. You want to raise the split point to 85/86.

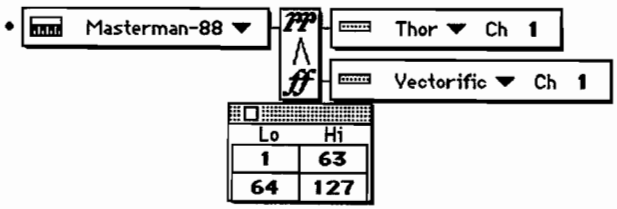


Figure 6-17: Velocity Split Patch

- Shift-click the top output's Hi velocity value and drag the mouse up until the numerical is set for 85. The bottom output's Lo velocity value changes automatically to a value of 86.

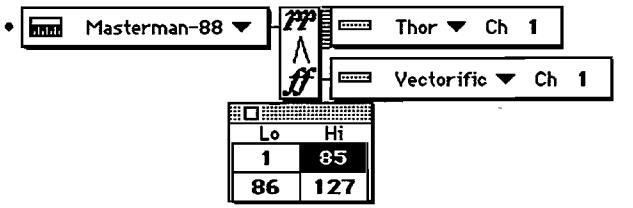


Figure 6-18: Gang Editing Velocity Split Points

Simple Splitter Module

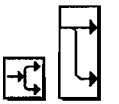


Figure 6-19: Simple Splitter Module

A Simple Splitter module sends one MIDI source to multiple destinations. A Simple Splitter module has no edit window.

Channel Splitter Module

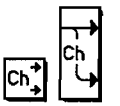


Figure 6-20: Channel Splitter Module

The Channel Splitter module splits the MIDI data by channel and, if desired, changes each output's MIDI channel. To open an edit window, insert a Channel Splitter module into a connection, then double-click the module.

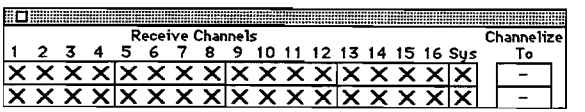


Figure 6-21: Channel Splitter Edit Window

Each row in the window controls which channels in the MIDI data stream are passed through to the corresponding splitter output. A checked channel passes data, an unchecked channel doesn't. **Sys** includes all MIDI System messages—system exclusive, MIDI Time Code, song select, tune request, clock, and system reset. The **Channelize To** numerical lets you change all the events passed to an output to the same MIDI channel. The "–" character means that the data is passed through without having its channel changed.

Read through the following examples to gain a better understanding of the Channel Splitter module.

Channel Splitter Module Examples

Follow the signal path through these next two connections to understand Channel Splitter modules and channelizing.

- Example 1: Look at Figure 6-22. Notice that the top of the Channel Splitter receives data on MIDI Channel 1. It is not channelized, so it exits the Splitter module on MIDI Channel 1. The top MIDI Destination module channelizes the MIDI data from Channel 1 to Channel 4. This means that the ProMaker/1 plays the voice assigned to MIDI Channel 4. The bottom half of the Channel Splitter module receives data on MIDI Channel 2 and channelizes it to MIDI Channel 3. The Vectorific MIDI Destination module is set to Channel "-", meaning that data received at its input is not channelized. Therefore, the Vectorific plays the voice assigned to MIDI Channel 3.

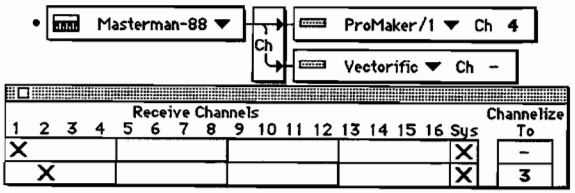


Figure 6-22: First Channel Splitter Example

- Example 2: Look at Figure 6-23. The top half of the connection hasn't changed, but the bottom half is different. Notice that data is still received by the Channel Splitter module on Channel 2, channelized to MIDI Channel 3, and sent out the Splitter module. The Vectorific MIDI Destination module is now set to MIDI Channel 1. This means that data entering the MIDI Destination module is channelized *again* to MIDI Channel 1, and that the Vectorific plays the voice assigned to MIDI Channel 1.

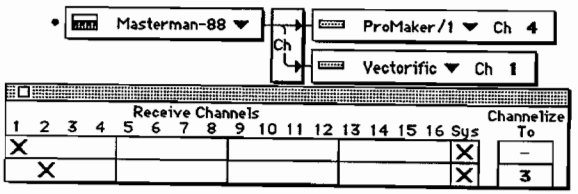


Figure 6-23: Second Channel Splitter Example

Note Range Splitter Module

Figure 6-24: Note Range Splitter Module

The Note Range Splitter module limits the range of MIDI notes (and polyphonic aftertouch events) routed to each output of the splitter. To open its edit window, insert a Note Range Splitter module into a connection, then double-click the module.

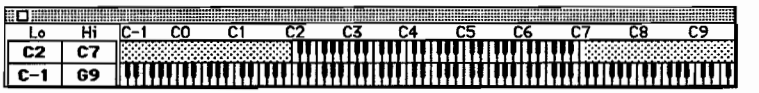


Figure 6-25: Note Range Splitter Edit Window

The edit window contains one line for each of the Splitter's outputs. You can edit each output's note range with the numericals, the graphic keyboard, or MIDI entry. When you click the lower half of the keyboard, all notes below the click point will disappear, and the numericals will indicate the new note range. Similarly, clicking high on the keyboard will remove notes above the click point. Clicking and dragging changes the note range as you move the mouse back and forth across the keyboard. You can change split points by "gang editing" as discussed earlier.

MIDI events other than notes and polyphonic aftertouch pass through to all outputs of the splitter.

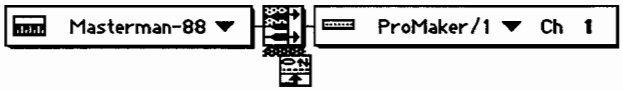
Note Range Splitter Module Example

Assume, for example, that you want to split your Masterman-88 keyboard to produce a right-hand melody sound on Channel 1 of the ProMaker/1 and a left-hand bass sound on Channel 1 of the Vectorific.

- Create a new patch and define your Source and Destination modules as discussed previously.

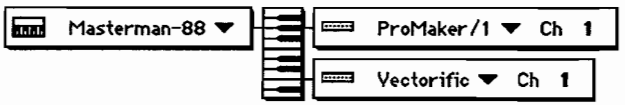
- Add a Note Range Splitter module between the MIDI Source and MIDI Destination modules.

- Click the MIDI Destination module icon and move the cursor below the Note Range Splitter module. The area below the Splitter module becomes highlighted.

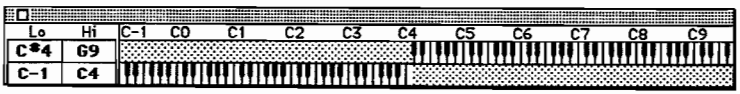


- Click the mouse to add a new, undefined MIDI Destination module.

- Select the Vectorific from the MIDI Destination module's pop-up device menu.
- Select MIDI Channel 1 in the MIDI Destination module's Channel numerical.



- Double-click the Note Range Splitter module and enter note ranges for each Splitter module output.



As shown here, all notes from C#4 to G9 will be played by the upper MIDI Destination module (the ProMaker/1) and all notes from C-1 to C4 will be played by the bottom MIDI Destination module (the Vectorific).

