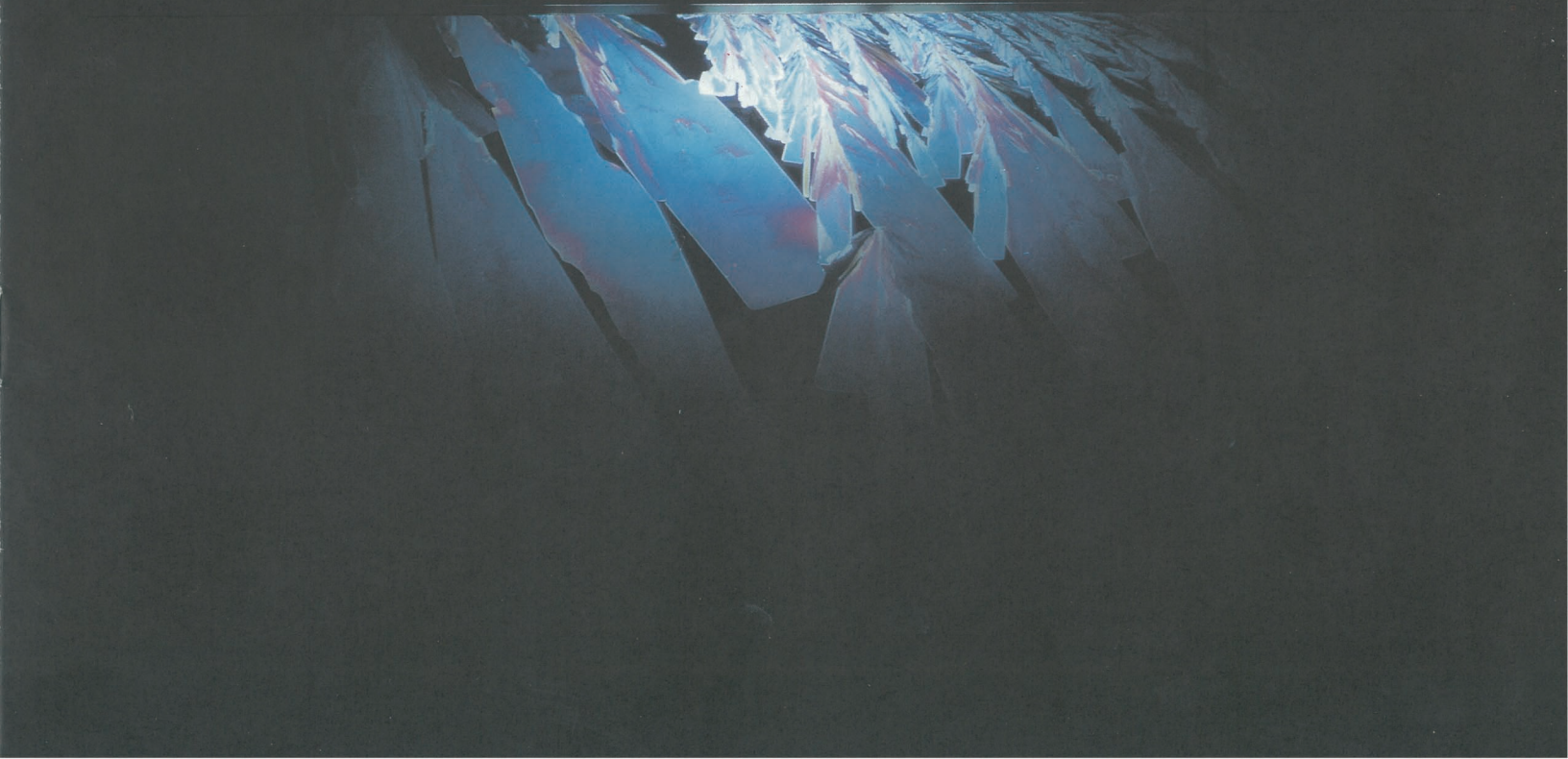
YAMAHA

DX7 II

DIGITAL PROGRAMMABLE ALGORITHM SYNTHESIZER

FD/D



ENHANCED FM

2-channel 6-operator 32-algorithm Digital FM Tone Generator

The Yamaha FM tone generator system has become an indispensable standard in the music field worldwide. Yamaha digital FM synthesis is used by more successful artists in more studios and on more stages than any other system. The reasons are obvious: incomparable sound quality, programming versatility and expressive power.
The DX7IIFD and DX7IID inherit all of this with the addition of many improvements and features that put them in a class of their own. Further, the new FM tone generator is a two-channel design, permitting dual and split play modes as well as true stereo output.
For those who are not familiar with the FM system or need to review the basics, here's a brief summary:

