

YAMAHA

# EX5

■ MUSIC SYNTHESIZER ■ REALTIME CONTROL ■ EXTENDED SYNTHESIS

# EX7

■ MUSIC SYNTHESIZER ■ REALTIME CONTROL ■ EXTENDED SYNTHESIS

# EX5R

■ TONE GENERATOR ■ REALTIME CONTROL ■ EXTENDED SYNTHESIS



# Unlimited Performance Potential Plus Total Music Production

The Yamaha EX5 and EX7 Music Synthesizers, and the EX5R Tone Generator, offer more music performance and production power than ever before available in a single keyboard or tone generator unit. All three models feature a unique Extended Synthesis system which incorporates a number of the most advanced tone generator technologies currently available ... *plus* a full-featured sampling system. There's also a top-quality internal effect system so no extra sound-processing equipment is required. 16-track song and 8-track pattern sequencers provide sophisticated on-board sequence programming and editing capability, while a unique 4-track arpeggiator function adds extended performance and accompaniment capability. The EX-series keyboards and tone generator also offer one of the most versatile and intuitive real-time control systems available, and they're expandable to suit a wide range of professional systems and requirements.

The EX5, EX5R, and EX7 give the serious musician everything he or she needs to perform, compose, arrange, or handle full-blown music production in one extraordinarily versatile instrument.



- Extended Synthesis engine including AWM, VL (EX5 & EX5R), AN, and newly developed FDSP tone generator systems.
- 128-note polyphony on the EX5 and EX5R; 64-note polyphony on the EX7.
- 512 voices and 128 performance setups.
- Sophisticated sampling feature with multi-format compatibility and resampling capability.
- 6 Controller Knobs provide unprecedented real-time control capability as well as precise, efficient data entry for editing.
- Pitch Bend wheel, two Modulation wheels, 6 Controller Knobs, Ribbon Controller, Scene keys, and Breath Control jack for unlimited real-time expressive control.
- 16-track song sequencer, 8-track pattern sequencer, and a versatile 4-track arpeggiator.
- Key Map function allows keyboard triggering of sampled phrases and patterns.
- Versatile master keyboard control capability.
- Professional expandability with a comprehensive range of options.



## Extended Synthesis

All tone generation systems have their strengths and weaknesses. One system may excel at creating certain types of voices, but none covers the full sonic vocabulary required by modern music production. The Extended Synthesis system employed in the EX synthesizers puts the full spectrum of electronic sound at your fingertips by combining multiple state-of-the-art Yamaha tone generation technologies in one incredibly versatile instrument. There's the outstanding sample-based sound and programmability of AWM synthesis. For incredibly realistic and expressive wind and string instrument simulations there's VL synthesis. When you want a beefy analog synthesizer voice, AN synthesis can give it to you. And all-new FDSP technology offers the most responsive effects and simulated resonant systems available. All of these tone generator systems are brought together in a four-element voice structure which allows up to four different "waves" —the basic building blocks of the EX voices —to be combined as required.

This is simply the most powerful array of tone generation technologies ever provided in a single keyboard or tone generator unit.

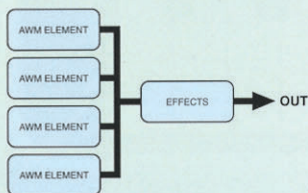
## AWM Synthesis

(Available on the EX5/5R/7)

AWM, or "Advanced Wave Memory", is Yamaha's original system for effectively using sampled waveforms in synthesizers and tone generators. The strength of AWM synthesis lies not only in its outstanding sound quality, but also in its extraordinary ability to "shape" and control the sound of the samples with a comprehensive system of envelope generators, filters, key scaling parameters, modulation, and more.

### AWM Voice Structure

AWM voices can have from 1 to 4 AWM elements. Each AWM element can use a preset wave or a sampled waveform. The ability to combine AWM elements means that you can, for example, combine separate samples for the attack and sustain portions of an instrument's sound, with independent control over each.



