Using SynclavierX with Core MIDI

Legacy versions of Synclavier® PowerPC[™] for Mac OS 9 included a MIDI driver for "OMS" (Opcode System's Open Music System). That MIDI driver provided "virtual" MIDI ports for MIDI Clock and MIDI Timecode, the Synclavier® keyboard, and each Synclavier® sequencer track.



Release 5.2.3 of SynclavierX implements similar MIDI functionality (and more!) with a full-featured Mac OS X Core MIDI Driver. Release 5.2.3 of SynclavierX introduces fully routable "Virtual" output ports that can be addressed from the MIDI Routing Display (J page).

The general capabilities of the SynclavierX Core MIDI Driver are as follows:

MIDI Input to SynclavierX can -

- trigger Synclavier® sounds on the keyboard or any sequencer track in real time
- be recorded into the Synclavier® sequencer
- control the Synclavier® with MIDI Clock and Song Position messages
- be received from a real hardware MIDI port connected to your Mac
- be received from a virtual sequence engine running on your Mac
- be received from a virtual sequence engine running on any Mac on your local network

SynclavierX MIDI Output can -

- be generated from the keyboard or Synclavier® tracks in real time
- include MIDI Time Code generated by the Synclavier® sequencer
- include MIDI Clock and Song Position messages
- be routed to a hardware MIDI port connected to your Mac
- be routed to a virtual sequence engine running on your Mac
- be routed to a virtual sequence engine running on any Mac on your local network

Please note that the Synclavier® Real Time Software (and documentation) uses the designator "OMS" to refer to the virtual MIDI capabilities that are implemented within the Mac OS X Core MIDI driver.

The capabilities of the SynclavierX MIDI Driver are available on both PowerPC and Intel Macintosh computers. They also can be used on systems with no Synclavier® hardware by using the "Virtual" PCI-1 kernel extension (described under Installation on page 3).

What is Core MIDI

Apple's Core MIDI system is a collection of system software that lets you describe your MIDI hardware setup so that hardware and software purchased from different vendors can work together. The SynclavierX Core MIDI Driver creates "virtual" MIDI Ports that can send and receive MIDI data from other Macintosh applications (or hardware devices) without the delays normally associated with MIDI devices. Additionally, SynclavierX includes a MIDI Patching window that lets you send or receive MIDI data to or from other MIDI hardware devices connected to your system.

Apple's Core MIDI system is best described at:

http://www.apple.com/macosx/features/coreaudio/

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Installing the SynclavierX Core MIDI driver

- 1) Core MIDI itself requires no separate installation; it is built into Mac OS X.
- 2) Run the Synclavier Installer which is included in the downloaded SynclavierX disk image file. This will install the SynclavierX Core MIDI driver and the PCI-1 kernel extension
- 3) If your hardware installation does not include the PCI-1 hardware interface, you will need to install the "Virtual PCI-1" driver. See the "Read Me" file in the "Virtual MIDI Users" folder of the installation disk image. If you require the "Virtual PCI-1" driver, it must be installed after a full SynclavierX installation.

Notes to Intel Macintosh Users

Release 5.2.3 of SynclavierX is fully compatible with Intel-based Macintosh computers. Intel-based Macintoshes can access the PCI-1 using a PCI expansion system available from Magma Systems (<u>http://www.magma.com/products/pci/</u>). Their CB1H Half Length 1 Slot PCI Expansion System is fully compatible with the PCI-1 interface card. The PCI Expansion System connects with your Macintosh using a host card appropriate for your computer model - either their SUBEC34 ExpressCard/34 (in the case of a MacBook Pro) or their SUBPEHIFX1-CB PCI Express host card (in the case of a Mac Pro desktop unit).

