

YAMAHA

DX27
DX27S

DIGITAL PROGRAMMABLE ALGORITHM SYNTHESIZER
SYNTHÉTISEUR NUMÉRIQUE À ALGORITHMES
PROGRAMMABLES

DIGITAL PROGRAMMIERBARER ALGORITHMUS
SYNTHESIZER

OWNER'S MANUAL
MANUEL D'UTILISATION
BEDIENUNGSANLEITUNG

CONGRATULATIONS!

Your Yamaha DX27/27S Digital Programmable Algorithm Synthesizer incorporates state-of-the-art digital FM tone generation technology, providing extraordinarily vibrant, rich voices and outstanding playability. The DX27/27S has a programmable 24-voice INTERNAL memory (RAM) from which any voice can be selected at the touch of a button, two 96-voice PRESET ROM memories (a total of 192 fine preset voices!), a 96-voice BANK memory that permits storage of PRESET voices in any configuration for one-touch selection, and a cassette interface that permits unlimited storage of FM voices. Of course, the DX27/27S is fully programmable, allowing you to create your own FM voices or sound effects. Broad MIDI compatibility is also provided so the DX27/27S can control or be controlled via other MIDI-compatible music equipment.

Additionally, the DX27S features a built-in stereo amplifier and speaker system so you can simply switch-on and play!

To ensure that you gain maximum benefit from all the performance and flexibility provided by the DX27/27S, we urge you to read this owner's manual thoroughly while actually trying out all of the available functions.

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PRECAUTIONS

1. Location

Avoid locations exposed to direct sunlight or other sources of heat. Also avoid locations subject to vibration, excessive dust, cold or moisture.

2. Cleaning

Do not attempt to clean the exterior with chemical solvents, this may damage the finish. Clean with a soft, dry cloth.

3. Service and Modifications

Do not open the DX27/27S or attempt to make your own repairs or modifications to any part of the instrument. Such actions may not only result in electrical shock or damage, but will also void the product warranty. Refer all servicing to a qualified Yamaha service center.

4. Relocation

When moving the instrument be sure to unplug the AC mains cord as well as all other connecting cables.

5. Handling

Avoid applying excessive force to switches and slide controls, dropping or rough handling. The DX27/27S is ruggedly constructed using reliable solid-state circuitry, but it is still a fine instrument and should be treated with care.

6. Electrical Storms (Lightning)

Digital circuitry, such as that used in the DX27/27S, is sensitive to voltage spikes and surges. Because of this, the DX27/27S should be turned off and unplugged from the AC power outlet in the event of an electrical storm.

7. Electromagnetic Fields

Digital circuitry is also sensitive to electromagnetic fields such as those produced by television sets, radio receivers, transmitters, transceivers, etc. The DX27/27S should be kept several feet away from any such sources in order to prevent possible random malfunctions.

CHAPTER I: SETTING UP

1. Audio Outputs

The DX27 has a single monaural audio OUTPUT jack. The line-level signal from this jack can be fed to an instrument amplifier, sound reinforcement mixing console or recording console.

The DX27S has dual audio outputs: OUTPUT I and OUTPUT II. Since the DX27S features a true stereo Chorus effect, these outputs should be connected to separate channels of a stereo sound system to get the best chorus sound. OUTPUT I can be used as a monaural output if desired. Of course, there's no need to use the audio outputs at all if you will be using the DX27S internal speaker and amplifier system.

2. Speaker Switch (DX27S only)

The SPEAKER switch on the DX27S rear panel turns the internal speaker system on or off. Although this switch may be OFF when external amplification is used, make sure it is ON if you intend to use the internal amplifier and speaker system.

3. Optional Foot Switch

The FOOT SW phone jack is for an optional footswitch. It accepts a Yamaha FC-4 or FC-5 footswitch or equivalent for portamento/sustain control; press for sustain or portamento release to damp or turn portamento off.

4. Optional Foot Controller (DX27S only)

An optional Yamaha FC7 Foot Controller can be connected to the DX27S rear-panel FOOT VOL jack to provide foot volume control.

5. Optional BC-1 Breath Controller

Yamaha's unique BC-1 breath controller is plugged into the mini-jack on the rear panel.

6. Headphones

The PHONES jack accepts any standard pair of stereo headphones. The audio signal is sent to the headphones in mono (DX27) or in stereo (DX27S). Headphone volume is controlled by the VOLUME control on the top panel.

7. MIDI Terminals

These terminals are used when connecting the DX27/27S to other MIDI (Musical Instrument Digital Interface) compatible equipment such as digital sequence recorders, modular FM voice generators, drum machines, etc. The MIDI OUT terminal transmits MIDI data from the DX27/27S to other MIDI equipment. The MIDI OUT terminal will normally be connected to the MIDI IN terminal of the receiving equipment. The MIDI IN terminal receives MIDI data from external MIDI equipment such as a digital sequence recorder, music computer or modular FM voice generator. The DX27/27S's MIDI IN terminal will normally be connected to the MIDI OUT terminal of the transmitting equipment. The MIDI THRU terminal re-transmits the data received at the MIDI IN terminal. Thus, data received via the DX27/27S MIDI IN terminal can be simultaneously sent to other MIDI equipment.

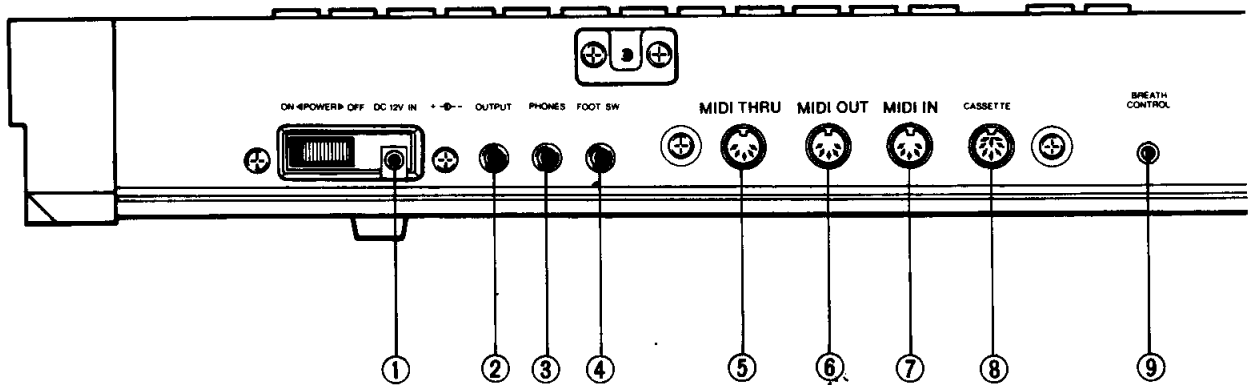
8. Cassette

The DIN connector end of the supplied cassette cable is plugged into the DX27/27S CASSETTE connector. The three plugs on the other end of the cable should be connected to a cassette data recorder (the kind normally used with personal

Move the cursor to the next character position and enter the next character as described above. When your new ID message is complete, simply press any button other than the KEY SHIFT, DATA ENTRY, STORE or FUNCTION buttons to enter the normal operation mode. The new ID message you have entered will now be displayed every time you turn the instrument ON.

