9 Supplemental Information

List of ROM Waves

KEYBOARD	ELEC PIANO
	PERC ORGAN
	DRAWBAR ORGAN
	PAD SYNTH
STRING-SOUND	STRING HIT
	MUTE GUITAR
	MUTE GUITARWF
	GTR-SLIDE
BRASS+HORNS	HORN HIT
WIND+REEDS	BARI SAX HIT
BASS-SOUND	UPRIGHT BASS
	BS HARMONICS
	FM BASS
	ANALOG BASS 1
	ANALOG BASS 2
	FRETLESS BASS
	MUTE BASS
	SLAP BASS
DRUM-SOUND	2001 KICK
	808 KICK
	AMBIENT KICK
	BAM KICK
	BANG KICK
	BBM KICK
	BOOM KICK
	COSMO KICK
	ELECTRO KICK
	MUFF KICK
	PZ KICK
	SNICK KICK
	THUMP KICK
	TITE KICK
	WILD KICK
	WOLF KICK
	WOO BOX KICK
	808 SNARE
	808 RIMSHOT
	909 SNARE
	BANG SNARE
	BIG ROCK SNAR
	CHILL SNARE
	CLASSIC SNARE
	CLEAN SNARE
	COSMO SNARE
	GATED SNARE
	HOUSE SNR 1
	HOUSE SNR 2
	HOUSE SNR 3
	JAMM SNARE
	LIVE SNARE
	LUDWIG SNARE
	MUTT SNARE
	REAL SNARE
	RIMSHOT
	SLANG SNARE
	SPAK SNARE
	WOLF SNARE
	ZEE SNARE
	BRUSH SLAP
	SIDE STICK 1
	SIDE STICK 2
	STICKS
	STUDIO TOM
	ROCK TOM
	909 TOM
	SYNTH DRUM
CYMBALS	808 CLOSED HT
	808 OPEN HAT
	909 CLOSED HT
	909 OPEN HAT
	HOUSE CL HAT
	PEDAL HAT
	PZ CL HAT
	R&B CL HAT
	SMACK CL HAT
	SNICK CL HAT
	STUDIO CL HAT
	STUDIO OPHAT1
	STUDIO OPHAT2
	TECHNO HAT
	TIGHT CL HAT
	TRANCE CL HAT
	CR78 OPENHAT
	COMPRESS OPHT
	CRASH CYMBAL
	CRASH LOOP
	RIDE CYMBAL
	RIDE BELL
	CHINA CRASH
PERCUSSION	808 CLAP
	808 CLAVE
	808 COWBELL
	AGOGO
	BONGO
	CABASA
	CLAVE
	CONGA HIGH
	CONGA LOW
	CONGA MUTE
	CONGA SLAP
	CUICA
	ETHNO COWBELL
	GUIRO
	MARACAS
	SHAKER
	SHEKERE DN
	SHEKERE UP
	SLAP CLAP
	TAMBOURINE DN
	TAMBOURINE UP
	TIMBALE HI
	TIMBALE LO
	TIMBALE RIM
	TRIANGLE HIT
	VIBRASLAP
	WHISTLE
	WOODBLOCK
TUNED-PERCUS	BIG BELL
	SMALL BELL
	GAMELAN BELL
	MARIMBA
	MARIMBA WF
SOUND-EFFECT	SCRATCH 1
	SCRATCH 2
	SCRATCH 3
	SCRATCH 4
	SCRATCH 5
	SCRATCH 6
	SCRATCH LOOP
WAVEFORM	SAWTOOTH
	SQUARE WAVE
	TRIANGLE WAV
	SQR+SAW WF
	SINE WAVE
	ESQ BELL WF
	BELL WF
	DIGITAL WF
	E PIANO WF
	DIG VOCAL WF
	DEEP PAD WF
INHARMONIC	HISS
	NOIZZZ
	TEXTURE
TRANSWAVE	BROKEN TWF

List of SoundFinder Categories

If there are no sounds of a particular type in the ASR-X Pro memory, the type will not be displayed:

Category	Description
USER-SND	This special category is ideal for storing the sounds you create—sounds will also appear in their appropriate SoundFinder musical instrument type list. All RAM kits are designated as USER-SNDs.
DEMO-SND	Demo sounds are designed to demonstrate the scope of sounds in the ASR-X Pro. Whenever this is selected, the first sound in the type will be selected; the ASR-X Pro will not reselect the last sound selected in the DEMO-SND type. Demo sounds also appear in their appropriate Sound Type list.
EXP-SND	Expansion board sounds.
DRM-SND	ROM drum key sounds.
ROM-SND	All sounds in ROM.
RAM-SND	All sounds in RAM.
ALL-SND	All sounds.
BASS	Acoustic and electric basses.
BASS-SYN	Synth basses, and processed electric basses with a "synthy" quality.
BELL	Acoustic and synth bell sounds, both pitched (e.g., glockenspiel, celesta). and non-pitched (e.g., church bells).
BRASSECT	Trumpet, trombone, tuba, French horn, saxophone, and mixed brass sections (including sampled sections) and small ensembles (with more than one distinct pitch/"player" on a single key).
BRASSOLO	Solo brass (e.g., trumpet, trombone, tuba, French horns).
DRUM-KIT	Drum kits that use the ENSONIQ drum map.
DRMKITGM	Drum kits that use the General MIDI drum map.
GUITAR-A	Steel, nylon, and gut-stringed acoustic guitars.
GUITAR-E	Clean electric guitars and distortion guitars.
HITS	Hits of all kinds.
KEYS	Other stringed keyboard sounds (e.g., harpsichord and clavinet).
LAYERS	Unnatural layered combinations of acoustic elements (e.g., a bass harmonic layered with a string section), excluding pianos/electric-pianos/organs layered with other sounds in which the piano/electric-piano/organ element is dominant. Also excludes multi-instrumental orchestral layers.
LOOPGRUV	Looped, repeating musical passages and drum rhythm loops (sampled or wave-sequenced) that play on one key.
MALLET	Tuned mallet-struck percussion instruments (e.g., marimba, xylophone, timpani, steel drum, log drum).
ORCHSTRA	Multi-instrumental orchestral Sounds (e.g., mixed strings/brass/woodwinds/reeds/orchestral percussion) layered with one another.
ORGAN-A	Acoustic pipe and pump organs.
ORGAN-E	Electric and electronic organs.
ORGANLYR	Any organs layered with other sounds in which the organ element is dominant.
PERC-KIT	Percussion kits that use either the ENSONIQ or General MIDI percussion maps.
PERCSOLO	Solo untuned percussion (e.g., taiko, synth-tom) includes most drum key sounds.
PIANO-A	Acoustic pianos, honky-tonk, toy pianos, and piano forte.
PNOLYR-A	Acoustic pianos layered with other sounds in which the acoustic piano element is dominant.
PIANO-E	Electric and electronic piano sounds, and electric pianos layered with acoustic pianos.
PNOLYR-E	Electric pianos layered with other sounds in which the electric piano element is dominant.
PLUCKED	Plucked strings (e.g., harps, banjo, dulcimer, sitar), pizzicato strings, and other plucked instruments (e.g., kalimba).
SAX-SOLO	Solo saxophones.
SOUND-FX	Realistic sound effects (e.g., broken glass, animal sounds, record scratches) and entirely non-pitched fantasy and chaos sound effects.(e.g., spacecraft, environments)
SPLITS	Combination keyboard splits of two or more different types of sounds. Also includes splits of similar sounds that have discontiguous key ranges (e.g., a bassoon/oboe split that covers the natural ranges of both instruments).
STRGSECT	Bowed string sections (including sampled sections) and small string ensembles (with more than one distinct pitch/"player" on a single key).
STRGSOLO	Bowed solo strings (e.g., violin, viola, cello).
SYN-COMP	Non-vintage, sustaining and non-sustaining, polyphonic synth sounds with a pitched or non-pitched, highly obtrusive attack component that lend themselves toward comping (i.e., you can always play successive 1/8 note chords with these funky sounds).
SYN-LEAD	Monophonic lead synth sounds (excluding monophonic synth basses).
SYN-PAD	Non-vintage, sustaining, polyphonic synth sounds with a pitched, less obtrusive attack component, and an appropriate release, that lend themselves toward pad playing.
SYN-VINT	Polyphonic, signature vintage "analog" synth sounds (excluding monophonic vintage synth leads and synth basses). Normally these are named after the synth that they evoke.
SYNOTHER	Other types of pitched, polyphonic, hybrid synth sounds with sustaining, disparate components (e.g., sample & hold sync sounds).
VOCALS	Vocal sounds (e.g., choirs, synth-vox).