Selecting SynclavierX Virtual MIDI Ports from other Macintosh applications

I/O	Port System Name	Show As	Visible	State	In 'All Input
In	TASCAM US-428 US-428 Port 1	TASCAM US-428 US-428 Port 1	×	Active	×
In	TASCAM US-428 US-428 Port 2	TASCAM US-428 US-428 Port 2	×	Active	×
In	TASCAM US-428 US-428 Control Port	TASCAM US-428 US-428 Control Port	×	Active	×
In	SynclavierX Keyboard	SynclavierX Keyboard	×	Active	×
In	SynclavierX MIDI Time Code	SynclavierX MIDI Time Code	×	Active	×
In	SynclavierX Midi Clock	SynclavierX Midi Clock	×	Active	×
In	SynclavierX Tracks 1 - 16	SynclavierX Tracks 1 - 16	×	Active	×
In	SynclavierX Tracks 17 - 32	SynclavierX Tracks 17 - 32	×	Active	×
In	SynclavierX Tracks 33 - 48	SynclavierX Tracks 33 - 48	×	Active	×
In	SynclavierX Tracks 49 - 64	SynclavierX Tracks 49 - 64	×	Active	×
In	SynclavierX Tracks 65 - 80	SynclavierX Tracks 65 - 80	×	Active	×
In	SynclavierX Tracks 81 - 96	SynclavierX Tracks 81 - 96	×	Active	×
In	SynclavierX Tracks 97 - 112	SynclavierX Tracks 97 - 112	×	Active	×
In	SynclavierX Tracks 113 - 128	SynclavierX Tracks 113 - 128	×	Active	×
In	SynclavierX Tracks 129 - 144	SynclavierX Tracks 129 - 144	×	Active	×
In	SynclavierX Tracks 145 - 160	SynclavierX Tracks 145 - 160	×	Active	×
In	SynclavierX Tracks 161 - 176	SynclavierX Tracks 161 - 176	×	Active	×
In	SynclavierX Tracks 177 - 192	SynclavierX Tracks 177 - 192	×	Active	×
In	SynclavierX Tracks 193 - 200	SynclavierX Tracks 193 - 200	×	Active	×
Out	TASCAM US-428 US-428 Port 1	TASCAM US-428 US-428 Port 1	×	Inactive	
Out	TASCAM US-428 US-428 Port 2	TASCAM US-428 US-428 Port 2	×	Inactive	
Out	TASCAM US-428 US-428 Control Port	TASCAM US-428 US-428 Control Port	×	Inactive	
Out	SynclavierX Keyboard	SynclavierX Keyboard	×	Inactive	
Out	SynclavierX MIDI Time Code	SynclavierX MIDI Time Code	×	Inactive	
Out	SynclavierX Midi Clock	SynclavierX Midi Clock	×	Inactive	
Out	SynclavierX Tracks 1 - 16	SynclavierX Tracks 1 - 16	×	Active	
Out	SynclavierX Tracks 17 - 32	SynclavierX Tracks 17 - 32	×	Inactive	
Out	SynclavierX Tracks 33 - 48	SynclavierX Tracks 33 - 48	×	Inactive	
Out	SynclavierX Tracks 49 - 64	SynclavierX Tracks 49 - 64	×	Inactive	
Out	SynclavierX Tracks 65 - 80	SynclavierX Tracks 65 - 80	×	Inactive	
Out	SynclavierX Tracks 81 - 96	SynclavierX Tracks 81 - 96	×	Inactive	
Out	SynclavierX Tracks 97 - 112	SynclavierX Tracks 97 - 112	×	Inactive	
Out	SynclavierX Tracks 113 - 128	SynclavierX Tracks 113 - 128	×	Inactive	
Out	SynclavierX Tracks 129 - 144	SynclavierX Tracks 129 - 144	×	Inactive	
Out	SynclavierX Tracks 145 - 160	SynclavierX Tracks 145 - 160	×	Inactive	
Out	SynclavierX Tracks 161 - 176	SynclavierX Tracks 161 - 176	×	Inactive	
Out	SynclavierX Tracks 177 - 192	SynclavierX Tracks 177 - 192	×	Inactive	
Out	SynclavierX Tracks 193 - 200	SynclavierX Tracks 193 - 200	×	Inactive	

The image above shows how SynclavierX virtual MIDI ports are selected from the Cubase SX application. Other Macintosh applications will have a similar mechanism for choosing SynclavierX virtual MIDI ports.

Some applications may omit the 'SynclavierX' portion of the SynclavierX virtual MIDI port name.

The SynclavierX Keyboard Virtual MIDI Port

The SynclavierX Keyboard virtual MIDI port can send MIDI data in response to notes played on the Synclavier® keyboard or in response to controller movements from the mod wheel, pitch wheel, breath controller, pedal 1, pedal 2 or the sustain foot switch. Additionally, MIDI data sent to the SynclavierX Keyboard virtual MIDI port can trigger Synclavier® sounds as if they were played live.

Sending MIDI Data from the SynclavierX Keyboard

To use the Synclavier® keyboard to send MIDI data to a Macintosh application, you must route the keyboard MIDI data to the SynclavierX Keyboard virtual MIDI output. This is done either using the MIDI button on the VK button panel:



or from the MIDI Display (J) screen:



Note: the Synclavier® Keyboard virtual MIDI port always sends data using MIDI Channel 1. MIDI data being sent to the Synclavier® Keyboard virtual MIDI port can be sent using any MIDI channel number.