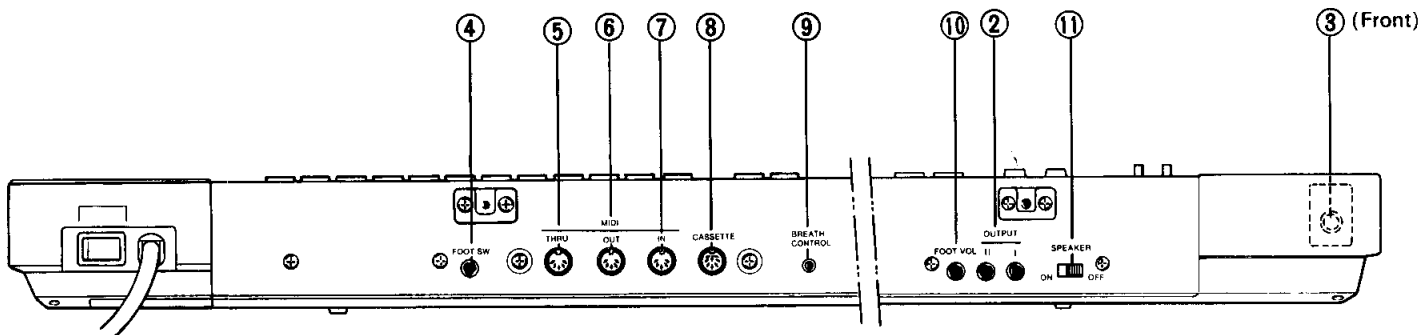
DX27/27S CONNECTIONS

DX27



- | | | |
|--------------------------------|---|-------------------------|
| ① AC ADAPTOR (PA-1210) | ④ ON/OFF FOOTSWITCH | ⑧ BLACK (not used) |
| ② MIXER OR STEREO SOUND SYSTEM | ⑤ DIRECT OUTPUT OF SIGNAL RECEIVED AT MIDI IN | WHITE (EAR) |
| ③ STEREO OR MONO HEADPHONES | ⑥ TO MIDI EQUIPMENT | RED (MIC) |
| | ⑦ FROM MIDI EQUIPMENT | ⑨ BC1 BREATH CONTROLLER |
| | | ⑩ FOOT VOL |
| | | ⑪ SPEAKER |

DX27S



1. DX27/27S Voice Memory Configuration

The DX27/27S has three different voice memories which serve different purposes. They are:

The 24-voice INTERNAL memory.

This voice memory is used for quick selection of voices for performance, and it is to this memory that original voices you have edited or programmed are initially stored. Cassette LOAD and STORE operations are also carried out to and from the 24-voice INTERNAL memory. Voices from the 192-voice PRESET memory may also be stored in the INTERNAL memory.

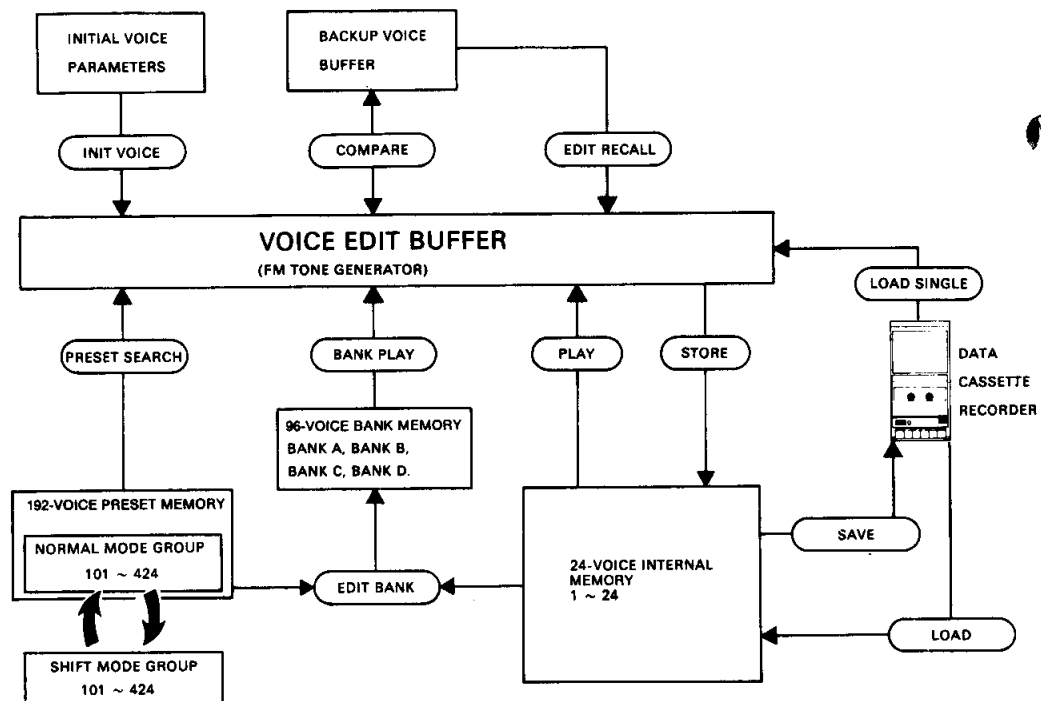
The 96-voice BANK memory (4 BANKS x 24 voices each).

The BANK memory incorporates four 24-voice BANKS—A, B, C and D. The BANK is most useful for storing groups of voices you have arranged for specific purposes. The different banks may be programmed with different voice groups you need for different "sets" in a performance, or you can categorize your voices into BANKs (i.e. piano-type voices in one bank, brass in another, etc.), or any combination you like. The BANK can be loaded with voices from the PRESET memory (described below) or from the INTERNAL memory using the EDIT BANK function.

The 192-voice PRESET memory.

This is a read-only memory which contains 192 FM voices. These are organized into two groups of 96 voices each. The first group is accessible in the NORMAL mode, while the second group is accessed in the SHIFT mode (these modes will be described below). These voices may be selected and stored in the BANK or INTERNAL memories as desired. They can also be directly accessed and played using the PRESET SEARCH function.

The chart below shows the overall DX27/27S voice memory configuration. The VOICE EDIT BUFFER is a special memory into which a voice is placed when selected. Whether a voice is selected from the INTERNAL memory, the BANK memory, or the PRESET memory, it is placed in the VOICE EDIT BUFFER where it can be played, edited, stored in another memory location or saved on cassette.

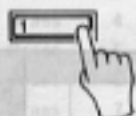


NOTE:

The voices in the PRESET memory are numbered as follows: each group of 96 voices—the NORMAL group and the SHIFT group—is further subdivided into four groups of 24 voices each (101–124, 201–224, 301–324, and 401–424). Thus you have NORMAL group voices 101–424, and SHIFT group voices 101–424.

2. The INTERNAL PLAY Mode

To access the 24-voice INTERNAL memory, enter the INTERNAL PLAY mode by pressing the INTERNAL PLAY button. Next, select a voice from the INTERNAL memory by pressing the corresponding voice selector button (1–24). At this point, the LCD display will indicate the voice number and voice name. These are preceded by a "P," indicating that the INTERNAL PLAY mode has been selected.



P 1 Ivory Ebony

In this mode, you can play any of the voices currently in the DX27/27S's 24-voice INTERNAL memory individually.

3. The BANK PLAY Mode

The BANK PLAY mode enables you to access the 96 BANK memory locations. These initially contain the first group of 96 voices from the 192-voice PRESET ROM. By using the SHIFT mode, however, you can also access the second group of presets while in the BANK PLAY mode. Later, you can store any voices you like in any order in any of the BANKS.

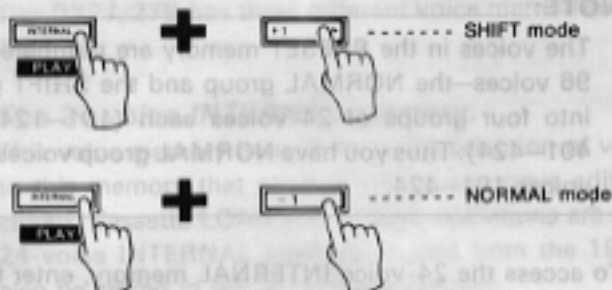
While in the INTERNAL PLAY mode, press any of the BANK buttons; BANK A—BANK D. This will select the appropriate BANK, and the 24 voices in that bank can be selected by pressing any of the DX27/27S's 24 voice buttons.