WINDREED	Solo woodwinds/reeds (e.g., flute, oboe, bassoon, clarinet, recorder, English horn, ocarina, bandoneon, shakuhachi, bagpipes, harmonica, accordion, melodica, didjeridoo).
*UTILITY	Utility resources (e.g., default template sounds used for programming and other special non-musical purposes).
*CUSTOM	The category in which the sounds that play waves are stored. When you send waves to pads, the pad sounds that play the waves are stored in this category.

Drum and Percussion Maps

ENSONIQ Drum Map

ZONE	KEY RANGE	DESCRIPTION
1	B1 to E2	
(6 keys)	KICK	The key C#2 allows for non-finish envelope sounds.
2	F2 to D3	
(10 keys)	SNARE	Includes sidestick—the keys from A2-C3 allow for non-finish envelope sounds (Snare rolls, brush swirls, etc.)
3	D#3 to C4	
(10 keys)	HATS	The keys G#3 and B3 allow for non-finish envelope sounds (closed hats first, opens on A#3 and B3; foot closed on C4).
4	C#4 to A4	
(9 keys)	CYMBL	The key A4 allows for non-finish envelope sounds (rides C#4 to E4; followed by crashes).
5	A#4 to F#5	
(9 keys)	TOMS	All keys in finish envelope mode.
6	G5 to C#6	
(7 keys)	PERC1	Shaken or small hits—tambourine (G5 to A5); shaker, cabasa, or maracas (A#5 to C6); claps (C#6); snap; woodblock
7	D6 to G6	
(6 keys)	PERC2	Latin non-pitched Percussion—bongo; conga slap; low conga; high conga; timbale
8	G#6 to D7	
(7 keys)	PERC3	Pitched and Bell-like Percussion—Triangle (A6 closed, A#6 long); cowbell (G#6); high agogo: low agogo; claves (B6, or at D#6 if there are no congas); vinyl surface noise (C7). The keys from B6-D7 allow for non-finish envelope sounds.

ENSONIQ Percussion Map

ZONE	KEY RANGE	DESCRIPTION
1	B1 to E2	Low Drums—the key C#2 allows for non-finish envelope sounds.
(6 keys)		
2	F2 to D3	
(10 keys)		Medium drums such as Conga, Tabla, Udu—the keys from A2-C3 allow for non-finish envelope sounds.
3	D#3 to C4	
(10 keys)		Small things that keep time (shakers, small drums, etc) Clave (G#3); sleighbells, castanets (C4). The keys G#3 and B3 allow for non-finish envelope sounds.
4	C#4 to A4	
(9 keys)		Small time-keeping instruments including ride cymbals and instruments like Guiro (C#4 to E4);. crash cymbals, or other accent instruments like windchime, vibraslap, gong (F4 to A4). The key A4 allows for non-finish envelope sounds.
5	A#4 to F#5	
(9 keys)		Things struck that play fills—like timbali, woodblocks, log drums, small pitched drums.
6	G5 to C#6	
(7 keys)		Tambourines or similar shaken instruments (G5-A5); small high-pitched shakers like maraccas, egg shakes (A#5 - C6); claps, clave (C#6)
7	D6 to G6	
(6 keys)		Multi hits of bongos, high drums, cuica, guiro (D6-E6); multi hits of agogo, or other metallic inst. (F6-G6)
8	G#6 to D7	
(7 keys)		Cowbell (G#6); Triangle (A6 closed, A#6 long); Long sounds like rainsticks (B6-D7) The keys from B6-D7 allow for non-finish envelope sounds.

GM Kit Map

MIDI Note #		GM Kit
35	B1	AcoustcKick
36	C2	Bright Kick
37	C#2	SideStick 1
38	D2	Snare-GM
39	D#2	HouseClap1
40	E2	Rock Snare
41	F2	Dry Tom 1
42	F#2	4xCl Hat3
43	G2	Dry Tom 1
44	G#2	Pedal Hat
45	A2	Dry Tom 1
46	A#2	OpenHat-GM
47	B2	Dry Tom 1
48	C3	Dry Tom 1
49	C#3	Crash 1-GM
50	D3	Dry Tom 1
51	D#3	Ride 1-GM
52	E3	China 1-GM
53	F3	RideBell-GM
54	F#3	Tambourine
55	G3	Splash1-GM
56	G#3	Cowbell
57	A3	Crash 1-GM
58	A#3	Vibraslap
59	B3	Ride 1-GM
60	C4	Bongo
61	C#4	Bongo
62	D4	Conga Mute
63	D#4	Conga High
64	E4	Conga Low
65	F4	Timbali
66	F#4	Timbali
67	G4	Agogo
68	G#4	Agogo
69	A4	Cabasa
70	A#4	Maracas
71	B4	Whistle B
72	C5	Whistle A
73	C#5	Guiro Short
74	D5	Guiro Long
75	D#5	Clave
76	E5	Woodblock 1
77	F5	Woodblock 1
78	F#5	Cuica 1
79	G5	Cuica 5
80	G#5	Tri Mute-GM
81	A5	Tri Open-GM
82	A#5	Shaker
83	B5	Sleighbell
84	C6	WindchimeGM
85	C#6	Castanets 1
86	D6	Mt Surdo-GM
87	D#6	Op Surdo-GM
	E6	Silence