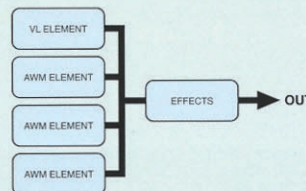
## Virtual Acoustic Synthesis

(Available on the EX5/5R)

The same tone generator technology used in the ground-breaking VL1, and the currently popular VL70-m tone generator. Yamaha's Virtual Acoustic ("VL") Synthesis tone generation system applies sophisticated computer-based "physical modeling" technology to musical sound synthesis, accurately simulating the very complex vibrations, resonances, reflections and other acoustic phenomena that occur in a real wind or string instrument.

### VL Voice Structure

VL voices can have 1 VL element and from 1 to 3 AWM elements. The VL element can be used alone to emphasize the full realism and expressive power of the VL tone generator, or with added AWM elements for thicker textures.



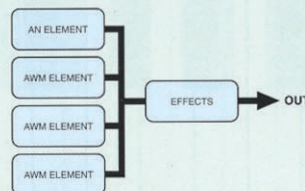
## AN Synthesis

(Available on the EX5/5R/7)

Yamaha AN Synthesis (Analog Physical Modeling) offers all the benefits of traditional analog synthesis with the stability, reproducibility, and precise control of digital technology. It is capable of accurately reproducing the sound of classic analog synthesizers without patch cables, setting charts, or the frustrating instability that was the bane of the analog age.

### AN(Poly) Voice Structure

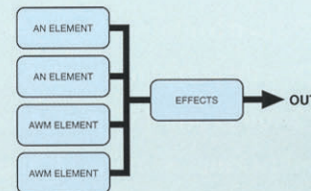
A standard (Poly) AN voice can have 1 AN element and from 1 to 3 AWM elements. Classic analog synth type sounds can be created with the single AN element alone. AWM elements can be added as necessary to "modernize" the sound.



### AN(Layer) Voice Structure

The EX5 and EX5R additionally allow "AN layer" voices which can have 1 or 2 AN

elements and 1 or 2 AWM elements. The combination of two AN elements in this voice type can result in really thick, powerful, punchy analog type voices. Once again, the AWM elements can be used to add realistic samples or other textures.



## FDSP Synthesis

(Available on the EX5/5R/7)

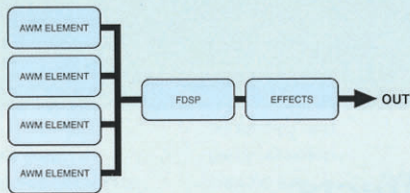
FDSP, or "Formulated Digital Sound Processing" adds a sophisticated note-dependent effect processor to the basic AWM synthesis system. In contrast to a standard effect stage, the FDSP synthesis stage uses individual note and velocity data to control effect parameters, thus making it possible to simulate the characteristics of a number of real-world musical components, as well as produce totally new effects. For example, FDSP can effectively model the frequency and velocity dependent characteristics of electromagnetic guitar or piano pickups, thus adding more realistic response to these types of voices, or adding a whole new dimension to other sounds. It can also alter the delay time of flange or chorus type effects according to the note played, thus producing totally new sounds that are responsive and "alive".

### FDSP Effect Type List

01: EP Pickup
02: EG Pickup
03: Water
04: PWM
05: Flange
06: Phaser
07: Self FM
08: Tornado
09: Ring Mod
10: Seismic

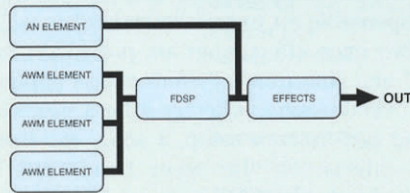
### FDSP Voice Structure

FDSP voices have from 1 to 4 AWM elements with an FDSP stage between the elements and the main effect stage. The FDSP stage can be applied to any or all of the AWM elements used, as required.

