MIDI Messages

A MIDI message is composed of a *status* byte, which identifies the message type, followed in most cases by one or more *data bytes*. The most significant bit of data bytes is always 0, to distinguish them from status bytes, whose most significant bit is 1. Except for System Exclusive messages, the status byte specifies exactly how many data bytes will follow it. System Exclusive messages are used for synthesizer patch dumps and parameter changes.

MIDI Objects

Max MIDI objects extract the essential data from incoming messages, so you don't need to know the details of the structure of MIDI messages. These objects are listed in the table below describing each type of MIDI message.

Raw MIDI

If you wish to deal with receiving and transmitting entire MIDI messages yourself, you can use the **midiin** and **midiout** objects. The **midiparse** and **midiformat** objects filter and format raw MIDI, and **sxformat** can help in formatting system exclusive commands for transmission by **midiout**.

To help you in managing MIDI data in Max, we have provided two reference charts here. The first chart identifies the different types of MIDI messages and shows their format. The second chart identifies controller numbers (the second byte of a MIDI control change message) that have been assigned a specific function.

MIDI Overview

MIDI Messages

Channel Messages Channel Messages use the lower 4 bits of the status byte to indicate the MIDI channel of the message. 0 is MIDI channel 1, and 15 is MIDI channel 16						
Function	*Objects*	*Status Byte*			*2nd Byte (0-127)*	*3rd Byte (0-127)*
		Decimal	*Hex*	*Binary*		
Note Off	**xnotein, xnoteout**	128-143	80-8F	1000xxxx	Key Number	Release Velocity
Note On	**notein, noteout**	144-159	90-9F	1001xxxx	Key Number	Velocity
Poly Pressure	**polyin, polyout**	160-175	A0-AF	1010xxxx	Key Number	Aftertouch
Control Change	**ctlin, ctlout**	176-191	B0-BF	1011xxxx	Controller Number	Controller Data
Program Change	**pgmin, pgmout**	192-207	C0-CF	1100xxxx	Program Number	
Aftertouch	**touchin, touchout**	208-223	D0-DF	1101xxxx	Aftertouch Value	
Pitch Bend	**bendin, bendout**	224-239	E0-EF	1110xxxx	Bend (LSB)	Bend (MSB)

System Messages						
Function	*Objects*	*Status Byte*			*2nd Byte (0-127)*	*3rd Byte (0-127)*
		Decimal	*Hex*	*Binary*		
System Exclusive	**sysexin, midiout**	240	F0	11110000	Mfr. ID Number	Arbitrary
Song Pos Ptr	**midiin, midiout**	242	F2	11110010	Position (LSB)	Position (MSB)
Song Select	**midiin, midiout**	243	F3	11110011	Song Number	
Tune Request	**midiin, midiout**	246	F6	11110110		
End of Sys Ex	**sysexin, midiout**	247	F7	11110111		
Clock	**rtin, midiout**	248	F8	11111000		
Start	**rtin, midiout**	250	FA	11111010		
Continue	**rtin, midiout**	251	FB	11111011		
Stop	**rtin, midiout**	252	FC	11111100		
Active Sensing	**midiin, midiout**	254	FE	11111110		
System Reset	**midiin, midiout**	255	FF	11111111		

MIDI Overview

Control Changes

Function	*Ctl Num*	*Values*
Continuous Controllers (MSB)	**0-31**	**0-127**
Modulation Wheel	1	0-127
Breath Controller	2	0-127
Foot Controller	4	0-127
Portamento Time	5	0-127
Data Entry	6	0-127
Main Volume	7	0-127
Balance	8	0-127
Pan	10	0-127
Expression	11	
Extra precision for the above (LSB)	**32-63**	
On/Off Switch Controllers	**64-95**	**127 and 0**
Sustain Pedal	64	127 and 0
Portamento On/Off	65	127 and 0
Sostenuto Pedal	66	127 and 0
Soft Pedal	67	
Other	**96-121**	**127**
Data Entry Yes (+1)	96	127
Data Entry No (-1)	97	
Channel Mode Messages	**122-127**	**127 and 0**
Local Control On/Off	122	0
All Notes Off	123	0
Omni Mode Off	124	0
Omni Mode On	125	0-16
Mono On	126	0
Poly On	127	