Velocity Splitter Module

Figure 6-26: Velocity Splitter Module

The Velocity Splitter module allows notes with only specific ranges of note-on key velocities to pass through to each output of the Splitter module. To open an editing window, insert a Velocity Splitter module into a connection, then double-click the module.

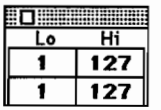


Figure 6-27: Velocity Splitter Edit Window

Like the Channel and Note Range Splitter modules, each row corresponds to one output of the splitter. You can enter velocity values with either numerical or MIDI input. You can "gang edit" multiple velocity values as discussed previously. Only notes with velocities within the specified range will pass through to the Splitter module's output.

MIDI events other than notes are passed through to all outputs of the splitter.

NOTE: *Some notes may be cut off early when transposing the outputs of a velocity splitter and playing chords.*

TRANSPOSER MODULE

Figure 6-28: Transposer Module

Use the Transposer module to transpose note and polyphonic aftertouch events. You can edit the Transposer module with either a simple edit window or a map edit window.

Opening and Using a Simple Transposer Edit Window

To open a simple Transposer edit window:

- Insert a Transposer module into a connection.
- Double-click the module. A simple Transposer edit window opens as shown in Figure 6-29.

Figure 6-29: Simple Transposer Edit Window

The transposition interval is expressed musically, not as a number of half-steps. If you prefer thinking in terms of half-steps, type the number of half steps into the numerical, then hit the Return or Enter keys. Negative values transpose downward and positive values transpose upward. The Transposer module in Figure 6-29 will transpose the MIDI note values up 1 octave plus a Major 2nd (14 half-steps).

Figure 6-30 shows the relationship between intervals and half-step values.

m2	minor second	1 half-step
M2	major second	2 half-steps
m3	minor third	3 half-steps
M3	major third	4 half-steps
P4	perfect fourth	5 half-steps
#4	sharp fourth (tritone)	6 half-steps
P5	perfect fifth	7 half-steps
m6	minor sixth	8 half-steps
M6	major sixth	9 half-seps
m7	minor seventh	10 half-steps
M7	major seventh	11 half steps
+1 oct	up one octave	12 half steps

Figure 6-30: Relation of Intervals to Half-Steps

NOTE: *Transposer modules change MIDI note numbers. They do not actually alter the internal tuning of your synthesizers. The musical intervals expressed in the Transposer module are based on standard Equal Temperament. Actual tuning amounts will change if you use alternate synthesizer tuning scales.*

Opening and Using a Map Transposer Edit Window

To open a map Transposer edit window:

- Click the **Map** button in the simple Transposer edit window.

A map Transposer edit window opens to show the current conditions of the simple Transposer edit window (as seen in Figure 6-31).

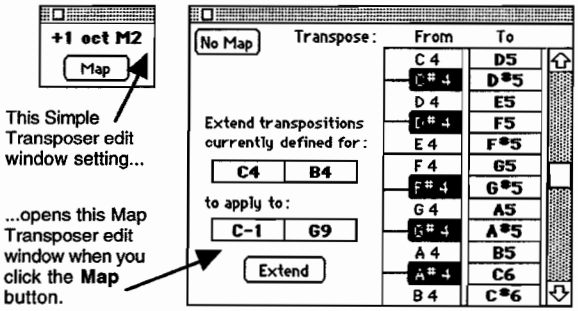


Figure 6-31: Opening the Map Transposer Edit Window

The scrolling keyboard along the right edge of the window lets you map any MIDI note to any other MIDI note. Use the **To** numerical to transpose each individual note (you can set each numerical using MIDI entry—see "Module Editing Basics" earlier in this chapter).

The controls in the left half of the window allow you to duplicate the transpositions defined in one note range for any other note range. For example, the default setting lets you create a tranposition map for the twelve notes of one octave, then duplicate these transpositions for all octaves. Use the four numericals to set the two ranges, then click the **Extend** button to perform the extension.

NOTE: *You may want to define some commonly used transposition maps as either virtual controllers or virtual instruments, and then use the virtual controller or instrument instead of a map in your OMS patches. Virtual Controllers and Virtual Instruments are discussed in Chapter 7.*

Maps use a relatively large amount of memory in your Studio 5, so if you find yourself using the same map in multiple places in the same patch document, you'll use less memory by putting maps into virtual controllers or virtual instruments.

Choosing Between a Simple or Map Transposition

If you click the map edit window's close box, the map edit window closes and the Transposer module will use that map to transpose MIDI data. The map edit window opens the next time you double-click that Transposer module.

If you click the **No Map** button, you'll delete your custom map, close the map edit window, and re-open the simple edit window. The Transposer module will use the simple edit window to transpose MIDI data.

MODIFIER MODULES

Figure 6-32: Modifier Module Group

Use Modifier modules to alter note-on velocities, mono aftertouch, poly aftertouch, pitch bend and MIDI control values. Each Modifier module uses either a simple Modifier edit window or a map Modifier edit window to modify MIDI data.

Opening and Using a Simple Modifier Edit Window

To open a simple Modifier module edit window:

- Insert a Modifier module into a connection.
- Double-click the new module. A simple Modifier edit window opens as shown in Figure 6-33 .

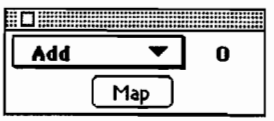


Figure 6-33: Typical Simple Modifier Edit Window

Each Modifier module's simple edit window contains a pop-up menu of modifiers. The choices are **Add, Scale, Invert, Max Limit, Min Limit, Set To**, and **Filter Out**. The modification amount is set by the numerical to the right.

Add will add the specified number to each MIDI data value. Positive and negative values may be used. **Scale** will scale the value by the specified percentage: 100% is unchanged, 50% halves each value, 199% (the maximum) nearly doubles each value (you cannot have values greater than 127 or less than 0, however). **Invert** changes 127->0, 126->1, 125->2 ... 1->126, and 0->127 except in the case of velocity where 0 (a note off) is left unchanged. **Max Limit** reduces all values higher than the specified value down to the limit you enter. Similarly, **Min Limit** increases all values lower than the specified value up to the limit you enter. **Set To** changes all values to the one you enter. **Filter Out** (which is not allowed for velocity) removes the event type completely.

Opening and Using a Map Modifier Edit Window

To open a Modifier module's map edit window:

- Click the **Map** button in the Simple Modifier edit window.

A map Modifier edit window opens to show the current conditions of the Simple Modifier edit window (as seen in Figure 6-34).

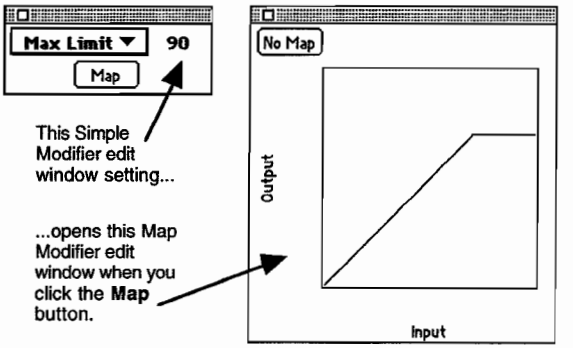


Figure 6-34: Opening a Map Modifier Edit Window

Click and drag inside the mapping area to create a new modifier map. The current cursor location's input value is shown below the map and its re-mapped value is shown to the left. MIDI data entering the Modifier module gets modified according to the curve.

Figure 6-35 illustrates a simple S-curve map—low and high input values result in very little output change, but middle input values create great changes in output values. Notice, as an example, that a value of 76 entering the Modifier module gets remapped to 95 before leaving the module.

