

YAMAHA

TX16W

DIGITAL WAVE FILTERING SAMPLER



THE YAMAHA TX16W DIGITAL WAVE FILTERING SAMPLER: THE WORLD OF SAMPLING HAS COME OF AGE

In a sleek rack-mountable unit, the Yamaha TX16W provides you, the discriminating musician, with unprecedented sampling power and sound-modeling features that will enhance your musical creativity. Now, absolutely any sound you hear can be captured on the TX16W—in stereo as well as mono—and reproduced with clarity and precision, or modified, expanded and enhanced to produce sounds that are even richer, even more expressive than they were in their original acoustic state.

With the arrival of the Yamaha TX16W Digital Wave Filtering Sampler, the exciting, limitless world of sampling has truly come of age.

■ UNIQUE DYNAMIC DIGITAL FILTERING

The flexibility and power of Dynamic Digital Filtering provides a wide range of tonal effects that are varied in real time by the way you play, producing sounds never before heard from a sampler. The Dynamic Digital Filters can be controlled by LFO, Envelope Generator, or MIDI control data such as Touch Sensitivity, Breath Control, Keyboard Scaling or After Touch. Authentic simulation of human voices, exciting ring-modulation effects, subtle, responsive parametric EQ—these effects must be heard.

■ STATE-OF-THE-ART 32-POINT STEREO SAMPLING

Create a vibrant, vivid "Voice" with sound variability by spreading up to 32 sampled "Timbres" across your keyboard. Timbres can be made with sampling durations of up to 16.3

seconds and sampling rates of up to 50 kHz, for rich, full-frequency reproduction. Voices are full 16-note polyphonic, and as many as 32 Voices can be stored in internal memory. Each Timbre can be assigned its own type of Dynamic Digital Filter for the creation of complex Voices.

■ VERSATILE VOICE LAYERING

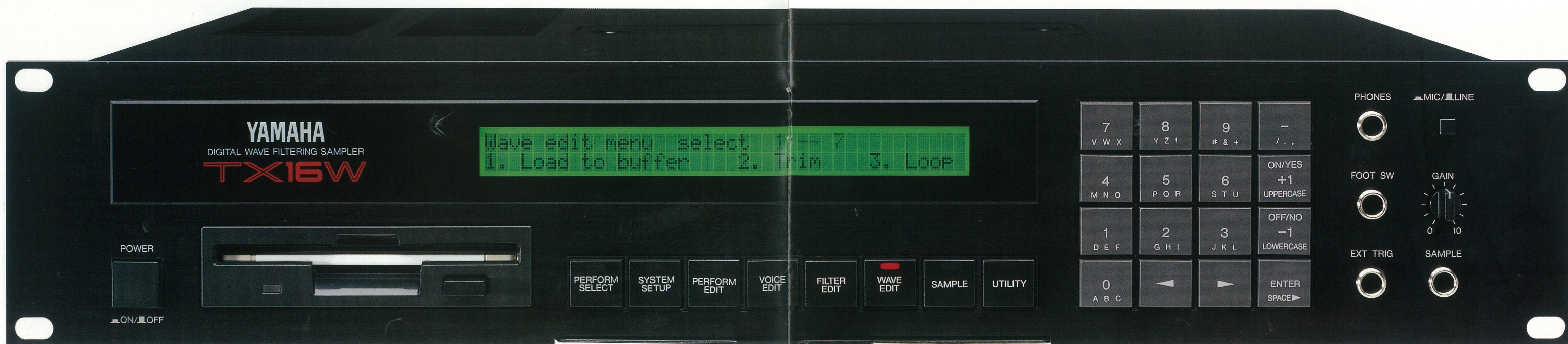
Assemble complicated "Performance" programs by layering as many as 16 Voices. Sophisticated Key-Crossfade capability lets you blend Voices across the keyboard for a variety of ensemble effects. The exciting Touch-Crossfade function lets you change between up to 16 Voices by key pressure for unheard-of musical expression. 32 Performances can be stored, and comprehensive selection of individual outputs for Voices, or Mix (stereo) outputs is provided.