PA 2 Uprt piano

The SHIFT Mode

By entering the DX27/27S SHIFT mode while in BANK PLAY, the correspondingly numbered voice from the second (SHIFT) group of preset voices will be selected. Note that in the BANK PLAY mode this only applies to voices which have been stored in the BANK memory from the 192-voice PRESET memory. Voices stored in the BANK from the 24-voice INTERNAL memory will not change when the SHIFT mode is selected.

To enter the SHIFT mode, hold down the INTERNAL PLAY button and press the +1 button. To return to the NORMAL mode hold down the INTERNAL PLAY button and press the -1 button.



4. The 192-Voice PRESET Memory

The DX27/27S comes with 192 different pre-programmed voices in an internal ROM (Read Only Memory). These voices can be loaded individually into the DX27/27S's selectable 24-voice INTERNAL memory, or into any location in the DX27/27S BANK memory.

THE 192 PRESET ROM VOICES NORMAL MODE VOICES

Group 1		Group 2		Group 3		Group 4	
01 IvoryEbony	Piano	01 Solid Bass	Bass	01 Easy Synth	Comping	01 Glocken	Percussion II
02 Uprt piano		02 SyntheBass		02 Easy Clav		02 Hamarimba	
03 HonkeyTonk		03 Mono Bass		03 >>WOW<<		03 SteelDrums	
04 Elec Grand		04 Elec Bass		04 Metal Keys		04 Tube Bells	
05 Pianobells		05 Fretless		05 PickPluck		05 Templegong	
06 Acous Elec		06 Horns		06 S/H Synth		06 Good Vibes	
07 OldElectro	E.P.	07 Flugelhorn	Brass	07 Heavysynth	Lead Synth	07 Racing Car	Effects I
08 NewElectro		08 Hard Brass		08 Harnosolo		08 Helicopter	
09 High Tines		09 Power Brass		09 Feed Lead		09 Alarm Call	
10 Wood Piano		10 BC1Trumpet		10 Mono Lead		10 Dopplar FX	
11 Vibrabelle	Organ	11 Strings	Strings	11 Lyrissy	Lead Acoustic	11 Storm Wind	Effects II
12 Pianobrass		12 Silk Cello		12 Schmooh		12 Birds	
13 Jazz Organ		13 Orchestra		13 Claranette		13 Hole in 1	
14 Ham(n)Eggs		14 SoloViolin		14 Pan Floot		14 <<Smash>>	
15 Club Organ		15 Box Cello		15 Lead Reed		15 FM SQUARE	
16 <6 Tease>		16 Richstring		16 Mono Sax		16 FM PULSE	
17 GentlePipe	17 5th String	17 Flutewood	17 FMSAWTOOTH				
18 Full Ranks	Plucked Strings	18 Harpsi low	Other KBD	18 <BC1> Sax	Percussion I	18 LFO NOISE	Effects II
19 Plukguitar		19 Harpsi Hi		19 BCL Hrmnca		19 PINK NOISE	
20 Soft Harp		20 Fuzz Clav		20 Timpani		20 Windbells	
21 Jazz Guit		21 Clear Clav		21 Xylosnare		21 Synvox	
22 Old Banjo		22 Squeezebox		22 Synballs		22 Whistling	
23 Kotokoto		23 Celeste		23 Clockwerks		23 Voices	
24 Folk Guit		24 Circustime		24 HeiferBell		24 Mars to ??	

SHIFT MODE VOICES

Group 1		Group 2		Group 3		Group 4	
01	Piano 1	01	Clickorgan	01	Rich Strg 1	01	Snare Bass
02	Piano 2	02	Drawbars	02	Rich Strg 2	02	SnareDrum 1
03	Piano 3	03	Guitar 2	03	Rich Strg 3	03	SnareDrum 2
04	Piano Vel	04	Fuzz Guit	04	Pizzicato	04	Tom Toms
05	Honkeyton2	05	Brit Guitar	05	Harpicord 1	05	SteelDrum 2
06	Deep Grand	06	Zither	06	Harpicord 2	06	Synth Perc
07	PhaseGrand	07	Harp 1	07	Clav 1	07	Xylophone 1
08	Left Hand	08	Lute	08	Clav 2	08	Xylophone 2
09	Elec Grnd 2	09	Sitar	09	Mute Clav 1	09	Marimba
10	E Grnd Vel	10	SynthBass 1	10	Mute Clav 2	10	Mamarimba
11	E Piano 1	11	SynthBass 2	11	LeadSynth 1	11	Glocken 2
12	E Piano 2	12	Pluck Bass	12	Cheeky	12	Vibe
13	E Piano 3	13	Flap Bass	13	RubberBand	13	TublarBell
14	E P String	14	Uprt Bass	14	Hollowlead	14	BellsBells
15	Hard Tines	15	Brass 1	15	Huff Talk	15	Wild War II
16	PercoPiano	16	Brass 2	16	Harmonica 1	16	YS 11
17	Organ 1	17	Brass 3	17	Harmonica 2	17	Wave
18	Organ 2	18	Brass 4	18	Horn	18	Winds
19	Elec organ	19	Brass 5	19	Flute 1	19	Shogakko
20	16 8 4 2 F	20	Brass 6	20	Flute 2	20	Fantasy
21	Theater	21	Brass 7	21	Oboe	21	SpaceChime
22	Small Pipe	22	Strings 1	22	Trombone	22	Ghosties
23	Mid Pipe	23	Strings 2	23	BC1 Horns	23	Space Talk
24	Big Pipe	24	Strings 3	24	Bassoon	24	Zing Plop

The PRESET voice can also be accessed directly and played using the PRESET SEARCH function.

PRESET SEARCH

This function allows you to directly access the voices in the PRESET memory in the order they appear in the PRESET memory.

PRESET SEARCH is accessed in the FUNCTION mode. To enter the FUNCTION mode, press the FUNCTION button. Then press any of the PRESET SEARCH selectors to access the corresponding voices (these are the same as the BANK A–D selectors used in the BANK PLAY mode). In the NORMAL (NON-SHIFT) mode, the PRESET SEARCH selectors call PRESET voice groups 101–124, 201–224, 301–324, and 401–424 from the NORMAL preset voice group. In the SHIFT mode (described previously in "The BANK PLAY Mode"), the correspondingly numbered voices from the SHIFT preset voice group are selected. The 24 voices in each group are selected by pressing the corresponding voice selector. After selecting PRESET SEARCH 101–124, for example, the LCD will appear as follows:

F301 Easy Synth

"F" indicates that you are in the FUNCTION mode PRESET SEARCH function.

This function lets you review the voices in the PRESET memory. It is also possible to store a voice selected in this mode into any of the 24-voice INTERNAL memory locations by using the STORE function described later in this manual.

CHAPTER III: THE FUNCTION MODE

The FUNCTION mode permits access to four groups of functions: tuning functions, MIDI functions, memory management functions, and performance functions. In this chapter, we'll describe each of these functions; what they do and how they are programmed.

1. Accessing the FUNCTION Mode

The FUNCTION mode is selected by pressing the FUNCTION button. Individual parameters to be programmed are then called by pressing the appropriate voice button. Note that when the FUNCTION mode is active, pressing a voice button calls the corresponding FUNCTION parameters, not the corresponding voice. The available functions are printed in brown below each voice button. Two additional functions, the MODE SET and KEY SET buttons are NOT included among the voice buttons; these function buttons are located immediately above the DATA ENTRY -1 and +1 buttons.