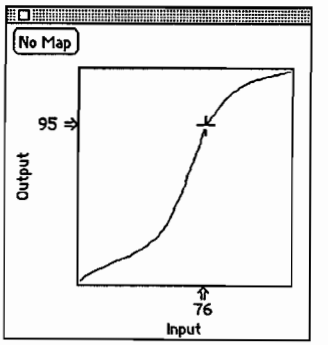


Figure 6-35: Simple S-Curve Modifier Map

To draw a straight line between two points, click at one end point, then shift-click at the other end point (see Figure 6-36).

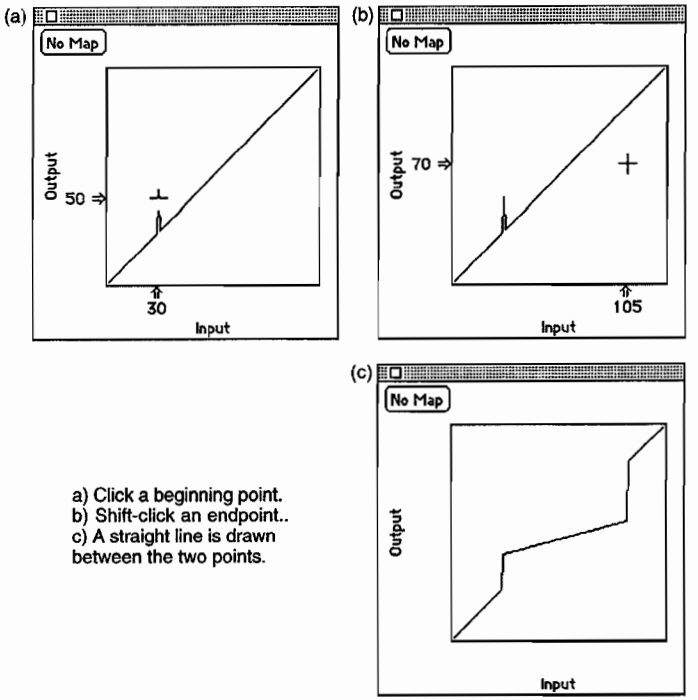


Figure 6-36: Drawing Straight Lines

NOTE: *You may want to define some commonly used modifier maps as either virtual controllers or virtual instruments, and then use the virtual controller or instrument instead of a map in your OMS patches. Virtual Controllers and Virtual Instruments are discussed in Chapter 7.*

Maps use a relatively large amount of memory in your Studio 5, so if you find yourself using the same map in multiple places in the same patch document, you'll use less memory by putting maps into virtual controllers or virtual instruments.

Choosing Between Simple and Map Modifiers

If you click the map edit window's close box, the map edit window closes and the Modifier module will use that map to modify MIDI data. The map edit window opens the next time you double-click that Modifier module.

If you click the **No Map** button, you'll delete your custom curve, close the map edit window, and re-open the simple edit window. The Modifier module will use the simple edit window settings to modify MIDI data.

Velocity Modifier

Figure 6-37: Velocity Modifier Module

Double-click the Velocity Modifier module to open its edit window. You can modify velocity values using either the simple or map edit windows. You cannot filter out velocity data, nor can you invert a note-off value of 0 (zero).

Aftertouch Modifier

Figure 6-38: Aftertouch Modifier Module

Double-click the Aftertouch Modifier module to open its edit window. You can modify mono aftertouch values using either the simple or map edit windows.

Poly Aftertouch Modifier

Figure 6-39: Poly Aftertouch Modifier Module

Double-click the Polyphonic Aftertouch Modifier module to open its edit window. You can modify poly aftertouch values using either the simple or map edit windows.

Pitch Bend Modifier

Figure 6-40: Pitch Bend Modifier Module

Double-click the Pitch Bend Modifier module to open its edit window. You can modify pitch bend values using either the simple or map edit windows.

Control Value Modifier

Figure 6-41: Control Value Modifier

Double-click the Control Value Modifier to open its edit window. This window contains an additional pop-up menu for choosing which MIDI continuous control value to modify.

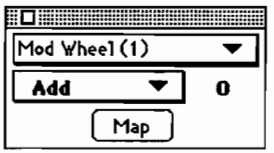


Figure 6-42: Control Value Modifier Edit Window

The Control Value Modifier module contains a small number in its lower right corner. This indicates the number of the control being modified.

Figure 6-43: Control Number Indicator

CONTROL NUMBER MAPPER MODULE

Figure 6-44: Control Number Mapper Module

The Control Number Mapper module changes one type of MIDI control message into another. To open an edit window for the Control Number Mapper module, insert it into a connection, then double-click the module.

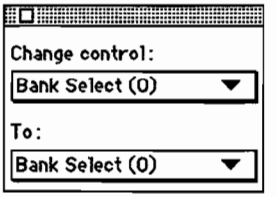


Figure 6-45: Control Number Mapper Edit Window

The Control Number Mapper Module's edit window contains two pop-up menus. Choose the old control number from the top pop-up menu. Use the bottom pop-up menu to choose the new control number.

Control Number Mapper Module Example

Assume, for example, that you wanted to play your Vectorific sound module from your Masterman-88 keyboard, and that you wanted to control the Vectorific's volume with the Masterman-88 modulation wheel.

- Create a connection with the Masterman-88 as the MIDI source and the Vectorific as the MIDI destination.
- Insert the Control Number Mapper module into the connection, then double-click it to open its edit window.
- Choose "Mod Wheel (1)" from the upper pop-up menu.
- Choose "Volume (7)" from the lower pop-up menu.

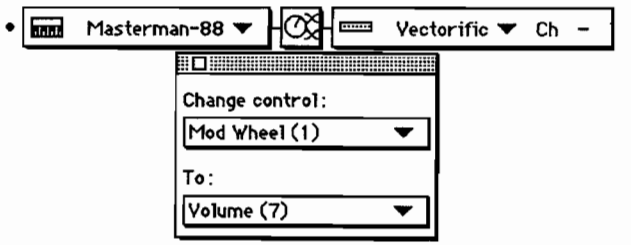


Figure 6-46: Mapping Mod Wheel to Volume

The Masterman-88 modulation wheel now controls the Vectorific's output volume.

7 Virtual Controllers and Virtual Instruments

Virtual Controllers and Virtual Instruments are extremely powerful features of OMS patches. Basically, they're enhanced versions of the MIDI devices defined in your current Studio Setup document. Any number of Virtual Controllers and Virtual Instruments can be stored within a patch document.

A Virtual Controller is the output of a MIDI device plus some form of MIDI processing. A Virtual Controller is treated the same as any other MIDI controller defined in your current Studio Setup document, except that it enhances the performance of a MIDI controller by adding MIDI processing. Virtual Controllers have two important uses:

1) They are used when common MIDI processing connections need to be used in multiple OMS patches.
2) They are used as sequencer inputs when you need to record a MIDI controller with some processing applied.

Basically, Virtual Controllers are additional sources of MIDI data (just like real MIDI controllers). You create these new sources by combining your real MIDI controllers with MIDI processing.

A Virtual Instrument is some form of MIDI processing routed to one or more MIDI devices. A Virtual Instrument is treated the same as any other MIDI destination defined in your current Studio Setup document, except that it enhances performance by stacking, splitting or layering various devices and adding MIDI processing. Virtual Instruments have two important uses:

1) They are used when common MIDI processing connections need to be used in multiple OMS patches.
2) They are used as sequencer destination instruments—allowing the sequenced tracks to play into a MIDI processing stream.