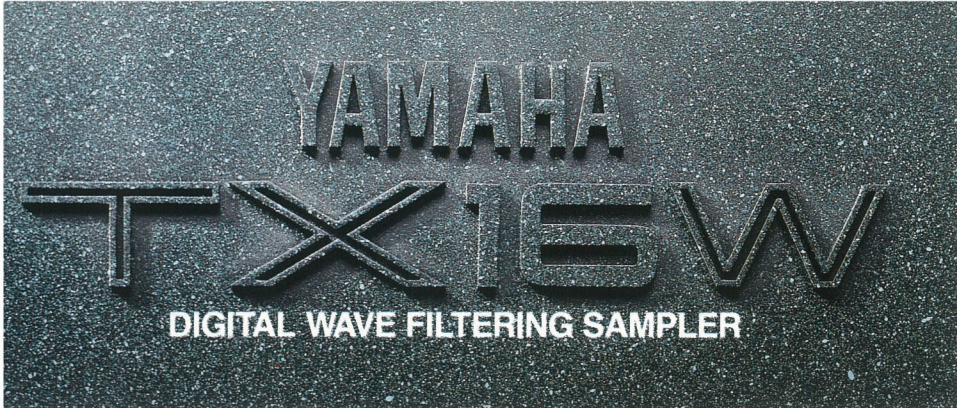
■ MASSIVE MEMORY

The TX16W's 1.5 Megabyte internal memory lets you store up to 43 seconds of samples. Easily installed expander boards let you increase the memory to 6 Megabytes, for maximum storage of 4 minutes of sampled data. For ease of handling, data can be saved onto 3.5" floppy disks.

■ A RANGE OF SUPERB FEATURES

Also included on the TX16W are: A complete range of professional sample-editing operations. Logical mode/job setup with clear, concise menus. Attractive graphic displays of important parameters for ease in editing. Five different sampling methods for superb results in any application.

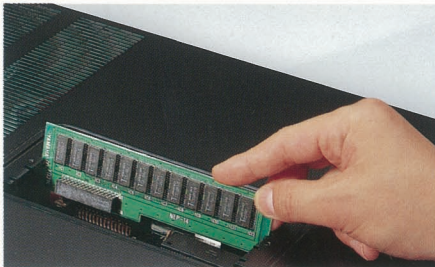




Pristine Sampling Plus Expandable Memory

The TX16W Digital Wave Filtering Sampler uses 12-bit A/D linear sampling with sampling frequencies of 16.7, 33.3 or 50 kHz for full-frequency reproduction of the most complex samples. Stereo sampling can be executed at a rate of 33.3 kHz, yielding clean samples of instruments with wide spatial characteristics such as piano or acoustic guitar. Stereo sampling also lets you capture the reverb characteristics of the environment for fuller, richer samples. Sounds of up to 16.3 seconds duration can be sampled, allowing long sounds such as cymbals to be sampled in full without the need of looping.

A 1.5 Megabytes of internal memory are provided, allowing storage of up to 43 seconds of sampled data. Three additional 1.5 Megabyte expansion boards may be installed, at a modest cost and in a simple operation, bringing total available memory up to a colossal 6 Megabytes. Each expansion board adds a



The EMM15 expansion board.

maximum 60 seconds of sampling time, permitting a total of 4 minutes of sampled sounds to be stored in internal memory (with 3 expansion boards), enough for the most complex live performance. Yamaha, in conjunction with world-class musicians and engineers, has produced an extensive floppy disk library of outstanding instrumental sounds to suit every musical situation.



32-Point Sampling Versatility

The TX16W's 32-point sampling capabilities enable you to allocate up to 32 individual samples (or "Timbres") to the keys of your keyboard, creating a single "Voice". For example, if you are using a 5-octave MIDI keyboard such as a Yamaha DX7II Synthesizer to play the TX16W, every other note could be assigned a separate Timbre for amazingly realistic reproduction of complex sounds such as orchestra or choir. Alternatively, you can sample 32 different percussion instruments and play them from your keyboard.

