YAMAHA

TX7

TONE GENERATOR

GENERATEUR DE SON

TONGENERATOR

OWNER'S MANUAL
MODE D'EMPLOI
BEDIENUNGSANLEITUNG

INTRODUCTION

Congratulations on your purchase of a Yamaha TX7 FM Expander! The Yamaha TX7 FM Expander is a MIDI controllable digital FM tone generator system which can dramatically expand the potential of the Yamaha DX7 Digital Programmable Algorithm Synthesizer. It also functions with other Yamaha DX series synthesizers. The TX7 incorporates a 32 voice memory as well as 32 programmable function memories containing the effect data for all 32 voices. There are also 32 function memories available primarily for use with the Yamaha DX7 digital FM synthesizer. Voices and function parameters can be transferred to and from other MIDI equipment via the MIDI interface. The TX7 also incorporates a cassette data interface that offers convenient mass storage and retrieval of FM voices as well as functions.

IMPORTANT

This manual is organized in tutorial form. Therefore, in order to fully understand all aspects of operating the TX7, we urge you to go through the manual and try out each operation as it is described.

CONTENTS

PRECAUTIONS

- Avoid placing the TX7 in locations exposed to direct sunlight or high temperatures, excessively high or low humidity, high dust concentrations, or vibration.

- Be sure to connect the TX7 to an AC power supply that meets the power supply specifications listed on the rear of the unit.

- If there is any danger of lightning occurring nearby, remove the power plug from the wall socket in advance.

- Be sure to make all connections properly, as described in the "CONNECTIONS" section below.

- To avoid damaging your speakers and other playback equipment, turn off the power of all related equipment before making connections.

- Do not use excessive force in handling control switches and knobs.

- To avoid broken cords and short circuits, be sure to unplug all connectors by grasping the respective plugs --NOT the cords.

- Remove the power plug from the AC mains socket if the unit is not to be used for an extended period of time.

- Remove all plugs and connections if the unit is to be transported, to prevent damage to the cords and jacks.

- Do not use solvents such as benzene or paint thinner to clean the unit. Do not use insecticides or other pressurized spray products in proximity to the unit. Wipe off the exterior with soft cloth.

EFFECTS ON OTHER ELECTRONIC EQUIPMENT

- Since this unit incorporates digital circuitry, simultaneous use of other equipment such as TVs, radios, etc. in close proximity may cause noise and erroneous operation. If this occurs, separate the affected units sufficiently to eliminate the problem. It is also a good idea to use separate line filters on each piece of equipment.

FOR USERS WHO WISH TO CONNECT THEIR TX7 TO THE DX7, DX9, OR KX1:

- The TX7 will not operate properly when connected to KX1 and DX7 manufactured before the standardization of MIDI specification--AFTER TOUCH will not operate. The serial numbers of the instruments concerned are:

  DX7 serial numbers: 1001--24880,25125--26005
  KX1 serial numbers: 1001--1105

  In addition, if the TX7 is connected to DX7 or DX9 manufactured before the specifications were changed, the DX7 or DX9 will not be able to receive the contents of the DX function memory in the TX7. The serial numbers of the instruments concerned are:

  DX7 serial numbers: 1001--24880, 25125--26005
  DX9 serial numbers: 1001-2450

  If you wish to connect your TX7 to one of the above-numbered instruments, ask your dealer to replace the DX7, DX9, or KX1 system ROM.

BACKUP BATTERY

- The TX7 incorporates a special lithium backup battery system so that data in memory is returned even when power is switched OFF.

- Do not attempt to replace the battery yourself. Refer this job to your dealer.

- The backup battery should last for approximately 5 years. We recommend replacing the battery early.

- All data in the TX7 memory will be lost when the battery is changed. Be sure to save data you wish to keep onto cassette tape prior to replacing battery.

- When the battery voltage drops below 2. 3 volts, the TX7's LCD display will read "CHANGE BATTERY" when the power is turned ON.

CONNECTIONS & PANEL

Control Panel
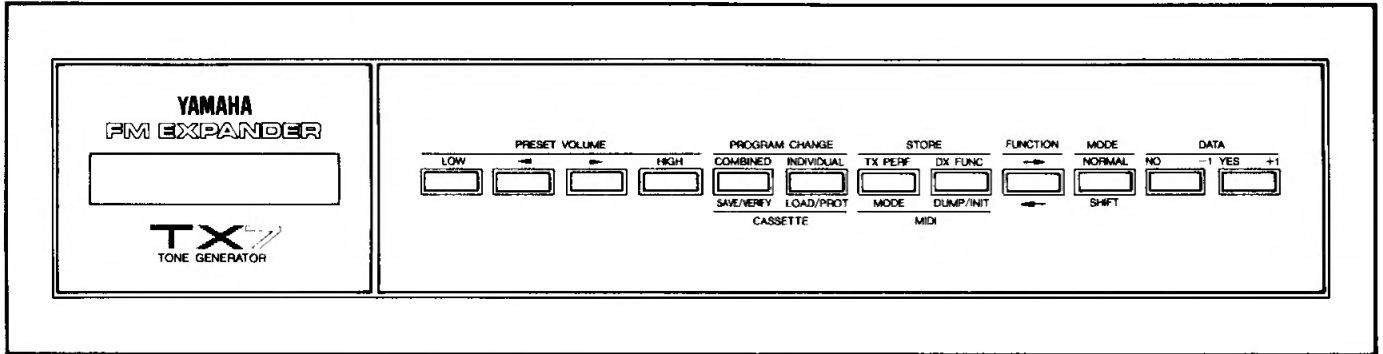
Rear Panel
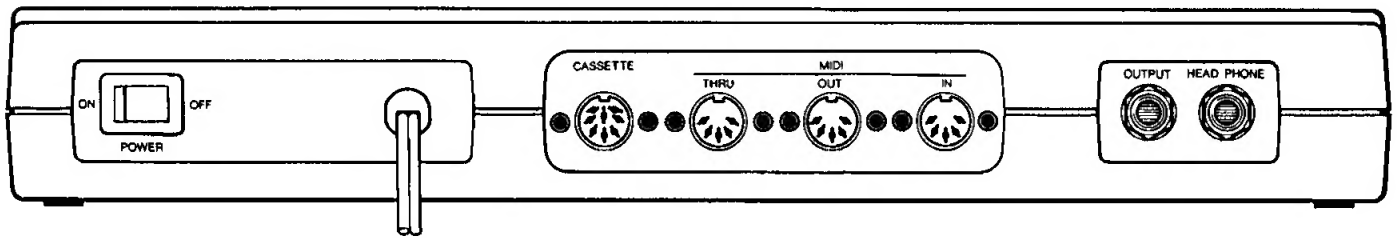
SYSTEM CONNECTIONS
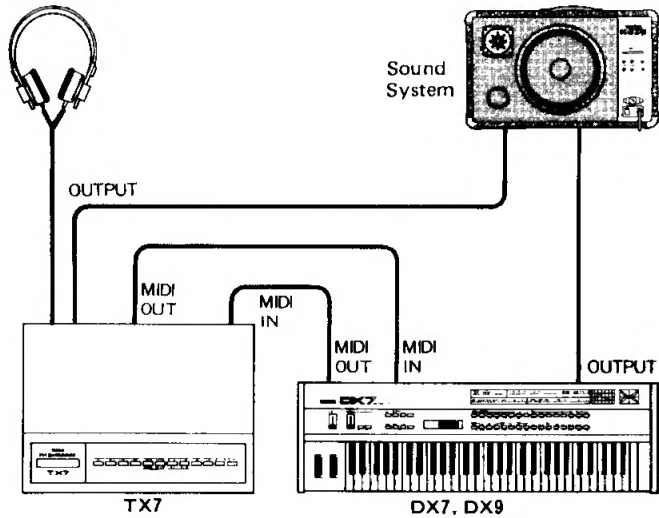
CASSETTE CONNECTIONS
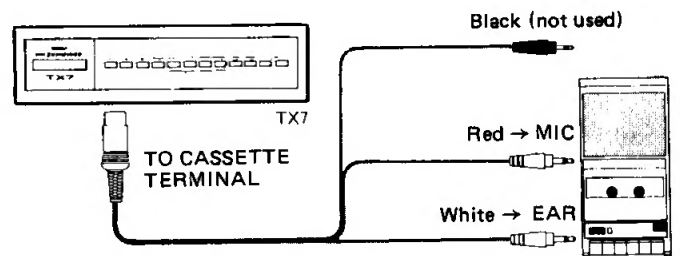
SYSTEM/MEMORY CONFIGURATION