Basically, Virtual Instruments are additional destinations of MIDI data (just like real MIDI sound modules). You create these new destinations by combining your real MIDI sound modules with MIDI processing.

NOTE: *MIDI data can sometimes get very dense when working with Virtual Controllers and Virtual Instruments. Therefore, when designing your patches, it's a good idea to always use Event Type Filter Modules to remove any unnecessary data.*

The following sections discuss Virtual Instruments and Virtual Controllers; why you may wish to use them; how to set them up; and how to access them within Vision.

A Virtual Controller is the output of a MIDI device *plus* some form of MIDI processing. Let's look at an example of a Virtual Controller.

Assume that your new Masterman-88 keyboard is too sensitive to aftertouch. Pushing just slightly on the keys causes the Masterman-88 to send very high aftertouch values. You can design a Virtual Controller that processes the aftertouch data *before* sending it to your sequencer or MIDI devices.

- Click the **Virtual Controllers** button or choose **Edit Virtual Controllers** from the **Patch** menu to open a Virtual Controllers editing window.

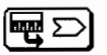


Figure 7-1: Virtual Controllers Button

You'll see that the Virtual Controllers editing window looks very similar to the patch editing window. Use the Virtual Controllers editing window to create and store as many Virtual Controllers as the Studio 5's memory will allow.

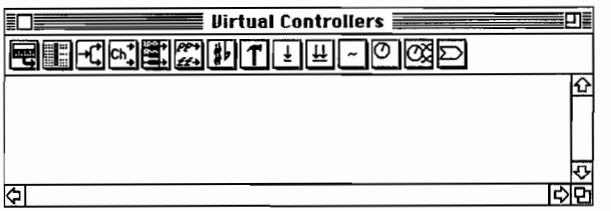
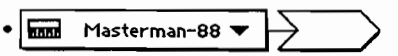


Figure 7-2: Virtual Controllers Edit Window

- Click the MIDI Source module icon. The cursor will turn into the MIDI Source icon. Click anywhere in the space below the Module Palette to create an undefined connection.

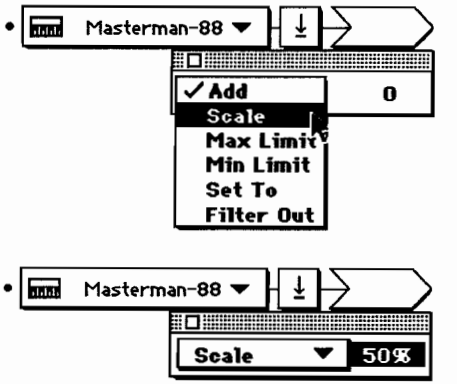
Notice that this connection looks very similar to an undefined patch connection; the only difference is that the MIDI Destination module is replaced by a Virtual Controller module.

- Choose the Masterman-88 from the MIDI Source module's pop-up menu.



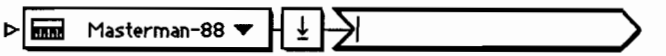
- Insert a Mono Aftertouch Modifier module between the MIDI Source module and the Virtual Controller module.

- Double-click the Mono Aftertouch Modifier module to open its editing window.
- Choose **Scale** from the Modifier module's pop-up window and enter a value of **50%** into the Modifier module's numerical.

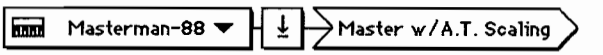


This will scale the Masterman-88 Mono Aftertouch output by 50%, resulting in the desired decrease in Mono Aftertouch sensitivity.

- Click the Virtual Controller Module. Its border will become thick and it will contain a flashing text-insertion cursor.



- Type a suitable name for your new Virtual Controller.



- Close the Virtual Controller editing window.

If you open a patch in the patch editing window, you'll see that "Master w/A.T. Scaling" has been added to your list of possible MIDI sources. Now, instead of using the Masterman-88 as a controller, you can use the improved Virtual Controller as your MIDI source.

The previous example provided a graphic illustration of the Virtual Controller definition—Virtual Controllers are the output of a MIDI device *plus* some form of MIDI processing.

Virtual Controllers are edited similarly to patches, except that instead of MIDI Destination Modules, there are Virtual Controller Modules.

All of the modules and connections to the left of the Virtual Controller Module are used to define the output of that Virtual Controller. There may be any number of Virtual Controllers for each real controller.

Virtual Controllers appear in the pop-up MIDI source menus when you edit a patch. If you choose a Virtual Controller, it has the same appearance in the patch editing window as in the Virtual Controller editing window, except that you can't edit its name.

Efficient Use of Virtual Controllers

There are two kinds of Virtual Controller connections:

- Those that do not "multiply" MIDI data.

  In this type of a connection, no one MIDI event from a source reaches more than one Virtual Controller. You make non-multiplying Virtual Controller connections either by avoiding multi-output splitter modules or by extensive use of filtering. An example of two different non-multiplying connections is shown in Figure 7-3.

Figure 7-3: Non-Multiplying Virtual Controller Connections

- Those that do "multiply" MIDI data.

  In this type of connection, a single MIDI event from a source reaches more than one Virtual Controller. Connections that use unfiltered, multi-output splitter modules multiply MIDI data by sending duplicate data to numerous Virtual Controllers. An example of a multiplying connection is shown in Figure 7-4.

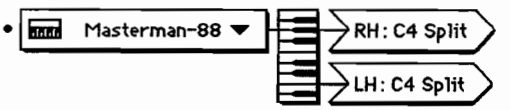


Figure 7-4: Multiplying Virtual Controller Connection

The connection shown in Figure 7-4 doubles all MIDI events (pitch bend, controls, mono aftertouch, etc.) except for notes and polyphonic aftertouch events.

When you design patches using Virtual Controllers created in a "multiplying" connection, avoid using the Virtual Controllers independently. Either use all of the Virtual Controllers created in a multiplying connection or don't use any at all. If you don't use all of a multiple connection's Virtual Controllers, you will waste microprocessor power since you'll send MIDI data to Virtual Controllers that aren't in your patch.

For example, if you wanted to create a patch where your left hand controls one module and your right hand controls another, you could use the two Virtual Controllers shown in Figure 7-4. The patch would look as shown in Figure 7-5.

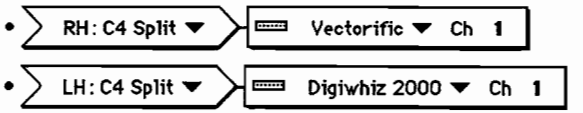


Figure 7-5: Patch Using Virtual Controllers from Multiplying Connection

If, however, you wanted to create a patch where only your left hand controlled a module, you should used the "LH: B3&DOWN" Virtual Controller shown in Figure 7-3. The patch would look as shown in Figure 7-6.

Figure 7-6: Patch Using Virtual Controllers from Non-Multiplying Connection

If, instead of using the "LH: B3&DOWN" Virtual Controller in the patch, you used the "LH: C4 Split" Virtual Controller shown in Figure 7-4, you would waste processing power since all MIDI events generated by the Masterman-88 (other than notes and poly aftertouch) are sent to both the "LH: C4 Split" and "RH: C4 Split" Virtual Controllers. Since this patch doesn't use the "RH: C4 Split" Virtual Controller, this would be an inefficient use of Virtual Controllers and your Studio 5's microprocessor.

Using Virtual Controllers with Vision

OMS applications such as Vision and Studio Vision (versions 1.3 or later) treat Virtual Controllers as they would any other MIDI input device.