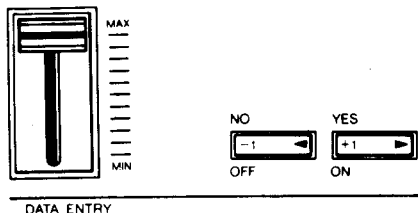
When the FUNCTION mode is selected, the LCD should look something like this.

A rectangular LCD display showing the text "F M. Tune = 0". The "F" is in the first character position, indicating FUNCTION mode is active. "M. Tune" is the name of the selected function, and "0" is the current data value.

The "F" in the first character position of the LCD indicates that the FUNCTION mode is active. Following the "F" is the name of the selected function and its current data. In the example above, the MASTER TUNE function is selected (press the 1 button), and the data is currently set at 0.

2. Entering Function Data

Once the desired function has been selected, its value can be changed by using either the linear DATA ENTRY slider located to the left of the panel, or the adjacent -1/+1 buttons.



Moving the DATA ENTRY slider away from you increases the value of the selected parameter, and moving the control towards you decreases the data value. Pressing the -1 button decreases the value of the selected parameter by one, and pressing the +1 button increases the value by one. While the DATA ENTRY slider is valuable for quickly approaching the desired value of parameters that have a large data range, the +1 and -1 buttons permit precise step-wise location of a specific value. The switches are also easier to use with parameters that only have two values (i.e. ON or OFF). In some cases, you will be required to answer YES or NO to prompts that appear on the LCD display. The -1/+1 buttons are used for this purpose.

3. The Performance Parameters

"Performance parameters" are programmable parameters which pertain mainly to real-time performance effects, such as how the Pitch Bend and Modulation Wheels affect the sound. After a function is selected using the corresponding button, it can be incremented by continuing to press the same button.

* Note that performance parameters 13 through 24 can be set differently for each individual voice. Once you have changed any of these function parameters for a particular voice, you can save your new settings with the INTERNAL voice by using the STORE function. (see *CHAPTER IV: VOICE PROGRAMMING*, 4. Storing Voice Data).

13: POLY/MONO



This function selects either the POLY or MONO output mode. Voices programmed with the POLY mode will let you play up to 8 notes. In the MONO mode, the DX27/27S acts as monophonic keyboard.

Once the POLY/MONO function is selected, subsequent presses of button #13 will alternate between the POLY and MONO modes. The DATA ENTRY buttons can also be used; the -1 button selects POLY and the +1 button selects MONO.

14: PITCH BEND RANGE



This function sets the pitch range of the Pitch Bend Wheel located at the upper left of the DX27/27S panel. The Pitch Bend Wheel automatically centers at normal pitch. Moving the Wheel upward (away from the player) will raise the pitch, and moving it downward (toward the player) will lower the pitch. These pitch bend directions can also be reversed by holding down the PITCH B MODE button while switching the DX27/27S power ON. This provides the same depth of effect but in the opposite direction of wheel movement. This can be useful in performance situations.

The data range is from 0 to 12. At 0, the Pitch Bend Wheel is off and will have no effect. Each increment between 1 and 12 represents a semitone (i.e. the pitch variation between any white key and a black key immediately next to it). Thus, if this function is set to 12, maximum travel of the Pitch Bend Wheel either above or below its center position will produce a one-octave pitch variation.

The DATA ENTRY slider and -1/+1 buttons can be used to enter the data. Once the PITCH BEND RANGE function is called, subsequent presses of button #14 will increment (increase) the data value.

P B MODE: MODE SET



This function button, located immediately above the DATA ENTRY -1 button, offers a choice of three Pitch Bend Wheel modes: Low, High and Kon. In the Low mode, the Pitch Bend Wheel affects only the lowest note played on the keyboard. In other words, if a chord is played, the Pitch Bend Wheel will affect only the pitch of the lowest note in the chord—this makes it possible to produce some interesting effects. The High mode is just the opposite, only the highest note played will be affected by the Pitch Bend Wheel. In the Kon (Key on) mode, all notes played are affected by the Pitch Bend Wheel.

The DATA ENTRY slider, the -1/+1 buttons and the PB MODE button can be used to select the desired mode.

NOTE:

The PB MODE parameter is NOT individually programmable for each voice.

15: PORTAMENTO MODE

Two different portamento modes are available: Full Time Portamento and Fingered Portamento. When the POLY/MONO function (button #13) is set to POLY, only the Full Time Portamento mode is accessible. In the MONO mode, however, you have a choice between the Full Time and Fingered portamento modes.

- (1) "Full T. Porta" (MONO and POLY modes): A conventional portamento effect in which portamento occurs whenever a new note is played.
- (2) "Fingered Porta" (MONO mode): Portamento only occurs if the previously played note is held while the next note is played. This mode is useful in recreating the effect of guitar string bending techniques, acoustic bass or bass guitar slide effects, etc. If you lift your hand off the DX27/27S keyboard between notes, there will be no portamento effect.

Once the PORTAMENTO MODE function is called, subsequent presses of button #15 will alternate between the two available portamento modes (provided that the MONO mode is selected). The DATA ENTRY slider and -1/+1 buttons can also be used to select the desired portamento mode.

16: PORTAMENTO TIME

This function sets the speed of the portamento effect.

The data range is from 0 to 99. At 0, the portamento is off. A setting of 99 will produce the longest portamento effect.

Data can be entered using the DATA ENTRY slider and -1/+1 buttons. Once the PORTAMENTO TIME function has been called, subsequent presses of button #16 (PORTAMENTO TIME) will increment the data value.

17: FOOT SWITCH ASSIGN (DX27)

Note that the operation of button #17 differs slightly on the DX27 and DX27S. On the DX27 it determines whether the Yamaha FC4 or FC5 footswitch plugged into the rear panel FOOT SW jack will function as a SUSTAIN or PORTAMENTO pedal. The desired mode is selected using the +1/-1 buttons. When PORTAMENTO is selected, the footswitch can be used to turn the PORTAMENTO effect ON or OFF: press ON, release OFF. The PORTAMENTO effect parameters must be set using the PORTAMENTO MODE and PORTAMENTO TIME buttons (#15 and #16). In the SUSTAIN mode, the footswitch will sustain notes to the limit set by the envelope generator's D2R parameter (see *CHAPTER IV: ENVELOPE GENERATOR*, 18: D2R) when it is set to a rate other than 0, even after the keys have been released. If the EG D2R parameter is set to 0, then the D1L level will be held until the footswitch is released.

17: FOOT SWIFoot VOL (DX27S)



FOOT SW/
FOOT VOL

This function sets the operation of an FC4 or FC5 footswitch connected to the rear-panel FOOT SW jack, and an FC7 foot controller connected to the rear-panel FOOT VOL jack. Successive presses on the #17 button alternate between FOOT SW or FOOT VOL programming.

In the FOOT SW mode you can select either SUSTAIN or PORTAMENTO, setting the footswitch to turn the selected effect ON and OFF. The PORTAMENTO function parameters can be adjusted using the PORTAMENTO MODE and PORTAMENTO TIME buttons (#15 and #16, respectively). When SUSTAIN is selected the footswitch will sustain notes played to the limit set by the ENVELOPE GENERATOR's D2R parameter (see *CHAPTER IV: ENVELOPE GENERATOR*, 18: D2R) when it is set to a rate other than 0. If the D2R parameter is set to 0, then the D1L level will be maintained until the footswitch is released.

