Xio™
MIDI IMPLEMENTATION

Model : Novation XioSynth (synth mode only)

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Version: 1.0.08

Function		Transmitted	Received	Remarks
Basic Channel	Default	1 – 16	1 – 16	Memorised
	Changed	1 – 16	1 – 16	
Mode	Default		MODE 3 - 4	Memorised in Program Data
	Messages	X	X	
	Altered	****************		
Note Number		0 – 127	0 – 127	Note data can be transmitted by the Arpeggiator
	True Voice	****************		
Velocity	Note On	O v = 1 – 127	O v = 1 – 127	
	Note Off	O v = 1 – 127	X	
Aftertouch	Keys	X	X	
	Channel	O	O	
Pitch Bend		O	O	7-bit resolution
Control Change		0 – 1, 3, 5 – 13, 16 – 32, 40 – 64, 68 – 70, 72 – 76, 80 – 85, 87 – 88, 90 – 94, 98 – 99, 102 – 112, 114 – 119	1 – 3, 5 – 6, 8 – 13, 16 – 32, 40 – 64, 68 – 70, 72 – 76, 80 – 85, 87 – 88, 90 – 94, 98 – 99, 102 – 112, 114 – 121, 122 – 127	See Controller and NRPN tables for full details
Program Change		0 – 99	0 – 99	
	True	****************		
System Exclusive		O	O	Program and Global data dumps, OS Upgrades
System Common		X	O	
System Real-Time	Clock	X	O	
	Commands	X	O (Start only)	
Aux Messages	Local Control	X	O	
	All Notes Off	X	O	
	Active Sense	X	X	
	Reset Control	X	X	
	All Sound Off	X	O	

Mode 1 : OMNI ON, POLY   Mode 2 : OMNI ON, MONO   O : Yes
Mode 3 : OMNI OFF, POLY   Mode 4 : OMNI OFF, MONO   X : No

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MIDI CONTROLLER LIST

Some controllers adhere to the normal midi-specified use (e.g. modwheel, pan) but most are used arbitrarily and therefore may clash with assignments of other products. We have tried to avoid misuse of some "standard" controllers which could cause problems.

Unless noted, all controllers are transmitted and received. Unless notes all parameters have the range 0-127.

* * *   Denotes a signed value where 64 represents zero.
       Unless noted, this is -64...0...+63 stored as 0...64...127.
       Another example is -12...0...12 stored as 52...64...76.

—   Denotes controller is not used.

The term "pulse width" is properly applied when square wave is selected.
For other waveforms, read "pulse width" as "double waveform phase effect".
Double waveform phase offset is zero when the signed pulse width position parameter is 64 (meaning 0).

Common parameters are transmitted and received on the Synth MIDI Channel, set in the Synth Global Menu on the Xio.

#	MIDI-SPECIFIED USE	XIOSYNTH USE
0	bank msb	IGNORED/TRANSMITTED WITH VALUE 0
1	modwheel msb	MODWHEEL
2	breath msb	BREATH CONTROL (receive only)
3	undefined msb	ARP PATTERN (0...6 = up, down, ud1, ud2, order, chord)
4	foot controller msb	—
5	portamento time msb	PORTAMENTO TIME
6	data entry msb	used for NRPN data values
7	volume msb	MIDI VOLUME (transmit only)
8	balance msb	PREGLIDE SEMITONES * * * -12...+12 (0=preglide disabled)
9	undefined msb	ARP/GENERAL SYNC RATE (64-191 bpm) (common)
10	pan msb	PAN POSITION * * *
11	expression ms	EXPRESSION PEDAL
12	effect control 1 msb	NON-SYNC PAN RATE
13	effect control 2 msb	SYNC PAN RATE 0...34 (non-sync, 32 Triplet...12 Bars)
14-15		—
16	gen. controller 1 msb	MODWHEEL DISTORTION * * *
17	gen. controller 2 msb	DISTROTION COMPENSATION
18	gen. controller 3 msb	MODWHEEL DELAY SEND
19	gen. controller 4 msb	NON-SYNC DELAY TIME
20	undefined msb	SYNC DELAY TIME 0...19 (non-sync, 32 Triplet...12 Bars)
21	undefined msb	DELAY FEEDBCAK
22	undefined msb	DELAY STEREO WIDTH
23	undefined msb	DELAY RATIO
24	undefined msb	MODWHEEL REVERB SEND
25	undefined msb	REVERB DECAY
26	undefined msb	MODWHEEL CHORUS SEND
27	undefined msb	NON-SYNC CHROUS RATE
28	undefined msb	SYNC CHROUS RATE 0...34 (non-sync, 32 Triplet...12 Bars)
29	undefined msb	CHORUS FEEDBACK
30	undefined msb	CHORUS MOD DEPTH
31	undefined msb	CHORUS MOD CENTRE POINT
32	bank lsb	BANK SELECT 0...1

