

MIDI Implementation

The Trigon-6 receives MIDI data according to the settings you have chosen in the GLOBAL settings. In addition, there is interaction between some of the Program parameters that determine the overall response of Trigon-6 to MIDI data. Following are the Global parameters that affect response to MIDI:

MIDI Channel: All, 1...16—Selects which MIDI channel to send and receive data, 1 to 16. All receives on all 16 channels.

MIDI Clock: Sets the Trigon-6's ability to send and receive MIDI clock messages:

- Off: MIDI Clock is neither sent nor received
- Out: MIDI Clock is sent, but not received
- In: MIDI Clock is received, but not sent
- Clock Thru (i-0): MIDI Clock is received and passed to MIDI Out
- In, No Start/Stop (n55): Receives MIDI Clock but does not respond to MIDI Start or Stop command.



When set to IN or IN THRU, if no MIDI clock is present at the selected input, the arpeggiator and sequencer will not function.

Clock Port: MID, USB—Sets the port(s), MIDI or USB, by which MIDI clock signals are received.

Param Xmit: Off, CC, NR—Changes to the values of front panel controls are transmitted via MIDI as Continuous Controllers (CC) or Non-registered Parameter Number (NR). Transmission of parameters can also be turned off.



NRPNS are the preferred method of parameter transmission, since they cover the complete range of all parameters, while CCs are limited to a range of 128.

Param Rcv: Off, CC, NR—Sets the method by which parameter changes are received via MIDI. As with transmission, NRPNS are the preferred method.

MIDI Control: Off, On—When On, the synth will respond to MIDI controllers, including Pitch Wheel, Mod Wheel, Pedal, Volume.

MIDI Sysex: MID, USB— When set to MIDI (MID) it will receive and transmit them using the MIDI ports/cables When set to USB it will receive and transmit them using the USB port/cable. MIDI SysEx messages are used when sending and receiving a variety of data including, programs, alternative tunings, system updates, and more.

MIDI Out: MID, USB, btH, PLY— Sets the port by which MIDI data will be transmitted (MIDI, USB, MIDI + USB, or Poly Chain)..

MIDI Messages

System Real-Time Messages

Status	Description
1111 1000	MIDI Timing Clock

Received Channel Messages

Status	Second	Third	Description
1000 nnnn	0kkkkkkk	0vvvvvvv	Note Off. Velocity is ignored
1001 nnnn	0kkkkkkk	0vvvvvvv	Note On. Note off if vvvvvvv = 0
1010 nnnn	0kkkkkkk	0vvvvvvv	Polyphonic Key Pressure
1011 nnnn	0vvvvvvv	0vvvvvvv	Control Change; see "Received Controller Messages"
1100 nnnn	0pppppppp		Program change, 0-99 for Programs 1-100 within current Bank
1101 nnnn	0vvvvvvv		Channel Pressure
1110 nnnn	0vvvvvvv	0vvvvvvv	Pitch Bend LS Byte then MS Byte

Notes: 0kkkkkkk
 nnnn
 0vvvvvvv

Note number 0 — 127
 Channel number 0 to 15 (MIDI channel 1-16).
 Ignored if MIDI channel set to ALL
 Value

Received Controller Messages

Status	Second	Third	Description
1011 nnnn	1	0vvvvvvv	Mod Wheel: directly assignable controller
1011 nnnn	4	0vvvvvvv	Foot Controller: directly assignable controller
1011 nnnn	7	0vvvvvvv	Volume: Combined with Master Volume and Voice Volume
1011 nnnn	74	0vvvvvvv	Brightness: Added to low-pass filter cutoff frequency
1011 nnnn	32	0vvvvvvv	Bank Select: 0 - 4 select user banks 0 - 4; 5 - 9 select factory banks 0 - 4; others ignored
1011 nnnn	64	0vvvvvvv	Damper pedal: Holds envelopes in Sustain if 0100 0000 or higher
1011 nnnn	123	0vvvvvvv	All Notes Off: Clear all MIDI notes
1011 nnnn	121	0vvvvvvv	Reset All Controllers: Clears all MIDI controllers to 0, MIDI volume to maximum

See sections below for additional Continuous Controller (CC) and Non-registered Parameter Number (NRPN) messages received.