The receiving Macintosh application also must be set up to receive MIDI data from the SynclavierX Keyboard virtual MIDI port. How this is done will depend on which Macintosh application you are using. The image on the previous page shows how virtual MIDI ports are selected in Cubase SX.

Sending MIDI Data to the Synclavier® Keyboard

The sound that is currently active on the Synclavier® keyboard can be triggered from any Macintosh application by sending MIDI data to the SynclavierX Keyboard virtual MIDI port.

In order for MIDI data sent to the SynclavierX Keyboard virtual MIDI port to be recognized by SynclavierX, you must enable "OMS" MIDI input. This can be done using the Synchronization panel of the Audio Event Editor:



"OMS" MIDI input can also be enabled directly form the MIDI Routing Display:

Sync In:	OFF	Inputs:	ALL
Sync Out:	OFF	Clock Type:	CLK
Echo:	OFF	OMS Input:	ON

In release 5.2.1 of SynclavierX, the "OMS" MIDI input will be enabled by default if there is no other Synclavier® MIDI hardware installed in the system.

Virtual MIDI Ports for the Synclavier® Sequencer

MIDI data **from** Synclavier® sequencer tracks can be sent either to dedicated virtual MIDI ports or to the fully-routable virtual MIDI ports introduced in Release 5.2.3.

The dedicated virtual MIDI ports contain MIDI data from a fixed set of sequencer tracks as described in the following table. The MIDI Channel of each note on/note off message indicates the specific sequencer track.

SynclavierX Tracks 1-16	Track: MIDI Channel:	1 1	2 2	3 3	4 4	5 5	6 6	7 7	8 8
	Track:	9	10	11	12	13	14	15	16
	MIDI Channel:	<u> </u>	<u>10</u> 18	<u>11</u> 19	<u>12</u> 20	<u>13</u> 21	<u>14</u> 22	<u>15</u> 23	16 24
SynclavierX Tracks 17-32	MIDI Channel:	1	2	3	4	5	6	7	8
	Track:	25	26	27	28	29	30	31	32
	MIDI Channel:	<u> </u>	<u>10</u>	25	<u>12</u>	<u>13</u>	<u>14</u> 20	<u>15</u> 20	16
SynclavierX Tracks 33-48	MIDI Channel:	33 1	2	30	30 4	5	6	39 7	40 8
	Track: MIDI Channel:	41 9	42 10	43 11	44 12	45 13	46 14	47 15	48 16
	Track:	49	50	51	52	53	54	55	56
SynclavierX Tracks 49-64	MIDI Channel:	1	2	3	4	5	6	7	8
	Track: MIDI Channel:	57 9	58 10	59 11	60 12	61 13	62 14	63 15	64 16
	Track:	65	66	67	68	69	70	71	72
SynciavierX Tracks 65-80	MIDI Channel:	1	2	3	4	5	6	7	8
	Track: MIDI Channel:	73 9	74 10	75 11	76 12	77 13	78 14	79 15	80 16
	Track:	81	82	83	84	85	86	87	88
SynclavierX Tracks 81-96	MIDI Channel:	1	2	3	4	5	6	7	8
	Track:	89	90	91	92	93	94	95	96
	Track:	9	08	00	100	101	102	103	104
SynclavierX Tracks 97-112	MIDI Channel:	1	2	3	4	5	6	7	8
	Track:	105	106	107	108	109	110	111	112
	MIDI Channel:	112	10	11	12	13	14	15	16
SynclavierX Tracks 113-128	MIDI Channel:	1	2	3	4	5	6	7	8
	Track:	121	122	123	124	125	126	127	128
	MIDI Channel:	9	10	11	12	13	14	15	16
SynclavierX Tracks 129-144	Track:	129	130	131	132	133	134	135	136
	Track	137	138	139	- 140	141	142	143	144
	MIDI Channel:	9	10	11	12	13	14	15	16
Syncloviery Tracks 145 160	Track:	145	146	147	148	149	150	151	152
Synciavier A fracks 145-100	MIDI Channel:	1	2	3	4	5	6	7	8
	MIDI Channel:	153	154	155	150	157	158	159	160
	Track:	161	162	163	164	165	166	167	168
SynclavierX Tracks 161-176	MIDI Channel:	1	2	3	4	5	6	7	8
	Track: MIDI Channel:	169 9	170 10	171 11	172 12	173 13	174 14	175 15	176 16
	Track:	177	178	179	180	181	182	183	184
SynclavierX Tracks 177-192	MIDI Channel:	1	2	3	4	5	6	7	8
	Track: MIDI Channel [,]	185 9	186 10	187 11	188 12	189 13	190 14	191 15	192 16
	Track:	193	194	195	196	197	198	199	200
SynclavierX Tracks 193-200	MIDI Channel:	1	2	3	4	5	6	7	8
	Irack: MIDI Channel [.]								

