

YAMAHA

DX7S

DIGITAL PROGRAMMABLE ALGORITHM SYNTHESIZER



THE WORLD'S MOST PLAYED, MOST PLAYABLE SYNTHESIZER IS BETTER THAN EVER

When the original Yamaha DX7 was released, FM tone generator technology and the Digital Programmable Algorithm Synthesizer concept were totally new, and quickly became a focal point for the music industry. Several years later, FM tone generator technology is no longer new. The intervening years, however, have seen considerable research and development, feedback from professional artists, and significant advancements in the fields of electronics and semiconductor fabrication. Thanks to this growth and enhancement the Yamaha 6-operator Digital Programmable Algorithm Synthesizer is now available in cost-effective form: the DX7S.



ENHANCED FM SOUND AND EXTRAORDINARY EXPRESSIVE POWER



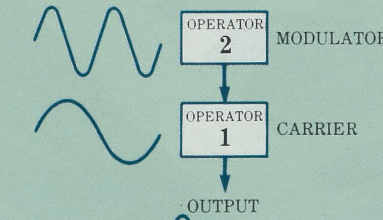
Improved 6-operator 32-algorithm Digital FM Tone Generator

The sound of the Yamaha FM tone generator system is, by now, familiar to anyone who listens to contemporary music. In fact, the Yamaha digital FM tone generator system—whether in a keyboard like the original DX7 or an independent tone generator unit—is used by more artists in more studios and on more stages throughout the world than any other system. Part of the reason for this record-breaking popularity is its incomparable sound quality, programming versatility and expressive power. The single-channel FM tone generator in the new DX7S takes digital FM synthesis to new levels of performance and versatility with the addition of many improvements and features. A most striking feature of the DX7S is its remarkably clean, well-defined sound. There's a very good reason for this: its new FM tone generator system uses advanced high-speed digital circuitry that provides significant improvements in frequency response and dynamic range. The fabulous voices that have been created for the original DX7 and other 6-operator DX-series synthesizers or TX-series tone generators are all fully compatible with the DX7S. In fact, existing voices can be considerably enhanced on the DX7S using new voice parameters and expanded performance control.

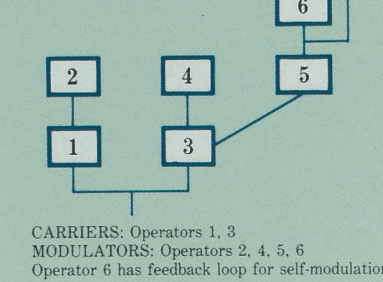
The Basics of Digital FM Synthesis

FM synthesis is capable of creating extremely complex, changing music waveforms that can be accurate reconstructions of existing acoustic instrument sounds or totally artificial creations. This is accomplished by using a system of "operators"—six in the DX7S. An operator is basically a digital sine wave generator with a built-in 8-parameter envelope generator. Each operator can function either as a "carrier" or a "modulator." A carrier produces the basic pitch of a sound, while a modulator controls the harmonic structure and therefore the timbre of the sound according to its frequency in relation to the carrier and the amount of modulation it applies to the carrier. Since the amount of modulation applied can be varied in complex ways by the EGs built into each operator, virtually any type of time-based timbral variation can be created. The six operators of the FM tone generator are arranged in 32 different "algorithms," which are different arrangements of carrier/modulator relationships between the operators. Each algorithm, therefore, is capable of producing a completely different range of voices.

Basic Operation of FM Tone Generator



DX7S Algorithm No. 7



CARRIERS: Operators 1, 3
MODULATORS: Operators 2, 4, 5, 6
Operator 6 has feedback loop for self-modulation.