Transmitted Channel Messages

Status	Second	Third	Description
1000 nnnn	0kkkkkkk	0000000	Note Off.
1001 nnnn	0kkkkkkk	0vvvvvvv	Note On.
1011 nnnn	0vvvvvvv	0vvvvvvv	Control Change; see "Transmitted Controller Messages"
1100 nnnn	0ppppppp		Program change, 0-99 for Programs 00-99 within current Bank
1101 nnnn	0vvvvvvv		Channel Pressure
1110 nnnn	0vvvvvvv	0vvvvvvv	Pitch Bend LS Byte then MS Byte

Notes: 0kkkkkkk Note number 0 — 127
 nnnn Channel number 0 to 15 (MIDI channel 1-16).
 Ignored if MIDI channel set to ALL
 0vvvvvvv Value

Transmitted Controller Messages

Status	Second	Third	Description
1011 nnnn	0000 0001	0vvvvvv	Mod Wheel
1011 nnnn	0000 0100	0vvvvvv	Foot Controller: When assigned to Pedal 1 or Pedal 2
1011 nnnn	0000 0111	0vvvvvv	Volume: When assigned to Pedal 1 or Pedal 2
1011 nnnn	0100 1010	0vvvvvv	Brightness: When assigned to Pedal 1 or Pedal 2
1011 nnnn	0010 0000	0vvvvvv	Bank Select: 0 - 9
1011 nnnn	0100 0000	0vvvvvv	Damper pedal: Sends 0 if off, 0111 1111 when on
1011 nnnn	0000 0111	0vvvvvv	Volume knob

See sections that follow for additional Continuous Controller (CC) and Non-registered Parameter Number (NRPN) messages transmitted.

Additional Continuous Controllers Transmitted/Received

The following table details how MIDI Continuous Controllers (CCs) are mapped to Trigon-6 controls. They are transmitted when Param Xmit is set to CC, and recognized/received when MIDI Rcv Receive is set to CC.

CC#	Param
0	Bank Select MSB
1	Mod Wheel
3	BPM
4	Foot Controller
5	Glide Mode (Portamento Time)
6	Data Entry MSB
7	MIDI Volume
9	Distortion Amount
11	Expression
12	Voice Volume
38	Data Entry LSB
40	VCA Env Amt
41	VCA Env Vel Amt
43	VCA Env Attack
44	VCA Env Decay
45	VCA Env Sustain
46	VCA Env Release
47	Filter Env Amt
50	Filter Env Attack
51	Filter Env Decay
52	Filter Env Sustain
53	Filter Env Release
58	Arp On/Off
59	Arp Mode
60	Arp Range
62	Clock Divide
65	Glide On/Off
67	Osc 1 Octave
68	Osc 1 Synch
69	Osc 1 Level
70	Osc 1 Saw On
71	Osc 1 Pulse Tri On

CC#	Param
72	Osc 1 Pulse On
73	Osc 1 Pulse Width
75	Osc 2 Octave
76	Osc 2 Freq Fine
77	Osc 2 Level
78	Osc 2 Saw On
79	Osc 2 Tri On
80	Osc 2 Pulse On
81	Osc 2 Pulse Width
82	Osc 3 Octave
83	Osc 3 Freq Fine
84	Osc 3 Level
85	Osc 3 Saw On
86	Osc 3 Tri On
87	Osc 3 Pulse On
88	Osc 3 Pulse Width
89	Osc 3 Key On/Off
96	Data Inc
97	Data Dec
102	Lowpass Frequency
103	Lowpass Resonance
104	Lowpass Key Amount
105	Lowpass Velocity On
106	Lowpass Drive
107	Lowpass 2/4 Pole
120	All Sound Off
121	Reset Controllers
122	Local Control On/Off
123	All Notes Off
124	Omni Mode Off
125	Omni Mode On
126	Mono Mode On
127	Poly Mode On

NRPN Messages

The Non-Registered Parameter Number (NRPN) MIDI messages are used to transmit and receive both global and program parameters. They are transmitted when MIDI Parameter Send is set to NRPN in Global, and received when MIDI Parameter Receive is set to NRPN in Global.

The messages are handled in standard MIDI format using the NRPN CC commands in running status byte format. Below is the format used for transmitting a NRPN parameter.