Superior FM Sound Quality

A most striking feature of the new DX7II models is their remarkably clean, well-defined sound. The inherent vibrance and natural quality of FM sound comes through with new energy and transparency. There's a very good reason for this: the new FM tone generator system uses advanced high-speed digital circuitry that provides significant improvements in frequency response and dynamic range.

Full Compatibility with Previous 6-operator FM Voices

What about all the fabulous voices that have been created for the original DX7 and other 6-operator DX-series synthesizers or TX-series tone generators? They are all fully compatible with the DX7IIFD and DX7IID. In fact, existing voices can be considerably enhanced on the mark-II DXs using the new voice parameters and expanded performance control.

Dual, Split and Single Play Modes

Of course you can play any voice individually in the DX7IIFD and DX7IID SINGLE play mode, but the new DUAL and SPLIT play modes give you the power of two DXs rolled into one. Any two voices can be combined and played as one in the DUAL mode, letting you create extra rich, thick sounds—two different string sounds make a warm string ensemble, or different horn voices for a fat brass section. Since you're not limited to combining similar voices, you can also play unique combinations for a variety of striking effects—try combining harp and flute or piano and brass.
The SPLIT mode lets you assign different voices to the left and right-hand areas of the keyboard, so you can play two completely independent voices at once. A typical split configuration would be a bass voice for the left hand and a piano voice for the right, but you can choose any two voices to fit your own musical requirements.

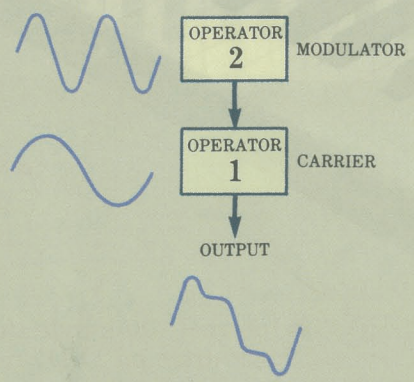
Stereo Outputs

The two-channel tone generator configuration of the DX7IIFD and DX7IID permits true stereo output for enhanced sound control. Output jacks "A" and "B" deliver the sound from the two respective tone generator channels. These can be connected to a stereo sound system for a really "big" sound field. When only output "A" is connected, the sound from both channels is mixed and delivered via that output. Stereo output capability also makes possible some exciting new PAN effects that we'll take a look at later in this catalogue.

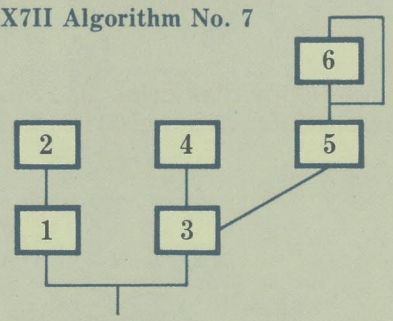
FM BASICS

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 DX7IIFD and DX7IID. 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



DX7II Algorithm No. 7



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

THE NEW GENERATION OF DX SYNTHESIZERS HAS ARRIVED

DX7 II

Since its introduction the Yamaha DX7 has grown to become a keystone in the music world. It is the foundation for a whole new generation of music-making tools that have revolutionized and revitalized the field.
But progress never ceases at Yamaha, and the results of an R&D project to refine and improve on the DX7 are now ready for release.
We present the DX7IIFD and DX7IID Digital Programmable Algorithm Synthesizers.