Sending MIDI Data from the Synclavier® Sequencer

The fully-routable virtual MIDI ports can contain data from any sequencer track and the keyboard.

Use the MIDI Display (J) screen to send MIDI data from a Synclavier® track to its dedicated virtual MIDI port, or to one of the 64 fully-routable Virtual MIDI Ports:

	Instrument Name	r Out	Chan	Pres 7
^L KBD	*Unnamed Timbre*			
г 1	Hi Strings	OMS	1	INDV
2	Low Strings	OMS	2	CHAN
3	Solo Guitar	OMS	3	
4				
5				
6				
7				
L 8				

or

	—Instrument Name—	r Out	Chan	Pres	٦
^l KBD	*Unnamed Timbre*	V2	1		
г 1					
2					

Sending MIDI Data to the Synclavier® Sequencer

The timbre that is stored on each Synclavier® track can be triggered from any Macintosh application by sending MIDI data to the corresponding SynclavierX Tracks virtual MIDI port. How this is accomplished will depend on which Macintosh application you are using.

CuBase SX uses an output selection button to direct MIDI data to a particular MIDI port and an intelligent data entry field to specify the MIDI channel number that is used.

MIDI 01	• • •				
	100				
M	С				
4@>	-2.00				
D. Sunda	wierV Tracks 1 16				
+J SynclavierX Tracks I - 16					
⊡ Syncla	vierX Tracks 1 – 16				
	∷ 2 → □				

CuBase SX MIDI Output Device and Channel Selection

In order for MIDI data sent to the SynclavierX Keyboard virtual MIDI port to be recognized by SynclavierX, you must enable "OMS" MIDI input. This can be done using the Synchronization panel of the Audio Event Editor:



. . .

30	NTSC	Dr	op	25	24	01	Send	Send
Frame	30	Fr(Ime	Frame	Frame		MS CLK	OMS MTC
Beats Measu	Per re:	4	Spe	ed:	.000)	Enab MIDI	le OMS Input

"OMS" MIDI input can also be enabled directly form the MIDI Routing Display:

Sync In:	OFF	Inputs:	ALL
Sync Out:	OFF	Clock Type:	CLK
Echo:	OFF	OMS Input:	ON

In release 5.2.1 of SynclavierX, the "OMS" MIDI input will be enabled by default if there is no other Synclavier® MIDI hardware installed in the system.

The SynclavierX MIDI Clock and MIDI Timecode virtual MIDI Ports

SynclavierX can send and receive MIDI Clock data through the SynclavierX MIDI Clock virtual port. Additionally, SynclavierX can send MIDI Timecode data through the SynclavierX MIDI Time Code virtual port.

SynclavierX cannot recognize incoming MIDI Timecode; it can only generate MIDI Timecode output. Additionally, SynclavierX cannot send both MIDI Clock and MIDI Timecode information at the same time. These limitations may be addressed in a later software release.

Sending MIDI Clock or MIDI Timecode Data from SynclavierX

Sending MIDI Clock or MIDI Timecode data can be activated from the VK button panel by holding the MIDI button and pressing the SMPTE button. While holding the MIDI button, press the SMPTE button once for MIDI Clock data, or twice for MIDI Timecode data. Continue to hold the MIDI button and press the External Sync button to select the timecode frame rate (drop, non-drop, NTSC 30, 25 or 24).



After holding the MIDI button and pressing the SMPTE button, use the knob to select which MIDI output is used to send the MIDI Clock or MIDI Timecode data.

You can also use the Synchronization panel of the Audio Event Editor to turn on or off MIDI Clock or MIDI Timecode output:

	SYNCHRONIZAT	TION	AND	TIME	CONTROL
\square	Display Times In	Se	CO	nds	

Send	Send
OMS CLI	K OMS MTC

The receiving Macintosh application also must be set up to receive MIDI Clock or MIDI Timecode data from the SynclavierX MIDI Clock or MIDI Timecode virtual port. How this is done will depend on which Macintosh application you are using.



CuBase SX MIDI Timecode Source Selection

Sending MIDI Clock Data to SynclavierX

SynclavierX can chase MIDI Clock data being sent to the SynclavierX MIDI Clock virtual port. As of Release 5.2.1 it cannot chase MIDI Timecode data.