Transmitted NRPN Messages

Status	Description
1011 nnnn	Control Change
0110 0011	NRPN parameter number MSB CC
0vvv vvvv	Parameter Number MSB
0110 0010	NRPN parameter number LSB CC
0vvv vvvv	Parameter Number LSB
0000 0110	NRPN parameter value MSB CC
0vvv vvvv	Parameter value MSB
0010 0110	NRPN parameter value LSB CC
0vvv vvvv	Parameter value LSB

The parameter number can be found in the two tables below, one for Global parameters, and the other for Program parameters. The parameter numbers and the parameter values are broken into two 7-bit bytes for MIDI transmission; the LSB has the seven least-significant bits, and the MSB has the seven most-significant bits, though in most cases the MSB will be zero or one, and never more than two.

When receiving an NRPN, all messages do not necessarily need to be transmitted, since the synth will track the most recent NRPN number, though it is usually good practice to send the entire message above.

Once an NRPN is selected, the synth will also respond to NRPN Data Increment and Decrement commands, which some controllers utilize. Finally, it responds to one RPN (Registered Parameter Number) command, the RPN/NRPN Reset command, which can be handy for resetting the currently selected parameter to a known state.

Received NRPN Messages

Status	Second	Third	Description
1011 nnnn	0110 0011	0vvvvvvv	NRPN parameter number MSB CC
1011 nnnn	0110 0010	0vvvvvvv	NRPN parameter number LSB CC
1011 nnnn	0000 0110	0vvvvvvv	NRPN parameter value MSB CC
1011 nnnn	0010 0110	0vvvvvvv	NRPN parameter value LSB CC
1011 nnnn	0110 0000	0xxxxxxx	NRPN parameter value Increment
1011 nnnn	0110 0001	0xxxxxxx	NRPN parameter value Decrement
1011 nnnn	0010 0101	01111111	RPN parameter number MSB CC - Reset NRPN parameter number (when both MSB and LSB received)
1011 nnnn	0010 0100	01111111	RPN parameter number LSB CC - Reset NRPN parameter number (when both MSB and LSB received)

Global Parameter Data

The table shows the Global data sent and received on global parameter dumps, and corresponding NRPN number when sent/received individually.

NRPN	Range	Description
1024	0-100	Master Fine Tune
1025	0-24	Master Coarse Tune
1026	0-16	MIDI Channel 0 = All
1027	0-3	MIDI Clock Mode 0 = Off 1 = Master 2 = Slave 3 = Slave Thru
1028	0-1	MIDI Clock Port 0 = MIDI Port 1 = USB
1029	0-2	MIDI Param Send* 0 = NRPN 1 = CC 2 = Off
1030	0-2	MIDI Param Receive† 0 = NRPN 1 = CC 2 = Off
1031	0-1	MIDI Control Enable 0 = Off 1 = On
1032	0-1	MIDI SysEx Enable 0 = Off 1 = On

NRPN	Range	Description
1033	0-3	MIDI Out Select 0 = Off 1 = MIDI 2 = USB 3 = MIDI+USB
1035	0-1	Local Control* 0 = Off 1 = On
1037	0-2	Pot Mode 0 = Relative 1 = PassThru 2 = Jump
1039	0-3	Seq Jack 0 = normal 1 = trigger 2 = gate 3 = trigger+gate
1040	0-3	Sustain Polarity 0 = normally open 1 = normally closed 2 = Sustain Normally Open/ Sequencer Normally Closed 3 = Sustain Normally Closed/ Sequencer Normally Open
1041	0-3	Velocity Response
1042	0-3	Aftertouch Response
1043	0-1	Mono/Stereo 0 = Stereo 1 = Mono
1044	0-16	Alt Tuning

*Controller received, but not transmitted.

†Controller transmitted, but ignored when received.

Program Parameter Data

The following table lists Trigon-6's program parameters.

NRPN	Value	Description
0	0-4	Osc 1 Octave
1	0-4	Osc 2 Octave
2	0-5	Osc 3 Octave
3	0-1400	Osc 2 Pitch
4	0-1400	Osc 3 Pitch
5	0-1	Osc 1 Saw
6	0-1	Osc 2 Saw
7	0-1	Osc 3 Saw Fall
8	0-1	Osc 1 Tri
9	0-1	Osc 2 Tri
10	0-1	Osc 3 Tri
11	0-1	Osc 1 Square
12	0-1	Osc 2 Square
13	0-1	Osc 3 Square
14	0-127	Osc 1 PW
15	0-127	Osc 2 PW
16	0-127	Osc 3 PW
17	0-127	Osc 1 Volume
18	0-127	Osc 2 Volume
19	0-127	Osc 3 Volume
20	0-1	Osc 1 Sync
21	0-1	Osc 1 Keyboard
23	0-127	Glide Rate
24	0-3	Glide Mode
25	0-1	Glide On/Off
26	0-12	Pitch Wheel Range
27	0-127	Vintage
29	0-164	Filter Cutoff
30	0-127	Filter Resonance
31	0-2	Filter Keyboard
32	0-1	FEnv Velocity
33	0-1	Filter 2-Pole