The TX7 incorporates the same FM tone generation system found in Yamaha DX series Digital Programmable Algorithm synthesizers and the Yamaha TX216 and TX816 tone generator systems. This is a 6-operator, 32-algorithm FM system which is programmable via the DX series synthesizers having the corresponding tone generators —-The DX7 and DX1, for example. Since the TX7 does not permit direct voice programming, we refer you to the documentation provided with the respective DX synthesizers for details on the FM tone generator system and programming procedures. The Voices programmed in a DX synthesizer can be loaded into the TX7 via the MIDI interface, however, and voices residing in the TX7 voice memory can be sent to a DX synthesizer. The TX7 does permit direct programming of its function memories (described below) via the front panel. The TX7 also has a data cassette interface which can be used to store and load the entire contents of the TX7 memory. The TX7 has 32 voice memories, each of which contains the data for one complete 6-operator FM voice. Each of these voice memories also has a function memory which contains the data for the function and control parameters of that voice. The programmable function parameters are given in the following chart:

MASTER TUNE
PLAY MODE, POLY/MONO
PITCH WHEEL RANGE PITCH WHEEL STEP
PORTAMENTO MODE PORTAMENTO/GLISSANDO SWITCH PORTAMENTO TIME
MODULATION WHEEL RANGE MODULATION WHEEL PITCH MODULATION WHEEL AMPLITUDE MODULATION WHEEL EG BIAS
FOOT CONTROL RANGE FOOT CONTROL PITCH FOOT CONTROL AMPLITUDE FOOT CONTROL EG BIAS
BREATH CONTROL RANGE BREATH CONTROL PITCH BREATH CONTROL AMPLITUDE BREATH CONTROL EG BIAS
AFTER TOUCH RANGE AFTER TOUCH PITCH AFTER TOUCH AMPLITUDE AFTER TOUCH EG BIAS
LIMIT KEY LOWEST LIMIT KEY HIGHEST
ATTENUATION

Thus, each TX7 voice can be independently programmed with its own real-time performance effects parameters —- pitch wheel, modulation wheel, foot controller, after touch response, breath controller, etc. When a specific voice is selected, its function parameters are automatically selected as well. These function parameters are directly programmable via the TX7 panel controls, or they can be sent to the TX7 from a DX synthesizer, via the MIDI interface. The TX7 also contains a second set of 32 function memories which is independent from that for the TX7 voice memories. This second function memory set is intended to be used with the voice memories in the DX7 synthesizer.

The DX7 itself also has 32 voice memories, but only a single function memory. Thus, if a new voice is selected which requires a different set of function parameters, these must be re-programmed via the DX7 panel controls. The TX7 supplies the DX7 with a complete set of 32 function memories corresponding to each voice. In the case of the DX9, which only has 20 voice memories, the TX7's first 20 (1 through 20) DX function memories apply, and only those functions which the DX9 incorporates can be used. In the basic system connection configuration given in the previous section, each time a new voice is selected on the DX synthesizer, the corresponding function memory in the TX7 is called, and the parameters it contains are automatically sent to the synthesizer via the MIDI interface.

The TX7 also has voice and function edit buffer memories, which contain the voice and function data in use.

(TX7 memory configuration diagram)
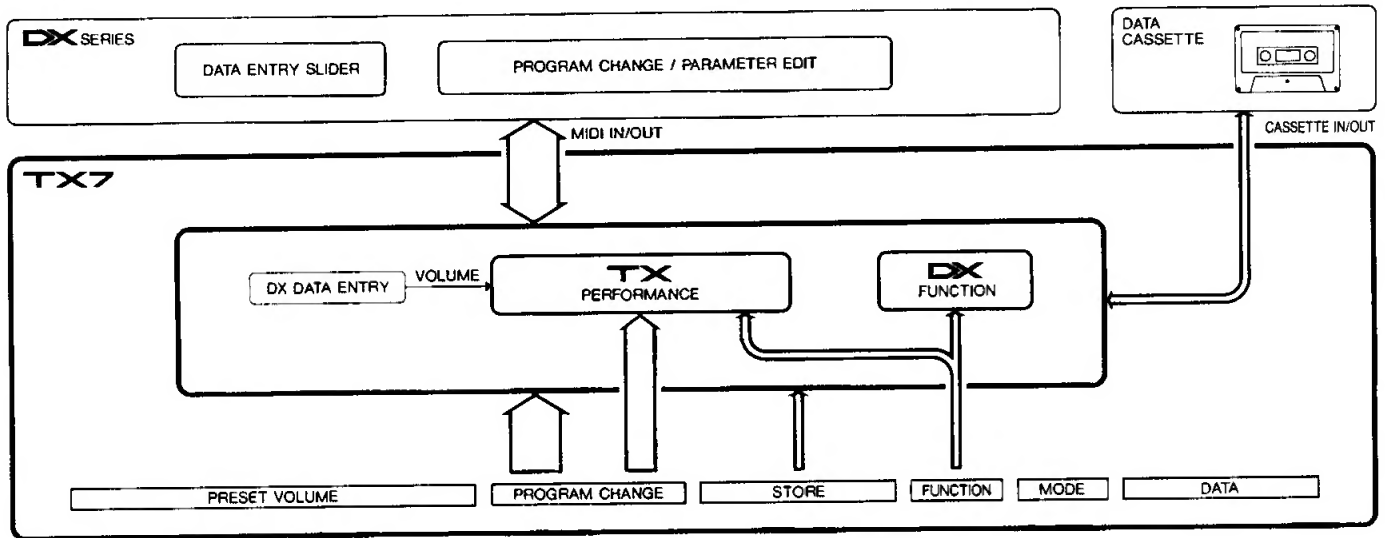
USING THE TX7 VOICES

As shipped, the TX7 voice memories contain the following pre-programmed voices with the corresponding function parameters:

1.	Acoustic Piano
2.	High Strings
3.	Trumpet B
4.	Female Choir
5.	Electric Piano B
6.	Electric Organ B
7.	Power Synthesizer B
8.	Fat Synthesizer B
9.	Spanish Guitar
10.	Cello B
11.	African Mallet B
12.	Electric Piano & Breath Control Brass B
13.	Pipe Organ B
14.	Synth Rise B
15.	Clav B
16.	String Pad
17.	Foot Control String Bell
18.	Horn Section B
19.	Double Harp B
20.	Electric Guitar B
21.	Electric Bass B
22.	Harpsichord B
23.	Vibraphone B
24.	Foot Control Brass
25.	FM Piano B
26.	Orchestra
27.	Bell Voice
28.	Tube Rise B
29.	Violins B
30.	Kalimba B
31.	Harmonic Synthesizer
32.	Touch Trumpet

TX7 owners will also be provided with a data cassette tape containing the above voice/function set (Voice set B on the tape), and a second voice/function set (Voice set A) which is as follows:

1.	Acoustic Piano
2.	High Strings
3.	Trumpet A
4.	Male Choir
5.	Electric Piano A
6.	Electric Organ A
7.	Power Synthesizer A
8.	Fat Synthesizer A
9.	Jazz Guitar
10.	Cello A
11.	African Mallet B
12.	Electric Piano & Breath Control Brass A
13.	Pipe Organ A

14. Synth Rise A
15. Clav A
16. Tine Electric Piano
17. Breath Control Flute
18. Horn Section A
19. Double Harp A
20. Electric Guitar A
21. Electric Bass A
22. Harpsichord A
23. Vibraphone A
24. Breath Control Saxophone
25. FM Piano A
26. Modulation Wheel Timpani
27. Time Warp
28. Tube Rise A
29. Violins A
30. Kalimba A
31. Harmonic Synthesizer
32. Orchestral

The pre-programmed internal voices can be accessed immediately, so we'll use them to become familiar with the TX7 and its operating procedures. Later we'll find out how to load voice set A into the DX7 and voice set B into the TX7 for combined use (voice sets A and B are designed primarily to be used together --see the "CASSETTE OPERATIONS" section, beginning on page 21).