Let's look at an example showing how to use Virtual Controllers with Vision. Assume that your Studio Setup document looks like Figure 7-7, and that you have defined a Virtual Controller like the one shown in Figure 7-8.

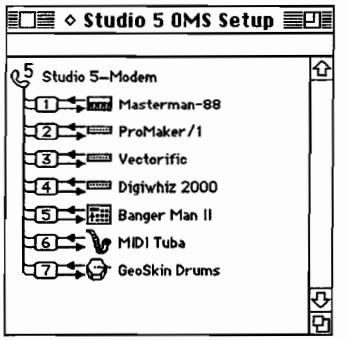


Figure 7-7: Studio Setup Document Example

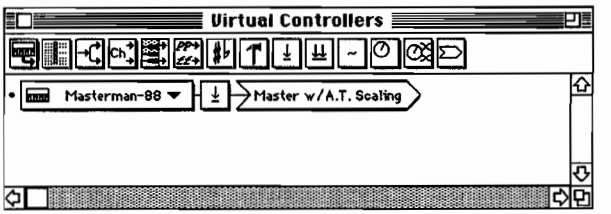


Figure 7-8: Virtual Controller Example

- Launch Vision.
- Choose **Enable Input Devices** from Vision's **Setups** menu. You'll see a dialog box listing all possible MIDI Input devices, including any Virtual Controllers, as defined by the current OMS patch document.

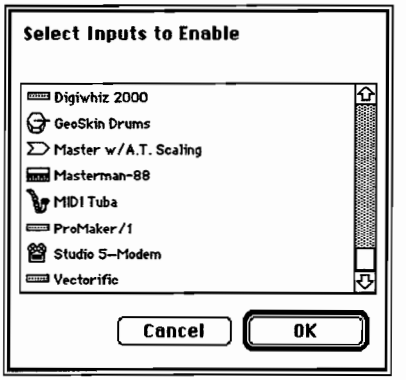


Figure 7-9: Vision's "Enable Input Device" Dialog Box

Notice, in this example, that the Virtual Controller named "Master w/A.T. Scaling" is available as a MIDI input source. You enable input devices by clicking them, which will also highlight them. In the following example, "Master w/A.T. Scaling" is highlighted and, therefore, is enabled as an input device.

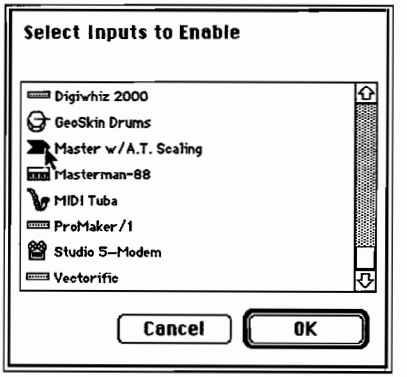


Figure 7-10: Enabling a Virtual Controller in Vision

By using the specially designed "Master w/A.T. Scaling" Virtual Controller as an input device, you can record data with satisfactory aftertouch values directly into Vision.

***NOTE**: Since Virtual Controllers use real MIDI input devices, it's possible to accidentally enable an input device twice. For example, if you enable both "Masterman-88" and "Master w/A.T. Scaling", you will get two notes for every one you play. For this reason, make sure that you only enable one input for each real, physical device.*

VIRTUAL INSTRUMENTS

A Virtual Instrument is made up of one or more MIDI destinations *plus* some form of MIDI processing. Virtual Instruments are basically the opposite of Virtual Controllers. Let's look at an example of a Virtual Instrument.

Assume that it's common for you to "stack" instruments together to get a really big MIDI sound—particularly your ProMaker/1 and Digiwhiz 2000 sound modules playing on MIDI Channel 2. Using Virtual Instruments, you can create that stack and always have it available as a MIDI destination.

- Click the **Virtual Instruments** button in the patch document window, or choose **Edit Virtual Instruments** from the **Patch** menu to open a Virtual Instruments editing window.

Figure 7-11: Virtual Instruments Button

You'll see that the Virtual Instruments editing window looks very similar to the patch editing window. Use the Virtual Instruments editing window to create and store as many Virtual Instruments as the Studio 5's memory will allow.

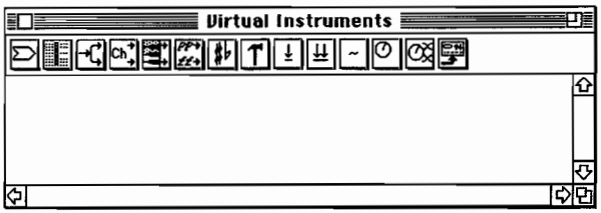


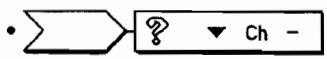
Figure 7-12: Virtual Instruments Edit Window

- Click the Virtual Instrument module icon.

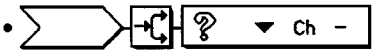
Figure 7-13: Virtual Instrument Module Icon

- Click in the blank space below the Module Palette to create an undefined Virtual Instrument connection.

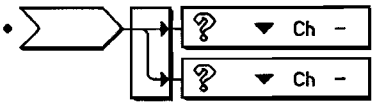
Notice that this connection looks very similar to an undefined patch connection; the only difference is that the MIDI Source module is replaced by a Virtual Instrument module.



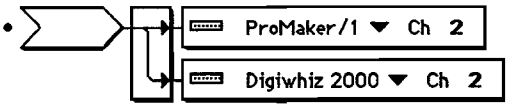
- Insert a Simple Splitter module between the Virtual Instrument and the MIDI Destination modules.



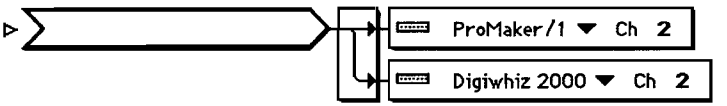
- Add a second MIDI Destination module by clicking its icon and inserting it below the Simple Splitter module.



- Choose the ProMaker/1 from the upper MIDI Destination module's pop-up window, and the Digiwhiz 2000 from the lower MIDI Destination module's pop-up window. Set their MIDI channels to Channel 2.



- Click the Virtual Instrument module to select it.



- Type in the name of your new Virtual Instrument and hit the Enter key.

- Close the Virtual Instrument editing window.

If you open a patch in the patch editing window, you'll see that "HippoStack" has been added to your list of MIDI destinations. Whenever you want to play a stack made up of the ProMaker/1 and Digiwhiz 2000 synthesizers on MIDI Channel 2, simply choose this Virtual Instrument as the MIDI Destination.

The previous example provided a graphic illustration of the Virtual Instrument definition—Virtual Instruments are made up of one or more MIDI destinations *plus* some form of MIDI processing.

Like Virtual Controllers, Virtual Instruments are edited similarly to patches with only minor exceptions. The Virtual Instrument editing window contains connections from Virtual Instruments to devices.

Instead of MIDI Source modules, there are Virtual Instrument modules:

Virtual Instruments appear in the pop-up MIDI destination menus when you edit a patch. If you choose a Virtual Instrument, it has the same appearance in the patch window as in the Virtual Instrument editing window, except that you can't edit its name.

NOTE: *System Exclusive messages should always be sent directly to the intended device. Sending System Exclusive to a Virtual Instrument containing a Splitter module and different devices thickens the MIDI data stream unnecessarily. Sending System Exclusive to a Virtual Instrument consisting of a Splitter module routed to different channels of the same device will corrupt the data.*

Using Virtual Instruments with Vision

OMS applications such as Vision and Studio Vision (versions 1.3 or later) treat Virtual Instruments as they would any other MIDI destination device.