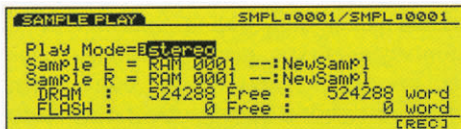


### AN + FDSP Voice Structure

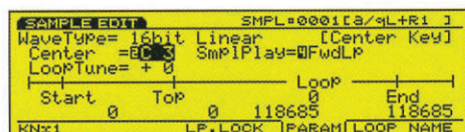
The EX5 and EX5R allow the AN and FDSP tone generator systems to be combined in "AN + FDSP" voices which can have 1 AN element and from 1 to 3 FDSP elements. The FDSP stage can be applied to any or all of the AWM elements used, as required.



## Sophisticated Sampling Capability

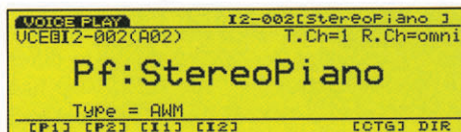


The EX Sample mode lets you "sample" sounds via a microphone or line source which can be used in AWM voice elements or mapped to and played via individual keys of the keyboard using the Key Map mode (see "Key Mapping", below). It is also possible to sample directly from the internal EX tone generator system, so you can capture any sound created by the EX synthesis engine — including variations produced by the internal effects and real-time control — and save it for later use. The Sample mode also includes a range of wave editing features which can be used to "fine tune" your samples for optimum sound: normalize, extract, tune, loop, and otherwise refine your sample as required.

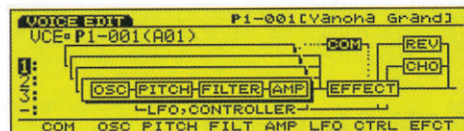


The EX5, EX5R, and EX7 are supplied with a 1-megabyte wave memory which can be expanded up to 65 megabytes by installing optional SIMM memory modules. An additional 8 megabytes of non-volatile flash memory becomes available for sample storage if the optional EXFML1 Flash Memory Boards (4 megabytes each) are installed. Sampled waveforms can be saved to floppy disk, or to an external storage device via the optional ASIB1 SCSI Interface. Wave files in standard WAV, AIFF, or AKAI® format produced using other equipment can also be loaded and used by the EX5, EX5R, and EX7.

## Outstanding Preset Voices & In-depth Editing Capability



The EX5, EX7, and EX5R come with 512 totally new, top-quality preset voices (265 preset + 256 internal) that take full advantage of the Extended Synthesis tone generators as well as the extended polyphony of these remarkable instruments (128 simultaneous notes on the EX5/EX5R, 64 on the EX7). You can use the preset voices as they are, edit them to create variations that suit your sound, or create totally new voices from scratch using the in-depth editing features provided. Any number of voices can be saved to floppy disk via the internal floppy disk drive, or to an external storage device —hard disk, ZIP drive, or JAZZ drive— via the optional ASIB1 SCSI interface.



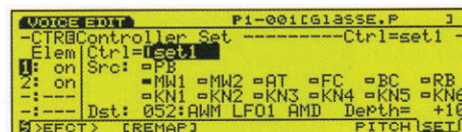
## Unparalleled Real-time Control

6 Controller knobs provided on all EX models can be assigned to a wide range of parameters for extraordinary real-time control capability. The EX5 and EX7 additionally feature standard pitch bend and modulation wheels, a second modulation wheel and a ribbon controller, plus

full keyboard initial and aftertouch response. The EX5R Tone Generator also offers extended controller versatility for enhanced programming and performance control.

In addition to real-time parameter control, the Controller Knobs function as data entry controls while editing for fast, efficient operation. You can, for example, use them to tweak the filter and envelope parameters of a voice. Or in a FDSP voice — an electric piano, for example — you could use the controller knobs to fine-tune the position of the "virtual" electromagnetic pickup, as required. There are also two scene buttons which can be used to switch or "morph" between memorized controller setups — individually memorized for each voice or performance setup. Rear panel jacks additionally allow connection of a foot controller and breath controller (particularly valuable for use with VL voices).

