

Chapter 14 Using External MIDI Devices

This chapter describes the MIDI messages that can be handled by the VS-1680 and the operations that the VS-1680 can perform using MIDI messages. For more detailed information about MIDI, refer to "About MIDI" (Appendices p. 4).

I. Synchronizing with MIDI Sequencers

The VS-1680 can be operated in synchronization with a MIDI sequencer. **Refer to the owners' manual for your sequencer in conjunction with this manual.** There are two main ways to accomplish synchronization, **one method is to use MTC (MIDI time code) and the other method is to use MIDI Clock.** MIDI Clock provides two methods; **Sync Track** and **Tempo Map**, either of which can be selected.

? **MTC** (Appendices p. 64)

A. Items Necessary for Synchronization

- VS-1680
- Internal IDE hard drive (HDP88 series)
- Audio equipment to be connected to the MASTER jack, or stereo headphones
- External MIDI sequencer or computer sequencer software (such as Emagic Logic)
- MIDI Cables

B. Master and Slave

When synchronizing the VS-1680 with a MIDI sequencer, the device that sends or transmits MTC or MIDI Clock and acts as the reference device is referred to as the **master**. The device that receives the MTC or MIDI Clock signals from the controlling device is called the **slave**. When using MTC, you can choose whether to have the MIDI sequencer be the master that controls the VS-1680, or to have the VS-1680 be the master that controls the MIDI sequencer. When you use MIDI Clock, you can synchronize a MIDI sequencer using the VS-1680 as the master, but it is not possible to synchronize the VS-1680 as a slave from the sequencer.

C. Using MTC

This section explains how the VS-1680 can be synchronized with a MIDI sequencer that implements MTC MIDI Time Code. When using MTC, you can choose to have the VS-1680 be the master that controls the MIDI sequencer, or to have the MIDI sequencer be the master that controls the VS-1680.

MTC Type

The VS-1680 can work with the following types of MTC. Check the specifications of the MIDI devices that you are using, and select the appropriate type of MTC in the VS-1680.

30: 30 frames per second non drop format. This is used by audio devices such as analog tape recorders, and for NTSC format black and white video.

29N: 29.97 frames per second non drop format. This is used for NTSC format color video.

29D: 29.97 frames per second drop format. This is used for NTSC live broadcast color video.

25: 25 frames per second. This is used for SECAM or PAL format video, film, and audio equipment.

24: 24 frames per second. This is used for film and some audio devices in the US.

? **Frame** (Appendices p. 63)

? **NTSC Format** (Appendices p. 64)

? SECAM/PAL Format (Appendices p. 64)

Drop Frame and Non-Drop Frame

There are two types of time code used by NTSC format video recorders, **drop** frame, in which the time code is not continuous, and **non-drop** frame, which features continuous time code. In drop, which is used for NTSC color video formats, the first two frames of every minute are dropped, except for those at ten-minute intervals.

graphic p 129 left column middle here

Non-drop is generally used for most video and audio productions, since formats with continuous frames are easier to deal with. In contrast, in situations such as live broadcasts, where the time code clock must match actual clock time, drop frame is used.

D. Synchronization using the VS-1680 as the Master

When you want the VS-1680 to control the MIDI sequencer, use the following procedure.

1. Connect the VS-1680 and the MIDI sequencer as shown below.

graphic p 129 right column top

2. Press [PLAY(DISPLAY)].
3. Hold [SHIFT] and press [F5(SYSTEM)]. The System menu icon appears in the display. If the System menu icon does not appear, press [F6(EXIT)].
4. Press [F4(MIDI)]. If "MIDI" does not appear in the display above [F4], press [PAGE] until "MIDI" appears, and then press [F4(MIDI)].
5. Use [←], [→], [↑], and [↓] to move the cursor to "MIDI Thru", and use the TIME / VALUE dial to change the setting.

MIDI Thru

This switches the function of the MIDI OUT / THRU connector. For this application, use "OUT".

Out: MIDI messages are sent from the VS-1680. Select this when sending metronome sound note messages or mixer parameter settings (Control Change messages or Exclusive messages).

Thru: This sends MIDI messages received via the MIDI IN connector without changing them.

6. Hold [SHIFT] and press [EXT SYNC]. The Sync / Tempo screen appears in the display.

graphic p 130 left column top

7. Use [←], [→], [↑], and [↓] to move the cursor to "Sync Gen.", and use the TIME / VALUE dial to change the setting.

Sync Gen. (Sync Generator)

This setting determines what type of MIDI signal is generated at the MIDI OUT connector on the VS-1680. For this application, choose "MTC".

Off: No MIDI signals are transmitted.

MTC: MIDI Time Code is transmitted.

MIDIclk: The Tempo Map MIDI Clock is transmitted.

SyncTr: The Sync Track MIDI Clock is transmitted.

Sync MTC Type

This selects the MTC frame rate (30, 29N, 29D, 25,24). Select the MTC rate which matches the rate used in your MIDI sequencer.

8. Press [PLAY(DISPLAY)] to return to the Playlist display.

9. Set your MIDI sequencer so it can operate according to the MIDI Clock messages received from external devices, and set it to play back MIDI song data. When playback begins on the VS-1680, the MIDI sequencer begins playback as well.

E. Synchronization using the VS-1680 as the Slave

When you want to use the MIDI sequencer as the master to control the VS-1680, use the following procedure.

When using MIDI sequencer software for personal computers

When using MIDI sequencer software for personal computers, depending on the hardware specifications and the playing conditions, the MTC signal sent to the VS-1680 may be unstable. Try to use the VS-1680 as the master as much as possible.