Let's look at an example showing how to use Virtual Instruments with Vision. Assume that your Studio Setup document looks like Figure 7-14, and that you have defined a Virtual Controller like the one shown in Figure 7-15.

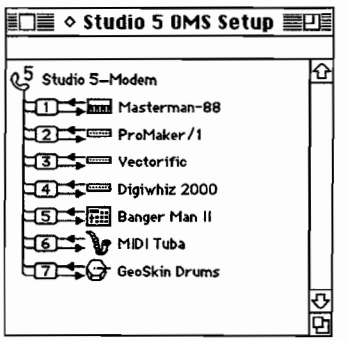


Figure 7-14: Studio Setup Document Example

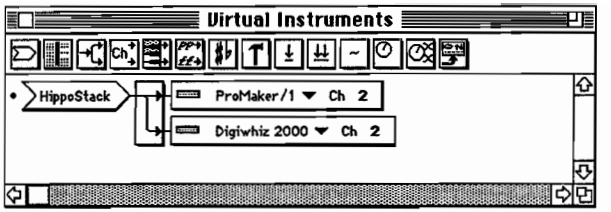


Figure 7-15: Virtual Instrument Example

- Launch Vision.
- Choose **Instruments** from Vision's **Setups** menu.
- Choose **New Instrument** from the **Instruments** menu. A new Instrument will be added to the MIDI Instruments list as shown in Figure 7-16.

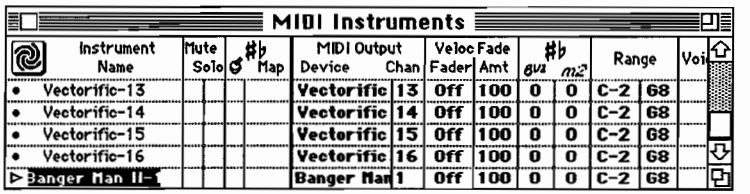


Figure 7-16: Adding an Instrument in Vision

- Choose "HippoStack" from the MIDI Output Device pop-up menu. This menu displays all MIDI destinations as defined in your current Studio Setup document as well as the Virtual Instruments in your current OMS patch document.

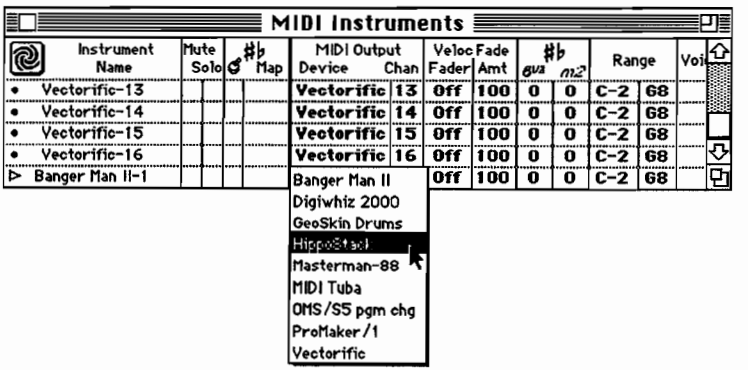


Figure 7-17: Selecting a MIDI Output Device in Vision

- Choose Channel 2 from the MIDI Output Channel pop-up menu (since "HippoStack" was designed to play on MIDI Channel 2).

The MIDI Instrument's name becomes "HippoStack-2", indicating that it uses the Virtual Instrument named "HippoStack", and that it is set to receive on MIDI Channel 2. You can keep this name or type another.

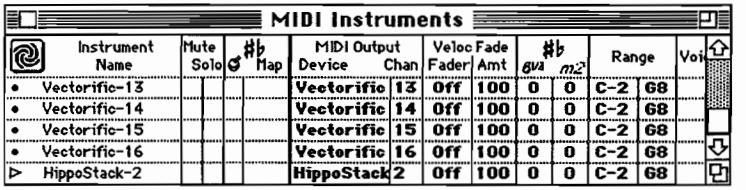


Figure 7-18: Newly Defined Instrument in Vision

- Click the Thru Instrument setting in the upper right corner of Vision's Control bar (the little keyboard). You'll see a pop-up menu of MIDI Instruments as defined in Vision's Instruments window.

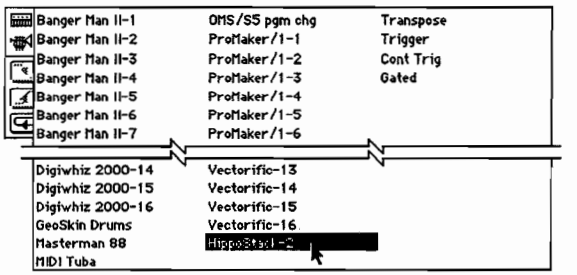


Figure 7-19: Choosing a Virtual Instrument in Vision

- Choose "HippoStack-2".

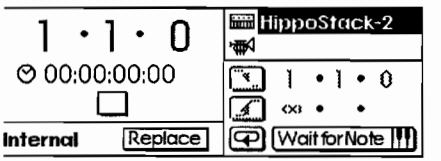


Figure 7-20: Vision Thru Instrument is a Virtual Instrument

The Thru Instrument will now play the Virtual Instrument named "HippoStack", which is the combined sound of the ProMaker/1 and the Digiwhiz 2000 sound modules on MIDI Channel 2.

Virtual Instruments can be used to define any number of MIDI Instruments within Vision. You can choose instruments within any of Vision's MIDI Instrument pop-up menus (as found in the Sequence window, List window, Graphic window, and so on).

There are two important advantages to using Virtual Instruments with Vision:

- **You wish to have a sound made up of several channels on several devices playing the same part.**

  Without Virtual Instruments, you would have the Macintosh send a separate MIDI event to each destination channel on each device. Using a Virtual Instrument allows the Macintosh to send just one MIDI event to the Virtual Instrument, which actually exists inside the Studio 5. This reduces the density of the MIDI data stream, making timing more efficient. It also transfers the Macintosh's work load to the Studio 5, which gives the Macintosh more processing time for other events.

- **You wish to play a sequence using an interesting OMS patch.**

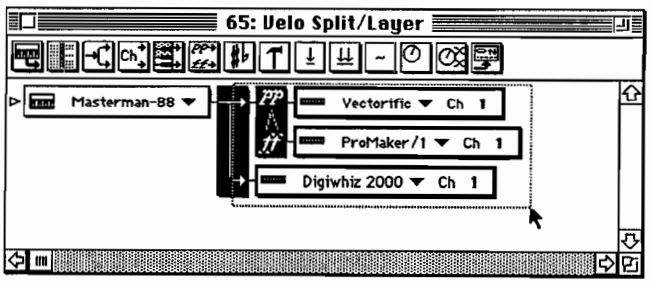
  To do so, simply create a Virtual Instrument consisting of the entire patch connection (except for the source module) and use it as Vision's Thru Instrument. This is detailed in the following section.