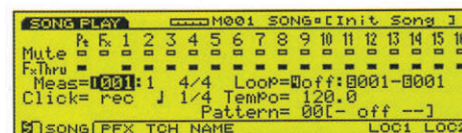
An important feature of all models is that a number of controller "sets" can be created, with total assignment freedom: e.g. different controllers can be assigned to totally different parameters, a single controller can be assigned to several parameters, multiple controllers can control a single parameter, or just about any combination of the above.



## Powerful Sequencing Functions

Not only do they offer the most powerful assortment of tone generator technologies currently available, but the EX5, EX5R, and EX7 feature and range of sequencing functions — all with fine 1/480th beat resolution — that give them many of the capabilities of a sophisticated music production system without the need for any extra equipment.

## 16-track Song Sequencer



The EX Song Sequencer is a full-featured sequencer complete with real-time play effects —including "groove" quantization— and a comprehensive range of editing functions.

A 30,000 note memory gives this sequencer plenty of capacity for recording and playback of complete songs with rich musical textures and complex arrangements. The EX sequencer can be synchronized to an external device using MIDI clock or MTC (MIDI Time Code).

SONG EDIT MO01 SONG=[Init Song ]									
Tr1									
		=====		Top of Track		=====			
001-01-000				00-108	(	F)	72		
001-01-120				00-108	(	F)	72		
001-01-240				00-108	(	F)	72		
001-01-360				00-108	(	F)	72		

## 8-track Pattern Sequencer

The 8-track "pattern" sequencer has most of the functions and features of the 16-track song sequencer, but is more suited to the production and management of shorter patterns or phrases such as drum tracks, dance grooves, or other frequently used phrases. Patterns can also be played via the EX Key Mapping feature, described below.

## 4-track Arpeggiator

4-track arpeggio patterns — from simple to sophisticated — can be stored as voice and/or performance parameters for automatic recall and use with individual performance setups. The EX Arpeggiator makes it easy to create automatic arpeggios, techno-style patterns, or a virtually unlimited range of other repeating phrases.

## Performance Mode

The EX Performance mode allows different voices to be assigned to different "parts" and combined in a number of ways for real-time performance or for sequencing via the EX Song or Pattern mode, or via external MIDI control. Either way, the Performance mode offers versatility and control not available in the Voice mode. Up to 128 performance setups can be stored in internal memory, and more can be saved to and loaded from floppy disk or an external storage device as required.

PERFORM EDIT PERF=002[Init Perform]									
PART 1=P1-001[Vanoha Grand] Bank=P1									
Lvr									
Bank	Number	Volume	Pan	1:Pfl	2:Pfl	3:Pfl	4:Pfl	P1	P1
001	001	001	001	001	001	001	001	001	001
127	127	127	127	127	127	127	127	127	127
ont	ont	ont	ont	ont	ont	ont	ont	ont	ont

## Layers

Different voices (known as "parts" in the Performance mode) can be combined in layers and played simultaneously. You have total

control over how the parts are mixed to create the final sound. Straightforward layering lets you combine similar voices to create exceptionally thick, rich textures. Completely different voices can also be layered for unique effects: a fairly common example would be layered piano and strings. But layering is only the beginning...

## Split Keyboard

Instead of layering voice parts over the same keyboard range, different parts can be assigned to different areas of the keyboard for split keyboard setups — for example, acoustic bass on the left-hand section and piano on the right-hand section of the keyboard. The parts can be assigned to completely different areas of the keyboard, or they can be partially overlapped as required.

## Velocity Switching

Velocity switching takes layering a step further by assigning the layered voices to different velocity ranges. For example, a slap bass voice could be created using two different bass sounds: the first a smooth fingered bass sound, and the second a snappy slapped bass sound. After assigning the two layers to appropriate velocity ranges, playing the keyboard gently produces the fingered sound, and playing harder produces the slapped sound. Using this technique an unlimited variety of new, responsive sounds can be created relatively easily. Velocity ranges can be overlapped as required so that the two voices sound together in overlap range.