- Micro-tuning capability permits use of alternate tuning systems
- Fractional level scaling for unprecedented level scaling precision and control
- Random pitch simulates intonation of acoustic instruments
- Stereo pan with touch, LFO, key number or EG-control
- 16-key multiple LFO timing for live, natural ensemble sound
- 32 performance memories combine voice and function data
- 64-voice internal memory
- Aftertouch pitch control offers fingertip pitch bend
- 2-channel 6-operator 32-algorithm FM tone generator
- Improved FM technology delivers superior sound quality
- Full compatibility with existing 6-operator FM voices
- Dual, split and single play modes
- Pitch EG with adjustable range for extra fine adjustment
- Comprehensive 40-character × 2-line LCD
- Stereo outputs
- Full MIDI implementation offers vast MIDI system control
- Dual alpha-numeric display
- New cartridges for voice, performance, micro-tuning, fractional level scaling data
- Internal 720 k-byte (formatted) 3.5" micro floppy disk drive on "FD" model stores voice, performance, micro-tuning and fractional scaling data
- DX7IIFD micro floppy disk drive also functions as a MIDI data recorder for external MIDI equipment
- Dual foot controllers
- Breath controller
- Dual foot switches
- Dual continuous sliders for data entry and real-time parameter control

UNPRECEDENTED EXPRESSION AND PERFORMANCE CONTROL

Random Pitch

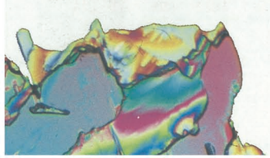
Every time the same note is played on a violin, trumpet or a number of other acoustic instruments, it is produced at a slightly different pitch—this is one of the factors that contribute to the "warmth" of acoustic music, and gives the listener a feel for the number of players in an ensemble.
The DX7IIFD and DX7IID give you this same warmth with the new Random Pitch feature. 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

Pitch bend effects on acoustic instruments are totally integrated with the playing of the note—a change in embrochure or the position of a finger—and thus are easily introduced as an expressive extension of the music. 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 playing of the note, but one hand is entirely occupied with pitch bend rather than playing. The DX7IIFD and DX7IID bring pitch bend back to the realm of touch 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.

Touch, LFO, Key Number or EG-controlled Panning

With its "A" and "B" channel stereo outputs, the DX7IIFD and DX7IID are capable of producing a wide range of subtle or startling panning effects. You're not limited to standard LFO-type panning, either: panning can also be controlled via keyboard touch (velocity) sensitivity, key number (for true stereo keyboard effects) or a special 8-parameter PAN envelope generator.



16-key Multiple LFO Timing

Normally, synthesizer LFO effects such as vibrato or tremolo are applied in perfect synchronization to all notes played. This would never be the case in a live ensemble—each player would start his vibrato or tremolo at a slightly different time, thus adding richness and warmth to the sound. The DX7IIFD and DX7IID come close to the acoustic ideal 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 that entirely escapes the cold, mechanical sound of conventional LFO effects.

Pitch Envelope Generator with Adjustable Range

Like the original DX7, the DX7IIFD and DX7IID feature 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 DX7II models, 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.

Dual Continuous Sliders for Data Entry and Real-time Parameter Control

In addition to a linear volume control, the DX7IIFD and DX7IID feature two continuous slider controls—CS1 and CS2. When programming, CS2 functions in the same way as the DATA ENTRY control on the original DX7, allowing fast, easy selection of parameters and values. In the PLAY mode, both continuous sliders can be assigned to control any of 105 voice parameters, making it possible to change the selected parameters in real time while playing. You can change the output level of any carrier to create timbral changes, vary any of the rate or level parameters of the envelope generator for any operator, change pitch EG parameters, vary LFO parameters, change algorithms, and many, many more. In short, you're free to do just about anything with the sound in real time. The fantastic expressive capacity offered by this feature is way beyond anything else available at this time.

Dual Foot Controllers

A pair of foot controller jacks on the rear panel accept optional Yamaha FC7 foot controllers, permitting control of volume, pitch modulation, amplitude modulation or envelope generator bias. Foot controller 1 can also be used to control any of the 105 voice parameters assigned to CS1 (Continuous Slider 1), for far-reaching voice control.

Breath Controller

The innovative Yamaha Breath Controller was a great success on the original DX7, and has been fully implemented on the new DX7II models with the addition of pitch control capability (pitch bias) to the original pitch modulation, amplitude modulation and envelope generator bias parameters. With an optional BC1 Breath Controller you can add realistic breath and tonguing effects to woodwind and brass voices, or to string or pure synth-type voices for unique effects.

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).

ADVANCED FEATURES

Micro-tuning

This feature unquestionably puts the DX7IIFD and DX7IID in a totally new class of digital keyboards. Stated simply, each note can be individually tuned—within a few cents of its normal pitch or over a range of octaves. This means that the entire keyboard can be precisely tuned as a piano tuner would do with a fine grand piano, alternate tuning systems can be explored, or wild effects can be created (such as tuning the keyboard in reverse). For the contemporary musician this makes it possible to combine two voices with slightly different tunings, producing 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.
Developed toward the end of the 19th century, this tuning features perfectly equal 1/2-tone intervals permitting complete freedom in transposition and key changes.