33-39		—
40	balance lsb	OSC1 SEMITONE *** -12...+12
41	undefined lsb	OSC1 CENT *** -50...+50
42	pan lsb	OSC1 BENDWHEEL PITCH AMOUNT ***
43	expression lsb	OSC1 LFO1 PITCH AMOUNT ***
44	effect control 1 lsb	OSC1 MOD ENV PITCH AMOUNT ***
45	effect control 2 lsb	OSC1 PULSE WIDTH POSITION *** (0=50% or in-phase double wave)
46	undefined lsb	OSC1 LFO2 PULSE WIDTH MOD ***
47	undefined lsb	OSC1 MOD ENV PULSE WIDTH MOD ***
48	gen. controller 1 lsb	OSC2 SEMITONE *** -12...+12
49	gen. controller 2 lsb	OSC2 CENT *** -50...+50
50	gen. controller 3 lsb	OSC2 BENDWHEEL PITCH AMOUNT ***
51	gen. controller 4 lsb	OSC2 LFO1 PITCH AMOUNT ***
52	undefined lsb	OSC2 MOD ENV PITCH AMOUNT ***
53	undefined lsb	OSC2 PULSE WIDTH POSITION *** (0=50% or in-phase double wave)
54	undefined lsb	OSC2 LFO2 PULSE WIDTH MOD ***
55	undefined lsb	OSC2 MOD ENV PULSE WIDTH MOD ***
56	undefined lsb	OSC3 SEMITONE *** -12...+12
57	undefined lsb	OSC3 CENT *** -50...+50
58	undefined lsb	OSC3 BENDWHEEL PITCH AMOUNT ***
59	undefined lsb	OSC3 LFO1 PITCH AMOUNT ***
60	undefined lsb	OSC3 MOD ENV PITCH AMOUNT ***
61	undefined lsb	OSC3 PULSE WIDTH POSITION *** (0=50% or in-phase double wave)
62	undefined lsb	OSC3 LFO2 PULSE WIDTH MOD ***
63	undefined lsb	OSC3 MOD ENV PULSE WIDTH MOD ***
64	sustain pedal	SUSTAIN
65-67		—
68	legato footswitch	UNISON DETUNE
69	hold 2	INDIVIDUAL OSCILLATOR RANDOM DETUNE
70	sound controller 1	PORTAMENTO MODE (0=exp, 1=lin)
71	sound controller 2	—
72	sound controller 3	OSC1 LEVEL (to filter)
73	sound controller 4	OSC2 LEVEL (to filter)
74	sound controller 5	OSC3 LEVEL (to filter)
75	sound controller 6	NOISE LEVEL (to filter)
76	sound controller 7	OSC 1*2 RINGMOD LEVEL (to filter)
77-79		—
80	gen. controller 5 lsb	NON-SYNC LFO1 SPEED
81	gen. controller 6 lsb	SYNC LFO1 SPEED 0...34 (non-sync, 32 Triplet...12 Bars)
82	gen. controller 7 lsb	LFO1 DELAY (GRADUAL ONSET TIME/ONE-SHOT MODE DELAY)
83	gen. controller 8 lsb	NON-SYNC LFO2 SPEED
84	portamento control	SYNC LFO2 SPEED 0...34 (non-sync, 32 Triplet...12 Bars)
85	undefined	LFO2 DELAY (GRADUAL ONSET TIME/ONE-SHOT MODE DELAY)
86	undefined	—
87	undefined	ARPEGGIATOR SYNC SETTING 0...15 (32 Triplet...1 Bar)
88	undefined	ARPEGGIATOR GATE TIME *** (+64 GIVES TIED NOTE IN MONO MODE)
89	undefined	—
90	undefined	DISTROTION LEVEL
91	effects 1 depth	REVERB SEND LEVEL
92	effects 2 depth	DELAY SEND LEVEL
93	effects 3 depth	CHORUS SEND LEVEL
94	effects 4 depth	PAN MOD DEPTH
95-97		—
98	nrpn lsb	NRPN LSB NUMBER