NRPN	Value	Description
34	0-100	Program Volume
35	0-127	Pan Spread
36	0-254	FEnv Amount
40	0-127	FEnv Attack
41	0-127	VCA Attack
42	0-127	FEnv Decay
43	0-127	VCA Decay
44	0-127	FEnv Sustain
45	0-127	VCA Sustain
46	0-127	FEnv Release
47	0-127	VCA Release
48	0-1	VCA Velocity
49	0-9	FX A Type
50	0-13	FX B Type
51	0-1	FX On/Off
53	0-127	FX A Wet/Dry
54	0-127	FX B Wet/Dry
55	0-127	FX A Param 1
56	0-127	FX B Param 1
57	0-127	FX A Param 2
58	0-127	FX B Param 2
59	0-1	FX A Sync On/Off
60	0-1	FX B Sync On/Off
63	0-127	Distortion
64	0-254	LFO Freq
66	0-1	LFO Sync On/Off
68	0-255	LFO Amount
69	0-1	LFO Osc 1 Freq Dest
70	0-1	LFO Osc 2 Freq Dest
71	0-1	LFO Osc 3 Freq Dest

NRPN	Value	Description
72	0-1	LFO PW 1 Dest
73	0-1	LFO PW 2 Dest
74	0-1	LFO PW 3 Dest
75	0-1	LFO Filter Dest
76	0-1	LFO Amp Dest
77	0-254	Aftertouch Amount
78	0-1	Touch Osc 1 Freq Dest
79	0-1	Touch Osd 2 Freq Dest
80	0-1	Touch Osc 3 Freq Dest
81	0-1	Touch Filter Dest
82	0-1	Touch Amp Dest
83	0-1	Touch Amp LFO
84	0-1	Touch FX A Mix
85	0-1	Touch FX B Mix
86	0-254	Polymod FEnv Amt
87	0-254	Polymod Osc 3 Amt
88	0-1	Polymod Osc 1 Freq Dest
89	0-1	Polymod Osc 2 Freq Dest
90	0-1	Polymod Osc 3 Freq Dest
91	0-1	Polymod PW 1 Dest
92	0-1	Polymod PW 2 Dest
93	0-1	Polymod Feedback Dest
94	0-1	Polymod Filter Dest
95	0-1	Unison On/Off
96	0-6	Unison Voice Count
97	0-5	Key Mode
98	30-250	BPM
100	0-4	Arp Mode
101	0-2	Arp Octave
102	0-1	Arp On/Off
103	0-9	Clock Divide

NRPN	Value	Description
104	0-1	Arp Hold
105	0-1	Sequencer On/Off
106	0-1	Sequencer Rec On
137-200	0-127	Seq Step 1-64 Vel 3
201-264	12-108	Seq Step 1-64 Note 4
265-328	0-127	Seq Step 1-64 Vel 4
329-392	12-108	Seq Step 1-64 Note 5
393-456	0-127	Seq Step 1-64 Vel 5
457-520	12-108	Seq Step 1-64 Note 6
521-584	0-127	Seq Step 1-64 Vel 6
1024	0-100	Tuning Fine
1025	0-24	Tuning Coarse
1026	0-16	MIDI Channel
1027	0-4	MIDI Clock
1028	0-1	MIDI Clock Port
1029	0-2	MIDI Param Send
1030	0-2	MIDI Param Receive
1031	0-1	MIDI MIDI Control
1032	0-1	MIDI SysEx Control
1033	0-1	MIDI Out
1035	0-1	Local Control
1037	0-2	Pot Mode
1039	0-3	Seq Jack
1040	0-3	Sustain Polarity
1041	0-3	Velocity Response
1042	0-3	At Response
1043	0-1	Stereo Mono
1044	0-16	Alt Tuning

Control NRPN Data

The following table lists the Trigon-6's control NRPN data. It is received and transmitted but not saved as part of a program.

NRPN	Value	Description
1088	0-1	Seq Play/Stop *
1	0-1	Osc 1 Sync
2	0-127	Osc 1 Level
3	0-254	Osc 1 Shape

*Only available in NORMAL Seq jack mode.