Begin by turning the TX7 ON--after connecting it to your DX7 as illustrated on the "CONNECTIONS" page. You will be greeted by the <<YAMAHA TX7>> display which will appear on the LCD panel for a few seconds, and then the LCD panel will read "CMB 1 ACC. PIANO", indicating that voice number 1 (acoustic piano) is selected in the combined mode--but we'll find out what that means a little later. First we'll need to know how to set the TX7's OUTPUT and PHONES volume level.
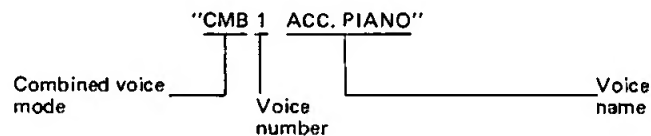
Volume Control / Programming

The four buttons on the TX7 panel under the PRESET VOLUME group label are used to set volume level and program the TX7's preset volume function. First, try pressing and holding either of the PRESET VOLUME arrow buttons. The LCD panel will show a black horizontal bar which will soon begin to shorten or lengthen depending on which arrow button you have pressed. The volume bar will disappear as soon as the arrow buttons are released. Simply, the longer the bar, the higher the volume. Thus, the arrow buttons can be used to manually set any volume level (the length of the bar at the instant the arrow button is released corresponds to the volume set). Pressing either arrow button quickly, once, and then releasing it causes the volume to be increased or decreased one increment in the specified direction. The entire length of the bar corresponds to 80 increments (16 LCD character x 5 segments per character).

Volume control
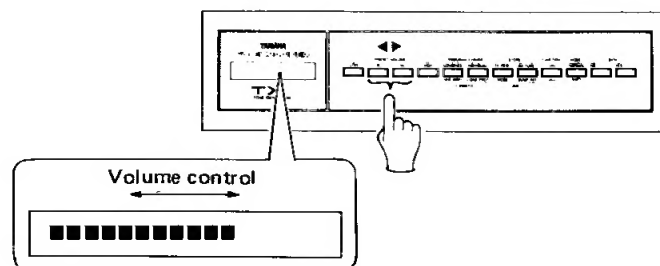
The LOW and HIGH buttons in the PRESET VOLUME group correspond to two preset volume levels that you can program yourself. To set the LOW preset volume level, hold down the LOW button (the currently select volume level will be displayed) then, while still holding down the LOW button, use the arrow buttons to set the desired LOW volume level, then release the LOW button. Now when you press the LOW button, the volume level you just selected will automatically be set. The same programming procedure applies to the HIGH button. The only catch is that the TX7 will NOT accept a LOW setting which is higher than the HIGH setting and vice-versa——logical enough.

At this point you might want to plug a pair of headphones into your TX7's PHONES jack, or monitor its output through your sound system while actually setting the appropriate volume levels (turn off the sound output from the connected synthesizer for the moment). Play on the connected synthesizer's keyboard to generate some sound for this purpose.

The Combined Voice Mode

If you have just set the TX7 preset volume levels as described above, you will have already heard the Acoustic Piano voice (pre-programmed voice 1). You can now try out the remaining 31 voices by selecting them with the DATA group NO/−1 and YES/+1 buttons. Each press the YES/+1 button will increments the selected voice number by one, and each press on the NO/−1 button will decrement the selected voice number by one. Holding down either button will cause continuous incrementing or decrementing in the specified direction. Notice that the voice numbers on your DX7 synthesizer also changed to correspond with the voice you selected on the TX7. (If this didn't happen, check again to make sure that the MIDI IN and OUT terminals of the TX7 are properly connected to the corresponding MIDI terminals on your synthesizer, as shown in the CONNECTIONS diagram on page 5). Now try this: select any voice on your DX7 synthesizer——the correspondingly numbered voice on the TX7 should have automatically been selected. This is the COMBINED voice mode. Any voice you select on either the TX7 or your DX7 synthesizer will cause the correspondingly numbered voice on the other to be selected as well. Thus, you have 32 voice "combinations". This means that by storing appropriate voices in the appropriate memory locations you can combine, for example, a cello voice and a string voice to get a really thick string sound, a male chorus and a female chorus voice for a full chorus sound, or you can combine completely unrelated voices to create unique new textures——all selectable by pressing a single button.

In addition to calling the same voice number on the TX7, selecting a voice on your DX7 synthesizer selects the corresponding DX function memory in the TX7, and transfers the parameters it contains to the DX synthesizer's own function memory. We'll find out more about the function memories later ("THE TX7 AND DX FUNCTION MEMORIES" section, page 12).

Set up your sound system so you can monitor the output of both the TX7 and your DX synthesizer simultaneously, and try out some of the combinations that "happen" with the voices currently residing in the TX7 and DX7 synthesizer memories. We'll find out how to lock the TX7's MASTER TUNE function to that of the DX7 later ("MIDI OPERATIONS" section, "MIDI MODE Functions", "D. ENTRY RCV. OFF", page 25). For now, use the DX7 synthesizer's MASTER TUNE function to match it to the pitch of the TX7. You can balance the levels of the TX7 and DX synthesizer output either at the mixer used in your sound system, or by using the respective volume control functions on the TX7 and the DX synthesizer. It is possible to control the volume of the TX7 via the DX7 synthesizer's DATA ENTRY control, but we'll discover how to do that later ("MIDI OPERATIONS" section, "MIDI MODE Functions", "D. ENTRY VOL OFF", page 25).

The Individual Voice Mode

Of course, you won't always want to use combined voices. The TX7 also has an INDIVIDUAL voice mode that allows completely independent selection of the TX7 voices. To activate the INDIVIDUAL mode, press the PROGRAM CHANGE group INDIVIDUAL button. Note that the first section of the LCD display which originally read "CMB", for "COMBINED", now reads "IND" for "INDIVIDUAL". Also note that you can now select any voice on either the TX7 or your synthesizer without affecting the voice selected on the other. Even though voice selection is now independent, selecting a voice on the DX7 synthesizer does call out the function parameters from the correspondingly numbered DX function memory in the TX7. Once again, don't worry about the function memories just yet.

(COMBINED and INDIVIDUAL mode memory configuration chart)

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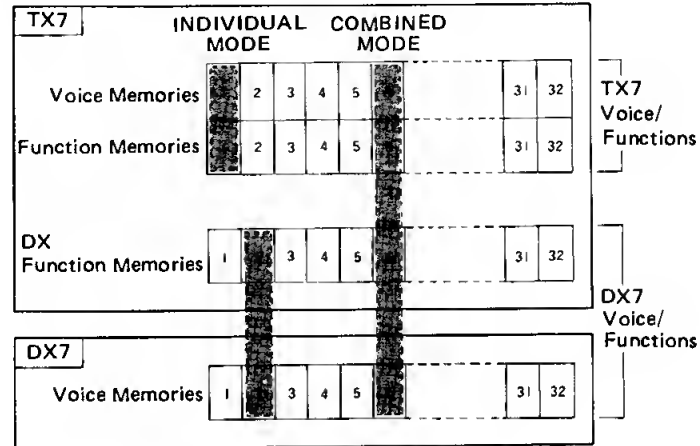
THE TX7 AND DX FUNCTION MEMORIES

To review, the TX7 has two sets of 32 function memories: one for the TX7's own voices, and one specifically for Yamaha DX synthesizer voices. At this time, the Yamaha DX7 and DX9 Digital Programmable Algorithm Synthesizers (the DX7 with 32 voices and the DX9 with 20) benefit most from the TX7's DX function memory expansion capability. The top-line Yamaha DX1 Digital Programmable Algorithm Synthesizer already has dual voices generators and independent function memories for each of its voices, but adding a TX7 to a DX1 gives you triple-voice performance capability which, with a little imagination, will allow you to create some really impressive sounds. Of course, more Yamaha DX synthesizers are on the way, and they, too, will benefit greatly by addition of the TX7 FM Expander.