2. Pure (Major).
3. Pure (Minor).
Originally used for brass instruments, these tunings are based on natural harmonics and therefore produce beautiful harmonies in ensemble performance.

4. Mean tone.
This tuning was developed to eliminate the discordant sound of the third in the Pythagorean scale, and was a favorite of Handel.

5. Pythagorean.
The tuning of the Grecian era, this was the basis for the music of the middle ages.

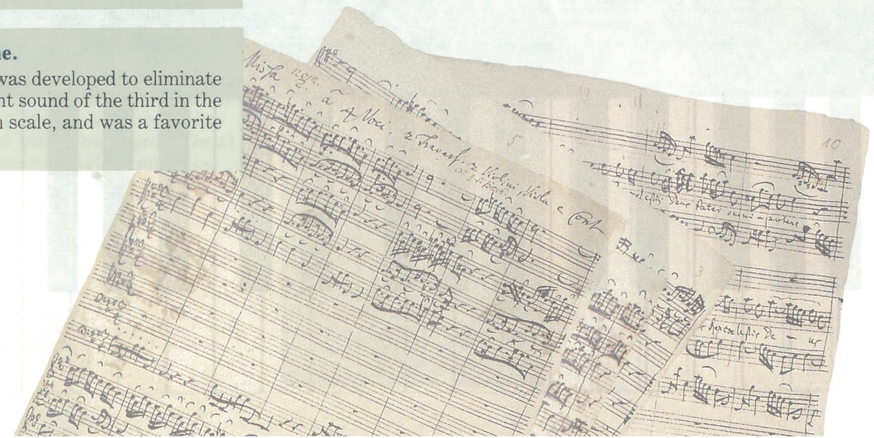
6. Werckmeister.
7. Kirnberger.
8. Vallotti & Young.
These tunings were favored from the days of Bach, Beethoven and Chopin right up to the age of the romanticists.

9. 1/4 shifted equal.
A 1/4-tone scale is combined with equal temperament to produce a feeling of tension.

10. 1/4 tone.
While the normal interval between the notes on a keyboard is 1/2-tone, 1/4-tone steps are used in this tuning.

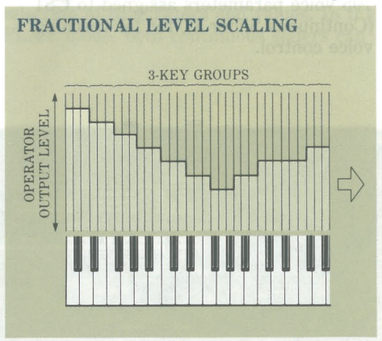
11. 1/8 tone.
The interval between the notes on the keyboard is 1/8-tone.

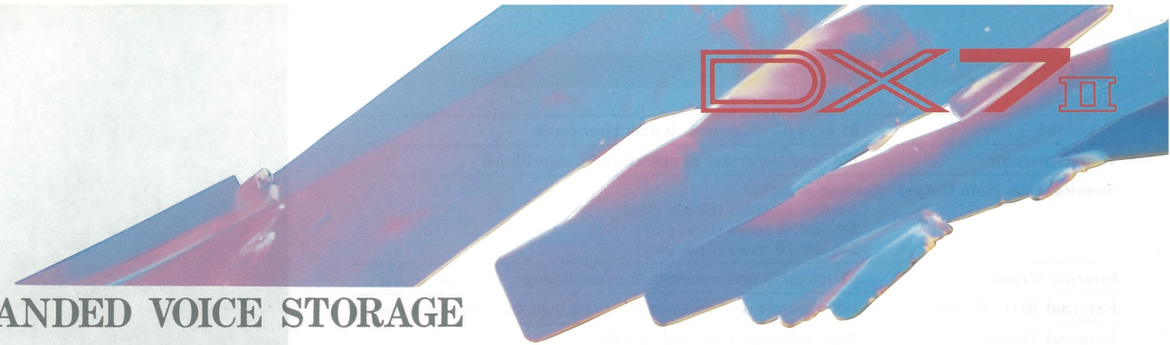
Up to 63 original micro-tunings can also be stored on a standard RAM4 cartridge and recalled as required.