1. Connect the VS-1680 and the MIDI sequencer as shown below.
graphic p 130 right column top
2. Hold [SHIFT] and press [EXT SYNC]. The Sync / Tempo screen appears in the display.
graphic p 130 right column middle
3. Use [←], [→], [↑], and [↓] to move the cursor and use the TIME / VALUE dial to change the settings.

Sync Error Level

This sets the interval (0-10) for checking MTC reception when synchronizing the VS-1680 as MTC is transmitted by an external MIDI device. When MTC is not sent continuously, the VS-1680 checks the MTC and cancels synchronization if there is an error. By setting a longer interval under such circumstances, synchronization can continue, even if there are errors in the source MTC.

Sync MTC Type

This selects the MTC frame rate (30, 29N, 29D, 25,24). Select the MTC rate which matches the rate used in your MIDI sequencer.

4. Press [PLAY(DISPLAY)] to return to the Playlist display.
5. Set your MIDI sequencer to transmit MTC.
6. Press [EXT SYNC]. The button will begin blinking, indicating the VS-1680 is set to synchronize using MTC from the external MIDI sequencer.
7. Press [PLAY]. The button blinks green, indicating the VS-1680 is in MTC receive standby. When the MIDI sequencer begins playback and begins transmitting MTC, then playback also begins on the VS-1680. During synchronization, the EXT SYNC indicator and PLAY indicator remain lit.

F. Using MTC Offset

When the VS-1680 is running under the control of the MTC from an external MIDI device, you can synchronize the song's playback time and the MTC time. The difference in these two times is called the **offset**. For example, if the MTC time is 01h00m00s00f00, and the song's time is 00h10m00s00f00, the offset is as follows:

$$\begin{aligned}\text{Offset} &= (\text{MTC Time}) - (\text{Song Time}) \\ \text{Offset} &= 01\text{h}00\text{m}00\text{s}00\text{f}00 - 00\text{h}10\text{m}00\text{s}00\text{f}00 \\ \text{Offset} &= 00\text{h}50\text{m}00\text{s}00\text{f}00\end{aligned}$$

If the offset value turns out to be a negative number, add 24h00m00s00f00 to the MTC time before subtracting the Song Time. For example if the MTC time transmitted is 00h00m50s00f00, and you want the song to playback at 00h01m00s00f00, then the offset works out as shown below.

Offset = (MTC Time) - (Song Time)
= 00h00m50s00f00 - 00h01m00s00f00
= (24h00m00s00f00 + 00h00m50s00f00) - 00h01m00s00f00
= 23h59m50s00f00

** Note: the VS-1680 will not continuously playback from 23h59m59s29f99 to 00h00m00s00f00. Song playback across 00h00m00s00f00 will momentarily stop at 23h59m59s29f99 before resuming playback.*

graphic p 131 right column top

1. Hold [SHIFT] and press [F5(SYSTEM)]. The System menu icon appears in the display. If the System menu icon does not appear, press [F6(EXIT)].
2. Press [F1(SYSPM)]. If "SYSPM" does not appear in the display above [F1], press [PAGE] until "SYSPM" appears, and then press [F1(SYSPM)].
3. Use [←], [→], [↑], and [↓] to move the cursor to "Offset", and use the TIME / VALUE dial to change the setting.

Offset

When the VS-1680 is as a slave to an external MIDI device, you can synchronize the song's playback time and the MTC time. The offset settings range varies depending on the MTC frame rate selected for the current song.

Time Display Format

Select one of the reference times (REL, ABS) to appear in the display. For this application, choose "ABS".

REL: The starting time of the song is displayed as 00h00m00s00f00.

ABS: The starting time of the song is based on the offset time.

4. Press [PLAY(DISPLAY)] to return to the Playlist display.

II. Using the Sync Track (Master)

If your MIDI sequencer supports Song Position Pointer messages, you can use the MIDI Clock to synchronize operations. There are two methods of synchronizing using the MIDI Clock. One is to use the Sync Track, and the other is to use the Tempo Map. Here is an explanation of how to control the MIDI sequencer from the VS-1680 using the Sync Track.

A. What is the Sync Track?

In addition to the tracks for recording audio signals, the VS-1680 has a separate track for recording MIDI Clock signals. This is called the **sync track**. Unlike conventional multi-track tape recorders, it is not necessary to reserve one of the audio tracks for recording the sync track.

To use the sync track, the MIDI clock of the external MIDI song data to which you want to synchronize must first be recorded into the sync track. Then, transmit the recorded MIDI clock data to the MIDI sequencer to synchronize the MIDI song data. This method is good to use when the MIDI song data was created before the VS-1680 song was.

When synchronizing to MIDI song data in which the tempo gradually increases or decreases, the tempo map allows more precise following of tempo changes, compared to the tempo map in which tempo is set for each measure.

B. Recording MIDI Clock Messages

1. Connect the VS-1680 and the MIDI sequencer as shown below.

graphic p 132 left column bottom

2. Hold [SHIFT] and press [EXT SYNC]. The Sync / Tempo screen appears in the display.
3. Press [F1(STRec)].
4. "Wait for Start Command" appears in the display, and the sync track is ready to record MIDI clock data. If you wish to cancel the MIDI clock data record, press [EXIT].
5. Start playback of the MIDI song. The MIDI clock data is recorded on the sync track. While MIDI clock data is being recorded, the input sources can be monitored, but audio tracks cannot be recorded or played back.
6. When the MIDI song data is finished playing back, the VS-1680 automatically stops recording MIDI clock data.