In the FOOT VOL mode the data entry controls can be used to select a value from 0 to 99. The value selected sets the minimum volume level produced with the FC7 foot controller connected to the FOOT VOL jack in the minimum position. If set to 0, the foot controller will produce no change in volume (volume will always be maximum). At 99, maximum volume variation will be produced—from no output at the minimum foot controller position to maximum volume.

18: MODULATION WHEEL RANGE, PITCH.



PITCH
WHEEL RANGE

As you move the DX27/27S Modulation Wheel away from you, an increasing amount of LFO (Low Frequency Oscillator) modulation is applied to the selected voice. The LFO modulation can be made to modulate the pitch of the voice, producing a range of vibrato type effects. The WHEEL RANGE, PITCH function is used to set the maximum depth of pitch modulation which can be applied using the Modulation Wheel. The actual effect produced depends on the settings of the LFO parameters (these will be discussed in *CHAPTER IV: VOICE PROGRAMMING*). Note, however, that the appropriate voice PITCH MODULATION SENSITIVITY parameter must be set to a value higher than 0 for pitch modulation to be effective. (The voice PITCH MODULATION SENSITIVITY parameter will also be discussed in *CHAPTER IV*.) The data range is from 0 to 99. At 0, pitch modulation is OFF, and moving the Modulation Wheel will cause no pitch modulation to be applied to the voice. A setting of 99 will produce the greatest possible pitch modulation depth.

Data is entered using the DATA ENTRY slider or buttons. Once this function is called, subsequent presses of button #18 will increment the data value.

NOTE:

Modulation Wheel control direction is reversed along with the Pitch Bend Wheel when the PITCH B MODE SET button is pressed while turning on the power to the DX27/27S.

19: MODULATION WHEEL RANGE, AMPLITUDE



The LFO modulation can also be made to modulate the amplitude (level) of specified voice elements (operators), producing a range of tremolo or timbre modulation (wah-wah) type effects. The WHEEL RANGE; AMPLITUDE function is used to set the maximum depth of amplitude modulation that can be applied by using the Modulation Wheel. The actual effect produced depends on the settings of the LFO parameters (discussed in *CHAPTER IV: VOICE PROGRAMMING*). The appropriate voice AMPLITUDE MODULATION SENSITIVITY parameter must be set to a value higher than 0 for amplitude modulation to be effective. (The voice AMPLITUDE MODULATION SENSITIVITY parameter will also be discussed in *CHAPTER IV*.)

The data range is from 0 to 99. At 0, amplitude modulation is OFF, and moving the Modulation Wheel will cause no amplitude modulation to be applied to the voice. A setting of 99 produces the greatest possible amplitude modulation depth.

Data is entered using the DATA ENTRY slider or buttons. Once this function is called, subsequent presses of button #19 will increment the data value.

The Yamaha Breath Controller

The optional Yamaha BC-1 Breath Controller is a unique way of adding musical expression as you play the DX27/27S keyboard. The BC-1 is held in the mouth just like the mouthpiece of a wind instrument. Blowing harder or softer into the BC-1 mouthpiece produces a corresponding effect. The Breath Controller can be used to apply varying amounts of pitch or amplitude LFO modulation, just like the Modulation Wheel. In addition, it can be set up to directly affect the pitch, amplitude or timbre in response to breath pressure. When used to directly affect amplitude (EG BIAS), for example, the Breath Controller can be used to add realistic tonguing effects to brass and other wind instrument sounds.

The four BREATH parameters listed below determine just how the Breath Controller will affect the DX27/27S's sound. These parameters may be set individually, or combined for more complex effects.

20: BREATH RANGE, PITCH



This function is used to set the maximum depth of the LFO pitch modulation that can be applied by using the Breath Controller. The actual effect produced depends on the settings of the LFO parameters (discussed in *CHAPTER IV: VOICE PROGRAMMING*). Note, however, that the appropriate voice PITCH MODULATION SENSITIVITY parameter must be set to a value higher than 0 for pitch modulation to be effective. (The voice PITCH MODULATION SENSITIVITY parameter will be discussed in *CHAPTER IV: VOICE PROGRAMMING*.)

The data range is from 0 to 99. At 0, the pitch modulation is OFF, and applying breath pressure to the Breath Controller will have no effect. A setting of 99 will produce the greatest possible pitch modulation depth.

Data is entered using the DATA ENTRY slider and -1/+1 buttons. Once this function is called, subsequent presses of button #20 will increment the data value.

21: BREATH RANGE, AMPLITUDE



This function is used to set the maximum depth of the LFO amplitude modulation that can be applied by using the Breath Controller. It works exactly like the previous instructions for setting the LFO pitch modulation (20: BREATH RANGE, PITCH) except that this function affects amplitude.

22: BREATH RANGE, PITCH BIAS

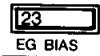


This function uses the breath pressure applied to the BC-1 Breath Controller to directly control the pitch of the voice. In other words, the LFO has no effect. Only your breath pressure directly affects the pitch of the voice.

The data range is from 0 to 99. At 50, pitch bias is OFF. A setting of 99 will allow the Breath Controller to raise the pitch 4-octaves, and a setting of 0 will allow it to lower the pitch 4-octaves.

Data is entered using the DATA ENTRY slider and -1/+1 buttons. Once this function is called, subsequent presses of button #22 will increment the data value.

23: BREATH RANGE, EG BIAS



This function uses the breath pressure applied to the BC-1 Breath Controller to directly control the amplitude or timbre of the voice, according to settings of the corresponding voice parameters which will be covered in *CHAPTER IV*. The LFO has no effect—only your breath pressure directly affects the amplitude or timbre of the voice.

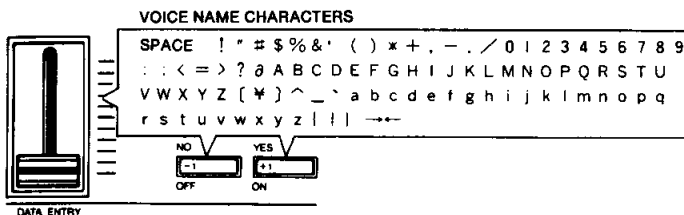
The data range is from 0 to 99. At 0, EG bias is OFF. A setting of 99 allows the greatest amplitude or timbre variation to be produced by the Breath Controller.

Data is entered by using the DATA ENTRY slider and -1/+1 buttons. Once this function is called, subsequent presses of button #23 will increment the data value.

24: VOICE NAME



This function moves the LCD cursor from left to right, allowing you to name any new voice or sound you have created before storing it. When button #24 is pressed, the cursor flashes over the first letter in the name of the voice presently occupying a space in the INTERNAL memory. The DATA ENTRY slider or -1/+1 buttons are used to move through the selectable characters (A to Z) and symbols, while subsequent presses of the the VOICE NAME CURSOR button will move the LCD cursor to the immediate right.



KEY SET



During either of the normal DX27/27S play modes, pressing the KEY SHIFT button instantly transposes the pitch of the entire DX27/27S keyboard up or down to the key that was programmed using this function. When KEY SHIFT is engaged, the letter "K" will appear as the first character in the LCD display until the KEY SHIFT button is pressed again, returning the keyboard to normal pitch.

To set or program the key that the DX27/27S will transpose to when the KEY SHIFT button is pressed in either play mode, enter the FUNCTION mode and press KEY SET.

The transpose range for the KEY SHIFT function is up or down two octaves. The data range is from -24 to +24, with 0 corresponding to standard keyboard pitch. Each increment corresponds to a shift in pitch of one semitone—a setting of 2 would raise the pitch of the entire keyboard up a whole step.