List of Quantize Templates

The following is a list of all the quantize parameters and their settings for the available quantize templates (there is no data recorded for High Key and Low Key):

Name	Q. to:	Strength	Swing	Random	Shift	Win. Min	Win. Max.	Q Offs?	Move Offs?	Deltas
Strict 1/4	1/4	100	50	0	0	0	50	off	on	off
Strict 1/8	1/8	100	50	0	0	0	50	off	on	off
Strict 1/16	1/16	100	50	0	0	0	50	off	on	off
Strict 1/8T	1/8T	100	50	0	0	0	50	off	on	off
Tighten 1	1/8	5	50	0	0	0	50	off	on	off
Tighten 2	1/8	20	50	0	0	0	50	off	on	off
Tighten 3	1/8	50	50	0	0	0	50	off	on	off
Tighten 4	1/8	70	50	0	0	0	50	off	on	off
Tighten 5	1/16	5	50	0	0	0	50	off	on	off
Tighten 6	1/16	20	50	0	0	0	50	off	on	off
Tighten 7	1/16	50	50	0	0	0	50	off	on	off
Tighten 8	1/16	70	50	0	0	0	50	off	on	off
Randomize 1	1/8	50	50	3	0	0	50	off	on	off
Randomize 2	1/8	60	50	15	0	0	50	off	on	off
Randomize 3	1/16	50	50	3	0	0	50	off	on	off
Randomize 4	1/16	60	50	15	0	0	50	off	on	off
Note Offs 1	1/8	100	50	0	0	0	50	on	on	off
Note Offs 2	1/16	100	50	0	0	0	50	on	on	off
Swing 1	1/16	90	55	0	0	0	50	off	on	off
Swing 2	1/16	92	57	1	0	0	50	off	on	off
Swing 2	1/16	100	63	0	0	0	50	off	on	off
Humanize 1	1/16	75	51	2	0	0	50	off	on	off
Delta 1/8	1/8	100	50	0	0	0	50	off	on	on

What Is MIDI?

Musical instrument and computer manufacturers have agreed upon a set of standards that allows their products to communicate with each other. It's called "MIDI," an acronym for "Musical Instrument Digital Interface." There are two basic aspects to the MIDI standards: the kind of wiring to be used for connecting MIDI devices, and the nature of messages that will be sent through those wires.

Life In The MIDI World

MIDI has opened up incredible possibilities for musicians and music lovers alike. Here are some of the things MIDI has made possible:

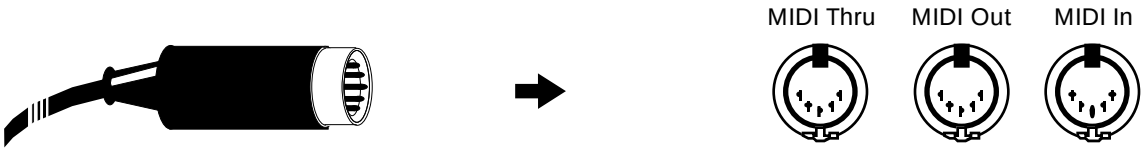
- Musicians can record their performances into MIDI recorders—called *sequencers*—which are found in keyboard workstations, groovestations such as the ASR-X Pro, in stand-alone boxes, and in computers. Once recorded, MIDI-recorded performances can be tweaked and nudged to perfection. Musical arrangements can be re-orchestrated after they've been recorded. Full-blown multi-instrument recordings can be easily created.
- Keyboardists can connect their instruments to a myriad of sound-producing MIDI boxes. MIDI allows a conventional-looking keyboard, to control a number of such devices at the same time, providing for the creation of new, complex timbres. Keyboardists can also set up specific areas on their keyboards to control specific external MIDI devices. These same capabilities are available to computer users. Actually, pretty much any musical instrument can be outfitted to control MIDI devices.

- Musicians can benefit from the communication possible between MIDI instruments and computers to program sounds for their instruments on their computers, taking advantage of the computers' large graphic displays.
- Internal data from one MIDI device can be transmitted to another for storage.
- Recording engineers can control mixing consoles and effects devices with MIDI.

Understanding MIDI

MIDI Hardware

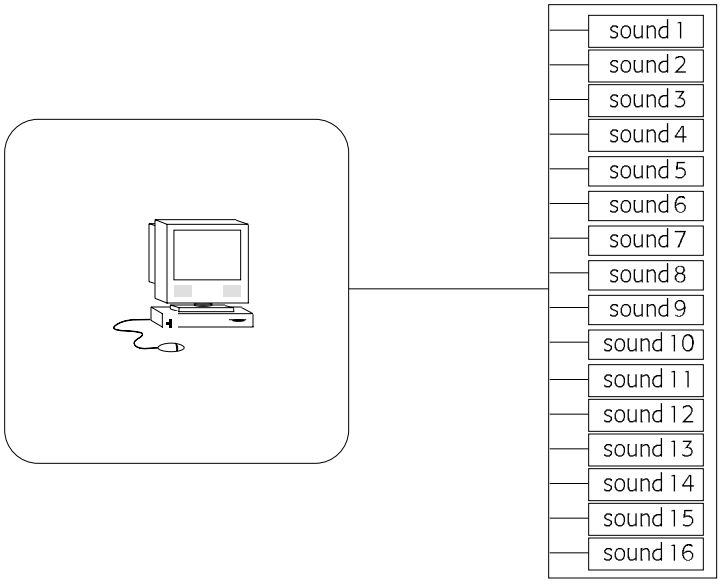
The architects of MIDI had to settle, first of all, on the MIDI hardware: the wires. All MIDI cables have the same kind of plug on either end. There are three MIDI sockets, or jacks, on the back of most MIDI instruments. The MIDI Thru jack is for MIDI data that passes through the instrument unchanged, on its way to some other MIDI device. The instrument sends out its own MIDI information through the MIDI Out jack. The MIDI In jack is for MIDI information coming into the instrument.