C. Synchronized Operation

1. Connect the VS-1680 and the MIDI sequencer as shown below.

graphic p 132 right column bottom

2. Press [PLAY(DISPLAY)].
3. Hold [SHIFT] and press [F5(SYSTEM)]. The System menu icon appears in the display. If the System menu icon does not appear, press [F6(EXIT)].
4. Press [F4(MIDI)]. If "MIDI" does not appear in the display above [F4], press [PAGE] until "MIDI" appears, and then press [F4(MIDI)].
5. Use [←], [→], [↑], and [↓] to move the cursor to "MIDI Thru", and use the TIME / VALUE dial to change the setting.

MIDI Thru

This switches the function of the MIDI OUT / THRU connector. For this application, use "OUT".

Out: MIDI messages are sent from the VS-1680. Select this when sending metronome sound note messages or mixer parameter settings (Control Change messages or Exclusive messages).

Thru: This sends MIDI messages received via the MIDI IN connector without changing them.

6. Hold [SHIFT] and press [EXT SYNC]. The Sync / Tempo screen appears in the display.

graphic p 133 left column middle

7. Use [←], [→], [↑], and [↓] to move the cursor to "Sync Gen.", and use the TIME / VALUE dial to change the setting.

Sync Gen. (Sync Generator)

This setting determines what type of MIDI signal is generated at the MIDI OUT connector on the VS-1680. For this application, choose "SyncTr".

Off: No MIDI signals are transmitted.

MTC: MIDI Time Code is transmitted.

MIDIclk: The Tempo Map MIDI Clock is transmitted.

SyncTr: The Sync Track MIDI Clock is transmitted.

8. Press [PLAY(DISPLAY)] to return to the Playlist display.

9. Set your MIDI sequencer so it can operate according to the MIDI Clock messages received from external devices, and set it to play back MIDI song data. When playback begins on the VS-1680, the MIDI sequencer begins playback as well.

III. Using the Tempo Map

If your MIDI sequencer supports Song Position Pointer messages, you can use the MIDI Clock to synchronize operations. There are two methods of synchronization using the MIDI Clock: one is to use the sync track, and the other is to use the tempo map. This section provides an explanation of how to control the MIDI sequencer from the VS-1680 using the tempo map.

A. What is a Tempo Map?

A tempo map is a song's measure, beat, and tempo information. By transmitting this information to MIDI sequencers and other devices, it can be used to synchronize operation with external MIDI devices. The tempo map sets tempo changes for each measure, so you can record information which specifies changes in rhythm and tempo to be played from any designated measure. With the VS-1680, tempo maps are numbered sequentially from the beginning of the song, with Tempo Map 1 first, followed by Tempo Map 2, Tempo Map 3, and so on. Tempo Map 1 is already specified at the beginning of the song, and determines the initial tempo of the song. To change the tempo at a subsequent measure, create a new tempo map at each location where you want the tempo to change. You can create up to 50 Tempo Maps per song.

graphic p 133 right column bottom

B. Creating A Tempo Map

1. Hold [SHIFT] and press [TAP]. The Tempo Map appears in the display. Tempo Map 1 (the initial tempo) is displayed.
2. Press [←], [→], [↑], and [↓] to move the cursor and use the TIME / VALUE dial to change the settings as desired.

graphic page 134

(Tempo)

Sets the tempo (25.0 - 250.0) of the Tempo Map

Meas (Measure)

Selects the measure number of the song (1-999) where the next tempo map starts.

Beat

This sets the tempo map time signature (1/1 to 8/1, 1/2 to 8/2, 1/4 to 8/4, 1/8 to 8/8). The function buttons work as shown below.

- | | |
|--------------------|--|
| [F2(New)]: | Adds a new tempo map to the current ending location. |
| [F3(Ins)]: | Inserts a new tempo map at the position of the cursor. |
| [F4(Del)]: | Deletes a tempo map at the position of the cursor. |
| [F6(EXIT)]: | Exits the Tempo Map screen. |

** Tempo Map 1 is the song's initial tempo. You cannot delete Tempo Map 1.*

5. When you are finished setting the Tempo Map, press [F6(EXIT)]. The Sync/Tempo screen appears in the display.
6. Press [PLAY(DISPLAY)] to return to the Playlist display.

C. Synchronized Operation

1. Connect the VS-1680 and the MIDI sequencer as shown below.

graphic p 135 left column top

2. Press [PLAY(DISPLAY)].
3. Hold [SHIFT] and press [F5(SYSTEM)]. The System menu icon appears in the display. If the System menu icon does not appear, press [F6(EXIT)].
4. Press [F4(MIDI)]. If "MIDI" does not appear in the display above [F4], press [PAGE] until "MIDI" appears, and then press [F4(MIDI)].
5. Use [←], [→], [↑], and [↓] to move the cursor to "MIDI Thru", and use the TIME / VALUE dial to change the setting.

MIDI Thru

This switches the function of the MIDI OUT / THRU connector. For this application, use "OUT".

Out: MIDI messages are sent from the VS-1680. Select this when sending metronome sound note messages or mixer parameter settings (Control Change messages or Exclusive messages).

Thru: This sends MIDI messages received via the MIDI IN connector without changing them.

6. Hold [SHIFT] and press [EXT SYNC]. The Sync / Tempo screen appears in the display.

graphic p 135 right column top

7. Use [←], [→], [↑], and [↓] to move the cursor to "Sync Gen.", and use the TIME / VALUE dial to change the setting.

Sync Gen. (Sync Generator)

This setting determines what type of MIDI signal is generated at the MIDI OUT connector on the VS-1680. For this application, choose "MIDIclk".

Off: No MIDI signals are transmitted.

MTC: MIDI Time Code is transmitted.