Sampling Frequency (kHz)	Single Sample	Sampling Time (seconds)		
		Total Sampling Time (approx.)		
		1.5 Mbyte internal memory	with 1 1.5-Mbyte board	with 3 1.5-Mbyte boards (6 Mbytes)
16.7 mono	16.3	43	106	232
33.3 mono	7.9	21	53	116
33.3 stereo	7.9	10	47	58
50.0 mono	5.2	14	35	77

Corresponding to the sampling frequencies in the chart from top to bottom, each expansion board adds (in seconds) the following sample time memory capacities: 62.9, 31.4, 15.7, and 20.9.

The Power of Performance Editing

On the TX16W, the word "Performance" takes on a new meaning. It indicates a program which you can create by layering up to 16 different Voices for unlimited sound possibilities. The TX16W can store as many as 32 Performances, allowing you to blend Voices in more combinations than you'd need for even the most complicated live show. Each Voice can be detuned and transposed, and its many Timbres modulated by their own LFOs (Low Frequency Oscillators) for lush ensemble effects. A "global" LFO can be assigned to affect the entire Performance. You can also control each Voice within a Performance through MIDI data sent on individual MIDI channels for spectacular sequencing possibilities.

Effortless Sound Sampling

In spite of its technical sophistication, sampling sounds on the TX16W is extremely easy to do. Simply call up the the Sample Mode, select the sampling frequency, sampling time, and the type of trigger that you want to use. You can use the sound itself to trigger sampling (AUTO), a separate signal (EXTERNAL), a footswitch, or a combination of footswitch and either INPUT or EXTERNAL. Use the footswitch to put sampling start on stand by as close to the beginning of the sound as possible to avoid sampling an undesirable sound; the TX16W automatically starts sampling when it receives the INPUT or EXTERNAL signal. Set the level for the sound (both LEFT AND RIGHT LEVELS if you are sampling in stereo). The display shows the level of the sound on a convenient, easy-to-read peak hold horizontal bar graph.



If you're not satisfied with the sample, merely press the ENTER key to resample the sound. Fast, easy, and convenient.

Even though creating high quality samples with the TX16W is an extremely easy process, getting a concert grand piano or a symphony orchestra to sample from often isn't. That's why Yamaha, in conjunction with world-class musicians and engineers, has produced an extensive floppy disk library of outstanding instrumental and vocal sounds to suit every musical situation.

Comprehensive Waveform (Sample) Editing

The TX16W lets you mold and modify samples (called Waveforms) to create superbly authentic instrument sounds, or any sound you can imagine. Use the Auto Zero Cross point function to locate a zero level point in a sample to facilitate rapid looping operations. Loop crossfade allows you to make glitch-free, seamless loops. The Trim function lets you finely adjust the length of the sample. Reverse the sound of a sample for special effects. Mix two samples to create a new sounds, with the attack of one of the sound delayed by a specified amount, using the Offset function.

Every change that you make can be monitored on the spot for guess-free editing. And to speed up the editing process, everything that you need to see when editing a sample is conveniently displayed on the TX16W's clear, bright liquid crystal display.



Synthesizer-Style Voice Editing

The TX16W features voice editing that compares in many ways with the advanced voice programming features on the Yamaha DX7IIFD/D Synthesizers, except the TX16W provides harmonically rich samples of real sounds, rather than digitally-generated tones. The Amplitude EG lets you subtly shape the envelope of the sound. The Pitch EG allows you

to add expressive pitch variations. Use the Amplitude Modulation and Pitch Modulation functions to add sensitive vibrato and tremolo via an external Modulation Wheel, Foot Controller, Breath Controller, or by After Touch. Fully-adjustable Pitch Bend Range (via an external Pitch Bend Wheel) is also provided.