99	nrpn msb	NRPN MSB NUMBER (transmitted with value 0)
100	rpn lsb	—
101	rpn msb	—
102	undefined	FILTER FREQUENCY LFO2 MOD DEPTH * * *
103	undefined	FILTER Q NORMALISE (127=zero filter drive at max resonance)
104	undefined	FILTER OVERDRIVE
105	undefined	FILTER FREQUENCY
106	undefined	FILTER RESONANCE
107	undefined	FILTER FREQUENCY MOD ENV DEPTH
108	undefined	AMPLITUDE ENVELOPE ATTACK
109	undefined	AMPLITUDE ENVELOPE DECAY
110	undefined	AMPLITUDE ENVELOPE SUSTAIN
111	undefined	AMPLITUDE ENVELOPE RELEASE
112	undefined	AMPLITUDE ENVELOPE VELOCITY DEPTH * * *
113	undefined	—
114	undefined	MOD ENV ATTACK
115	undefined	MOD ENV DECAY
116	undefined	MOD ENV SUSTAIN
117	undefined	MOD ENV RELEASE
118	undefined	MOD ENV VELOCITY DEPTH * * *
119	undefined	MIX OUTPUT LEVEL (controls pre-effects signal level)
120	all sounds off	ALL NOTES OFF WITH FAST RELEASE (receive only)
121	reset controllers	—
122	local on/off	LOCAL ON/OFF
123	all notes off	ALL NOTES OFF (receive only)
124	omni off	ALL NOTES OFF (receive only)
125	omni on	ALL NOTES OFF (receive only)
126	mono mode setup	ALL NOTES OFF (receive only)
127	poly mode on	ALL NOTES OFF (receive only)

MIDI NRPN LIST

The Xio uses NRPNs as detailed below. NRPNs 104-106 are used to access multiple parameters. The value sent determines which parameter the NPRN message will control.

0	OSC 2>3 FM FIXED LEVEL
1	OSC 2>3 FM AD ENVELOPE DEPTH * * *
2	AD ENVELOPE VELOCITY DEPTH * * *
3	AD ENVELOPE ATTACK
4	AD ENVELOPE DECAY
5	OSC 1,2,3 MODWHEEL DIRECT PITCH DEPTH * * *
6	OSC 1,2,3 AFTERTOUCH DIRECT PITCH DEPTH * * *
7	OSC 1,2,3 BREATH DIRECT PITCH DEPTH * * *
8	OSC 1,2,3 MODWHEEL LFO1 PITCH DEPTH * * *
9	OSC 1,2,3 AFTERTOUCH LFO1 PITCH DEPTH * * *
10	OSC 1,2,3 BREATH LFO1 PITCH DEPTH * * *
11	FILTER KEYBOARD TRACKING (0=NONE, 127=PRECISE PITCH TRACK)
12	FILTER MODWHEEL DIRECT FREQUENCY DEPTH * * *
13	FILTER AFTERTOUCH DIRECT FREQUENCY DEPTH * * *
14	FILTER BREATH DIRECT FREQUENCY DEPTH * * *
15	FILTER MODWHEEL LFO2 FREQUENCY DEPTH * * *
16	FILTER AFTERTOUCH LFO2 FREQUENCY DEPTH * * *
17	FILTER BREATH LFO2 FREQUENCY DEPTH * * *