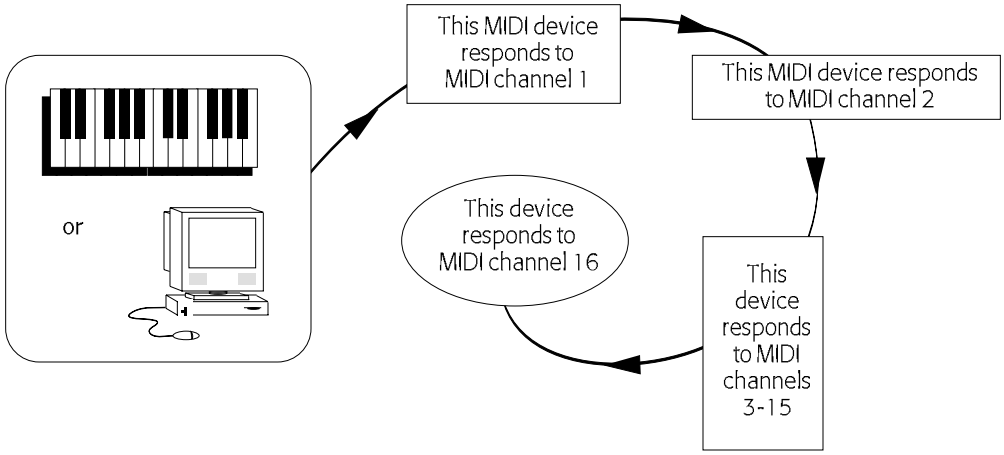
The MIDI cable itself can carry 16 independent channels of MIDI information that travel together through the wire. This means that you can have 16 separate MIDI conversations going on at once among instruments and/or computers connected together with MIDI cables.

How MIDI Channels Work

MIDI instruments can be set up to listen to specific channels and ignore everything else that's going on. This allows a central device such as a keyboard or your personal computer to control each instrument individually. Some instruments—such as the ASR-X Pro—are capable of responding to as many as 16 channels at once. Such instruments are referred to as being *multi-timbral*—it's as if there are up to 16 musical instruments in one box, and MIDI allows you to control each sound separately.



MIDI rigs can also combine both possibilities, with some instruments programmed to respond to one MIDI channel or another, and multi-timbral devices set up to receive up to 16 channels at once.



MIDI messages travel up and down all these channels, and these constitute the second major component of the MIDI Spec.

How MIDI Messages Work

MIDI works in a manner reminiscent of the old player pianos, whose sheets of hole-punched paper told the keyboard mechanism which keys to press down and when. It's not sound that's sent through MIDI cables; it's instructions from one MIDI device—called the "controller"—to another. Of course, MIDI generally doesn't cause any keys to physically move.

Suppose a keyboardist presses a note on a keyboard which is controlling some sound-producing MIDI box. The controller would send out a *Key Down* (or "note-on") message for that note. The MIDI box receiving such a message would play the note. When the keyboardist lets go, the controller would send out a *Key Up* message, and the receiving device would stop sounding the note. It's as simple at that.

MIDI captures the expressive nuances in a performance by sending out other kinds of messages. Controllers can sense how hard a musician plays—referred to in the MIDI world as velocity—and can instruct other devices to respond accordingly. Sustain and sostenuto foot pedals also send out MIDI messages. There are many tools for expression that can be transmitted and responded to via MIDI.

To tell a MIDI instrument which sound program you want to hear, you would send a MIDI Program Change.

MIDI can also send messages that have the same effect as pushing buttons and twirling knobs on a receiving device. To make sure that only the intended instrument listens to such instructions, MIDI sends it a special greeting in a language only it can understand. Every MIDI device has such a language, and these "hey there" messages are referred to as "System Exclusive headers." System Exclusive data is often referred to as SysEx data.

In MIDI recording, all of the messages that a controller produces are sent to a sequencer. Most sequencers have Record, Stop and Play buttons, since they're usually designed to resemble tape recorders. When the Record button is pressed, the sequencer captures incoming MIDI information. Pressing Stop tells the sequencer to store that information in its memory. When Play is pressed, it sends it back out.

The Art of MIDI

The fact that MIDI is so simple to use is a testament to the cleverness of its designers. Its true magic, however, lies in MIDI's power as a tool in the creative process, and in the imaginations of those artists who wield it.