Random Pitch

Acoustic instruments such as violins, trumpets, guitars and others rely on human touch to produce notes of a specific pitch. Because the pitch-controlling factor is human, the same note may be produced at a slightly different pitch each time it is played. This is one of the factors that contribute to the "warmth" of acoustic music, and gives the listener a feel for the number of players in an ensemble. The DX7S gives you the "human touch" with Random Pitch. The pitch of each note is varied randomly, dramatically adding to the fullness and life of the sound. The range of random pitch variation can be changed in 7 steps to suit different types of voice.

Aftertouch Pitch Control

When a guitar player bends or "chokes" a string, or a sax player changes his embouchure to shift the pitch of a note, the action required to produce the desired pitch bend is totally integrated with the playing of the note. Acoustic instruments allow pitch bend effects to be introduced as an expressive extension of the music as easily as a vocalist may slide the pitch of a note sung. In synthesizers, however, the application of pitch bend generally depends on the operation of a separate control wheel or lever. This not only means that a separate control has to be coordinated with the play-

ing of the note, but one hand is entirely occupied with pitch bend rather than playing. The DX7S puts pitch bend at the player's fingertips with aftertouch-controlled pitch. Increased pressure on a key can cause an increase or decrease in pitch over a specified range, so you can actually "feel" pitch bends like never before. Maximum aftertouch pitch bend range is ± 4 octaves.

16-key Multiple LFO Timing

LFO-based (Low-Frequency Oscillator) synthesizer effects such as vibrato or tremolo can sound cold and mechanical simply because modulation is applied in perfect synchronization to all notes played. This never happens in a live ensemble because each player starts his vibrato or tremolo at a slightly different time. The DX7S brings "live" warmth to synthesized LFO effects with a multi-mode LFO which actually starts the LFO effect for each individual note according to the timing with which the keys are played. The result is an extremely natural, thick multi-instrument sound.

Pitch Envelope Generator with Adjustable Range

Like the original DX7, the DX7S features an independent 8-parameter pitch EG which can be used to vary the pitch of notes played: a slight pitch rise at the attack of the note or complex, drastic pitch changes throughout the duration of the note. In the DX7S, however, the capacity for subtle pitch variations has been significantly increased by providing the pitch EG with a selection of 4 ranges: 8 octaves, 2 octaves, 1 octave or 1/2 octave. The entire 0-99 value range of the pitch EG parameters functions within the selected overall range, permitting extremely fine adjustment of pitch variation over a small range or broad, dramatic pitch sweeps.

Micro-tuning

This feature completely redefines the limits of human control which can be applied to synthesized sound. Micro-tuning means that each note of the keyboard can be individually tuned within a few cents of its normal pitch or over a range of octaves. The tuning of the keyboard can therefore be modified to create a warmer or more tense sound, alternate tuning systems can be explored, or wild effects can be created (such as tuning the keyboard in reverse). Far from being limited to pure tuning variation, Micro-tuning makes it possible to combine two voices with slightly different

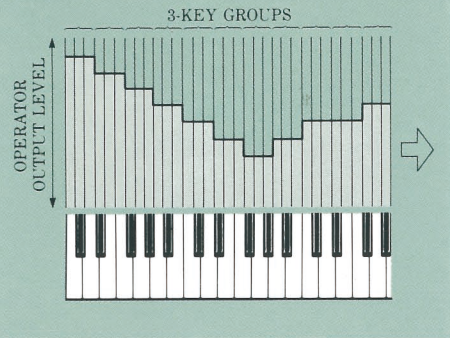
tunings to produce a varying, natural detune effect across the keyboard. The academic musician can play Bach in the tuning of his era, and avant-garde artists can delve into the expressive power of 1/4-tone, 1/8-tone or any other tuning. Two Micro-tuning memories are provided on-board for your own creations, as well as a range of 11 preset "standard" tunings:

1. Equal Temperament.
2. Pure (Major).
3. Pure (Minor).
4. Mean tone.
5. Pythagorean.
6. Werckmeister.
7. Kirnberger.
8. Vallotti & Young.
9. 1/4 shifted equal.
10. 1/4 tone.
11. 1/8 tone.