Performance Editing—Vast Potential

The truly unique sound potential of the TX16W becomes impressively apparent when you examine its Performance editing capabilities. Each Performance can include a combination of up to 16 Voices, whose level, tuning, transposition and MIDI Receive Channel can be individually selected.

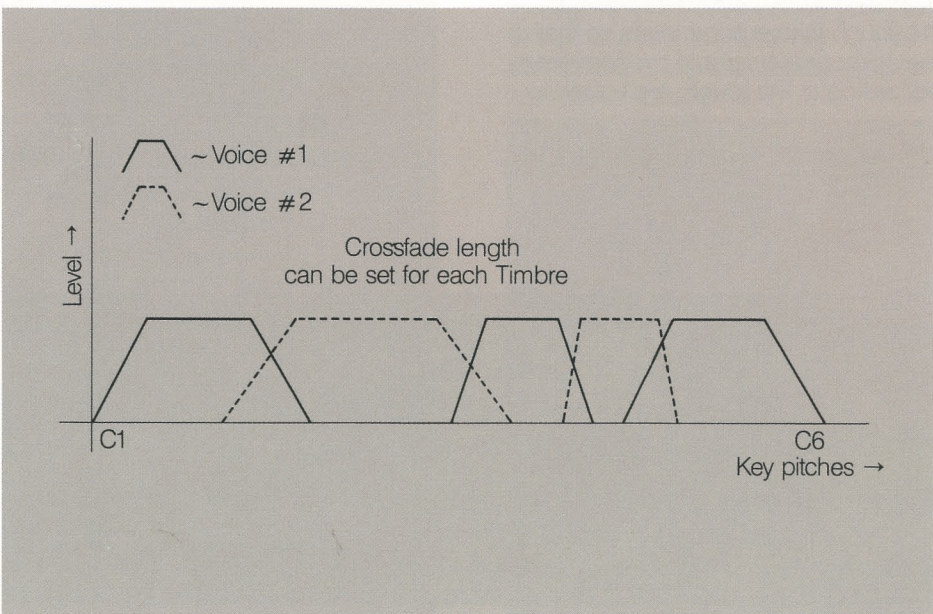
The innovative Alternative Assign function actually lets you play a different Voice each time you press a key, creating constantly changing timbres. For example, you can reproduce the subtle pitch and tone changes of a choir by using 16 human voice samples each with slightly different tunings and Dynamic Digital Filter settings.

Output Assign lets you route Voices #1 through #8 to their own individual outputs (up to eight), or send them to one or both of the Mix outputs. This allows you to independently process the sound of each Voice—ideal for a multi-percussion Performance.

You can add sampled sounds to your music in perfect synchronization with the External Trigger feature. Just run an audio signal (a recorded drum beat, a live bass guitar, etc.) into the TX16W to trigger any selected Performance on any selected note.

Voice-Blending via Key Crossfades

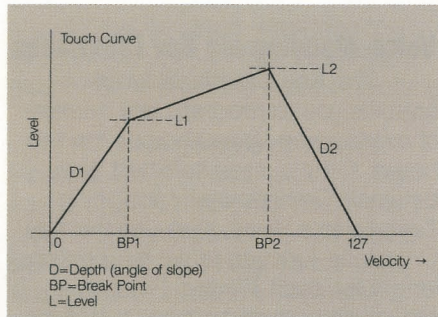
The Key Crossfade function enables you to program any number of overlapping Voices across the keyboard. Simply leave selected gaps between Timbres when assigning Timbres to a Voice, then use the Key Crossfade function to set the crossfade length for each Timbre. Perform a similar procedure on a second Voice whose Timbres correspond to the gaps in the first Voice. Combine the two Voices in a Performance, for Key Crossfades tailored to suit your exact needs.