List of MIDI Controller Names

Bank Select #000 - Bank Select	Expression#043 - Expression LSB	MIDIContrl#086 - UNDEFINED
Mod Wheel #001 - Mod Wheel or Lever	FXControl1#044 - Effect Control 1 LSB	MIDIContrl#087 - UNDEFINED
Breath #002 - Breath Controller	FXControl2#045 - Effect Control 2 LSB	MIDIContrl#088 - UNDEFINED
MIDIContrl#003 - UNDEFINED	MIDIContrl#046 - UNDEFINED	MIDIContrl#089 - UNDEFINED
FootContrl#004 - Foot Controller	MIDIContrl#047 - UNDEFINED	MIDIContrl#090 - UNDEFINED
Glide Time#005 - Portamento Time	GenPurpse1#048 - UNDEFINED	FX Depth 1#091 - Effects Depth 1
Data Entry#006 - Data Entry MSB	GenPurpse2#049 - General Purpose 1 LSB	FX Depth 2#092 - Effects Depth 2
Volume #007 - Volume	GenPurpse3#050 - General Purpose 2 LSB	FX Depth 3#093 - Effects Depth 3
Balance #008 - Balance	GenPurpse4#051 - General Purpose 3 LSB	FX Depth 4#094 - Effects Depth 4
MIDIContrl#009 - UNDEFINED	MIDIContrl#052 - General Purpose 4 LSB	FX Depth 5#095 - Effects Depth 5
Pan #010 - Pan	MIDIContrl#053 - UNDEFINED	Data Inc #096 - Data Inc
Expression#011 - Expression	MIDIContrl#054 - UNDEFINED	Data Dec #097 - Data Dec
FX Control1#012 - Effect Control 1	MIDIContrl#055 - UNDEFINED	NonRgPmLSB#098 - Non-Reg param Num LSB
FX Control2#013 - Effect Control 2	MIDIContrl#056 - UNDEFINED	NonRgPmMSB#099 - Non-Reg param Num MSB
MIDIContrl#014 - UNDEFINED	MIDIContrl#057 - UNDEFINED	RgParamLSB#100 - Reg param Num LSB
MIDIContrl#015 - UNDEFINED	MIDIContrl#058 - UNDEFINED	RgParamMSB#101 - Reg param Num MSB
GenPurpse1#016 - General Purpose 1	MIDIContrl#059 - UNDEFINED	MIDIContrl#102 - UNDEFINED
GenPurpse2#017 - General Purpose 2	MIDIContrl#060 - UNDEFINED	MIDIContrl#103 - UNDEFINED
GenPurpse3#018 - General Purpose 3	MIDIContrl#061 - UNDEFINED	MIDIContrl#104 - UNDEFINED
GenPurpse4#019 - General Purpose 4	MIDIContrl#062 - UNDEFINED	MIDIContrl#105 - UNDEFINED
MIDIContrl#020 - UNDEFINED	MIDIContrl#063 - UNDEFINED	MIDIContrl#106 - UNDEFINED
MIDIContrl#021 - UNDEFINED	Sustain #064 - Sustain	MIDIContrl#107 - UNDEFINED
MIDIContrl#022 - UNDEFINED	PortOn/Off#065 - Portamento On/Off	MIDIContrl#108 - UNDEFINED
MIDIContrl#023 - UNDEFINED	Sostenuto #066 - Sostenuto	MIDIContrl#109 - UNDEFINED
MIDIContrl#024 - UNDEFINED	Soft Pedal#067 - Soft Pedal	MIDIContrl#110 - UNDEFINED
MIDIContrl#025 - UNDEFINED	LegatoFtsw#068 - Legato Ftsw	MIDIContrl#111 - UNDEFINED
MIDIContrl#026 - UNDEFINED	Hold 2 #069 - Hold 2	MIDIContrl#112 - UNDEFINED
MIDIContrl#027 - UNDEFINED	PatchSelct#070 - Snd Variation (Patch Select)	MIDIContrl#113 - UNDEFINED
MIDIContrl#028 - UNDEFINED	Timbre #071 - Harmonic Content (Timbre)	MIDIContrl#114 - UNDEFINED
MIDIContrl#029 - UNDEFINED	Release #072 - Release	MIDIContrl#115 - UNDEFINED
MIDIContrl#030 - UNDEFINED	Attack #073 - Attack	MIDIContrl#116 - UNDEFINED
MIDIContrl#031 - UNDEFINED	Brightness#074 - Brightness	MIDIContrl#117 - UNDEFINED
BankSelect#032 - Bank Select LSB	SoundCntl6#075 - Sound Controller 6	MIDIContrl#118 - UNDEFINED
Mod Wheel #033 - Mod Wheel LSB	SoundCntl7#076 - Sound Controller 7	MIDIContrl#119 - UNDEFINED
Breath #034 - Breath Controller LSB	SoundCntl8#077 - Sound Controller 8	
MIDIContrl#035 - UNDEFINED	SoundCntl9#078 - Sound Controller 9	
FootContrl#036 - Foot Controller LSB	SoundCtl10#079 - Sound Controller 10	
Glide Time#037 - Portamento Time LSB	GenPurpse5#080 - General Purpose 5	
Data Entry#038 - Data Entry LSB	GenPurpse6#081 - General Purpose 6	
Volume #039 - Volume LSB	GenPurpse7#082 - General Purpose 7	
Balance #040 - Balance LSB	GenPurpse8#083 - General Purpose 8	
MIDIContrl#041 - UNDEFINED	Portamento#084 - Portamento Control	
Pan #042 - Pan LSB	MIDIContrl#085 - UNDEFINED	

ASR-X Pro MIDI Implementation

The ASR-X Pro features an extensive MIDI (Musical Instrument Digital Interface) implementation. For most applications, you will find all the information you need regarding the ASR-X Pro's MIDI functions in this manual—additional information is supplied in the following MIDI Implementation Chart.

ASR-X Pro **MIDI Implementation Chart** **Version: 1.00**

Function...		Transmitted	Recognized	Remarks
Basic Channel	Default	1	1-16	
	Changed	1-16	1-16	
Mode	Default	POLY	MULTI	
	Messages	X	X	
	Altered	X	X	
Note Number	True voice	36-96	21-108	Note reception is filtered by Key Lo and Key High track parameters
Velocity	Note On	0	0	Note On velocity reception is filtered by VelocityRange Lo and VelocityRange Hi track parameters
	Note Off	0	0	Transmitted Note Off velocity is always 64
After Touch	Key	0	0	Sounds and sequencer only
	Channel	0	0	
Pitch Bend		X	0	supports held mode
Control Change		0-119	0-119	see "MIDI Controllers Reception Behavior" below
Program Change		0-127	0-127	select sounds from the currently selected bank
	True#	0-127	0-127	
System Exclusive		0	0	see ASR-X Pro SysEx Specification recognizes MIDI Tuning Dump Standard and Single-Note Tuning Change messages
System Common	Song Position	0	0	
	Song Select	X	X	
	Tune Request	X	X	
System Real Time	Clock	0	0	
	Commands	X	X	
Aux Messages	Local On/Off	X	X	
	All Notes Off	0	0	
	Active Sensing	X	X	
	System Reset	X	X	
Notes	Response to received Controllers varies depending on the nature of the ASR-X Pro parameter affected—see parameter descriptions for details.			

Mode 1: Omni On, Poly Mode 2: Omni On, Mono O : Yes
Mode 3: Omni Off, Poly Mode 4: Omni Off, Mono X: No

MIDI Controllers Reception Behavior

Control Change	Description	Remark
0-119	SysCTRL 1-4	assignable controllers
0	Bank Select MSB	always 0
1	Mod Wheel	
4	Foot (Pedal)	
5	Portamento Time	
6	Data Entry MSB	for editing of registered and non-registered parameters only, after registered or non-registered parameter MSB and LSB are received
7	Volume	
10	Pan	
11	Expression Controller	
32	Bank Select LSB	
64	Sustain	
65	Portamento On/Off	
66	Sustenuto	
72	Release Time	Amp Env Release
73	Attack Time	Amp Env Attack
74	Brightness	Filter Cutoff
75	Sound Controller 6	Normal LFO Rate
76	Sound Controller 7	Amp Env Decay
77	Resonance	Filter Resonance
91	Effects 1 Depth	FX Bus Select, described in Chapter 2.
98	Non-Reg. Param. Select LSB	Track parameter descriptions in Chapter 2 list track parameters' Non-Registered parameter LSB values
99	Non-Reg. Param. Select MSB	always 0
100	Reg. Param. Select LSB	always 0, 1 or 2 only
101	Reg. Param. Select MSB	always 0
119	Mute	values mute or un-mute track corresponding to MIDI channel: 127=mute track; 000=un-mute track; 064=remove track from group solo

Reset All Controllers (MIDI controller #121) Reception Behavior

When the system ResetControlRecv=Off, the reset all controllers message will be ignored.

When system ResetControlRecv=On, the following MIDI messages and parameters on all tracks assigned to the MIDI channel on which the message was received will be reset to the following values:

Assignable SysCtrl1-4=000	Controller 008=064	Controller 070 to 071=000
Pitch Bend=center	Controller 009=000	Controller 072 to 079=064
Channel Pressure=000	Controller 010=064	Controllers 080 to 097=000
Polyphonic Pressure=000 for all 88 keys	Controller 011=127	Controller 098 to 101=cleared
Controllers 001 to 004=000	Controllers 012 to 031=000	Controllers 102 to 119=000
Controller 005=064	Controllers 033 to 064=000	Controllers 120 to 127=left unchanged
Controller 006=000	Controller 065=000	
Controller 007=127	Controllers 066 to 069=000	

When Track ParamReset=Off:

Controllers 005, and 070 to 079 will be left unchanged.