MIDIclk: The Tempo Map MIDI Clock is transmitted.

SyncTr: The Sync Track MIDI Clock is transmitted.

8. Press [PLAY(DISPLAY)] to return to the Playlist display.
9. Set your MIDI sequencer so it can operate according to the MIDI Clock messages received from external devices, and set it to play back MIDI song data. When playback begins on the VS-1680, the MIDI sequencer begins playback as well.

IV. Other Methods to Generate A Sync Track or Tempo Map

There may be instances when audio is recorded into the VS-1680 before a Sync Track is recorded, or before a Tempo Map is generated. It is possible to create a Sync Track or Tempo Map to match previously recorded audio. This is helpful when you want to record a new MIDI sequence on an external sequencer, based on the previously recorded tracks in the VS-1680. An example of this might be when you want to program a drum machine to add percussion parts to a previously recorded "live" drum track in the VS-1680. If you create a Sync Track or Tempo Map which matches the live drum track, the MIDI sequence will be in sync.

A. Place Markers Along with the Tempo

1. Press [ZERO].

2. Press [PLAY] to begin song playback.
3. While listening to the song, press [TAP] on each beat of each measure, for the entire song.
4. When the song is finished, press [STOP].

B. Create a Sync Track from Markers

After placing markers for each beat of a song, it is possible to convert the marker data into a Sync Track. This is useful when you have already recorded a guitar or vocal performance in the VS-1680, and now you want to synchronize a MIDI sequencer to the recording.

1. Hold [SHIFT] and press [EXT SYNC].
2. Press [F2(STCnv)].
3. Press [F1(TP ST)].
4. Press [⇐] and [⇒] to move the cursor. Rotate the TIME / VALUE dial to change each value.

graphic p 136 left column center

Beat

Specify the time signature (number of beats per measure).

Tap Beat

Specify the number of markers in each measure.

5. Press [F5(Exec)].
6. "Overwrite Tempo Map" appears in the display. Press [YES]. Or, to cancel the operation, press [NO].
7. When the Marker to Sync Track Conversion is finished, press [PLAY(DISPLAY)] to return to the Playlist display.

C. Create a Tempo Map from Markers

After placing markers for each beat of a song, it is possible to convert the marker data into a Tempo Map. This is useful when you have already recorded a guitar or vocal performance in the VS-1680, and now you want to synchronize a MIDI sequencer to the recording using a Tempo Map.

1. Hold [SHIFT] and press [EXT SYNC].
2. Press [F2(STCnv)].
3. Press [F2(TP TM)].
4. Press [⇐] and [⇒] to move the cursor. Rotate the TIME / VALUE dial to change each value.

graphic p 136 right column top

Beat

Specify the time signature (number of beats per measure).

Tap Beat

Specify the number of markers in each measure.

5. Press [F5(Exec)].
6. "Overwrite Tempo Map" appears in the display. Press [YES]. Or, to cancel the operation, press [NO].
7. When the Marker to Tempo Map Conversion is finished, press [PLAY(DISPLAY)] to return to the Playlist display.

D. Create a Tempo Map from a Sync Track

If you've already recorded a Sync Track in the VS-1680 from an external MIDI source, you can convert it into a Tempo Map.

1. Hold [SHIFT] and press [EXT SYNC].
2. Press [F2(STCnv)].
3. Press [F3(ST TM)].
4. Press [⇐] and [⇒] to move the cursor. Rotate the TIME / VALUE dial to change each value.

graphic p 136 right column BOTTOM

Sync Track Beat

Specify the time signature (number of beats per measure) for the MIDI clock data recorded in the sync track.

5. Press [F5(Exec)].
6. "Overwrite Tempo Map" appears in the display. Press [YES]. Or, to cancel the operation, press [NO].
7. When the Sync Track to Tempo Map Conversion is finished, press [PLAY(DISPLAY)] to return to the Playlist display.

E. Creating a Sync Track Automatically

In cases where live audio was recorded into the VS-1680 before a Tempo Map was set, you can automatically create a sync track based on two points in the song, and then convert the sync track to a Tempo Map using the method explained above. ("Creating a Tempo Map from a Sync Track"). To automatically create a sync track, you must specify a start time, an end time, and the exact number of measures between the start time and the end time.

1. Hold [SHIFT] and press [EXT SYNC].
2. Press [F2(STCnv)].
3. Press [F4(TI TM)].
4. Press [⇐] and [⇒] to move the cursor. Rotate the TIME / VALUE dial to change each value.

graphic p 137 left column middle

Start Time

Specify the selected start time.

End Time

Specify the selected end time.

Measure

Specify the exact number of measures between the Start Time and the End Time.

Beat

Specify the time signature (number of beats per measure).

5. Press [F5(Exec)].
6. "Overwrite Tempo Map" appears in the display. Press [YES]. Or, to cancel the operation, press [NO].
7. When the Time to SyncTrack Conversion is finished, press [PLAY(DISPLAY)] to return to the Playlist display.

F. Delaying Sync Track and Tempo Map Start Times

Usually, a sync track or tempo map is created with 00h00m00s00f00 as the beginning of the song. However, actual audio recording doesn't typically start at 00h00m00s00f00. If such is the case, you can determine how much later recording begins after the start of the song. This time is referred to as **offset**. If you want the first measure of the song to begin ten seconds from the beginning of the song, set the offset time to 00h00m10s00f00.

* During recording or playback when the beginning of a sync track or tempo map is reached, the start message is sent from the MIDI OUT connector. This is convenient when you want to synchronize operation with an external MIDI sequencer.