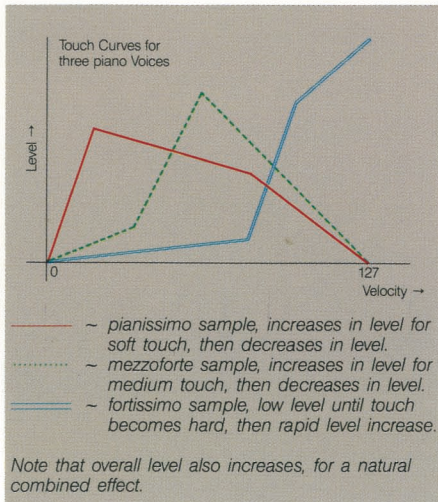


Programmable Touch Curves for Velocity Crossfades

The TX16W's Touch Curve parameters let you create key touch dynamics for individual Timbres in more detail than ever before, allowing touch response to be finely tuned across the entire keyboard. Six adjustable parameters let you specify the three-segment Touch Curve so that a Timbre can get louder or softer as touch pressure is increased. This provides a wide variety of touch response configurations, creating a totally natural keyboard feel.



This also allows you to create a Performance in which a different mix of Voices will be heard according to how hard you strike the keys. For example, to create a realistic grand piano sound, use three piano Voices. Set the Touch Curve parameters so that the appropriate sample predominates according to the touch: a pianissimo



sample for a light touch, crossfading with a mezzoforte sample as you reach a medium touch, which in turn crossfades with a fortissimo sample as you play hard.

Dynamic Digital Filter—Real Time Digital Parametric Filtering

Up until now, most synthesizers and samplers only provided real-time control of the cut-off frequency of a filter—usually a low-pass filter. The exclusive Dynamic Digital Filter puts the TX16W in a class of its own. This extraordinary digital processing function allows you to control, by the way you play, a wide range of filter parameters. In the past these parameters had to

be adjusted by using costly studio equalizers which, although of high quality, could not respond to playing.

On the TX16W you can select velocity, envelope generator, modulation wheel, LFO, after touch, or any MIDI controller to affect such parameters as the “Q” setting of a band-pass filter, the slope of a high-pass filter or the frequency of a notch filter.

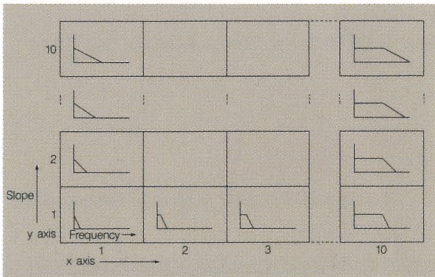
A total of 16 fully-variable Filter Tables are available on a floppy disk supplied with the TX16W. All 16 Filter Tables can be loaded into the TX16W's Filter Table Memory. Further Filter Tables will be made available as Yamaha's engineers create them,

FILTER TABLE	CONTROLLABLE PARAMETERS	
	X-AXIS	Y-AXIS
Low pass filter with resonance	Frequency	Level
Low pass filter (low frequency range)	Frequency	Level
High pass filter with resonance	Frequency	Level
Low pass filter (high frequency range)	Frequency	Level
Narrow band pass filter	Frequency	Level
High pass filter (low frequency range)	Frequency	Level
Wide band pass filter	Frequency	Level
High pass filter (high frequency range)	Frequency	Level
High pass changing to a low pass filter	Frequency	Level
Band pass changing to a band eliminate filter	Frequency	Level
Dip (notch) filter	Frequency	Level
Peak filter	Frequency	Level
Sloping low pass filter (low frequency range)	Frequency	Slope
Sloping low pass filter (high frequency range)	Frequency	Slope
Sloping high pass filter (low frequency range)	Frequency	Slope
Sloping high pass filter (high frequency range)	Frequency	Slope

constantly expanding the potential of the TX16W.

The applications of the Dynamic Digital Filter are astonishing. Imagine being able to program a velocity-triggered ring modulation effect on a guitar Voice, or emphasizing a narrow frequency band on an orchestral program, controlling the amount of emphasis by foot pedal, or using a Breath Controller to control the slope of high-pass filtering on a saxophone sample.

Two parameters can be set for each filter type; one of them is set to a fixed value, and the other can be controlled dynamically.