When Track ParamReset=On:

Controllers 005, and 070 to 079 will be reset to the values listed above.

Note: Track MIDI reception filters do not affect reception of the Reset All Controllers message.

Track ParamReset Behavior

When the System/MIDI Track ParamReset parameter is set to "On," selecting a new sound for a track causes certain parameters on the track to reset to default values. The following details the behavior of all of the track parameters in this regard.

Track parameter	Is parameter reset on sound selection?	Parameter's default value
Track Volume	no	n/a
Mix (Expression)	no	n/a
Vol/MixPolarity	no	n/a
Track Pan	no	n/a
FX Bus	see "AutoSelect FXBus "	n/a
Pitch Bend Up	yes	Prog
Pitch Bend Down	yes	Prog
Octave Shift	yes	0oct
Semitone Shift	yes	0st
Fine Tuning	yes	0cents
PitchTbl	yes	Prog
Glide Mode	yes	Prog
Glide Time	yes	Prog
Delay Offset	yes	0ms
SyncLFO&Noise	yes	Prog
Normal LFO Rates	yes	0
LFO Depth	yes	0
LFO Delay Time	yes	0
Amp Env Attack	yes	0
AmpEnv Decay	yes	0
AmpEnv Release	yes	0
Filter Cutoff	yes	0
Filter Resonance	yes	0
FiltEnv Attack	yes	0
FiltEnvDecay	yes	0
FiltEnvRelease	yes	0
Amp&Filt Env Vel	yes	0
Key Range Lo	no	n/a
Key Range Hi	no	n/a
VelocityRange Lo	no	n/a
VelocityRange Hi	no	n/a
VelocityMode	no	n/a
PressureMode	yes	Auto
ProgramChngeRecv	no	n/a
Bank Select Recv	no	n/a
Data Entry Recv	no	n/a
Pitch Bend Recv	no	n/a
Mod Wheel (1) Recv	no	n/a
FootPedal (4) Recv	no	n/a
Volume (7) Recv	no	n/a
Pan (10) Recv	no	n/a
Expressn (11) Recv	no	n/a
Sustain/SostRecv	no	n/a
SysCtrl1 Recv	no	n/a
SysCtrl2 Recv	no	n/a
SysCtrl3 Recv	no	n/a
SysCtrl4 Recv	no	n/a

Using RPNs and NRPNs to Edit Parameters

MIDI allows for a special category of controllers called RPNs (for "Registered Parameter Numbers") and NRPNs (for "Non-Registered Parameter Numbers"). Many sound parameters can be edited via RPNs and NRPNs. If this is the case, the parameter's description found in this chapter will list the appropriate RPN or NRPN. If a parameter is displayed while being edited via MIDI, the display will reflect the changes you make.

RPN MIDI messages must adhere to a specific structure in order to be properly understood by receiving devices such as the ASR-X Pro. They must include the following components:

- A continuous controller status byte for the appropriate MIDI channel—this will be the MIDI channel of the selected track (see Chapter 2)
- MIDI controller 101—the RPN MSB—with a value of 000
- MIDI controller 100—the RPN LSB—with the RPN value listed in the description of the relevant parameter
- MIDI controller 006—Data Entry—with the value to which you'd like to set the parameter. The values displayed for each parameter correspond to one of 128 possible MIDI values (which run from 000 up to 127). You can count the parameter values displayed on the ASR-X Pro, beginning from 000, to locate the corresponding Data Entry value you'll want to send to the ASR-X Pro.

NRPN MIDI messages must also adhere to a specific structure in order to be properly understood by receiving devices such as the ASR-X Pro. They must include the following components:

- A continuous controller status byte for the appropriate MIDI channel—this will be the MIDI channel of the selected track (see Chapter 2)
- MIDI controller 099—the NRPN MSB—with a value of 000
- MIDI Controller 098—the NRPN LSB—with the NRPN value listed in the description of the relevant parameter
- MIDI Controller 006—Data Entry—with the value to which you'd like to set the parameter. The values displayed for each parameter correspond to one of 128 possible MIDI values (which run from 000 up to 127). You can count the parameter values displayed on the ASR-X Pro, beginning from 000, to locate the corresponding Data Entry value.

Registered Parameters

Registered parameters 0, 1 and 2 are received multi-timbrally by the ASR-X Pro. When received on a track's MIDI channel, RPN 0 affects the track's pitch bend up and down simultaneously: Pitch bend up is raised and pitch bend down is lowered by the same RPN value. RPNs 1 and 2 edit Semitone Shift and Fine Tuning parameters, respectively, when received on the track's MIDI channel.

Registered parameters must be transmitted to the ASR-X Pro as a continuous controller status byte followed by three consecutive continuous controller messages: The registered parameter MSB and LSB values select the track parameter to be edited, and a Data Entry value invokes the parameter's setting.

Controllers

Number	Name	Value
101	Registered Parameter Select MSB (Most Significant Byte)	always 0
100	Registered Parameter Select LSB (Least Significant Byte)	00, 01 or 02 (see below)
6	Data Entry MSB	0-127, desired track parameter setting

Registered Parameters

Number	Name	ASR-X Pro Parameter Range
00	Pitch Bend Range	0-12 (displayed as Pitch Bend Up =0-12 up; raises pitch; Pitch Bend Down=0-12 down
01	Fine Tuning	0-127 (displayed as -50 cents to +49 cents)
02	Coarse Tuning	0-127 (displayed as -64st to +63st)

Non-Registered Parameters

Non-registered parameters are received multi-timbrally by the ASR-X Pro, affecting track parameters when received on the track's MIDI channel.

Non-registered parameters must be transmitted to the ASR-X Pro as a continuous controller status byte followed by three consecutive continuous controller messages. The non-registered parameter MSB and LSB select the track parameter, and a data entry value invokes the track parameter's desired setting.