1. Hold [SHIFT] and press [EXT SYNC]. The Sync / Tempo screen appears in the display.
2. Use [←], [→], [↑], and [↓] to move the cursor to “Sync Offset”,
3. Use the TIME / VALUE dial to specify the offset.
4. Press [PLAY(DISPLAY)] to return to the Playlist display.

V. Using a MIDI Controller

The VS-1680 can transmit its mixer settings and functions as MIDI messages. Or, MIDI messages from an external MIDI controller can be used to control the VS-1680's track status and mixer settings.

A. **Switching Track Status**

You can use MIDI control change messages to switch the status of each track. MIDI channels 1 - 16 correspond to Tracks 1 - 16 respectively. Use controller number 3 to switch the track status. Depending on the value of controller number 3, the track status changes as shown below.

When stopped:

VALUE	0 - 31	32 - 63	64 - 95	96 - 127
STATUS	Mute→Mute Play→Mute Rec→Mute Source→Mute	Mute→Play Play→Play Rec→Play Source→Play	Mute→Rec Play→Rec Rec→Rec Source→Rec	Mute→Source Play→Source Rec→Source Source→Source

During playback or recording:

VALUE	0 - 31	32 - 63	64 - 95	96 - 127
STATUS	(*1) Play→Mute (*1) Source→Mute	Mute→Play Play→Play (*1) (*1)	(*1) (*1) Rec→Rec Source→Rec(*2)	(*1) (*1) Rec→Source(*2) Source→Source

(*1) Ignored

(*2) Cannot be switched while recording. “Source” here indicates “the status in which the track indicator blinks alternately red and orange” and is only valid when Record Monitor is set to “AUTO” (p. xx)

B. **Switching Scenes**

You can switch mixer Scenes with MIDI Program Change messages sent by an external MIDI controller.

During Playback of a Song

Scenes cannot be switched during song playback. Because of this, the VS-1680 will stop momentarily if it receives a program change message during playback instructing it to change scenes. While it is stopped, the scene is switched, and playback resumes. During recording, only effect program change messages can be received. Scenes cannot be switched during recording.

1. Hold [SHIFT] and press [F5(SYSTEM)]. The System menu icon appears in the display. If the System menu icon does not appear, press [F6(EXIT)].

2. Press [F4(MIDI)]. If "MIDI" does not appear in the display above [F4], press [PAGE] until "MIDI" appears, and then press [F4(MIDI)].
3. Use [←], [→], [↑], and [↓] to move the cursor to "P.C.Scene", and use the TIME / VALUE dial to change the setting.

P.C.Scene (Program Change Scene)

With this set to "ON", the scene is changed when program change messages are received. For this application, select "on".

4. Press [PLAY(DISPLAY)] to return to the Playlist display.

Use MIDI channel 16 for switching scenes. The relationship between the program change number received by the VS-1680 and the Scene Number it switches to is shown below.

<u>Program Number</u>	<u>Scene Number</u>
1 - 8	1 - 8

* For more detailed information, refer to "MIDI Implementation" (Appendices p. 25)

C. Switching Effects

You can use MIDI control change messages transmitted from an external MIDI controller to switch effects.

1. Press [PLAY(DISPLAY)].
2. Hold [SHIFT] and press [F5(SYSTEM)]. The System menu icon appears in the display. If the System menu icon does not appear, press [F6(EXIT)].
3. Press [F4(MIDI)]. If "MIDI" does not appear in the display above [F4], press [PAGE] until "MIDI" appears, and then press [F4(MIDI)].
4. Use [←], [→], [↑], and [↓] to move the cursor to "P.C.Eff", and use the TIME / VALUE dial to change the setting.

P.C.Eff (Program Change Effect)

With this set to "ON", the effect is changed when program change messages are received. For this application, select "on".

5. Press [PLAY(DISPLAY)] to return to the Playlist display.

MIDI channels 1 - 4 correspond to EFX1 - EFX4 respectively. The relationship between the bank number received by the VS-1680 and the Effect Patch Number it switches to is shown below.

<u>Bank # MSB</u>	<u>Bank # LSB</u>	<u>Program #</u>	<u>Patch #</u>
0	0	1 - 100	P000 - P099
0	1	1 - 100	P100 - P199
0	2	1 - 10	P200 - P209
0	3	1 - 100	U000 - U099
0	4	1 - 100	U100 - U199

D. Adjusting Effects

You can use MIDI control change messages transmitted from an external MIDI controller to control effects.

1. Press [PLAY(DISPLAY)].
2. Hold [SHIFT] and press [F5(SYSTEM)]. The System menu icon appears in the display. If the System menu icon does not appear, press [F6(EXIT)].
3. Press [F4(MIDI)]. If "MIDI" does not appear in the display above [F4], press [PAGE] until "MIDI" appears, and then press [F4(MIDI)].
4. Use [←], [→], [↑], and [↓] to move the cursor to "C.C.Eff", and use the TIME / VALUE dial to change the setting.

C.C.Eff (Control Change Effect)

With this set to "On", the effect is adjusted when control change messages are received. For this application, select "on".

5. Press [PLAY(DISPLAY)] to return to the Playlist display.

** If you wish to use control change messages to switch effects, use NRPN (Non Registered Parameter Numbers). For more detailed information, refer to "MIDI Implementation" (Appendices p. 25).*

VI. Using an External MIDI Sound Source to Play the Metronome

A MIDI sound source can be used to play the metronome with a sound of your choosing. To do this, use the following procedure.