The x-axis of the filter (in this example the cutoff frequency) is fixed at a selected value, and the y-axis (the slope of the filter) is dynamically controlled with a selected Bias sensitivity (the amount by which it will respond to MIDI data). Using the same Filter Table, the y-axis could be fixed and the x-axis could respond to playing, resulting in dynamic control of the cutoff frequency, for unique real-time tonal variations.

The Dynamic Digital Filter also has its own independent envelope generator as well as an LFO. Key Scaling allows you to adjust, over a wide range (with negative or positive settings), the amount by which the Dynamic Digital Filter will track across the keyboard.



32 filter settings (including Filter Table type, x- and y-axis response settings, and LFO, EG and Scaling settings) can be named and stored in the TX16W's internal Filter Memory bank. For incredible sound-modeling potential, each of the 32 Timbres in a Voice can be assigned a different filter setting.

MIDI Flexibility for Total Control

The TX16W features an impressive MIDI specification which allows you to control it in an enormous number of configurations, for any musical situation.

For example, MIDI data can be independently received for each Voice within a Program (there are 16 MIDI channels available and the TX16W lets you assign up to 16 Voices in a Performance). You could, therefore, have music data stored on 16 separate MIDI channels in a QX5 Digital Sequence Recorder, which when played back will create the effect of a 16-piece orchestra.

In addition, reception of MIDI after touch, pitch bend and program change messages can be turned off, set to normal operation, or assigned to a selected “global” channel. For example, a MIDI guitar controller could be used to send note information on six separate MIDI channels (one for each string). At the same time, pitch bend changes received on the global MIDI channel would affect all six channels.

The MIDI Note On/Off function can be set so that the TX16W receives only odd or even note data. Using two TX16W's each loaded with the same Performance, you can create powerful 32-note polyphony by setting one TX16W to receive only odd-numbered MIDI notes, the other to receive only even-numbered MIDI notes.

Incoming Control Change data can be rerouted to various internal functions. Breath control, for instance, could be used to sustain notes.

Program change commands can be reassigned to any Performance number. For example, the Yamaha WX7 Wind MIDI Controller permits selection of programs 1 through 5. With this function you can assign any 5 of the TX16W's 32 Performances to be selected by program numbers 1 through 5.



TX16W Modes and Functions

PERFORMANCE SELECT

SYSTEM SETUP

Master Volume—Master Tune—MIDI Switch—Control Number Assign—Program Change—Device Number—Protect

PERFORMANCE EDIT

Voice Assign—Receive Channel—Output—Volume—Detune—LFO—Note Shift—External Trigger—Name

VOICE EDIT

Slot—Wave Assign—Filter Assign—Pitch—Velocity Curve—Amplitude EG—Pitch EG—LFO—Amplitude Modulation Sensitivity—Pitch Modulation Sensitivity—Velocity Bias Sensitivity—Pitch Bend—Timbre Name

FILTER EDIT

Table—Filter EG—Filter LFO—Key Scaling—LFO Modulation Sensitivity—Bias Sensitivity—Filter Name

WAVE EDIT

Load to Buffer—Trim—Loop—Loop Crossfade—Reverse—Mix—Wave Name

SAMPLE

Frequency—Level Set—Record

UTILITY

Store—Disk Load—Disk Save—Format—Init—Disk Copy—MIDI Dump

SPECIFICATIONS

-tone GENERATION METHOD, POLYPHONY

Linear conversion Advanced Wave Memory voice generation
Simultaneous Output Notes: 16
Simultaneous Output Voices: 16
Key Assign: Last note priority

INTERNAL MEMORY

Performance Memory: 32
Voice Memory: 32
Timbre Memory: 64
Filter Memory: 32
Wave Memory: 1.5 MBytes (maximum 6 MBytes, with 3 optional 1.5 MByte expansion boards)

A/D CONVERSION

12 bit linear (provides 72 dB dynamic range)

SAMPLING RATES

16.7 kHz, 33.3 kHz, 50.0 kHz (mono); 33.3 kHz (stereo)