Function Memory Parameters

The following is a list of all the function parameters that can be programmed in the TX7, and the corresponding display which will appear on the TX7's LCD display when each function is selected for programming.

FUNCTION	DISPLAY
MASTER TUNE	MASTER TUNE 0
PLAY MODE, POLY/MONO	PLAY MODE = POLY
PITCH WHEEL RANGE	PW RNG = ▓, STP = 0
PITCH WHEEL STEP	PW RNG = 0, STP = ▓
PORTAMENTO MODE	PORTA ▓TN, PRT, 0
PORTAMENTO/GLISSANDO SWITCH	PORTA RTN, ▓LS, 0
PORTAMENTO TIME	PORTA RTN, PRT, ▓
MODULATION WHEEL RANGE	MW = ▓, P0, A0, E0
MODULATION WHEEL PITCH	MW = 0, P▓, A0, E0
MODULATION WHEEL AMPLITUDE	MW = 0, P0, A▓, E0
MODULATION WHEEL EG BIAS	MW = 0, P0, A0, E▓
FOOT CONTROL RANGE	FC = ▓, P0, A0, E0
FOOT CONTROL PITCH	FC = 0, P▓, A0, E0
FOOT CONTROL AMPLITUDE	FC = 0, P0, A▓, E0
FOOT CONTROL EG BIAS	FC = 0, P0, A0, E▓
BREATH CONTROL RANGE	BC = ▓, P0, A0, E0
BREATH CONTROL PITCH	BC = 0, P▓, A0, E0
BREATH CONTROL AMPLITUDE	BC = 0, P0, A▓, E0
BREATH CONTROL EG BIAS	BC = 0, P0, A0, E▓
AFTER TOUCH RANGE	AT = ▓, P0, A0, E0
AFTER TOUCH PITCH	AT = 0, P▓, A0, E0
AFTER TOUCH AMPLITUDE	AT = 0, P0, A▓, E0
AFTER TOUCH EG BIAS	AT = 0, P0, A0, E▓
LIMIT KEY LOWEST	SP ▓ = C-2, H = G8
LIMIT KEY HIGHEST	SP L = C-2, ▓ = G8
ATTENUATION	ATTENUATION 7

* In the above displays, the cursor block (▓) indicates the selected parameter.
* Some of the above functions pertain to real-time effects control from the connected DX synthesizer, while others are "direct" functions which take effect immediately after being set. The real-time control functions are: pitch wheel, modulation wheel, foot control, breath control and after touch. The direct functions are: master tune, split low limit, split high limit, attenuation, mono-poly play mode, and portamento.
* For real time effect control from the DX synthesizer to function, the "CTL. CHNG. RCV. ON" (or "OFF") function, described in the "MIDI OPERATIONS" section, must be "ON".

Editing Function Memory Parameters

When you begin editing the function parameters, you will actually be editing the parameters in a buffer memory which is independent from the 32 TX7 and 32 DX function memories. When a TX7 voice is selected, its corresponding function memory data is called into the TX7's function edit buffer, where it resides until a new voice is selected. Thus you can actually hear the effect of function parameter changes on the selected voice as you are editing. In order for the edited functions to be recalled automatically the next time that voice is selected, they must then be stored in the appropriate TX7 or DX function memory as described in the "Storing TX7 & DX Function Parameters" section.

All the function parameters described above are accessed for editing by using the FUNCTION button. Note that the FUNCTION button has two arrows: the one above pointing to the right, and the one below pointing to the left. These arrows correspond to the TX7's NORMAL and SHIFT modes, selected by the MODE button immediately to the right of the FUNCTION button. In the NORMAL mode, each press on the FUNCTION button scrolls forward through the function list, while in the SHIFT mode each press on the FUNCTION button scrolls backwards through the function list (for more details on using the SHIFT/NORMAL MODE button, see "More About the Shift and Normal Modes", on page 18).

Press the FUNCTION button a few times and note that the TX7 LCD displays correspond to those given in the FUNCTION & DISPLAY list given above. At some point press the MODE button, once, then try pressing the FUNCTION button again. You will now move backwards through the function list. Press the MODE button again to revert to forward scrolling. This makes it faster and easier to access specific functions for editing.

The value or mode of the selected function is then set using the DATA NO/−1 and YES/+1 buttons. The NO/−1 and YES/+1 buttons decrement and increment the value of the selected function, respectively. Note that on displays which contain a number of functions, the position of the blinking block cursor indicates the currently selected function.

Direct Functions

These of functions take effect immediately when they are set. That is, they are not effects which can be controlled via the connected DX synthesizer's various controllers.

MASTER TUNE

| MASTER TUNE 0 |

This is the TX7's master tune function. All voices are affected simultaneously. The displayed tuning range is from −64 to +63. Each increment corresponds to a 1.2 cent change in pitch. Thus, the entire tuning range is ±75 cents. Setting MASTER TUNE to 0 sets the TX7 to standard (A = 440 Hz) pitch.

The DATA NO/−1 and YES/+1 buttons are used to increment and decrement the MASTER TUNE value. Hold the NO/−1 or YES/+1 button down for continuous decrementing or incrementing in the specified direction.

PLAY MODE, POLY/MONO

| PLAY MODE = POLY |

This function determines whether the TX7 voices are playable in the monophonic or polyphonic mode. The NO/−1 and YES/+1 buttons are used to set the MONO or POLY mode. MONO mode operation is last-note priority.

PORTAMENTO MODE

`PORTA ░TN, PRT, 0`

Four portamento modes are available: two of which can be selected in the poly-phonic play mode (see "PLAY MODE, POLY/MONO", above), and two of which can be selected in the monophonic play mode.

*POLY PORTAMENTO Modes: When the TX7 is set to the POLY PLAY MODE, either the RETAIN (RTN) or FOLLOW (FLW) portamento mode can be selected using the NO/−1 and YES/+1 buttons.

In the RETAIN mode, any sustained notes will be held (retained) when a new note is played. The pitch of the new note will be reached via a portamento slide from the previously played notes. In the FOLLOW mode, all sustained notes will slide to a subsequently played note. If the sustain is OFF, only the pitch of the last note played will slide to the new note.

*MONO PORTAMENTO Modes: When the TX7 is set to the MONO PLAY MODE, either the FINGERED (FGD) or FULL TIME (FUL) portamento mode can be selected using the NO/−1 and YES/+1 buttons. In the FINGERED mode, the pitch of the note will only slide to that of the subsequently played note if the first note played is held down while the second note is played. If the first note played is released before the second note is played there will be no portamento effect. In the FULL TIME mode, portamento always occurs, whether the first note played has been released or is held. Note that this function merely selects the portamento mode, and the actual portamento (or glissando) effect must be turned on by setting an appropriate PORTAMENTO TIME, as described below.

PORTAMENTO/GLISSANDO SWITCH

`PORTA RTN, ░LS, 0`

This function determines whether a continuous portamento slide or stepped ("glissando") slide will be produced. The PORTAMENTO (PRT) and GLISSANDO (GLS) modes are selected using the NO/−1 and YES/+1 buttons. If the GLS mode is selected, the pitch change from one note to another proceeds in semitone steps, according to the PORTAMENTO TIME value.

PORTAMENTO TIME

`PORTA RTN, PRT, ░`

This function determines the speed of the portamento or glissando slide effect. The available range is 0 to 99. At 0 no effect is produced. A setting of 99 produces the longest portamento or glissando.

*A footswitch connected to the DX7 PORTAMENTO control jack can also be used to turn the TX7 portamento function on and off.

LIMIT KEY LOWEST

`SP░ = C-2, H = G8`

With the LIMIT KEY LOWEST and LIMIT KEY HIGHEST functions it is possible to designate a specific range of keys on the DX7 keyboard which will control the TX7. Any key outside the key range designated will not produce any sound output from the TX7.