## Multi-timbre Tone Generator

Another important function of the Performance mode is to assign and set up as many as 16 parts for the internal EX Song or Pattern mode sequencer, or for multi-timbre MIDI control from an external computer-based or stand-alone MIDI sequencer device. The Performance mode volume, pan, and effect parameters define the overall sequence mix.

## Key Mapping

The EX Key Map mode allows you to assign individual samples, patterns, or pattern tracks to different keys of the keyboard (or MIDI note numbers in the case of the EX5R). The assigned samples and/or patterns can then be played via the EX5/EX7, or via an external sequencer or other MIDI controller on all models. Key Mapping makes it possible, for example, to combine playback of looped rhythm samples with patterns to create new rhythmic textures that can be controlled "live", in real time.

KEY MAP					
Note	Mode	Tr/Bnk	Number	PlayMode	
0#2	Ptn	all	03 NewYear2	toggle	
B 2	smpl	RAM	0001 Sample C	oneshot	
C#3	SEPTN	OTri	01 NewYear1	8gating	
C#3	off				
D 3	Ptn	Tr2	02 Happy!	oneshot	

## Effects

The EX effect system is not an "extra". It is a top-quality digital signal processing system which is capable of producing effects rivalling and even exceeding those of many separate component effect units in quality. In the EX5, EX5R, and EX7, effect programming is an integral and important part of voice programming, and the ability to control specific effect parameters in real time makes them indispensable for expressive control as well.

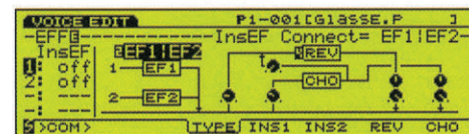
Two main effect types are provided: "System" and "Insertion". System effects apply to the overall sound, whether it be a voice, an entire performance setup, a song, etc. Insertion effects, on the other hand, can be applied individually to each voice.

## System - Reverb & Chorus

The System effects include two separate effect "units": the Reverb effect unit with 12 different reverb-related effects including realistic simulations of the natural reverberation in various halls and rooms, and the Chorus effect unit with a selection of 17 chorus-type effects, including flanging, phasing, symphonic, and others. Independent reverb and chorus settings can be made for each voice in the Voice mode, and for each performance setup in the Performance mode.

## Insertion Effects

Two insertion effect units are provided in addition to the Reverb and Chorus system effect units described above. The Effect 1 unit includes 24 effects including chorus, distortion and overdrive, amp simulation, auto wah, equalization and more. The Effect 2 unit adds a range of delay, reverb, and other effects, providing a total of 79 effects.



## Effect Type List

### Reverb Block

- [1] HALL1-[8] PLATE
- [9] WHITE ROOM-[12] CANYON

### Chorus Block

- [1] CHORUS-[5] CHORUS5
- [6] CELESTE1-[9] CELESTE4
- [10] FLANGER1-[12] FLANGER3
- [13] SYMPHONIC
- [14] PHASER
- [15] ENSEMBLE DETUNE
- [16] DELAY L,R(stereo)
- [17] Control Delay(mono)

### Insertion Small Block

- [0] THRU
- [1]-[4] CHORUS1-4
- [5]-[8] CELESTE1-4
- [9]-[11] FLANGER1-3
- [12] TREMOLO
- [13] AUTO PAN
- [14] DISTORTION
- [15] OVERDRIVE
- [16] AMP SIMULATOR
- [17] EXCITER
- [18] COMPRESSOR
- [19] NOISE GATE
- [20] AUTO WAH
- [21] TOUCH WAH
- [22] PHASER

### Insertion Large Block

- [0] THRU
- [1]-[5] CHORUS1-5
- [6]-[9] CELESTE1-4
- [10]-[12] FLANGER1-3
- [13] SYMPHONIC
- [14] DELAY L,C,R
- [15] DELAY L,R
- [16] ECHO
- [17] CROSS DELAY
- [18] ROTARY SPEAKER1
- [19] ROTARY SPEAKER2
- [20] TREMOLO
- [21] AUTO PAN
- [22] Ambience
- [23] PHASER1