Creating Virtual Instruments from Existing Patches

If you create an interesting OMS patch and decide you want to use it as a Virtual Instrument in a MIDI sequence, you can simply copy the connection (less the MIDI Source module) from the Patch Editing window and paste it into the Virtual Instruments edit window. To do so:

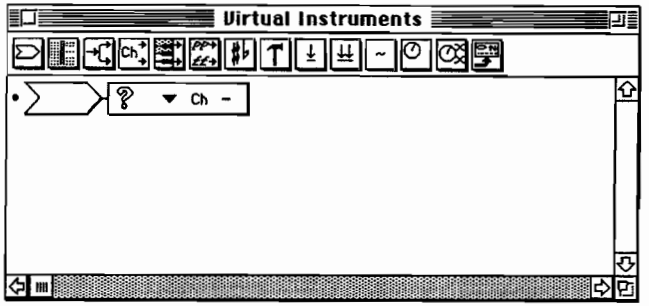
- Open the Patch Edit Window for the patch you want to turn into a Virtual Instrument.
- Select every part of the connection except the MIDI Source module.

  There are two ways to do this: 1) click the selector dot to the left of the connection (selecting all modules), then command-click the MIDI Source module to deselect it; or 2) drag a rectangle around all the modules except the MIDI Source module.

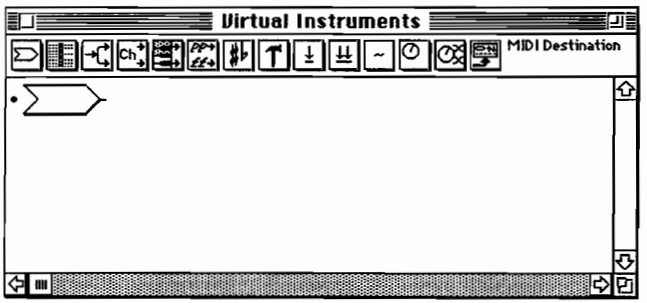


- Choose **Copy** from the **Edit** menu.
- Open the Virtual Instruments edit window.

- Click the Virtual Instrument module icon, then click in the blank space below the Module Palette to create an undefined Virtual Instrument connection.

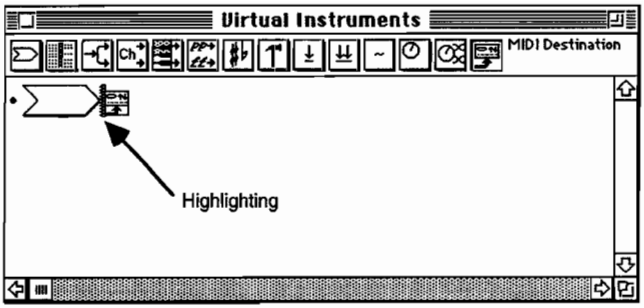


- In the new connection, click the MIDI Destination module to select it and hit the Delete key to remove the MIDI Destination module from the connection.

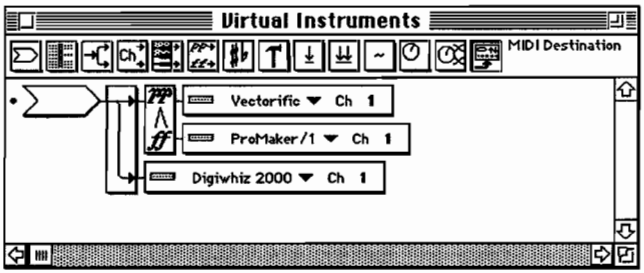


- Click the MIDI Destination module icon, then move the cursor just to the right of the Virtual Instrument module. Do not click the mouse!

  Notice that the area to the right of the Virtual Instrument module becomes highlighted.



- Type **⌘-V** to paste the contents of the clipboard into the highlighted area.



- Type a name into the Virtual Instrument module and save it.

  You're now ready to use this newly created virtual instrument in your sequencing program.

8 Program Change Sources

Use the Program Change Sources window to specify various ways to change OMS patches. You can design Program Change Sources to:

a) Change OMS patches from a MIDI controller.

b) Change OMS patches from a MIDI controller only if an additional MIDI control is activated.

c) Step through a pre-determined patch chain using a MIDI controller.

Program Change Sources make it convenient to change OMS patches from a MIDI controller when you're working within other MIDI applications. You don't have to use the patch document window to change OMS patches. A patch document can contain any number of Program Change Sources.

OPENING A PROGRAM CHANGE SOURCES EDIT WINDOW

- Click the **Program Change Sources** button in the patch document window, or choose **Edit Program Change Sources** from the **Patch** menu to open the Program Change Sources window.

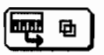


Figure 8-1: Program Change Sources Button

You'll see that the Program Change Sources window looks very similar to the patch editing window, except that the module palette is different.

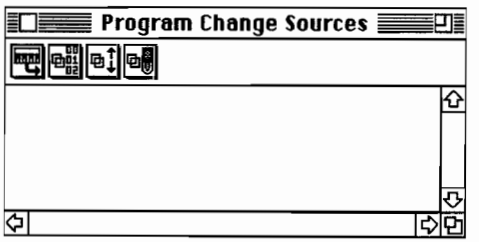


Figure 8-2: Empty Program Change Sources Window

PROGRAM CHANGE SOURCES EDIT WINDOW TERMINOLOGY

Figure 8-3 shows the terminology for the Program Change Sources window.

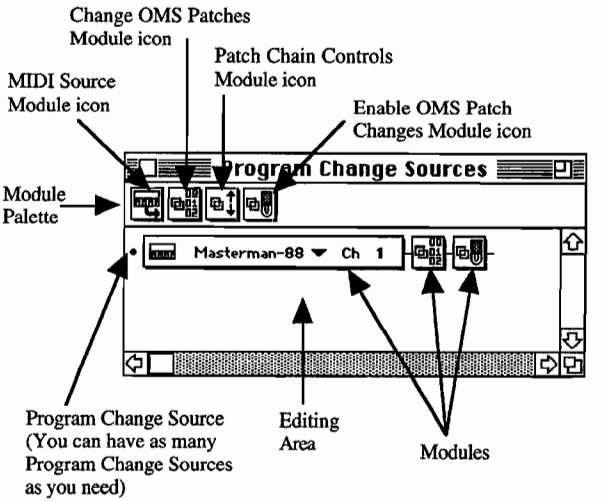


Figure 8-3: Anatomy of a Program Change Sources Window

Module placement and editing techniques are similar to those used for the patch editing window. The following sections discuss each module in detail.

MIDI SOURCE MODULE

Figure 8-4: MIDI Source Module

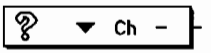
The MIDI Source module in the Program Change Sources window is very similar to the MIDI Source module in the patch editing window. The only difference is that this MIDI Source module contains a MIDI channel numerical; the patch editing window's MIDI Source module does not.

Use this MIDI Source module to specify which device and MIDI channel will control program changes using the other modules to which it's connected.

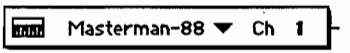
To insert and define a MIDI Source module:

- Click the MIDI Source module icon. The cursor will change into a MIDI Source module icon.

- Click in the blank space below the Module Palette to create an undefined Program Change connection.



- Choose a MIDI source from the MIDI Source module's pop-up menu.
- Use the Channel numerical to set a MIDI transmission channel. A dash ("-") means that the MIDI source data can come from any channel.



You will not yet be able to change OMS patches via MIDI, since the MIDI Source module's only purpose is to define the source and channel of MIDI data. See the following sections to learn how to change OMS patches using several different methods.

CHANGE OMS PATCHES

Figure 8-5: Change OMS Patches Module

If you want OMS to receive MIDI program changes, you must use the Change OMS Patches module.

- Place a Change OMS Patches module to the right of the MIDI Source module using techniques discussed previously.