Controllers

Number	Name	Value
99	Non-Registered Parameter Select MSB (Most Significant Byte)	always 0
98	Non-Registered Parameter Select LSB (Least Significant Byte)	see track parameter descriptions in Chapter 2 for each parameter's Non-Registered parameter LSB value
6	Data Entry MSB	0-127, desired track parameter setting

List of RPNs and NRPNs

Track Parameter	Editing via MIDI
Expression	Responds to MIDI controller 011 and NRPN LSB 034.
FX Bus assignment (Insert, LightReverb, MediumReverb, WetReverb, Dry)	Responds to MIDI NRPN LSB 033.
Pitch Bend Up	Responds to MIDI NRPN LSB 022 (also responds to RPN LSB 000).
Pitch Bend Down	Responds to MIDI NRPN LSB 023 (also responds to RPN LSB 000).
Octave Shift (-4oct to +4oct)	Responds to MIDI NRPN LSB 011.
Semitone Shift	Responds to MIDI RPN LSB 002.
Fine Tuning	Responds to MIDI RPN LSB 001.
Pitch Table	Responds to MIDI NRPN LSB 021.
Glide Mode	Responds to MIDI controller 065 (see below) and NRPN LSB 031. When a value of 64 or greater for MIDI controller 065 is received, glide will be enabled for the part; values below 64 will not disable glide.
Glide Time	Responds to MIDI controller 005 and NRPN LSB 032.
Delay Offset (positive-only)	Responds to MIDI NRPN LSB 024.
SyncLFO&Noise (system tempo time division)	Responds to MIDI NRPN LSB 025.
Normal LFO Rates	Responds to MIDI controller 075 and NRPN LSB 008.
LFO Depth	Responds to MIDI NRPN LSB 009.
LFO Delay Time	Responds to MIDI NRPN LSB 010.
Amplitude Envelope Attack time	Responds to MIDI controller 073 and NRPN LSB 014.
Amplitude Envelope Decay time	Responds to MIDI controller 076 and NRPN LSB 015.
Amplitude Envelope Release time	Responds to MIDI controller 072 and NRPN LSB 016.
Filter Cutoff (lo-pass & hi-pass)	Responds to MIDI controller 074 and NRPN LSB 012.
Filter Resonance	Responds to MIDI controller 077 and NRPN LSB 013
Filter Envelope Attack time	Responds to MIDI NRPN LSB 017.
Filter Envelope Decay time	Responds to MIDI NRPN LSB 018.
Filter Envelope Release time	Responds to MIDI NRPN LSB 019.
Amp & Filter Envelope Velocity sensitivity	Responds to MIDI NRPN LSB 020.
Key Range Low limit	Responds to MIDI NRPN LSB 026.
Key Range High limit	Responds to MIDI NRPN LSB 027.
Velocity Range Low limit	Responds to MIDI NRPN LSB 028.
Velocity Range High limit	Responds to MIDI NRPN LSB 029.
VelocityMode	Responds to MIDI NRPN LSB 035.
Pressure Mode	Responds to MIDI NRPN LSB 030.
Mute button	Responds to MIDI NRPN LSB 036 (0=normal muted, 1=unmuted, 2=solo muted, 3=solo, 4-127=solo).

Pitch Tables and the MIDI Tuning Standard Format

Pitch tables created using an external computer can be downloaded into the ASR-X Pro's RAM pitch table using the MIDI Tuning Standard format. The ASR-X Pro can accommodate one user-defined RAM pitch table in addition to the many alternate pitch tables stored in ROM. The ASR-X Pro's pitch tables can be accessed by any of its 16 tracks through the setting of the track's PitchTbl parameter, or via NRPN LSB 021 values sent on the track's MIDI channel. You can also select a system-wide special pitch table by selecting the desired table with the PitchTbl System parameter.

The MIDI Tuning Standard is comprised of two kinds of messages: the MIDI Tuning Dump, a SysEx bulk dump which transmits tunings for all keys, and a Single-Note Tuning Change, which alters the tuning of a specific note. The SysEx bulk dump format is supported by several tuning editors for the Apple Macintosh and Microsoft Windows 95. It is anticipated that the Single-Note Tuning Change message will be employed by third-party tuning controllers to achieve Middle-Eastern music scales.

The ASR-X Pro's response to the Single-Note Tuning Change message has been extended to allow users to apply a single tuning change to the ASR-X Pro's entire pitch range. If a Single-Note Tuning Change message is sent to user-tuning number 7F (127), and if the note is between Middle C and an octave above (note numbers 60 to 71 inclusive), the tuning change will be applied to all notes in the current RAM pitch table. In all other cases, the note-change message only changes the tuning for the note specified. If a Single-Note Tuning Change message is received during playback of a note (between the key-down and key-up messages), the tuning change takes effect on the next note.

It is suggested that third-party tuning controllers should send a zero-pitch-detune message for each of the twelve notes supported by the Single-Note Tuning Change message and also select the RAM tuning for the receiving channel. The zero-pitch messages need only be sent once before sending their note-change messages.

For more information on the MIDI Tuning Standard, contact:

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WWW: http://www.dnai.com/~jinetwk

List of ROM System Pitch Tables

Pitch Table	Description
EqualTemper	The Western 12-tone equal-temperament tuning is used for the default pitch table.
Pythagrn-C	Early tuning derived by calculating 12 perfect fifths and adjusting the octaves downward as necessary. Leaves all fifths except the one between G# and D# very pure. The entire mathematical anomaly encountered by tuning up 12 perfect fifths (called the Pythagorean comma) is accounted for in the interval between G# and D#.
Just Int-C	Designed so that the major intervals in any scale are very pure, especially the third and fifth.
Meantone-C	One of the earliest attempts to derive a tuning which would accommodate music played in a variety of keys. The major third interval is very pure.
Wrkmeistr-C	Derived by Andreas Werkmeister, a contemporary of Bach, this is a further attempt to create a temperament which would accommodate music played in any key.
Vallotti-C	A variation of Pythagorean tuning in which the first 6 fifths in the circle of fifths are flat by 1/6 of the Pythagorean Comma. This is probably close to the tuning used by Bach for his Well-Tempered Clavier.
Grk-Diatonc	The basic building block of ancient Greek music (in which most modern Western music has its roots) was the tetra chord - four notes and three intervals spanning a perfect fourth. The placement of the two inner notes of the tetra chord determined its genus — diatonic, chromatic or enharmonic. This pitch table is derived from two diatonic tetra chords, combined to form a seven-note scale similar to the modern diatonic scale. It is to be played only on the white keys. Tone center is E.
Grk-Chromat	This pitch table is derived from two chromatic tetra chords (the intervals are, roughly, quarter-tone, half-step, major third), combined to form a seven-note scale. It is meant to be played on the white keys. Tone center is E.
Grk-Enharm	This pitch table is derived from two enharmonic tetra chords (the intervals are, more or less, two quarter-tones followed by a major third), combined to form a seven-note scale. It is meant to be played on the white keys. Tone center is E.
Turkish-A	This is a typical Turkish octave-based scale using only one quarter tone. The second note in the scale is tuned 40 cents flat from the equal-tempered equivalent. In this tuning B is 40 cents flatter from B natural. The scale rises from A.
Arabic-1	The intervals in this table form the basis for much Middle Eastern music. Here the octave is divided into 17 intervals, corresponding to the fret intervals of some stringed instruments used in this area. The scale rises from the base pitch of C4 in a series of three repeating intervals (in cents) of 90, 90, 24 and so on. From C4 to F5 represents an octave.