1. Connect the VS-1680 and the MIDI sound generator as shown below.

graphic p 165 right column top

2. Hold [SHIFT] and press [F5(SYSTEM)]. The System menu icon appears in the display. If the System menu icon does not appear, press [F6(EXIT)].
3. Press [F4(MIDI)]. If "MIDI" does not appear in the display above [F4], press [PAGE] until "MIDI" appears, and then press [F4(MIDI)].
4. Use [←], [→], [↑], and [↓] to move the cursor to "MIDI Thru", and use the TIME / VALUE dial to change the setting.

MIDI Thru

This switches the function of the MIDI OUT / THRU connector. The typical setting to use is "OUT".

Out: MIDI messages are sent from the VS-1680. Select this when sending metronome sound note messages or mixer parameter settings (Control Change messages or Exclusive messages).

Thru: This sends MIDI messages received via the MIDI IN connector without changing them.

5. Hold [SHIFT] and press [EXT SYNC]. The Sync / Tempo screen appears in the display.

graphic p 166 left column top

6. Use [←], [→], [↑], and [↓] to move the cursor to "Sync Gen.", and use the TIME / VALUE dial to change the setting.

Sync Gen. (Sync Generator)

This setting determines what type of MIDI signal is generated at the MIDI OUT connector on the VS-1680. Select "MIDIclk" if you wish to use the Tempo Map, and "SyncTr" if you are going to use a Sync Track.

Off: No MIDI signals are transmitted.

MTC: MIDI Time Code is transmitted.

MIDIclk: The Tempo Map MIDI Clock is transmitted.

SyncTr: The Sync Track MIDI Clock is transmitted.

7. Press [EXIT]. The System menu icon appears in the display.
8. Press [F5(METRO)]. The Metronome Parameter screen appears in the display.

graphic p 166 left column bottom

9. Use [⇐], [⇒], [↑], and [↓] to move the cursor and use the TIME / VALUE dial to change each of the settings.

Metronome Out

This selects where the metronome is output. For now, select "MIDI".

Selecting "Off" prevents you from making any settings related to the Metronome.

- Off:** The metronome sound is not output.
- INT:** The metronome sound is output from the MONITOR jacks.
- MIDI:** The metronome signal is only transmitted via the MIDI OUT connector.

Metronome Mode

This determines when the metronome is played.

- Rec Only:** The metronome sounds only during recording.
- Rec&Play:** The metronome sounds during playback and recording.

Metro Level (Metronome Level)

This adjusts the volume level (0-127) of the metronome output.

MID:Acc.Note (Accent Note)

This sets note numbers (C0-G9) for the downbeat. When the Drum set is playing, this selects specific percussion sounds.

MID:Nrm.Note (Normal Note)

This sets note numbers (C0-G9) for the upbeats. When the Drum set is playing, this selects specific percussion sounds.

MID:MetroCh (Metronome Channel)

This sets the MIDI channel (1-16) for transmitting Metronome sound Note Messages.

MID:Acc.Velo (Accent Velocity)

This sets the velocity (1-127) for the downbeats.

MID:Nrm.Velo (Normal Velocity)

This sets the velocity (1-127) for the upbeats.

10. This completes the settings for sounding the metronome through an external MIDI sound module. Press [PLAY(DISPLAY)] to return to the Playlist display.

VII. Using an External MIDI Device to Adjust the Mixer (Compu Mix)

The VS-1680 can send and receive mixer settings and movements as MIDI messages. You can use an external MIDI controller to control the VS-1680's faders, and by using a MIDI sequencer to record mixer settings and movements during playback as MIDI song data, the mixer can be controlled automatically by the MIDI sequencer when the song is played back. This is referred to as **Compu Mix**. Compu Mix uses Control Change messages and Exclusive messages.

When Using Exclusive Messages

When working with Compu Mix, you should use normal Control Change messages. If the use of Control Change messages would affect other MIDI devices in your setup, you may use System Exclusive messages instead. For more detailed information about Control Change messages and Exclusive messages, refer to "MIDI Implementation" (Appendices p. 25)

Correspondence between MIDI Channels and Controller Numbers

MIDI channels correspond to the mixer channels as shown below. For channel pairs linked with the Stereo Link function, Control Change messages can be exchanged using the odd-numbered channel's MIDI channel. Control Change messages transmitted via the even-numbered channel's MIDI channel are ignored.

MIDI Channel	Input Mixer	Track Mixer	Master Block
1	1	1	-
2	2	2	-
3	3	3	-
4	4	4	-
5	5	5	-
6	6	6	-
7	7	7	-
8	8	8	-
9	DIGITAL L	9	-
10	DIGITAL R	10	-
11	ST IN	11	-
12	EFX1	12	-
13	EFX2	13	-
14	EFX3	14	-
15	EFX5	15	-
16	-	16	Master Block

graphic entire contents of page 200 here

A. Preparations for Compu Mix

1. Make connections as shown below.

graphic p 201 left column top

2. Hold [SHIFT] and press [F5(SYSTEM)]. The System menu icon appears in the display. If the System menu icon does not appear, press [F6(EXIT)].
3. Press [F4(MIDI)]. If "MIDI" does not appear in the display above [F4], press [PAGE] until "MIDI" appears, and then press [F4(MIDI)].
4. Use [←], [→], [↑], and [↓] to move the cursor and use the TIME / VALUE dial to change the settings.

MIDI Thru

This switches the function of the MIDI OUT / THRU connector. For this application, use "OUT".

Out: MIDI messages are sent from the VS-1680. Select this when sending metronome sound note messages or mixer parameter settings (Control Change messages or Exclusive messages).

Thru: This sends MIDI messages received via the MIDI IN connector without changing them.

Cntrl Local (Control Local Switch)

When this is set to "Off", actual volume levels remain unchanged even when the faders on the VS-1680 are moved. Normally, this is set to "On". For this application, set the Control Local switch to "On".