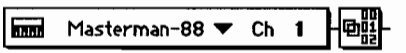


Figure 8-6: Adding a Change OMS Patches Module

In the example shown in Figure 8-6, MIDI program changes transmitted by the Masterman-88 on Channel 1 will change the OMS patch number.

Editing the Change OMS Patches Module

- Double-click the Change OMS Patches module to open its edit window.

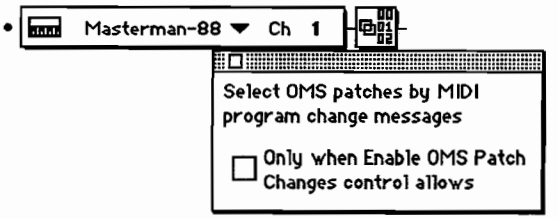


Figure 8-7: Change OMS Patches Module Edit Window

The edit window contains a single check box. When the box is unchecked, OMS recognizes MIDI program changes directly. When the box is checked, the status of an additional MIDI controller (typically a footswitch or button) determines whether OMS recognizes the program change message.

Uncheck the box if you want OMS to *always* change patches when it receives a MIDI program change message. Often, however, it's undesirable to change the OMS patch every time you send program changes from your master keyboard. If you check the check box, OMS patches change *only* when an additional MIDI control event is received. This allows you to send program changes to MIDI devices without changing the OMS patch.

If you check the check box, you'll need to use an Enable OMS Patch Changes module (see the following section).

ENABLE OMS PATCH CHANGES MODULE

Figure 8-8: Enable OMS Patch Changes Module

If you checked the check box in the Change OMS Patches module edit window, you must use the Enable OMS Patch Changes module to change OMS Patches.

- Add a new MIDI Source module to the Program Change Sources window.

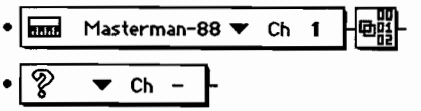


Figure 8-9: Adding a Second Connection

- Choose a MIDI Source and channel, then place an Enable OMS Patch Changes module to the right of the MIDI Source module.

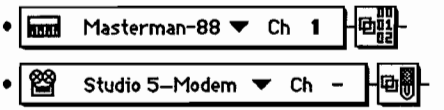


Figure 8-10: Defining OMS Patch Change Enabling Source

Editing the Enable OMS Patch Changes Module

- Double-click the Enable OMS Patch Changes module to open its edit window.

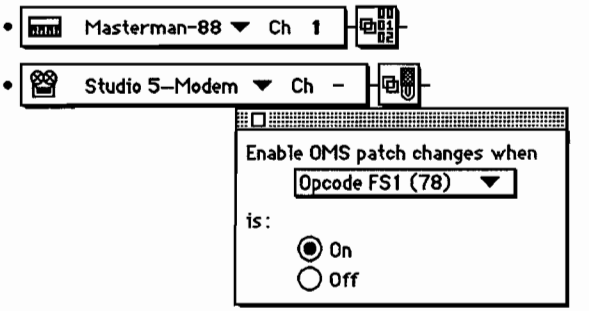


Figure 8-11: Enable OMS Patch Changes Module Edit Window

Use the pop-up menu to specify which MIDI control message enables OMS program changes. You can choose whether the control message needs to be "on" or "off" in order to enable OMS program changes.

In the connection shown in Figure 8-12, the Masterman-88 will change OMS patches *only* if you send the program change while holding down the Studio 5's Footswitch #1. Program Change messages from the Masterman-88 will not affect OMS patch selection if the Studio 5 footswitch is not down (on).

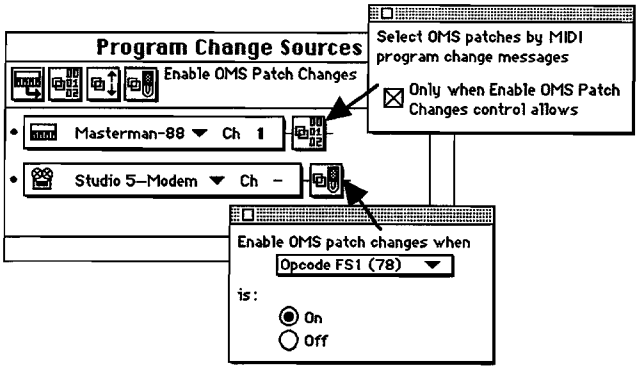


Figure 8-12: Example of an OMS Patch Change Connection

NOTE: Remember that Studio 5 footswitch and foot controller data is sent on MIDI Channel 15.

Using a Single OMS Patch Change and Enable Source

If you wish to use a single MIDI source for both OMS patch changes and enabling, you'll use only one connection.

Assume, for example, that you wanted to send OMS patch changes from your Masterman-88 controller while holding down its sustain pedal. You would create the connection shown in Figure 8-13.

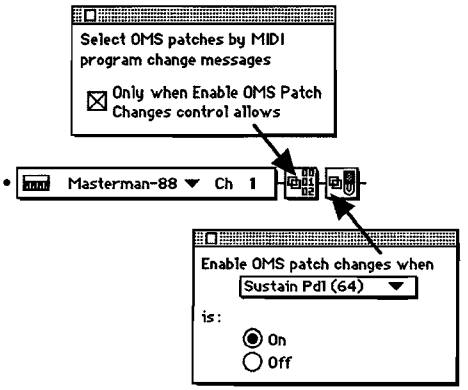


Figure 8-13: Single OMS Patch Change and Enable Source

PATCH CHAIN CONTROLS MODULE

Figure 8-14: Patch Chain Controls Module

Use this module to select a pair of MIDI controls to step up or down through a predefined Patch Chain. You define the Patch Chain in the Patch Chain Edit window (see Chapter 9).

- Place a Patch Chain Controls module to the right of a MIDI Source module using techniques discussed previously.

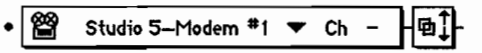


Figure 8-15: Adding a Patch Chain Controls Module

Editing the Patch Chain Controls Module

- Double-click the Patch Chain Controls module to open its edit window.

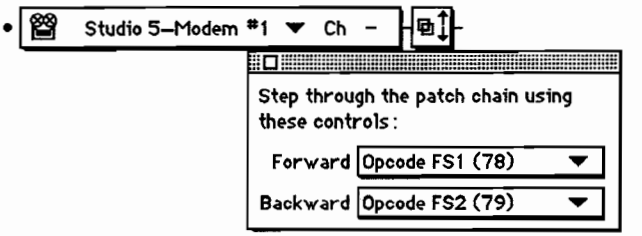


Figure 8-16: Patch Chain Controls Module Edit Window

- Choose (from the Forward pop-up menu) the MIDI control you wish to use to step forward through the Patch Chain.
- Choose (from the Backward pop-up menu) the MIDI control you wish to use to step backward through the Patch Chain.

For the example shown in Figure 8-16, you would use the Studio 5's Footswitch #1 to step forward through a Patch Chain, and the Studio 5's Footswitch #2 to step backward through a Patch Chain.

Patch Chains wrap around. When you reach the last patch in a chain, the next step will return you to the first patch in the chain.

See Chapter 9 to learn how to set up a Patch Chain.

NETWORKING NOTE: *If you're using multiple Studio 5's, Opcode recommends you connect all MIDI devices defined as Patch Chain control sources to the same interface. The reason is that each OMS micoprocessor (whether it's in the Macintosh or a Studio 5) has its own concept of the current location in the patch chain. If you use different devices connected to different interfaces to advance a patch chain, you may not get the results you expect.*