LIMIT KEY LOWEST specifies the lowest DX7 key which will produce an output from the TX7. The programmable range is from C-2 to G 8.

LIMIT KEY HIGHEST

`SP L = C-2, ░ = G8`

LIMIT KEY HIGHEST specifies the highest DX7 key which will produce an output from the TX7. The programmable range is from C-2 to G 8.

(Limit key operation examples)

LOWEST < HIGHEST

L[_____]H

Range between L and H

LOWEST = HIGHEST

L|H

Only one note produced

LOWEST > HIGHEST

____]H   L[____

Range below H and above L
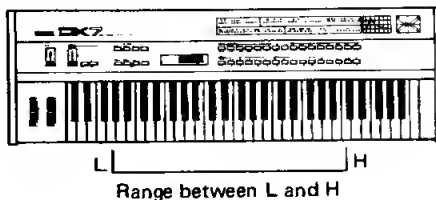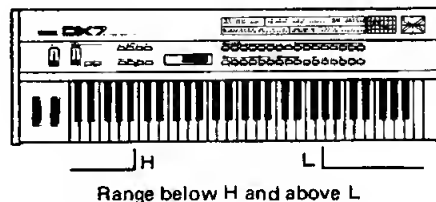
ATTENUATION

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This function sets the volume level of the corresponding voice. This is particularly useful for balancing the levels of different voices. The attenuation range is from 0 to 7, selected using the NO/−1 and YES/+1 buttons. A setting of 7 corresponds to maximum volume (minimum attenuation), and a setting of 0 corresponds to minimum volume (maximum attenuation).

Real-Time Control Functions

This group of functions pertains to effects which are controlled via controllers built into or connected to the DX synthesizer being used with the TX7.

Please note that all functions in this group, except the pitch wheel functions, have exactly the same parameters which produce the same effects via the different controllers. The parameters for MODULATION WHEEL, FOOT CONTROLLER, BREATH CONTROLLER and AFTER TOUCH are all the same: depth (0−−15), pitch (off or on), amplitude (off or on) and EG bias (off or on). For these four controllers to function, however, the AMPLITUDE MODULATION SENSITIVITY and PITCH MODULATION SENSITIVITY parameters in the voice data of the corresponding voice must be set to a value other than 0. The LFO modulation speed setting is also integral with the actual voice data, and must be set as required for each voice.

PITCH WHEEL RANGE

PW RNG = ▓,STP = 0

This function permits the DX7 pitch wheel to control TX7 voices. The pitch wheel parameters can be programmed individually for each voice. The pitch wheel range can be set from 0 to 12. At 0 the pitch wheel has no effect. Each increment increases the pitch wheel range by one semitone. Thus, the pitch wheel range would be set to 7 to achieve a full fifth (plus/ -minus one fifth from center position) range. A setting of 12 would give a full octave pitch bend, up and down. The desired pitch bend range is set using the NO/−1 and YES/+1 buttons.

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PITCH WHEEL STEP

The pitch bend range setting, described above, permits continuous pitch bend over the specified range. The step function, however, programs the pitch wheel to increase and decrease pitch in steps, the size of which are determined by the PITCH WHEEL STEP setting. Any STEP value higher than 0 causes the PITCH BEND RANGE value to be automatically set to 12. The PITCH BEND STEP range is also from 0 to 12. The following chart gives the number of steps and range for the various STEP values:

STEP = 1	....	±1 octave (12 semitones),	12 steps.
STEP = 2	....	±1 octave (12 semitones),	6 steps.
STEP = 3	....	±1 octave (12 semitones),	4 steps.
STEP = 4	....	±1 octave (12 semitones),	3 steps.
STEP = 5	....	±1 flat seventh (10 semitones),	2 steps.
STEP = 6	....	±1 octave (12 semitones),	2 steps.
STEP = 7	....	±1 fifth (7 semitones),	1 step.
STEP = 8	....	±1 sharp fifth (8 semitones),	1 step.
STEP = 9	....	±1 sixth (9 semitones),	1 step.
STEP = 10	....	±1 flat seventh (10 semitones),	1 step.
STEP = 11	....	±1 seventh (11 semitones),	1 step.
STEP = 12	....	±1 octave (12 semitones),	1 step.

MODULATION WHEEL RANGE

MW = ▓, P0, A0, E0

This function determines the maximum depth of modulation, as applied with the modulation wheel at its maximum position. The programmable range is 0 to 15, corresponding to the 0 to 99 range provided on the DX7. The desired depth value is selected using the NO/−1 and YES/+1 buttons.

MODULATION WHEEL PITCH

MW = 0, P▓, A0, E0

This "switch" determines whether modulation will be applied to the pitch of the corresponding voice to produce vibrato type effects. MODULATION WHEEL PITCH is either 0 (OFF) or 1 (ON).

MODULATION WHEEL AMPLITUDE

MW = 0, P0, A▓, E0

This "switch" determines whether modulation will be applied to the amplitude (volume) of the corresponding voice to produce tremolo or wow type effects. MODULATION WHEEL AMPLITUDE is either 0 (OFF) or 1 (ON).

MODULATION WHEEL EG BIAS

MW = 0, P0, A0, E▓

This "switch" determines whether modulation will be applied to the EG bias of the corresponding voice to produce tonal variations. MODULATION WHEEL EG BIAS is either 0 (OFF) or 1 (ON).

FOOT CONTROL RANGE

FC = ▓, P0, A0, E0

This function determines the maximum depth of modulation, as applied with the foot controller at its maximum position. The programmable range is 0 to 15, corresponding to the 0 to 99 range provided on the DX7. The desired depth value is selected using the NO/−1 and YES/+1 buttons.

FOOT CONTROL PITCH

`FC = 0, P ██ , A0, E0`

This "switch" determines whether modulation will be applied to the pitch of the corresponding voice to produce vibrato type effects. FOOT CONTROL PITCH is either 0 (OFF) or 1 (ON).

FOOT CONTROL AMPLITUDE

`FC = 0, P0, A ██ , E0`

This "switch" determines whether modulation will be applied to the amplitude (volume) of the corresponding voice to produce tremolo or wow type effects. FOOT CONTROL AMPLITUDE is either 0 (OFF) or 1 (ON).

FOOT CONTROL EG BIAS

`FC = 0, P0, A0, E ██`

This "switch" determines whether modulation will be applied to the EG bias of the corresponding voice to produce tonal variations. FOOT CONTROL EG BIAS is either 0 (OFF) or 1 (ON).

BREATH CONTROL RANGE

`BC = ██ , P0, A0, E0`

This function determines the maximum depth of modulation which can be applied with the breath controller. The programmable range is 0 to 15, corresponding to the 0 to 99 range provided on the DX7. The desired depth value is selected using the NO/−1 and YES/+1 buttons.

BREATH CONTROL PITCH

`BC = 0, P ██ , A0, E0`

This "switch" determines whether modulation will be applied to the pitch of the corresponding voice to produce tremolo or wow type effects. BREATH CONTROL AMPLITUDE is either 0 (OFF) or 1 (ON).

BREATH CONTROL AMPLITUDE

`BC = 0, P0, A ██ , E0`

This "switch" determines whether modulation will be applied to the amplitude (volume) of the corresponding voice to produce tremolo or wow type effects. BREATH CONTROL AMPLITUDE is either 0 (OFF) or 1 (ON).

BREATH CONTROL EG BIAS

`BC = 0, P0, A0, E ██`

This "switch" determines whether modulation will be applied to the EG bias of the corresponding voice to produce tonal variations. BREATH CONTROL EG BIAS is either 0 (OFF) or 1 (ON).

AFTER TOUCH RANGE

`AT = ██ , P0, A0, E0`

This function determines the maximum depth of modulation, as applied with the maximum after touch key pressure. The programmable range is 0 to 15, corresponding to the 0 to 99 range provided on the DX7. The desired depth value is selected using the NO/−1 and YES/+1 buttons.

AFTER TOUCH PITCH

$AT = 0, P$ ▓ $, A0, E0$

This "switch" determines whether modulation will be applied to the pitch of the corresponding voice to produce vibrato type effects. AFTER TOUCH PITCH is either 0 (OFF) or 1 (ON).