- [24] PHASER2
- [25]-[26] EARLY REF1-2
- [27] GATE REVERB
- [28] REVERSE GATE
- [29]-[31] KARAOKE1-3
- [32] AUTO WAH
- [33] TOUCH WAH
- [34] AUTO WAH DISTORTION
- [35] AUTO WAH OVERDRIVE
- [36] TOUCH WAH DISTORTION
- [37] TOUCH WAH OVERDRIVE
- [38] DISTORTION
- [39] OVERDRIVE
- [40] AMP SIMULATOR
- [41] COMPRESSOR
- [42] COMP DISTORTION
- [43] EXCITER
- [44] NOISE GATE
- [45] HALL1-[52] PLATE
- [53] PITCH CHANGE1
- [54] PITCH CHANGE2
- [55] ENSEMBLE DETUNE
- [56] VOICE CANCELAR
- [57] 2BAND EQ
- [58] 3BAND EQ
- [59] Control Delay1(mono)
- [60] Control Delay2(stereo)
- [61] DPCM
- [62] V-Distortion
- [63] V-Flanger
- [64] Talking Modulator
- [65] Beat Changer
- [66] DIGITAL SCRATCH
- [67] AUTO SYNTH
- [68] TECH MODULATION
- [69] LOW RESOLUTION
- [70] NOISY
- [71] ATTACK LOFI
- [72] DIGITAL TURNTABLE
- [73] JUMP
- [74] WAH+DIST+DELAY
- [75] WAH+ODRV+DELAY
- [76] COMP+DIST+DELAY
- [77] COMP+ODRV+DELAY
- [78] DIST+DELAY
- [79] OVERDRIVE+DELAY

## Master Keyboard Functions

With up to 16 assignable keyboard zones and full MIDI transmission of realtime controller data, the EX5 and EX7 offer MIDI control capability and versatility rivalling and even exceeding that of many dedicated master keyboards.



EX7 Front Panel



EX5R Front Panel



EX5 Rear Panel



EX7 Rear Panel



EX5R Rear Panel

## Professional Expandability

Although formidable music production tools on their own, the EX5, EX5R, and EX7 support a range of options that allow them to be easily integrated into larger, professional-class systems.

### EXIDO1 Individual Output Board

Provides 4 individual outputs, thus adding assignable individual output capability to the EX5/EX5R to 6, and bringing the total number of individual outputs on the EX5/EX5R to 6.



### EXDGO1 Digital Output Board

AES/EBU digital audio stereo output with word clock input.



### ASIB1 SCSI Interface

Allows direct connection to SCSI storage devices and/or a personal computer.



### EXFML1 Flash Memory Board

A pair of 4-megabyte boards for 8-megabytes of non-volatile sample storage.



### SIMM Memory

Up to 64 megabytes of SIMM memory for sample recording and playback.\*

\* Be sure to refer to the EX owner's manual before purchasing expansion SIMM memory to ensure compatibility.