Immediately after calling the KEY SET function, data can be entered simply by pressing any key on the keyboard. The pressed key then assumes the pitch of C3, and all other keys are adjusted accordingly. Pressing the A2 key, for example, will produce a setting of -3. Pressing the C5 key, will result in a setting of +24. Subsequent changes can be made using the DATA ENTRY slider or -1/+1 buttons, or you can continue to select new keys from the keyboard provided that you press the KEY SET button first each time.

NOTE:

The KEY SET function is not individually programmable for each voice.

4. Tuning Functions

1: MASTER TUNE ADJ



This is the DX27/27S MASTER TUNE function. All voices are affected simultaneously.

The programmable data range is from -64 to +63. When set at 0, the pitch of the A3 key is the standard 440 Hz. At the lowest setting (-64), the overall pitch of the keyboard is 100 cents (1 semitone) lower than standard pitch. At the highest setting (+63), the overall pitch of the keyboard is 100 cents higher than standard pitch.

Use the DATA ENTRY slider or -1/+1 buttons to enter the data for this parameter. Once the MASTER TUNE function is called, subsequent presses of button #1 will increment the data value.

5. Memory Management Functions

The Memory Management functions include functions for loading voices from the DX27/27S's 192-voice PRESET memory, for storing and loading the 24 INTERNAL memory voices to and from cassette tape, initializing the voice memory, recalling voice data from a special "safety" buffer memory, and turning the DX27/27S memory write/protect function ON and OFF.

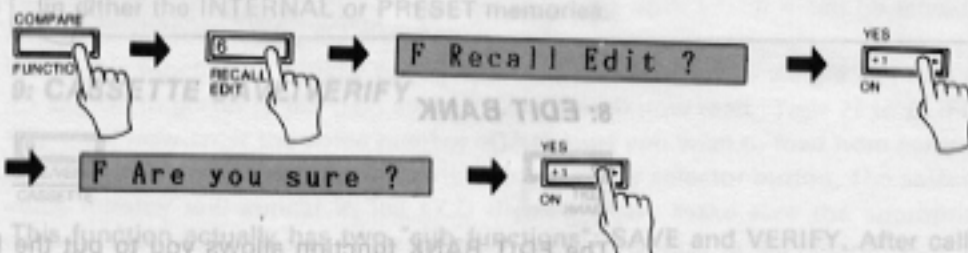
6: RECALL EDIT



In addition to the voice edit buffer, the DX27/27S has a special edit recall buffer memory which maintains the last edited voice data. If after editing or creating a

new voice, you inadvertently call new data into the voice edit buffer (by pressing one of the voice selector buttons) before storing the edited voice data, the voice in the edit buffer that you had spent so much time editing will be replaced with the new data. If you only make the mistake once, you can recover the edited data from the backup voice buffer and put it back into the voice edit buffer by using this function.

To do this, first press the FUNCTION button, and then the RECALL EDIT button. The LCD will read "Recall Edit ?" Confirm your intention to recall the data into the voice edit buffer by pressing the +1 button. The DX27/27S will again respond, this time with "Are you sure ?" Press the +1 button again to actually execute the recall edit function. The EDIT mode will then be entered, and the voice edit buffer will contain the data called from the backup voice buffer. Pressing another function button, the PLAY mode button, or the EDIT mode button during the above process will abort the RECALL EDIT function.



7: INIT VOICE



This function sets all voice parameters in the voice edit buffer to their "initialized" values, permitting voice programming from an effectively neutral set of values—a "clean slate."

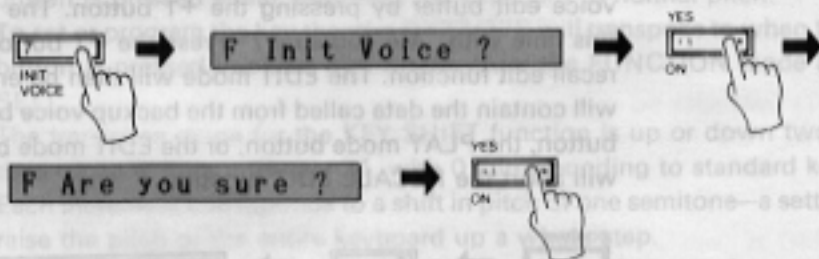
ALGORITHM	FEEDBACK	WAVE	SPEED	DELAY	LFO	PWD	AMD	SYNC	PITCH	AMPLITUDE	EG BIAS	KEY VELOCITY	AME	OP
1	0	triangl	35	0	0	0	off	6	0	0	0	0	0	4
2	0												0	3
3	0												0	2
4	0												0	1

OP	FREQ RATIO	DETUNE	AR	DR	DL	DR	FR	OUT LEVEL	RATE	LEVEL	TRANSPOSE	(CHORUS)
4	1.00	0	31	31	15	0	15	0	0	0		
3	1.00	0	31	31	15	0	15	0	0	0	C3	(off)
2	1.00	0	31	31	15	0	15	0	0	0		
1	1.00	0	31	31	15	0	15	90	0	0		

OSCILLATOR		ENVLOPE GENERATOR				OPERATOR		KEYBOARD SCALING		BREATH RANGE	
POLY/MONO	PITCH BEND RANGE	PORTAMENTO MODE	PORTAMENTO TIME	FOOT SW ASSIGN (VOL)	WHEEL RANGE PITCH	WHEEL RANGE AMPLITUDE	PITCH	AMPLITUDE	PITCH BIAS	EG BIAS	
Poly	4	Full T. Porta	0	Sus/100	50	0	0	0	50	0	

() = DX27S only

When this function is called, the LCD will read "Init Voice?" Confirm your intention to initialize the voice edit buffer by pressing the +1 button. The DX27/27S will then ask you to reconfirm your intention to initialize the voice with "Are you sure?" Press the +1 button again to actually execute the initialize operation. Once executed, the DX27/27S will automatically enter the EDIT mode, ready for voice programming. Pressing another function button, the PLAY mode button, or the EDIT mode button prior to the final step in the above process will abort the voice initialize function.



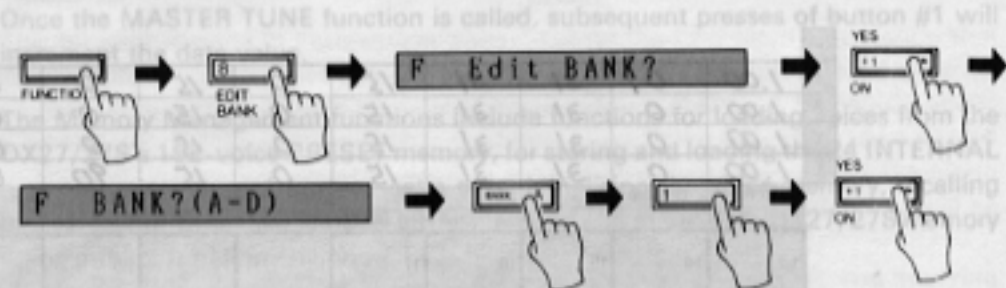
8: EDIT BANK



The EDIT BANK function allows you to put the PRESET voices (normal or shift mode) and the 24 INTERNAL memory voices into any of the 96 BANK memory locations, in any order you desire. In PRESET memory, the voices are immovable. If, for example, you want to have 10 specific voices all in consecutive memory locations (for convenience and for ease of selection during a performance) you could use the EDIT BANK function to place your 10 voices in locations 1-10 in BANK A.