Use the Synchronization panel of the Audio Event Editor to enable external synchronization to "OMS" MIDI:



Or you may activate external synchronization to "OMS" MIDI from the VK button panel by holding the MIDI button and pressing the External Sync Mode button:



Sending and receiving MIDI data from SynclavierX to or from real MIDI hardware ports (MIDI Patching Window)

Each SynclavierX virtual MIDI output can be patched to a real hardware MIDI port. Patchings are set up using the MIDI Patching window which is available from the Window menu. See page 3 (keyboard), page 6 (sequencer tracks) or page 9 (MIDI time code/MIDI clock) to see how to enable MIDI output.

00	SynclavierX MIDI Patching						
Synclavier	Synclavier						
Each SynclavierX virtual MIDI output can be patched to a real hardware MIDI port. Additionally, each SynclavierX virtual MIDI input can receive data directly from a real hardware MIDI port. Patchings between SynclavierX virtual MIDI ports and other virtual MIDI ports should be constructed from within the application that creates the virtual MIDI port.							
	MIDI From SynclavierX	MIDI To SynclavierX					
Each SynclavierX Vi	irtual MIDI output can be patch	ied to a hardware MIDI port:					
Keyboard	US-428 US-428 Port 1	•					
MIDI Time Code	(None)	•					
Midi Clock	(None)	•					
Tracks 1-16	(None)	•					
Tracks 17-32	US-428 US-428 Port 2	•					
Tracks 33-48	(None)	•					
Tracks 49-64	(None)	•					
Tracks 65-80	(None)	•					
Tracks 81-96	(None)	;					
Tracks 97-112	(None)	;					
Tracks 113-128	(None)	;					
Tracks 129-144	(None)	•					
Tracks 145-160	(None)	•					
Tracks 161-176	(None)	;					
Tracks 177-192	(None)	•					
Tracks 193-200	(None)	;					
		Done					

00	SynclavierX MI	DI Patching		
Synclavie				
Each SynclavierX virtual MIDI output can be patched to a real hardware MIDI port. Additionally, each SynclavierX virtual MIDI input can receive data directly from a real hardware MIDI port. Patchings between SynclavierX virtual MIDI ports and other virtual MIDI ports should be constructed from within the application that creates the virtual MIDI port.				
	MIDI From SynclavierX	MIDI To SynclavierX		
You can choose a	You can choose a hardware MIDI port to patch to each SynclavierX Virtual MIDI input:			
US-428 US-428	Port 1	•	To Keyboard	
(None)		4 *	To MIDI Time Code	
(None)		•	To Midi Clock	
US-428 US-428	Port 2	•	To Tracks 1-16	
(None)		•	To Tracks 17-32	
(None)		•	To Tracks 33-48	
(None)		•	To Tracks 49-64	
(None)		•	To Tracks 65-80	
(None)		•	To Tracks 81-96	
(None)		•	To Tracks 97-112	
(None)		•	To Tracks 113-128	
(None)		•	To Tracks 129-144	
(None)		•	To Tracks 145-160	
(None)		•	To Tracks 161-176	
(None)		•	To Tracks 177-192	
(None)		•	To Tracks 193-200	
		C	Done	

You must enable "OMS" MIDI Input (see page 4) for MIDI data sent to a SynclavierX virtual MIDI port to be recognized by SynclavierX.

Transferring a sequence from SynclavierX to an external Macintosh application

The SynclavierX MIDI driver can be used to accurately transfer a Synclavier® sequence to an external Macintosh application. The general steps are:

- 1) Set up the sequence to send MIDI (Midi Routing Display)
- 2) Set up the sequence to generate MIDI time code (Audio Event Editor Sync Panel)
- 3) Set up your external application to sync to MIDI Time Code. Make sure the frame rate matches between SynclavierX and your external application.
- 4) Create MIDI tracks in your external application as needed. Set the MIDI tracks up to listen on the appropriate channel and virtual MIDI port as indicated by the table on page 5.
- 5) Record-enable the tracks in your external application as needed.

When you start the Synclavier® sequencer, the external sequencer should start and sync using MIDI time code.

Some external applications require a 2-second pre-roll, so it might be necessary to slide all of your Synclavier® tracks to start slightly later.

Transferring a sequence on a system with no hardware voices

Due to limitations of the Synclavier® real time software, MIDI note-on/note-off events are not sent out if the system runs out of voices to play notes on a track. The work-around involves assigning an empty timbre to the track, and then enabling MIDI output for the track.

This technique can be used to transfer a legacy Synclavier® sequence to an external Macintosh application on an Mac with no associated Synclavier® hardware.