AFTER TOUCH AMPLITUDE

$AT = 0, P0, A$ ▓ $, E0$

This "switch" determines whether modulation will be applied to the amplitude (volume) of the corresponding voice to produce tremolo or wow type effects. AFTER TOUCH AMPLITUDE is either 0 (OFF) or 1 (ON).

AFTER TOUCH EG BIAS

$AT = 0, P0, A0, E$ ▓

This "switch" determines whether modulation will be applied to the EG bias of the corresponding voice to produce tonal variations. AFTER TOUCH EG BIAS is either 0 (OFF) or 1 (ON).

More About the Shift and Normal Modes

The MODE NORMAL and SHIFT button is used to select the group of functions accessible by certain buttons. Note that four of the TX7's control buttons have labels below as well as above them. The groups of functions corresponding to the labels above these buttons are accessed in the NORMAL mode, and the groups of functions corresponding to the labels below the buttons are accessed in the SHIFT mode. Specifically, in the NORMAL mode you can access the COMBINED and INDI-VIDUAL voice PROGRAM CHANGE functions, and the TX PERF and DX FUNC STORE functions. In the SHIFT mode you can access the CASSETTE SAVE/VERIFY and LOAD/PROT functions, and the MIDI MODE and DUMP/INIT functions. All these operations will be covered later. When the MODE button is pressed in any mode, except while editing function parameters (in which case it simply reverses the direction of scrolling through the function parameter list), the LCD display will read either "= NORMAL MODE! =" or "= SHIFT MODE !", indicating the mode you have just selected. You must then press the appropriate control button--PROGRAM CHANGE COMBINED in the NORMAL mode, for example--to access the desired functions.

Function Editing via the DX7 Data Entry Control

The DX7's DATA ENTRY control can be used to set all TX7 function memory pa-rameters except ON/OFF switch type parameters (e.g. MODULATION WHEEL PITCH ON/OFF) and functions not available on the DX7 (e.g. ATTENUATION). The procedure is as follows:
Set the TX7 to the SHIFT mode and press the MIDI MODE button until you get the "D.ENTRY RCV. ON" (or OFF) display. Turn this function ON by pressing the YES/+1 button. Set the DX7 to "SYS INFO AVAIL" (this is done by activating the DX7 FUNCTION mode, then pressing the number 8 memory button until the "SYS INFO UNAVAIL" display appears, then pressing the YES/+1/ON button), then select the function parameter to be programmed on the DX7. Setting the desired value on the DX7's LCD display will automatically set the corresponding value in the TX7 function edit buffer. This operation can be monitored on the TX7 display by calling the appropriate function display on the TX7. ON/OFF functions must be set using the TX7 NO/−1 and YES/+1 buttons.

Transferring the DX7 Functions to the TX7 Function Edit Buffer

The contents of the DX7 function memory can be sent to the TX7 function edit buffer as follows:
Set the DX7 to "SYS INFO AVAIL", then while still in the DX7 FUNCTION mode, press the DX7 function buttons corresponding to the function parameters you wish to send to the TX7. Each function will be transmitted as its button is pressed, and this can be confirmed on the TX7 by calling the appropriate TX7 function display.

Storing TX7 & DX Function Parameters

Once you have gone through and programmed the required functions for a particular voice, you will need to store the contents of the function edit buffer into the appropriate function memory. You can store the programmed functions in any of the 32 TX7 function memories, or any of the 32 DX function memories.

The first step in storing function data is to turn the TX7's internal memory protect OFF. This is accomplished by switching to the SHIFT mode and pressing the LOAD/PROT button. This button accesses three different functions: memory protect on/off (MEM. PROTECT ON), internal or external function memory load when loading data from a cassette tape (LOAD FUNC ? INT), and cassette load (LOAD CASSETTE ?). For now we will be concerned only with the memory protect function. Each press on the LOAD/PROT button cycles through the three available functions. Select the "MEM. PROTECT ON" display. The memory protect is then turned ON or OFF using the NO/−1 and YES/+1 buttons. Turn the memory protect OFF, then press the MODE switch to return to the NORMAL mode. Now press either the STORE TX PERF or DX FUNC button, depending on whether you want to store the programmed functions into one of the TX7's function memories or one of the DX function memories. If you select STORE TX PERF the display will respond with "STR TX PERF. ? XX", where "XX" is the number of the currently selected function memory. You can now activate the actual store operation for the displayed TX function memory number by pressing the YES/+1 button. The display will read "FINISHED !!!" after a few seconds, indicating that the store operation has been completed, and then will revert to the "STR TX PERF. ?XX" display. You can store the programmed function data into any other memory location by selecting a different memory number using the STORE TX PERF button. Each press on the STORE TX PERF button increments the displayed memory number by one.

Exactly the same process applies to storing the function data into any one of the DX function memories. If you press the STORE DX FUNC button the display will respond with "STR DX's FUNC ?XX", where "XX" is the currently selected function memory number. Any other DX function memory can be selected using the STORE DX FUNC button, and the store operation is executed by pressing the YES/+1 button.

*Be sure to turn memory protect back ON after the store operation.

① NORMAL / SHIFT ➡ `= SHIFT MODE! =`

② LOAD/PROT ➡ `MEM. PROTECT ON`

③ NO −1 ➡ `MEM. PROTECT OFF`

④ NORMAL / SHIFT ➡ `= NORMAL MODE! =`

⑤ TX PERF ➡ `STR TX PERF.? XX`

or

Currently selected number

DX FUNC ➡ `STR DX's FUNC? XX`

⑥ YES +1 ➡ `FINISHED !!!`

⬇

`STR TX PERF.? XX`

or

`STR DX's FUNC? XX`
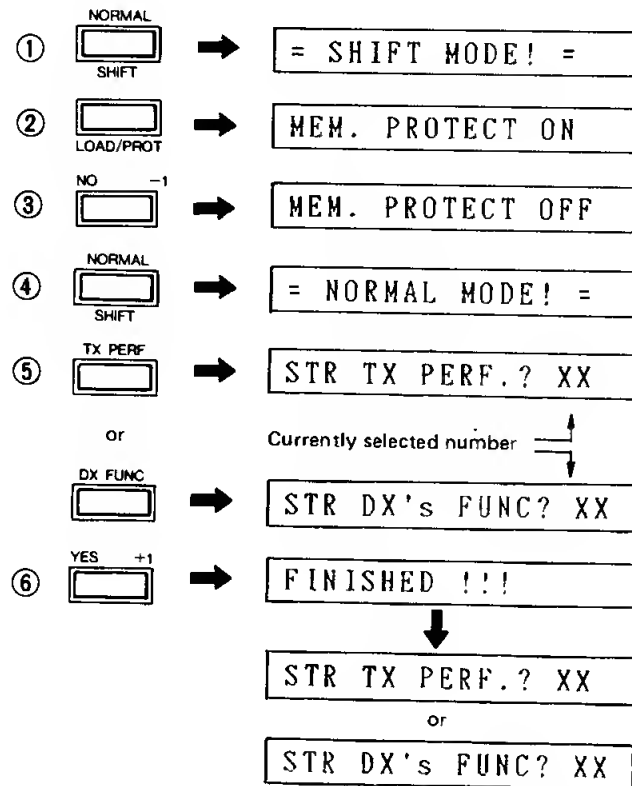
Monitoring DX Function Memory Changes

In order to be able to monitor the effect of function parameter changes on a DX voice while editing the parameters via the TX7 panel controls, set the DX7 to "SYS INFO AVAIL", return to the play mode, and press the appropriate DX7 voice selector button. This operation sends the selected voice data to the TX7's voice buffer (the TX7 display will show the name of the selected DX voice). The DX voice can now be monitored via the TX7 output while you set up the desired function parameters. Then use the STORE DX FUNC button to store the programmed parameters in the appropriate DX function memory, as described previously. The DX voice is only temporarily stored in the TX7's voice buffer, and will be replaced by the original TX7 voice when the corresponding TX7 voice number is next selected.