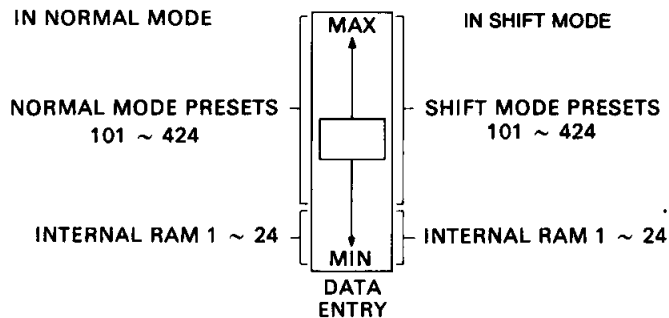
The DX27/27S has 4 banks of 24 voices in the BANK memory. This means that you can have 4 personally-arranged 24-voice groups to choose from (i.e., a separate BANK for each set in a performance).

To enter the EDIT BANK function, press the FUNCTION button followed by the EDIT BANK button. The LCD will respond with "Edit BANK?" Reaffirm your intention to complete the process by pressing the +1 button. The LCD will again respond, this time with "BANK? (A-D)." Select a BANK for editing, and then the button corresponding to the voice you want to change. Now, select a new voice for that position by using the DATA ENTRY slider or the -1/+1 buttons. You can change as many of the voices as you like. When you're finished, press the INTERNAL PLAY button to exit the EDIT BANK function.



The following diagram shows approximately where in the DATA ENTRY control range the INTERNAL and PRESET voices are located.

In addition to the voice edit buffer, the DX27/27S has a special edit recall buffer memory which maintains the last edited voice data. If after editing or creating a



NOTE:

The BANK memories are not actually loaded with the voice data, but the voice number. Thus, when a BANK memory location is selected, the voice corresponding to the voice number stored in that location is called from its memory in either the INTERNAL or PRESET memories.

9: CASSETTE SAVE/VERIFY



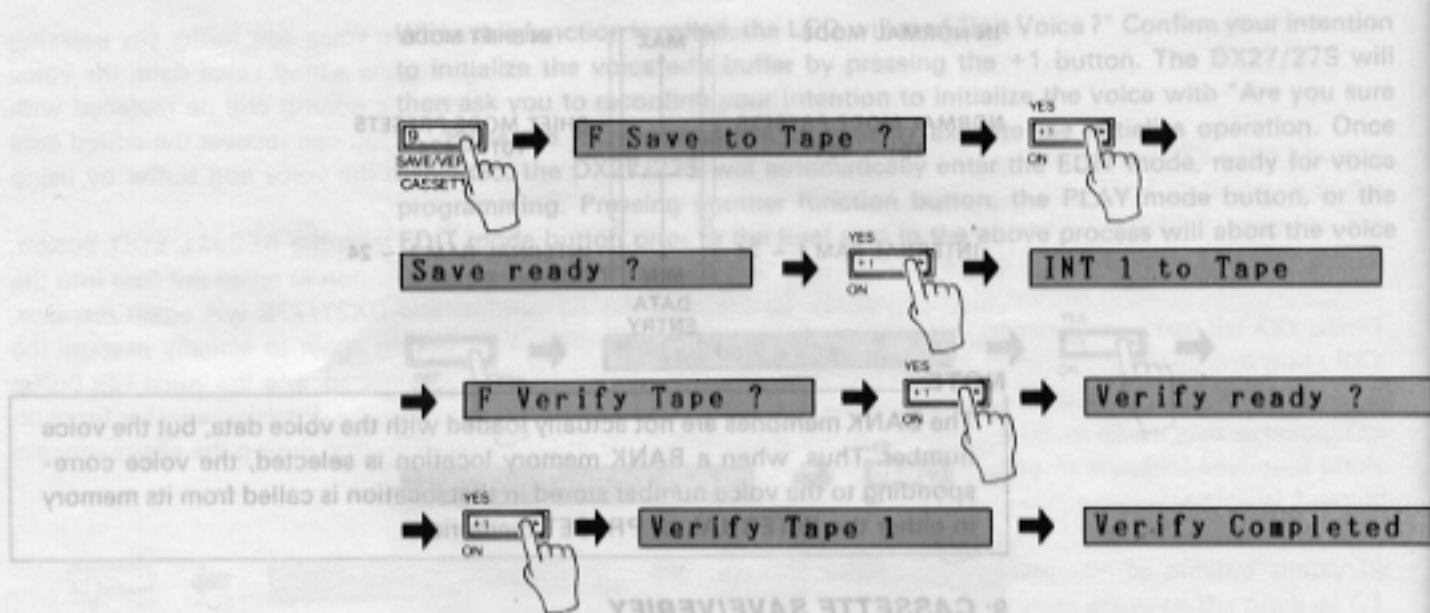
This function actually has two "sub-functions": SAVE and VERIFY. After calling this function, subsequent presses of button #9 alternates between the SAVE and VERIFY sub-functions. Normally, however, you will start with the SAVE function, which saves the entire contents of the DX27/27S's INTERNAL voice memory onto cassette tape. The VERIFY function is then used to compare the data saved on cassette with the data still in INTERNAL memory, to make sure that no errors occurred in the SAVE process.

Before using this function, make sure that an appropriate data cassette recorder is properly connected to the DX27/27S, as described in *CHAPTER 1: SETTING UP*.

When this function is initially called, the LCD will read "Save to Tape ?" Confirm your intention to save the contents of the 24 voices to cassette tape by pressing the +1 button. The display will then read "Save ready?" At this point, make sure that the cassette recorder is set up properly with a suitable blank tape, and then set up the recorder to begin recording. To perform the actual save operation, press the +1 button. (Pressing the -1 button prior to the final step in the above process will abort the CASSETTE SAVE function.) As the DX27/27S saves each voice to tape, the LCD display will indicate the voice number being saved.

When all 24 voices have been saved, the DX27/27S will automatically go into the VERIFY mode, so that you can make sure that the data was recorded properly.

Stop the cassette recorder. The LCD will now read "Verify Tape ?" To verify, first rewind the tape to the beginning of the data just saved, and then press the +1 button in response to the "Verify Tape ?" display showing. The display will now read "Verify ready?" Press the +1 button to confirm and then start the cassette recorder (playing). The DX27/27S will now read in each voice from the cassette tape, and compare it with the corresponding voice data in the INTERNAL voice memory, while the LCD indicates the verification process. If the cassette and INTERNAL data matches, the display will read "Verify Completed." You can then enter any of the PLAY modes by simply pressing the corresponding mode selector button. If an error is encountered, this will be displayed on the LCD. If this happens, go back and try the SAVE process—followed by the VERIFY process—one more time. If the error persists, then you may have to carefully adjust the record and/or playback level of the cassette recorder, or use a higher quality recorder or tape. Be sure to check that all cassette connections are set up properly.



10: LOAD



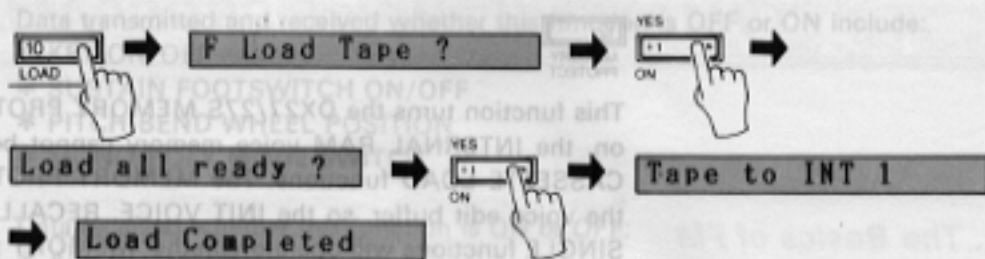
This function loads a complete set of 24 voices from cassette tape into the DX27/27S's INTERNAL voice memory. Before using this function make sure that all cassette connections have been set up properly, as described in *CHAPTER 1: SETTING UP*. Also make sure that the DX27/27S's MEMORY PROTECT function (12) is OFF.