Control Type (Mixer Control Type)

This selects the type of MIDI messages used when transmitting mixer settings to an external MIDI device, or when MIDI messages from an external MIDI device are used to control the mixer. For this application, set this to "C.C."

Off: MIDI messages related to mixer operations are not transmitted or received.

C.C.: The mixer is controlled using Control Change messages.

Excl: The mixer is controlled using Exclusive messages.

5. Follow the procedure as described in "Synchronizing with MIDI Sequencers" (p. xx), make the necessary settings in both the VS-1680 and the MIDI sequencer to synchronize the two machines. Set the MIDI sequencer so messages received at the MIDI In connector are not output from the MIDI out connector.

B. Recording with Compu Mix

1. Prepare the VS-1680's mixer settings (faders, panning, etc.) as desired.
2. Put the MIDI sequencer in Record mode, and begin playback of the VS-1680.
3. When playback begins, immediately hold [SHIFT] and press [SCENE]. The mixer's initial condition is transmitted from the MIDI OUT connector.
4. As you listen to the song, make adjustments to the faders and other controls as needed.
5. When the song is finished, stop the MIDI sequencer and the VS-1680.

This completes the recording with Compu Mix. Save the MIDI song data to a floppy disk or other storage media. When you go back to the beginning of the MIDI song data and the VS-1680 song, and begin playback on the VS-1680, the mixer is controlled according to the Compu Mix data.

C. To Have Fader Movements Ignored

When playing back songs using Compu Mix, you may want the actual volume levels to remain unchanged even when the faders on the VS-1680 are moved. In such instances, use the following procedure.

1. Hold [SHIFT] and press [F5(SYSTEM)]. The System menu icon appears in the display. If the System menu icon does not appear, press [F6(EXIT)].
2. Press [F4(MIDI)]. If "MIDI" does not appear in the display above [F4], press [PAGE] until "MIDI" appears, and then press [F4(MIDI)].
3. Use [←], [→], [↑], and [↓] to move the cursor to "Cntl Local", and use the TIME / VALUE dial to change the settings.

Cntl Local (Control Local Switch)

When this is set to "Off", actual volume levels remain unchanged even when the faders on the VS-1680 are moved. Normally, this is set to "On". For this application, set the Control Local switch to "Off".

4. Press [PLAY(DISPLAY)] to return to the Playlist display.

VIII. Synchronizing with MMC

The VS-1680 supports MIDI Machine Control (MMC). This means when two VS-1680s are synchronized, or when a VS-1680 is synchronized with a MIDI sequencer that also implements MMC, operations such as play, stop, fast forward, etc., can be accomplished by operating only the Master device.

? MMC (Appendices p. 64)

* *Some MIDI devices are not compatible with the MMC used by the VS-1680. If you are using such a device, the VS-1680 cannot be operated in the manner described in this Owner's Manual. For more detailed information about MMC functions for the VS-1680, refer to "MIDI Implementation" (Appendices p. 25).*

Below is an explanation of synchronizing the VS-1680 with a software based MIDI sequencer using MMC. For this example, we are using Cakewalk Pro Audio, a computer based sequencer compatible with MTC and MMC. Make the connections as shown below, referring to the Cakewalk owner's manual as you go along.

graphic p 194 center

In this example, Cakewalk is the MMC master, and the VS-1680 is the MTC master. Cakewalk can be used to control VS-1680 operations such as play, stop, changing track status, and more.

* **Use a MIDI Interface** when connecting the VS-1680 to a computer. You normally also use a MIDI interface when connecting a sound module to a computer.

A. Settings for the VS-1680

1. Hold [SHIFT] and press [F5(SYSTEM)]. The System menu icon appears in the display. If the System menu icon does not appear, press [F6(EXIT)].
2. Press [F4(MIDI)]. If "MIDI" does not appear in the display above [F4], press [PAGE] until "MIDI" appears, and then press [F4(MIDI)].
3. Use [←], [→], [↑], and [↓] to move the cursor and use the TIME / VALUE dial to change the settings as follows.

MIDI Thru

This switches the function of the MIDI OUT / THRU connector. For this application, use "Out".

Out: MIDI messages are sent from the VS-1680. Select this when sending metronome sound note messages or mixer parameter settings (Control Change messages or Exclusive messages).

Thru: This sends MIDI messages received via the MIDI IN connector without changing them.

SySEx.Rx (System Exclusive Receive Switch)

Exclusive messages are received when this is set to "On". For this application, set to "On". The Exclusive messages can be received when the VS-1680 is in Play condition.

MMC (MMC Mode)

this setting determines how the VS-1680 implements MMC. For this application, set this to "Slave".

Off: MMC is not used. MMC is neither transmitted nor received.

MASTER: MMC is transmitted. The VS-1680 functions as the MMC Master for external MIDI equipment.

SLAVE: MMC is received. The VS-1680 functions as a MMC Slave to external MIDI equipment.

Control Type (Mixer Control Type)

This selects the type of MIDI messages used when transmitting mixer settings to an external MIDI device, or when MIDI messages from an external MIDI device are used to control the mixer. For this application, set this to "C.C.".

Off: MIDI messages related to mixer operations are not transmitted or received.

C.C.: The mixer is controlled using Control Change messages.

Excl: The mixer is controlled using Exclusive messages.

4. Hold [SHIFT] and press [EXT SYNC]. The Sync / Tempo screen appears in the display.
5. Use [←], [→], [↑], and [↓] to move the cursor and use the TIME / VALUE dial to change each of the values.