CASSETTE OPERATIONS

The TX7 has a built-in cassette data interface which can be used to store voice and function data for later loading and use. Each time a SAVE or LOAD operation is executed, an entire set of 32 voice plus 32 function memories is either saved to or loaded into the TX7 from the cassette tape. You have the option of selecting whether you save/load the 32 TX7 voices plus 32 TX7 function memories, or the 32 TX7 voices plus 32 DX function memories. Before attempting a save, verify or load operation, make sure the cassette recorder used is properly connected to the TX7 as shown in the CONNECTIONS diagram on page 5.

Save/Verify

To save an entire voice plus function set, first set the TX7 to the SHIFT mode and press the CASSETTE SAVE/ VERIFY button. The SAVE/VERIFY button accesses four cassette functions: "SAVE NUMBER 0", "SAVE FUNC ? INT", "SAVE TAPE ? TX=0", and "VERIFY CASSETTE ?". These functions are called in the order given above each time the SAVE/VERIFY button is pressed. They are used as follows.

"SAVE NUMBER 0"
This function allows you to specify a file number from 0 to 127 for the voice/function set to be saved. The specified number is recorded at the beginning of the data recorded on the cassette, allowing specific files to be easily located on tapes containing a number of files. The number of the first file encountered during a LOAD operation is displayed on the TX7's LCD, allowing you to verify that the TX7 is loading the desired file. Set the SAVE NUMBER using the NO/−1 and YES/+1 buttons, then press the SAVE/VERIFY button again to go on to the next step

"SAVE FUNC ? INT"
This function lets you specify whether you want to save the TX7's function memory data along with the TX7 voices, or the DX function memory data with the TX7 voices. The options are "INT", corresponding to the TX7 function memory set, and "EXT" corresponding to the DX function memory set. The selection is made using the NO/−1 and YES/+1 buttons. Once set, press the SAVE/VERIFY button again to go on to the next step.

"SAVE TAPE ? TX=0"
You are now ready to execute the actual save operation. This display also gives you the file number you set in the first step. When you are ready to begin saving, start the cassette recorder in the record mode and press the YES/+1 button. The TX7 display will respond with "NOW WORKING !!" indicating that the data is being recorded onto the cassette tape. The save operation takes about 45 seconds, afte which the display will read "FINISHED !!!" for a few seconds and then will revei t to "SAVE TAPE?TX=0".
Press the SAVE/VERIFY button again to go on to the verify step.

"VERIFY CASSETTE?"
This function checks to see that the data has been correctly recorded on the cassette by reading the cassette file just saved and comparing the data with that in the TX7 memory. Rewind the cassette recorder to the beginning of the saved file, press the YES/+1 button, then start the cassette recorder in the play mode. The "NOW WORKING !!" display will appear and the TX7 will read and verify the entire file.

If no errors are encountered the "FINISHED !!!" display will appear for a few seconds and then will revert to the "VERIFY CASSETTE ? " display. If an error is found, however, the display will read "TAPE ERROR". If this happens, try SAVEing the data again. Depending on the cassette recorder you use, you may have to adjust the cassette volume control and/or tone control to achieve reliable operation. Cleaning and demagnetizing the cassette recorder heads might also help.

Load

Pressing the LOAD/PROT button in the SHIFT mode calls the MEMORY PROTECT ON/OFF function we have already seen, and the cassette "LOAD FUNC ? INT" and "LOAD CASSETTE?" functions. Start the load procedure by calling the "LOAD FUNC ? INT" (or "EXT") display.

"LOAD FUNC ? INT"

This function lets you select whether the function memory data from the cassette tape will be loaded into the TX7 function memories or the DX function memories. Select either "INT", corresponding to the TX7 function memories, or "EXT", corresponding to the DX function memories using the NO/−1 and YES/+1 buttons. Then press the LOAD/PROT button again to go on to the next step.

"LOAD CASSETTE ?"

You are now ready to execute the actual load operation. Wind the cassette tape to the beginning of the file to be loded (This is easier if you have recorded voice memos on the cassette tape, prior to each data file. You can monitor the tape sound while searching for the desired file via the TX7's PHONES jack). Press the YES/+1 button and start the cassette recorder in the play mode. The TX7 display will respond with "NOW WORKING !!" while it is searching for the beginning of the file. When the file is located the display will read "FOUND TX=XX", where "XX" is the file number of the file being loaded. When the file has been loaded the TX7 display will read "FINISHED!!!" for a few seconds and then will revert to the "LOAD CASSETTE?" display.

Using the TX7 Cassette Interface to Save and Load DX7 Voices

The TX7 cassette interface can also be used to save or load all 32 DX7 voices plus the 32 DX function memories in the TX7. To SAVE, the DX7 voice memory data is transmitted to the TX7 voice memory via the MIDI interface, and then the SAVE operation is carried out as described above. To LOAD, the cassette data is first loaded into the TX7 memory, and then transmitted to the DX7 via the MIDI interface. In either case the previous memory contents of the TX7 will be completely erased, so make sure you have the TX7 memory data on cassette so it is not completely lost.

To transfer the DX7 voices to the TX7 for saving, first turn the TX7 memory protect function OFF. Then set the DX7 to "SYS INFO AVAIL", call the DX7 "MIDI TRANSMIT?" function and press the DX7 YES button to begin the transmission. The TX7 display will read "MIDI RECEIVED!" when the data from the DX7 has been transferred to the TX7 voice memory. Then, simply SAVE the TX7 voice memory plus DX function memory ("EXT") as described above.

To load a voice set from cassette tape into the DX7, first load the cassette file into the TX7 as described above. Then, to transmit the TX7 voice memory contents to the DX7, turn the DX7 internal memory protect function OFF, set the DX7 to "SYS INFO AVAIL", call the TX7 "MIDI TRANSMIT?" display by pressing the TX7 MIDI DUMP/INIT button in the SHIFT mode, then press the TX7 YES/+1 button to begin the transmission. The DX7 LCD display will read "MIDI RECEIVED" when the voices have been transferred to the DX7 voice memory.

*Make sure you turn the DX7 internal memory protect function ON, and set "SYS INFO UNAVAIL" after receiving voices from the TX7.
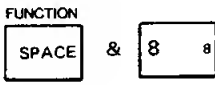
Operations for saving DX7 voices with functions onto cassette tape

① NORMAL [□] / SHIFT ➡️ `= SHIFT MODE! =`

② [□] LOAD/PROT ➡️ `MEM. PROTECT ON`
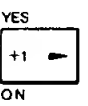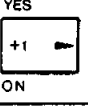
③ NO [□] −1 ➡️ `MEM. PROTECT OFF`

DX7

④ FUNCTION [SPACE] & [8 8] ➡️ `FUNCTION CONTROL`
`SYS INFO UNAVAIL`

⑤ YES [+1 ◄] ON ➡️ `FUNCTION CONTROL`
`SYS INFO AVAIL`

⑥ [8 8] ➡️ `FUNCTION CONTROL`
`MIDI TRANSMIT?`

⑦ YES [+1 ◄] ON ➡️ `MIDI RECEIVED!`

⑧ [□] SAVE/VERIFY ➡️ `SAVE NUMBER 0`

⑨ YES +1 [□] ➡️ `SAVE NUMBER XX`
0 ～ 127

⑩ [□] SAVE/VERIFY ➡️ `SAVE FUNC? INT`

⑪ YES +1 [□] ➡️ `SAVE FUNC? EXT`

⑫ [□] SAVE/VERIFY ➡️ `SAVE TAPE? TX=XX`

⑬ Start the cassette recorder
&
YES +1 [□] ➡️ `NOW WORKING !!`
⬇️
`FINISHED !!!`
⬇️
`SAVE TAPE? TX=XX`

Operations for loading voice data from cassette tape into the DX7

① ~ ③ same as above

④ [LOAD/PROT] ➡ | LOAD FUNC? INT |

⑤ [YES +1] ➡ | LOAD FUNC? EXT |

⑥ Wind the cassette tape to the beginning of the file to be loaded.