Sysex Messages

Universal System Exclusive Message (Device Inquiry)

Status	Description
1111 0000	System Exclusive (SysEx)
0111 1110	Non-realtime message
0vvv vvv	If MIDI channel is set to 1 - 16, 0vvvvvvv must match (unless MIDI Channel = ALL); always responds if 0vvvvvvv = 0111 1111.
0000 0110	Inquiry Message
0000 0001	Inquiry Request
1111 0111	End of Exclusive (EOX)

The Trigon-6 responds with:

Status	Description
1111 0000	System Exclusive (SysEx)
0111 1110	Non-realtime message
0vvv vvv	If MIDI Channel = ALL, 0vvvvvvv = 0111 1111. Otherwise 0vvvvvvv = Channel Number 0 - 15.
0000 0110	Inquiry Message
0000 0010	Inquiry Reply
0000 0001	DSI ID
0b11 1001	Trigon-6 ID (Family LS)
0000 0001	Family MS
0000 0000	Family Member LS
0000 0000	Family Member MS
0jjj nnnn	Main Software version: jjj - Minor rev; nnnn - Major rev
1111 0111	End of Exclusive (EOX)

Request Program Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0b11 1001	Trigon-6 ID
0000 0101	Request Program Transmit
0000 00vv	Bank Number, 0 - 9
0vvv vvvv	Program Number, 0 - 99
1111 0111	End of Exclusive (EOX)

The Trigon-6 will respond by sending out the Program Data in the format described below in *Program Data Dump*.

Request Program Edit Buffer Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0b11 1001	Trigon-6 ID
0000 0110	Request Program Edit Buffer Transmit
1111 0111	End of Exclusive (EOX)

The Trigon-6 will respond by sending out the current Program edit buffer in the format described below in *Program Edit Buffer Data Dump*.

Request Global Parameter Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0b11 1001	Trigon-6 ID
0000 1110	Request Global Parameter Transmit
1111 0111	End of Exclusive (EOX)

The Trigon-6 will respond by sending out the current values of Global Parameters in the format described in *Global Parameters Data Dump*.

Program Data Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0b11 1001	Trigon-6 ID
0000 0010	Program Data
0000 00vv	Bank Number: 0 - 9
0vvv vvvv	Program Number: 0 - 99
0vvv vvvv	1024 bytes expanded to 1171 MIDI bytes in "packed MS bit" format
1111 0111	End of Exclusive (EOX)

Program Edit Buffer Data Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	- ID
0b11 1001	Trigon-6 ID
0000 0011	Edit Buffer Data
0vvv vvvv	1024 bytes expanded to 1171 MIDI bytes in "packed MS bit" format
1111 0111	End of Exclusive (EOX)

Global Parameters Data Dump

Value	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0b11 1001	Trigon-6 ID
0000 1111	Main Parameter Data
0vvv vvvv	50 nibbles (LS then MS) for 25 Global parameters
1111 0111	End of Exclusive (EOX)



The Global Parameters Data Dump is not recognized when received; it is only transmitted when requested. NRPN messages are used to change Globals.

Packed Data Format

Data is packed in 8 byte “packets”, with the MS bit stripped from 7 parameter bytes, and packed into an eighth byte, which is sent at the start of the 8 byte packet.

Example:

Input Data

```
1 A7 A6 A5 A4 A3 A2 A1 A0
2 B7 B6 B5 B4 B3 B2 B1 B0
3 C7 C6 C5 C4 C3 C2 C1 C0
4 D7 D6 D5 D4 D3 D2 D1 D0
5 E7 E6 E5 E4 E3 E2 E1 E0
6 F7 F6 F5 F4 F3 F2 F1 F0
7 G7 G6 G5 G4 G3 G2 G1 G0
```

Packed MIDI data

```
1 00 G7 F7 E7 D7 C7 B7 A7
2 00 A6 A5 A4 A3 A2 A1 A0
3 00 B6 B5 B4 B3 B2 B1 B0
4 00 C6 C5 C4 C3 C2 C1 C0
5 00 D6 D5 D4 D3 D2 D1 D0
6 00 E6 E5 E4 E3 E2 E1 E0
7 00 F6 F5 F4 F3 F2 F1 F0
8 00 G6 G5 G4 G3 G2 G1 G0
```

This explains why it takes 1171 MIDI bytes to transmit 1024 Program data bytes.