Fractional Level Scaling

Level scaling permits creating a change in level and/or timbre (by changing the level of modulating operators) across the keyboard, and is therefore essential for the production of natural, well-balanced voices. The original DX7 offered a choice of level-scaling curves with variable depth. The DX7IIFD and DX7IID have the same capability, plus an all-new Fractional Level Scaling function which reaches new heights of precision and versatility. 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. Level scaling data can be stored on RAM4 cartridges.





EXPANDED VOICE STORAGE

Dual-bank 64-voice Internal Memory

While the original DX7 had 32 selectable voices on-board, the DX7IIFD and DX7IID double 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.

32 Internal Performance Memories

In addition to 64 internal voices, the DX7II models offer 32 performance memories which combine voice data with function parameters (modulation, aftertouch, foot controller, etc.) as well as play modes (dual, split, single). All you do is touch a key to call up one of 32 complete performance configurations.

Large-capacity Cartridges for Voice, Performance, Micro-tuning, Fractional Level Scaling Data

The DX7IIFD and DX7IID accept new large-capacity RAM4 cartridges for external data storage. A single RAM4 cartridge will hold the entire contents of the DX7IIFD or DX7IID 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 DX7IIFD and DX7IID are 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, 11 micro-tunings, and fractional level scaling data.

Internal 720 k-byte (formatted) 3.5" Micro Floppy Disk Drive on "FD" Model.

The DX7IIFD offers the ultimate in data storage and retrieval capacity as well as convenience with a built-in high-performance 3.5" micro floppy disk drive. A single micro floppy disk is equivalent in storage capacity to about 40 RAM4 cartridges, so you can have a massive voice, performance, micro-tuning and fractional scaling library ready for virtually instant access and use. The micro floppy disk will even function as a MIDI data recorder for external MIDI equipment, allowing fast, convenient storage of QX-series Sequence Recorder data, RX-series Digital Rhythm Programmer data, etc. Utility functions are provided for fast, easy disk copying and backup.

FULL MIDI IMPLEMENTATION

The DX7IIFD and DX7IID feature full MIDI function implementation for extensive MIDI system control capability. Naturally, they can be set to independently transmit and receive on any MIDI channel. In fact, the "A" and "B" tone generator channels can be programmed to receive on different MIDI channels if desired. Different MIDI control numbers can be assigned to tone generator channels "A" and "B," allowing 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.

COMPREHENSIVE 40-CHARACTER × 2-LINE BACKLIT LCD

A new expanded backlit liquid-crystal display panel makes operation and programming of the DX7IIFD and DX7IID easier than ever. You get a full status display of current modes and voice names while playing, and simultaneous display of all relevant parameters while programming.

SPECIFICATIONS

Keyboard	61 keys ($C_1 \sim C_6$), with Initial/After touch
Tone Generator	FM tone Generator (6 operators 32 algorithms)
Simultaneous Note Output (Reverse priority)	1-voice: 16 notes (Single play) 2-voice: 8 notes (Dual play) 2-voice: 16 notes (Split play)
Internal Memory	64-voices/32 performances, 2 micro tunings, 1 system set-up
External ROM Memory	128 voices/64 performances, micro tunings, fractional level scaling
External Memory	RAM cartridge (Optional, RAM4) Micro floppy disk (Optional, MF2DD) = Internal Memory × 40, MIDI exclusive data
Control Sliders and switches	Volume slider, Continuous sliders CS1, CS2 (Data entry) Data entry switch × 2, Mode setting switch × 12, 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 A/MIX, B, Headphones
Disk Drive (DX7II FD Only)	3.5" Micro Floppy Disk, built-in. 2DD 1M (720K bytes when formatted)
Display	LCD: 40 letters × 2 line (illuminated) LED: 7 segments × 2, digits × 2
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"), DX7IID : 10.5 kg (23.1 lbs.), DX7IIFD : 11.2 kg (24.7 lbs)
Standard Accessories	Music holder, ROM cartridge, 3.5" Micro floppy disk (MF2DD)
Optional Accessories	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, 3.5" Micro Floppy Disk MF2DD, Accessory Kit for DX ADX20 (FC5, FC7 and BC1)

All specifications subject to change without notice.

ACCESSORIES

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