When this function is initially called, the LCD will read "Load Tape?" Confirm your intention to load a complete set of 24 voices from cassette tape into the RAM voice memory (remember, this will erase any voices previously in the INTERNAL voice memory) by pressing the +1 button. The LCD will now read "Load all ready?" At this point, make sure the appropriate cassette tape is loaded into the recorder and is rewound to the beginning of the desired voice data. To execute the load, press the DATA ENTRY YES button again and start the cassette recorder (playing). (Pressing the -1 button prior to the final step in the above process will abort the CASSETTE LOAD function.) The DX27/27S will indicate each voice on the LCD as it is loaded. When the load function is completed, the LCD will read "Load Completed."

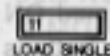
Stop the cassette recorder and turn the DX27/27S's MEMORY PROTECT function back ON. The LOAD function can be interrupted at any time by pressing the -1 button. This can, however, result in incomplete data loading, possibly causing "garbled" voice data to appear in one memory location.

NOTE:

Be sure to turn the MEMORY PROTECT function back ON after a successful LOAD operation.



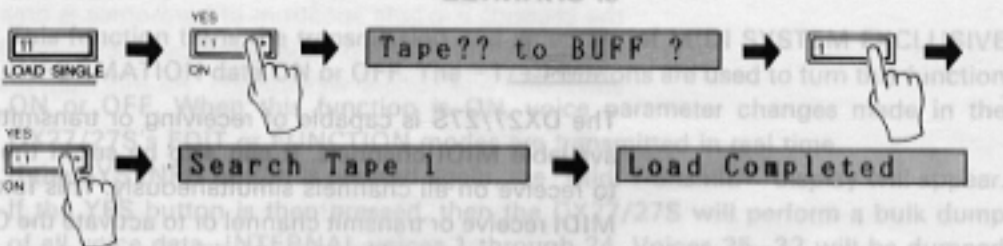
11: LOAD SINGLE



This function allows you to load a single voice from a previously saved 24-voice cassette file into the DX27/27S's voice edit buffer, after which it can be stored in any voice location using the STORE function.

When this function is initially called, the LCD will read "Load Single ?" Press the +1 button to go on to the next step. The LCD will now read "Tape ?? to BUFF?" You must now enter the voice number of the voice you wish to load from cassette; do this by pressing the corresponding voice memory selector button. The selected voice number will appear in the LCD display. Then, make sure the appropriate cassette is loaded in the cassette recorder and is rewound to the beginning of the voice file containing the desired voice, press the +1 button, and start the cassette recorder (playing). The LCD will read "Search Tape," followed by the tape number while the DX27/27S locates the selected voice and loads it into the voice edit buffer. When finished, the display will read "Load Completed." The LOAD SINGLE function can be interrupted by pressing the -1 button. Doing this, however, may result in garbled voice data in the DX27/27S's voice edit buffer.

The loaded voice may now be stored into any voice location by holding down the STORE button while pressing the voice button. This must be done before another voice button is pressed if you desire to keep the loaded voice in memory. Otherwise, the loaded voice data in the voice edit buffer will be erased and replaced by the voice data called by the pressed voice button.



DX21 CASSETTE LOAD

NOTE:

If you have a voice set programmed on a Yamaha DX21 Digital Programmable Algorithm Synthesizer, these voices can be transferred from data cassette to the DX27/27S. Of course, since the DX27/27S has 24 voice memories while the DX21 has 32, using the DX27/27S cassette LOAD operation will load only the first 24 voices of the DX21 32-voice set into the INTERNAL memory. The other voices (25-32) can be loaded using the DX27/27S LOAD SINGLE function. The voice numbers for voices 25 through 32 are accessed by pressing the STORE, FUNCTION, EDIT, INTERNAL PLAY, and BANK A-D buttons.

12: MEMORY PROTECT



This function turns the DX27/27S MEMORY PROTECT function on or off. When on, the INTERNAL RAM voice memory cannot be altered using the STORE or CASSETTE LOAD functions. The MEMORY PROTECT function does not affect the voice edit buffer, so the INIT VOICE, RECALL EDIT, and CASSETTE LOAD SINGLE functions will operate whether MEMORY protect is on or off.

When this function is called, the LCD will read either "M. Protect:on" or "M. Protect:off," according to the current state of the MEMORY PROTECT function (MEMORY PROTECT is automatically turned ON every time the main power to the DX27/27S is turned ON). The -1/+1 buttons and DATA ENTRY control are used to turn MEMORY PROTECT on or off.

6. MIDI Functions



This group of functions deals with parameters which control the transmission and reception of MIDI data via the DX27/27S's MIDI OUT and MIDI IN terminals. This section will describe how each parameter is programmed, while actual operational details will depend entirely on the type of MIDI equipment which will be used with the DX27/27S.

2: MIDI ON-OFF



This function turns the DX27/27S's MIDI capabilities ON or OFF. When on, the DX27/27S can transmit or receive MIDI data to or from external MIDI equipment. When off, no MIDI data interchange is possible.

This function is turned ON or OFF using the -1/+1 buttons or DATA ENTRY slider.

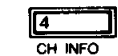
3: CHANNEL



The DX27/27S is capable of receiving or transmitting data on any one of the 16 available MIDI channels. It can also be set in the OMNI mode which enables it to receive on all channels simultaneously. This function is used to set the desired MIDI receive or transmit channel or to activate the OMNI receive mode. The receive or transmit channel is normally set to match the transmission or reception channel of the MIDI equipment to which the DX27/27S is connected.

Data is entered using the DATA ENTRY control or -1/+1 buttons. Subsequent presses of the CHANNEL button will move through the "Omni: on/off," "Midi R Ch=1-16," and "Midi T Ch=1-16" selection modes.

4: CH INFO



This is the MIDI channel information "button." It turns the transmission and reception of all MIDI BASIC EVENT DATA and OTHER EVENT DATA (exceptions noted below) ON or OFF. This function is turned ON or OFF using the -1/+1 buttons.

Data transmitted and received whether this function is OFF or ON include:

- * KEY ON/OFF
- * SUSTAIN FOOTSWITCH ON/OFF
- * PITCH BEND WHEEL POSITION
- * MONO/POLY MODE SWITCH

Data received whether this function is ON or OFF:

- * ALL NOTES OFF

Data NOT transmitted when this function is OFF include:

- * MODULATION WHEEL POSITION
- * BREATH CONTROLLER DATA
- * DATA ENTRY SLIDER AND SWITCH DATA
- * VOLUME (FOOT VOLUME (DX27S) and DATA ENTRY slider in PLAY mode)
- * PORTAMENTO FOOTSWITCH ON/OFF
- * CHORUS SWITCH ON/OFF (DX27S)
- * PROGRAM CHANGE (VOICE NUMBER) DATA

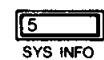
Data not received when this function is OFF include:

- * All of the above
- * PORTAMENTO TIME

NOTE:

The above MIDI data is generally common to all keyboards and equipment compatible with the MIDI system. Due to differences in the features provided by some manufacturers, however, complete compatibility can not be guaranteed.

5: SYS INFO



This function turns the transmission and reception of MIDI SYSTEM EXCLUSIVE INFORMATION data ON or OFF. The -1/+1 buttons are used to turn this function ON or OFF. When this function is ON, voice parameter changes made in the DX27/27S's EDIT or FUNCTION modes are transmitted in real time.

If the SYS INFO button is pressed again, the "Midi Transmit?" display will appear. If the YES button is then pressed, then the DX27/27S will perform a bulk dump of all voice data—INTERNAL voices 1 through 24. Voices 25—32 will be dumped as INIT VOICE parameters.