FRONT PANEL DISPLAY

40-character, 2-line, back lit LCD

FRONT PANEL CONTROLS

Power switch
8 Function Select keys (with LEDs)
Data Entry keys (Ten-key pads 0-9, -, Cursor <, >, +1, -1, ENTER)
Line/Mic attenuation switch
Input volume control

TERMINALS

MIDI IN, OUT, THRU
MIXED OUTPUTS I/MIX, II
INDIVIDUAL OUTPUTS 1-8
HEADPHONES [output (L, R) from MIXED OUTPUTS I, II]
SAMPLE INPUT (stereo phone jack)
EXTERNAL TRIGGER INPUT
FOOT SWITCH
EXTERNAL PORT

POWER REQUIREMENTS AND CONSUMPTION

General Model: 220-240 V (50/60 Hz), 25 W
U.S. and Canadian Models: 120 V (50/60 Hz), 25 W

DIMENSIONS (W×H×D)

480×94×372 mm (18-7/8"×3-11/16"×14-5/8")

WEIGHT

6.8 kg (14 lb., 15 oz.)

STANDARD ACCESSORIES

MIDI Cable×1, System Disk, Data Disk×6, Stereo Adaptor (for stereo sampling input)

Specifications subject to change without notice.

OPTIONAL ACCESSORY



DBS Series Sound Sampling Data Bank disks—
Part of the continuously expanding library of sounds for the TX16W.

DBS Series Sound Sampling Voice List

No.	GROUP NAME	TITLE
101	KEYBOARD 1	PIANO 2
102	KEYBOARD 2	HARPSICHORD 1
103	KEYBOARD 3	CELESTA 1
201	STRINGS 2	UNISON 1
202	STRINGS 3	VIOLA & VIOLIN 1
203	STRINGS 4	C. BASS & CELLO 1
204	STRINGS 5	TREMOLO 1
205	STRINGS 6	PIZZICATO 1
206	STRINGS 7	HIT STRINGS 1
301	WOODWIND 1	FLUTE & PICCOLO 1
302	WOODWIND 2	FAGOTTO, ENGLISH HORN 1 & OBOE 1
303	WOODWIND 3	B. CLARINET & CLARINET
304	BRASS 2	TROMBONE & TRUMPET 1
305	BRASS 3	TUBA & HORN 1
306	BRASS 4	SECTION HORN 1
307	BRASS 5	CHORD SECTION 1
308	SAX 1	FOUR SAXES 1
309	SAX 2	BARITONE & TENOR 1
310	SAX 3	ALTO & SOPRANO 1

No.	GROUP NAME	TITLE
401	GUITAR 2	E. GUITAR LEAD 1
402	GUITAR 3	E. GUITAR CHORD 1
403	GUITAR 4	A. GUITAR LEAD 1
404	HARP 1	SCALE 1
405	HARP 2	PHRASE 1
501	CHOIR 2	POPS VOICE 1
601	DRUM 1	KIT 1
602	DRUM 2	KIT 2
603	TUNED PERCUSSION 1	VIBRAPHONE 1
604	TUNED PERCUSSION 2	MARIMBA 1
605	TUNED PERCUSSION 3	GLOCKEN 1
606	TUNED PERCUSSION 4	TIMPANI & GONG
607	TUNED PERCUSSION 5	TUBULAR BELLS 1 & STEEL DRUMS 1
608	PERCUSSION 1	LATIN 1
609	PERCUSSION 2	WIND CHIME & HANDBELL
610	PERCUSSION 3	CYMBALS & GRAN CASSA
701	ETHNIC 1	SHAMISEN 1
702	ETHNIC 2	KOTO 1
703	ETHNIC 3	PHRASE 1
801	SOUND EFFECT 1	NATURE 1
802	SOUND EFFECT 2	ANIMALS & HUMANS 1
803	SOUND EFFECT 3	MACHINE 1

YAMAHA
YAMAHA CORPORATION
P.O. Box 1, Hamamatsu, Japan