18	AMPLITUDE MODWHEEL DIRECT DEPTH ***
19	AMPLITUDE AFTERTOUCH DIRECT DEPTH ***
20	AMPLITUDE BREATH DIRECT DEPTH ***
21-28	—
29	EQ BASS ***
30	EQ MID ***
31	EQ TREBLE ***
32-35	—
36	FILTER SHAPE
37-39	—
40	X-GATOR SYNC SETTING 0...19 (64 Triplet...1 Bar)
41	X-GATOR MODE (0...5=mono 16, mono-alt 1, mono-alt 2, stereo 16, st-swap 1, st-swap 2)
42	X-GATOR LEVEL
43	X-GATOR EDGE
44	X-GATOR DECAY
45	X-GATOR DELAY ***
46-49	—
50	OSC1 WAVEFORM (0...31)
51	OSC2 WAVEFORM (0...31)
52	OSC3 WAVEFORM (0...31)
53	LFO1 WAVEFORM (0...31)
54	LFO2 WAVEFORM (0...31)
55	LFO1 UNIPOLAR (0=centre-zero, 1=all positive)
56	LFO2 UNIPOLAR (0=centre-zero, 1=all positive)
57	LFO1 KEYSYNC START PHASE (0...357 degrees)
58	LFO2 KEYSYNC START PHASE (0...357 degrees)
59	LFO1 SYNC DELAY TIME 0...34 (non-sync, 32 Triplet...12 Bars)
60	LFO2 SYNC DELAY TIME 0...34 (non-sync, 32 Triplet...12 Bars)
61	—
62	FILTER TYPE (0...2 = LP, BP, HP)
63	OSC1 LFO1 LEVEL MOD ***
64	OSC2 LFO2 LEVEL MOD ***
65	OSC3 AD ENV LEVEL MOD ***
66	NOISE LFO1 LEVEL MOD ***
67	RING1*2 LFO1 LEVEL MOD ***
68	AUDIO INPUT LFO1 LEVEL MOD ***
69	OSC123 WAVEFORM KEYSYNC START PHASE (0...357 degrees)
70	NOISE TYPE (0...3 = white, hp, bp, hp*bp)
71	ARPEGGIATOR PATTERN (0...32 0=off, 32patterns)
72	FILTER FREQUENCY VELOCITY CONTROL ***
73	ARPEGGIATOR PATTERN VELOCITY MODE (0=use note-on velocity, 1=use velocity in pattern)
74	FIXED NOTE CONTROL (0=off, 1-127 fix the note to midi 1...127 i.e. C#-2...G8)
75	LFO1 OUTPUT LEVEL VELOCITY CONTROL ***
76	LFO2 OUTPUT LEVEL VELOCITY CONTROL ***
77	OSC1 LFO2 LEVEL MOD ***
78	OSC 2>3 FM LFO1 DEPTH MOD ***
79-103	—
104	AMP ENV MONO TRIGGER MODE (0=single, 1=multi)
	MOD ENV MONO TRIGGER MODE (2=single, 3=multi)
	AD ENV MONO TRIGGER MODE (4=single, 5=multi)
	OSC 1>2 SYNC (10=off, 11=on)
	LFO1 DELAY MONO TRIGGER MODE (12=single, 13=multi)
	LFO2 DELAY MONO TRIGGER MODE (14=single, 15=multi)
	LFO1 ONE-SHOT (16=off, 17=on)

104 (cont.)	LFO1 KEYSYNC (18=off, 19=on)
	LFO1 COMMON (20=off, 21=on)
	LFO2 ONE-SHOT (22=off, 23=on)
	LFO2 KEYSYNC (24=off, 25=on)
	LFO2 COMMON (26=off, 27=on)
	ARPEGGIATOR KEYSYNC (30=off, 31=on)
	ARPEGGIATOR LATCH (32=off, 33=on)
	CHORUS TYPE (34=chorus, 35=phaser)
	LFO SELECTOR (42...43=lfo1...2)
	X-GATOR ON/OFF (44=off, 45=on)
	X-GATOR KEYSYNC (46=off, 47=on)
	X-GATOR LATCH (48=off, 49=on)
105	OSC POLY MODE (0=mono, 1=mono ag, 2=poly 1, 3=poly 2)
	OSC 1 OCTAVE (16...19=-1...+2)
	OSC 2 OCTAVE (20...23=-1...+2)
	OSC 3 OCTAVE (24...27=-1...+2)
	ARPEGGIATOR OCTAVES (36...39=1-4 octaves)
	ARPEGGIATOR NOTES DESTINATION (40=internal, 41=external, 42=int & ext)
	CHORUS LFO SYNC INITIAL POSITION (44...47=off, left, mid, right)
	PAN LFO SYNC INITIAL POSITION (48...51=off, left, mid, right)
	OSC SELECTOR (56...58=osc1...3)
106	OSC UNISON (0...7=off, 2...8 voices)
	REVERB TYPE (8...13=chamber, small room, large room, small hall, large hall, grand hall)
	EFFECTS SELECTOR (16...21=delay, reverb, chorus, distort, EQ/vol, panning)