# Specifications

		EX5	EX5R	EX7
<b>Keyboard</b>	Type	Regular 76 keys	—	Regular 61 keys
	Touch Response	Velocity sensitive / Aftertouch	—	Velocity sensitive / Aftertouch
<b>Tone Generator</b>	Synthesis type	AWM, VL, AN, FDSP, Sampling(44.1KHz)		AWM, AN, FDSP, Sampling(44.1KHz)
	Polyphony	128		64
	Voice	512 (Preset 256 / Internal 256) *Up to 4 elements for each Normal voice / up to 128 elements for Drum voice		
	Voice Type	AWM / VL+AWM / FDSP / AN+AWM / AN+FDSP / Drum		AWM / FDSP / AN+AWM / Drum
	User Wave	1MB DRAM *Optionally expanded up to 72MB (64MB SIMM + 8MB Flash Memory)		
	FDSP Type	EP Pickup / EG pickup / Water / PWM / Flange / Phaser / Self FM / Tornado / Ring Mod / Seismic(10 types)		
	Performance Voice	Internal 128		
	Multitimbrs	16 parts		
	Others	Micro Tuning setting available, Voice Category Search function		
<b>Effects</b>	Reverb	12		
	Chorus	17		
	Insertion	79		
<b>Song Sequencer</b>	Track	16 + Pattern/Play Effect/Tempo		
	Capacity	Approx. 30000 notes		
	Song Number	1		
	Recording Mode	Multi / Step / Overdub / Replace / Punch In		
	Format	SMF Format 0 for SAVE and LOAD / SMF Format 1 and ESEQ for LOAD only		
	Note Resolution	1/480 per beat		
	MIDI Sync	Internal / MIDI Clock / MTC		
<b>Pattern Sequencer</b>	Track	8		
	Pattern	User 50		
	Recording Mode	Multi / Step / Overdub / Replace		
	Note Resolution	1/480 per beat		
<b>Key Map</b>	1 User kit of up to 128 samples / patterns *Complete 8 track patterns, single pattern tracks, or sampled waves can be assigned to each key.			
<b>Arpeggiator</b>	Arpeggiator Type	Preset 50 / User 50		
	Recording Mode	Step / Overdub / Replace		
	Track	4		
	Note Resolution	1/480 per beat		
<b>SMF Direct Play</b>	SMF Format 0 direct playback available			
<b>Display</b>	LCD	64 x 240 (Backlit) with Contrast knob		
<b>Connectors &amp; Terminals</b>	Headphone	1/4" Stereo Phone		
	Output	1/4" Phone x 2		
	Standard Individual Output	1/4" Phone x 2		—
	A/D Input	1/4" Phone x 2		1/4" Phone x 1
	MIDI	2 IN / 2 OUT / THRU		IN / OUT / THRU
	Sustain	1 Assignable	—	1 Assignable
	Foot Switch	1 Assignable	—	1 Assignable
	Foot Controller	1 Assignable	—	1 Assignable
	Foot Volume	1 Assignable	—	1 Assignable
<b>Storage</b>	Internal FDD	3.5" 2HD/DD		
	SCSI Devices	Optional SCSI devices available via optional ASIB1		
	File Type	All Data / Synth All / Voice / Wave / SMF / SONG / Pattern / Arpeggio *SMF Format 1/ ESEQ / AIFF / WAVE / AKA!® format Loading only		
<b>Controllers</b>	Pitch Bend	1	—	1
	Modulation	2	—	2
	Control Knob		6 Assignable	
	Ribbon Controller	1 Assignable	—	1 Assignable
	Breath Controller		1 Assignable	
	Scene Control Switch		2	
	Master Volume		1	
	A/D Input Gain		1	
	Rotary Encoder		1	
<b>Included Accessories</b>	Owners Manual, Demo disks			
<b>Options</b>	Flash Memory board	1 pair of EXFML1 Flash Memory Board (8MB; 2 x 4MB)		
	SIMM	1 pair of 72-pin DRAM SIMMs (Max 64MB; 2 x 32MB)		
	Individual Output	EXIDO1 Individual Output Board for Additional 4 Output Expansion		
	Digital Output	EXDGO1 Digital Output Board for AES/EBU with Word Clock In		
	SCSI	ASIB1 SCSI Interface for 50-pin Half Pitch connector *EXIDO1 and EXDGO1 cannot be installed simultaneously.		
<b>Dimensions</b>	1268(W) x 407(D) x 129(H) mm (49 1/8" x 16" x 5 1/12")	480(W) x 397(D) x 138(H) (18 7/8" x 15 2/3" x 5 5/12")	1061(W) x 407(D) x 129(H) mm (41 3/4" x 16" x 5 1/12")	
<b>Weight</b>	20 kg (44 1/8 lbs.)	9.8 kg (21 5/8 lbs.)	15 kg (33 1/8 lbs.)	

Specifications are subject to change without notice.

**SONDIUS-XG™**

Products bearing the SONDIUS-XG logo are licensed under patents of Stanford University and Yamaha as listed on the internet web site, <<http://www.sondius-xg.com>>. This product is not compatible with the XG format or XG song data.

For details please contact:



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