Fractional Level Scaling

No acoustic instrument produces perfectly equal level or timbre across its entire pitch range. Level scaling capability makes it possible to mimic this characteristics of acoustic instruments in a synthesizer. The DX7S offers an all-new Fractional Level Scaling system which represents the peak of precision and versatility in level scaling. The output level of each individual operator can be varied in three-key groups, so you can create virtually any level or timbre curve required. This means new realism and depth for the low acoustic piano notes, accurate reproduction of the various ranges of woodwind instruments, and generally ideal sound from every single note across the keyboard with any voice.

FRACTIONAL LEVEL SCALING



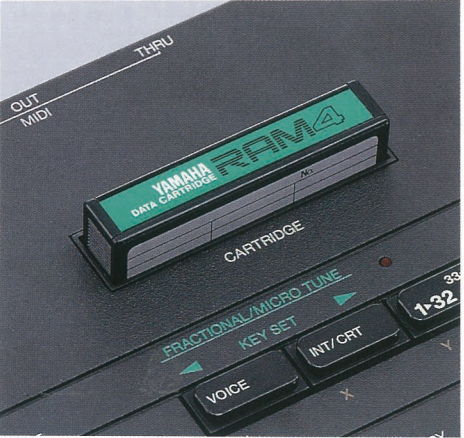
Dual-bank 64-voice Internal Memory & 32 Internal Performance Memories

While the original DX7 had 32 selectable voices on-board, the DX7S doubles this capacity with a 64-voice internal memory. A bank selector switches the 32 voice keys to select voices 1 through 32 or 33 through 64. In addition to these, the DX7S offers 32 performance memories which combine voice data with function parameters (modulation, aftertouch, foot controller, etc.). All you do is touch a key to call up one of 32 complete performance configurations.

Large-capacity Data Cartridges

The DX7S accepts new RAM4 cartridges for external data storage. A single RAM4 cartridge will hold the entire contents of the DX7S memory: 64 voices, 32 performance combinations, 2 micro-tunings and 1 system setup which includes master tuning, cartridge bank selection and MIDI configuration parameters. RAM4 cartridges can also be used for storage of fractional level scaling data. The DX7S is supplied with a read-only ROM cartridge containing 128 fabulous preset voices which cover the range of conventional musical instruments and include some

really innovative new sounds. The ROM also contains 64 performance combinations, and fractional scaling data.



Dual Continuous Sliders and Foot Controller Jacks for Unmatched Expressive Control

In addition to a linear volume control, the DX7S features two continuous slider controls—CS1 and CS2. When programming, CS2 functions as a DATA ENTRY control allowing fast, easy selection of parameters and values. When playing, both

continuous sliders can be assigned to any voice parameters, making it possible to change the selected parameters in real time while playing. You can control timbral variations, vary envelope generator parameters, change pitch EG parameters, vary LFO parameters, change algorithms, and many, many more—all in real-time for fantastic expressive capacity. A pair of foot controller jacks on the rear panel accept optional Yamaha FC-7 foot controllers, permitting control of volume, pitch modulation, amplitude modulation or envelope generator bias. Foot controller 1 can also be used to control any voice parameter assigned to CS1 (Continuous Slider 1), for far-reaching voice control.

Breath Controller

Breath-control capability was first introduced on the DX7, allowing realistic breath and tonguing effects to be added to woodwind and brass voices as well as providing a whole new range of effects for other synthesized voices. The breath control system has been improved and expanded on the new DX7S with the addition of pitch control capability (pitch bias) to the original pitch modulation, amplitude modulation and envelope generator bias parameters.