Sync Source

This setting determines if the VS-1680 is synchronized with other devices. For this application, set this to "INT".

INT: The VS-1680 runs according to its own internal clock. Select this when you are not synchronizing with other devices or when you want external MIDI devices to be controlled by sync signals from the VS-1680.

EXT: The VS-1680 is controlled with sync signals (MTC) from the connected external MIDI device. In this case, the VS-1680 does not operate unless it is receiving MTC. Select this setting when you want to use MTC from an external MIDI device to control the VS-1680.

Sync Gen. (Sync Generator)

This setting determines what type of MIDI signal is generated at the MIDI OUT connector on the VS-1680. For this application, choose "MTC".

Off: No MIDI signals are transmitted.

MTC: MIDI Time Code is transmitted.

MIDIclk: The Tempo Map MIDI Clock is transmitted.

SyncTr: The Sync Track MIDI Clock is transmitted.

6. Press [PLAY(DISPLAY)] to return to the Playlist display.

B. Settings for the Cakewalk Pro Audio

Make settings for Cakewalk Pro Audio as described below. For more detailed information about Cakewalk, refer to the Cakewalk Owner's Manual.

Setting | Clock: MTC (receives MTC)

Setting | MIDI Out: Select "Transmit MMC" (sends MMC)

Setting | Time Format: MTC from the VS-1680 (here, set "30")

* "30 Frame Drop" in Cakewalk corresponds to "29D" in the VS-1680.

In this set up, when you press "PLAY" in Cakewalk, MMC is transmitted to the VS-1680, which in turn begins playback. When the VS-1680 begins playing, it transmits MTC to Cakewalk.

C. Using Sound Cards which have a Digital Input / Output

When you have a sound card in your computer with a digital input and output (such as Audiomedia III or CardD), you can connect Cakewalk and your VS-1680 digitally. This is useful if you want to record audio from the VS-1680 into Cakewalk via the digital connection, edit the material in Cakewalk, and then send it back via the digital connection to the VS-1680 for mixdown. Be sure to read the owner's manual for Cakewalk as well as the sound card you are using.

About Sound Cards

Even when using the digital connections as described in the example, noise generated inside the computer in the vicinity of the sound card may leak into your audio. The level of noise will vary according to the computer's exterior panels, interior circuitry, the condition of cables, etc. In general, high-performance sound cards tend to resist this kind of noise better. With sound cards that have both analog and digital input and output, it may be necessary to configure the card to enable the digital input and output. Carefully read the owner's manual for your sound card, and make the necessary settings to enable the sound card to use the digital input and output.

D. Recording in Cakewalk

1. Make the connections as shown below.

graphic p 197

2. Follow the procedure as described in "Settings for the VS-1680" (p. xx) and "Settings for Cakewalk Pro Audio" (p. xx), set up the system so the VS-1680 and Cakewalk are synchronized.
3. Make settings to Cakewalk as shown below. For more detailed information, refer to the owner's manual.

Settings | Audio Options... | Advanced | SMPTE/MTC Sync: "High Quality"

** If your computer does not have adequate performance, even with the above settings you may not be able to get stable digital audio output, and the sound may suffer when digital connections are used. Additionally, Cakewalk Pro Audio 5.0 and Cakewalk Professional 5.0 do not feature the above mentioned settings. When using digital connectors, it is recommended you use Cakewalk Version 6.0 or higher.*

In this setup, when record is started in Cakewalk, MMC is transmitted to the VS-1680, which begins playing. During playback, the VS-1680 transmits MTC to Cakewalk, thus completing synchronization.

E. Recording in the VS-1680

1. Make the connections as shown below.

graphic p 198

2. Follow the procedure as described in "Settings for the VS-1680" (p. xx) and "Settings for Cakewalk Pro Audio" (p. xx), set up the system so the VS-1680 and Cakewalk are synchronized.
3. Make settings to Cakewalk as shown below. For more detailed information, refer to the owner's manual.

Settings | Audio Options... | Advanced | SMPTE/MTC Sync: "High Quality"

** If your computer does not have adequate performance, even with the above settings you may not be able to get stable digital audio output, and the sound may suffer when digital connections are used. Additionally, Cakewalk Pro Audio 5.0 and Cakewalk Professional 5.0 do not feature the above mentioned settings. When using digital connectors, it is recommended you use Cakewalk Version 6.0 or higher.*

4. Hold [SHIFT] and press [F5(System)]. The System icon appears in the display. If the System menu icon does not appear, press [F6(EXIT)].
5. Press [F1(SYSPM)]. If "SYSPM" does not appear in the display above [F1], press [PAGE] until it appears, then press [F1].
6. Use [→], [←], [↑] and [↓] to move the cursor to "MasterClk". If "MasterClk" is not displayed, press [F1(Prm 1)].

7. Use the TIME / VALUE dial to select either DIGIN1 or DIGIN2, depending on whether you are using a coaxial connector or an optical connector.

MasterClk (Master Clock)

This sets the VS-1680's reference clock.

- | | |
|----------------|--|
| DIGIN1: | Receives digital timing information from the DIGITAL IN 1 connector (coaxial). |
| INT: | Uses the VS-1680's own internal clock. |
| DIGIN2: | Receives digital timing information from the DIGITAL IN 2 connector (optical). |

8. Press [PLAY(DISPLAY)] to return to the Playlist display.
9. Make settings for the VS-1680 by following the procedure as described in "Recording Digital Signals" (p. xx).

In this status, when playback is started with Cakewalk, MMC is transmitted to the VS-1680, which begins recording. During recording, the VS-1680 transmits MTC to Cakewalk, thus completing synchronization.