Arabic-2	Similar to Arabic 1, except that here the octave is divided into 24 intervals. This makes one pitch octave cover two keyboard octaves, meaning that the fingering will be the same in any octave. This scale rises from the base pitch of C4 in a series of four repeating intervals (in cents) of 24, 66, 24, 90 and so on.
Arabic-3	This is a 12-tone scale using quarter tones (notes tuned sharp or flat by 50 cents from their equal-tempered equivalents) on the C#, E, G# and B keys.
Arabic-4	Another octave-based scale with an Arabic flavor. In this case the "quarter tones" are not perfectly equal, imparting a distinctive character to the notes.
Java-Pelog1	One of the two main scales of the gamelan orchestras of Java and Bali is the seven-tone scale called Pelog. The notes C, D, F , G, and A (which are reproduced on the black keys) are considered primary, with E and B used for grace notes. The octaves are stretched (tuned a little sharp) due to the harmonic content of the instruments in the gamelan. (There are many variations of these tunings, almost as many as there are gamelan ensembles. These tunings are to be considered typical, not definitive.)
Java-Pelog2	Another version of the seven-tone Pelog scale used in gamelan music. The notes C, D, F , G, and A (which are reproduced on the black keys) are considered primary, with E and B used for grace notes. The octaves are stretched (tuned a little sharp) due to the harmonic content of the instruments in the gamelan.
Java-Pelog3	A third version of the seven-tone Pelog scale used in gamelan music. The notes C, D, F , G, and A (which are reproduced on the black keys) are considered primary, with E and B used for grace notes.
Java-Slndro	A 15-tone equal tempered tuning from Java. Playing every third note (as in a diminished chord) yields a typical 5-tone scale of the gamelan. Other notes can be used as passing tones.
Java-Combi	This is actually two pitch tables in one. The white keys play the seven-tone Pelog scale, same as the table JAVA-PELOG1. The black keys play a five-tone scale called Slendro, which is close to a five-tone equi-tempered scale. Both tunings have their octaves stretched (tuned a little sharp) due to the harmonic content of the instruments in the gamelan.
Indian-Raga	Indian scale used to play ragas, based on 22 pure intervals called Srutis. This pitch table uses two keyboard octaves to play one octave in pitch. The 22 Srutis are mapped to keys in this two-octave range omitting the A#s, which play the same pitch as the adjacent A.
Tibetan	This tuning is based on a pentatonic scale from Tibet. Notice that playing the black keys yield a scale similar to the 5-tone Slendro tuning from Indonesia.
Chinese-1	This is a seven-tone scale used widely in China. It is meant to be played on the white keys.
Chinese-2	A seven-tone scale based on an ancient Chinese lute tuning. It is meant to be played on the white keys.
Thailand	This is a seven-tone equi-tempered scale from Thailand. It is meant to be played on the white keys.
24-Tone-Equ	Centered on C4, this scale has an even quarter tone (50 cents) between each keyboard note, and each pitch octave covers 2 keyboard octaves. This tuning has been used by many contemporary composers and can be used in some Middle Eastern music.
19-Tone-Equ	Centered on C4, this scale divides the octave into 19 equal steps. From C4 to G5 forms an octave. This scale yields very pure thirds and sixths, but not fifths. Like the 24-tone scale, this has been used by some modern composers.
31-Tone-Equ	Centered on C4, this scale divides the octave into 31 equal steps. From C4 to G6 forms an octave. Similar to 19-tone in the purity of its intervals.
53-Tone-Equ	This scale divides the octave into 53 equal steps. From C2 to F6 forms an octave. It yields very pure thirds, fourths and fifths.
Harmonic	This is a mathematically generated scale based on the relationships of the partials in the harmonics of the fifth octave of the linear harmonic spectrum. It is interesting mostly from a theoretical standpoint.
CarlosAlpha	Derived mathematically by Wendy Carlos in the search for scales with the maximum purity of primary intervals, This is based on the division of the octave into 15.385 equal steps (78 cents per key). One pitch "octave" covers 16 keys, though because the Carlos scales are asymmetric (not based on whole number divisions of the octave) they do not yield pure octaves.
Carlos-Beta	Wendy Carlos' Beta scale is based on the division of the octave into 18.809 equal steps 63.8 cents per key. One pitch "octave" covers 19 keys; though, being asymmetric, it yields no pure octaves.
CarlosGamma	Wendy Carlos' Gamma scale is based on the division of the octave into 34.188 equal steps (35.1 cents per key). This scale has essentially perfect major thirds, fourths and fifths. One pitch "octave" covers 35 keys, though, again, being asymmetric it yields no pure octaves.
Partch-43	Harry Partch was a pioneer of micro-tonality in the early 20th century. He developed this 43-tone-per-octave scale of pure intervals, and even designed an entire orchestra of instruments using this scale. The tonal center is found on key D2 (the low D on the 76-note keyboard). This pitch table has been transposed up an octave to bring the notes into a more usable range.
Reverse	This pitch table simply reverses the pitch-tracking of the keyboard, putting the highest notes at the bottom of the keyboard and the highest notes at the top. Hours of fun.
Bagpipe	This is the tuning of a traditional Scottish bagpipe.
ShonaMbira1	One tuning of the African Mbira, similar to the Kalimba or thumb-piano. Each Mbira player uses his own "tuning" which is his signature.
ShonaMbira2	Another Mbira tuning.
SuperJust	This is a Just Intonation scale created by Wendy Carlos.
88CET	88CET is a scale with a constant interval of 88 cents. It features three different thirds and close approximations to many just intervals. This keyboard mapping omits the G#/Ab key from the system.
Pierce-Bohl	An octave-repeating stretched scale invented by John Pierce which is derived from a pure twelfth divided into thirteen steps.
WS1	The WS scales are for single samples which span the entire keyboard. WS1 maintains 12 tones per octave for two octaves centered on middle C, then continues to high and low ends of the keyboard with 1/4 of a semitone or 48 tones per octave.
WS2	WS2 maintains 12 tones per octave for three octaves centered on middle C from G to G.
WS3	WS2 maintains 12 tones per octave for four octaves centered on middle C.
Stretch	A stretch tuning, in which the middle C is at unity, C1 is detuned flat 40 cents and C8 is detuned sharp 40 cents. The stretch is a linear ramp between these two offsets.
RandomDetun	Each note has been "tweaked" by + or - up to 10 cents, giving chords a chorused effect which is different for each note.
RAM	Selects pitch tables that can be downloaded via MIDI. See earlier for more information about RAM pitch tables.