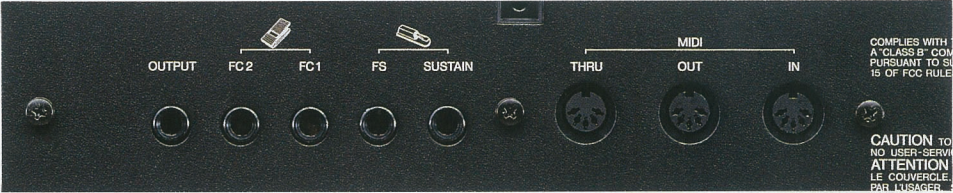
Dual Foot Switches

Two rear-panel foot switch jacks accept optional Yamaha FC4 or FC5 Foot Switches. One foot switch is dedicated to sustain control, while the other can be assigned for control of sustain, portamento, key hold (sostenuto) or soft (damper pedal).

Full MIDI Implementation

The DX7S will function perfectly within any MIDI music system thanks to an extended set of MIDI control functions. Naturally, it can be set to independently transmit and receive on any MIDI channel—or all channels at once. Different MIDI control numbers can be assigned for input, allowing versatile external control of the synthesizer's pitch modulation, amplitude modulation, envelope generator bias or volume parameters. The two continuous sliders can be programmed to transmit different MIDI control numbers for control

of external MIDI devices. A Local Control ON/OFF parameter permits releasing the internal tone generator from control of the DX keyboard so that, for example, a sequence recorder can control the DX tone generator while the DX keyboard controls an external tone generator. For versatile selection of programs on external MIDI equipment any of the voice select keys can be programmed to transmit any MIDI program number when pressed, or any desired MIDI program change number can be directly transmitted by using voice select keys 0 through 9 as numeric entry keys. And, of course voice, performance or micro-tuning data dumps can be transmitted or received as required. Assignable device numbers also make it possible to transmit or receive data to or from any type of MIDI device.



SPECIFICATIONS

Keyboard	61 keys (C ₁ ~ C ₆), with Initial/After touch
Tone Generator	FM tone Generator (6 operators 32 algorithms)
Simultaneous Note Output (Reverse priority)	1-voice: 16 notes
Internal Memory	64-voices/32 performances, 2 micro tunings, system set-up
External ROM Memory	128 voices/64 performances, micro tunings, fractional level scaling
External Memory	RAM cartridge (Optional, RAM4)
Control Sliders and switches	Volume slider, Continuous sliders CS1, CS2 (Data entry) Data entry switch × 2, Mode setting switch × 10, Voice switch × 32
Controls	PITCH BEND WHEEL, MODULATION WHEEL
External Control Terminals	BREATH CONTROL, SUSTAIN, FOOT SWITCH (Sustain, Portamento, Key hold, Soft), FOOT CONTROL 1 (Volume, Modulation, Voice parameter), FOOT CONTROL 2 (Volume, Modulation). RAM·ROM CARTRIDGE SLOT MIDI IN—OUT—THRU
Output Terminals	Output, Headphones
Display	LCD: 16 letters × 2 lines (illuminated) LED: 7 segments × 2 digits
Power Requirements, Power Consumption	General Model 110-120V/220-240V, 50/60 Hz. 15 W U.S. & Canadian Models 120V, 50/60 Hz. 15 W
Dimensions (W × H × D), Weight	999 × 85.8 × 333.7 mm (39-3/8" × 3-3/8" × 13-1/8"), 10.5 kg (23.1 lbs.)
Standard Accessories	Music holder, ROM cartridge
Optional Accessories	<div> RAM Cartridge RAM4 Flight Case LC-7IIF Hard Case LC-7IIH Soft Case SC-7II Cartridge Adaptor ADP1 Foot Switch FC4/FC5, Foot Controller FC7, Breath Controller BC1, BC2, Stand LG-100, MIDI Cable MIDI 01/03/15, Accessory Kit for DX ADX20 (FC5, FC7 and BC1) </div>

All specifications subject to change without notice.

ACCESSORIES



For details please contact:

SINCE 1887



YAMAHA
HAMAMATSU, JAPAN