⑦ [LOAD/PROT] ➡ | LOAD CASSETTE? |

⑧ [YES +1] ➡ | NOW WORKING!! |

&

Start the cassette recorder

⬇

| FOUND TX=XX |

⬇

| FINISHED !!! |

⬇

| LOAD CASSETTE? |

DX7

⑨ MEMORY PROTECT INTERNAL [X] & NO [-1 ←] OFF

➡ | MEMORY PROTECT
INTERNAL OFF |

⑩ & ⑪ Same as ④ & ⑤ in the "saving" operations above

⑫ [DUMP/INIT] ➡ | MIDI TRANSMIT? |

⑬ [YES +1] ➡ | NOW WORKING !! |

&

(DX7)

| FUNCTION CONTROL
MIDI RECEIVED |
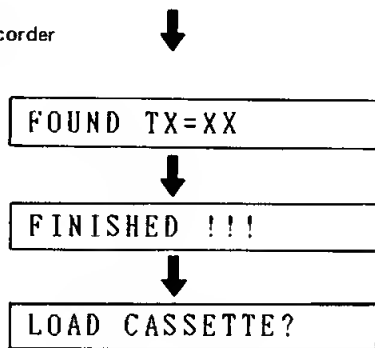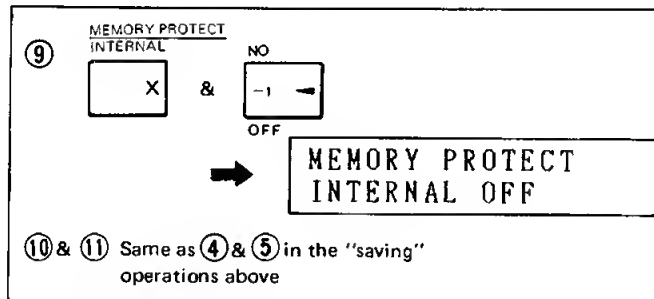
MIDI OPERATIONS

Although we have already used many of the MIDI functions available on the TX7 in the operations described in the preceding sections of this manual, this section will provide a summary of the operation for each MIDI function.

MIDI MODE Functions

Pressing the MIDI MODE button in the SHIFT mode accesses the following functions:

"D. ENTRY RCV. OFF"

When this function is ON, the TX7 is capable of receiving data via the DX synthesizer DATA ENTRY control. This capability is used for editing TX7 function parameters via the DX DATA ENTRY control. This function is also used to link the TX7 and DX tuning functions: Set DATA ENTRY RECEIVE to ON, call the TX7 MASTER TUNE function, and select the DX synthesizer MASTER TUNE function. Now the DATA ENTRY control will tune the DX and TX7 in perfect synchronization.
Use the NO/−1 and YES/+1 buttons to turn DATA ENTRY RECEIVE ON or OFF. Since this function and the DATA ENTRY VOLUME function cannot be active simultaneously, the latter will automatically be turned OFF when the former is turned ON.

"MIDI RCV. CH. 1"

This function determines on which of the 16 available MIDI channels the TX7 will receive MIDI data (when the OMNI MODE, below, is OFF). The desired MIDI channel number is set using the NO/−1 and yes/+1 buttons.

*The TX7 always transmits on MIDI channel 1. *The DX9, DX7, DX1, KX1, etc. all transmit on MIDI channel 1.

"OMNI MODE OFF"

This is the OMNI MODE switch. When the OMNI MODE is OFF, MIDI reception occurs only over the MIDI channel specified in the MIDI RECEIVE CHANNEL function, above. When the OMNI MODE is ON, MIDI data is received on all MIDI channels simultaneously. NO/−1 and YES/+1 select the desired mode.

"D.ENTRY VOL OFF"

Turning this function ON makes it possible to control the TX7 volume via the DX synthesizer DATA ENTRY control. Press YES/+1 to turn this function ON and NO/−1 to turn it OFF. Since this function and "D.ENTRY RCV.ON" cannot be active simultaneously, the latter will automatically be turned OFF when the former is turned ON.

"CTL. CHNG. RCV. OFF"

When this function is ON, the TX7 is capable of receiving the following real-time control data from the DX synthesizer:

*Modulation Wheel
*Breath Controller
*Foot Controller
*Portamento Time

*Sustain Switch
*Portamento Switch
*Volume

When this function is OFF, the above controls will have no effect even if the TX7 function parameters are set up to produce an effect.
The NO/−1 and YES/+1 buttons turn this function OFF and ON.

MIDI DUMP/INIT Functions

Pressing the MIDI DUMP/INIT button in the SHIFT mode accesses the following functions:

"VOICE INIT ?"

This function initializes a single TX7 voice plus function memory, or all 32 voice/function memories simultaneously. The initialized voice and function data is given in the following charts:

INITIALIZE VOICE PARAMETERS

Algorithm		1
Feedback		0
Pitch		8 feet
EG		⌐‾⌐
EG Scaling		none
Output Level	Operator 1 =	99
	Operator 2 −− 6 =	0
Modulation		0
Oscillator Key Sync		ON
Transpose		C3
LFO Waveform		Triangular
LFO Speed		35
LFO Delay		0
LFO Pitch Modulation Sensitivity		3
LFO Pitch Modulation Depth		0

INITIALIZE FUNCTION DATA

Master Tune	440 Hz
Play Mode	Poly
Pitch Bend Range	7
Pitch Bend Step	0
Portamento Mode	RETAIN
Portamento/Glissando Switch	PORT
Portamento Time	0
Modulation Wheel Range	8
Modulation Wheel Pitch	1
Modulation Wheel Amplitude	0
Modulation Wheel EG Bias	0
Foot Control Range	8
Foot Control Pitch	0
Foot Control Amplitude	0
Foot Control EG Bias	0
Breath Control Range	15
Breath Control Pitch	0
Breath Control Amplitude	0
Breath Control EG Bias	0

26

After Touch Range	8
After Touch Pitch	0
After Touch Amplitude	0
After Touch EG Bias	0
Limit Key Lowest	C-2
Limit Key Highest	G8
Attenuation	7

To initialize a single voice/function memory, activate the VOICE INIT function
with the TX7 memory protect function ON. This initializes only the voice and function
edit buffers, which can then be reprogrammed or stored in the initialized state into
any of the TX7's voice/function memories. First check that MEMORY PROTECT
is ON, then call the "VOICE INIT?" display and press the YES/+1 button to execute
the initialize operation. The TX7 display will respond with "MEM. PROTECTED",
but the voice and function edit buffers will be initialized.

To initialize the entire TX7 memory contents, activate the VOICE INIT function
with MEMORY PROTECT OFF. Remember that if you do this, any data previously
in the TX7 memory will be erased, so make sure you have a copy on cassette tape
if the TX7 contains voices and function data you wish to keep.

Operations for initializing a single voice/function memory

① NORMAL / SHIFT ➡ `= SHIFT MODE! =`

② LOAD/PROT ➡ `MEM. PROTECT ON`

③ DUMP/INIT ➡ `VOICE INIT?`

④ YES +1 ➡ `MEM. PROTECTED`
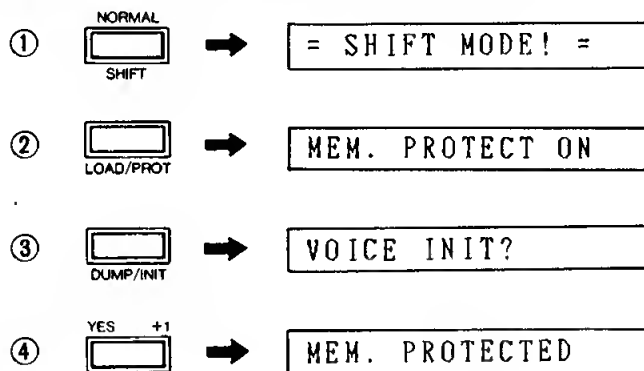
Operations for initializing the entire TX7 memory contents

① & ② Same as above

③ NO −1 ➡ `MEM. PROTECT OFF`

④ DUMP/INIT ➡ `VOICE INIT?`

⑤ YES +1 ➡ `NOW WORKING !!`

↓

`FINISHED !!!`

↓

`VOICE INIT?`
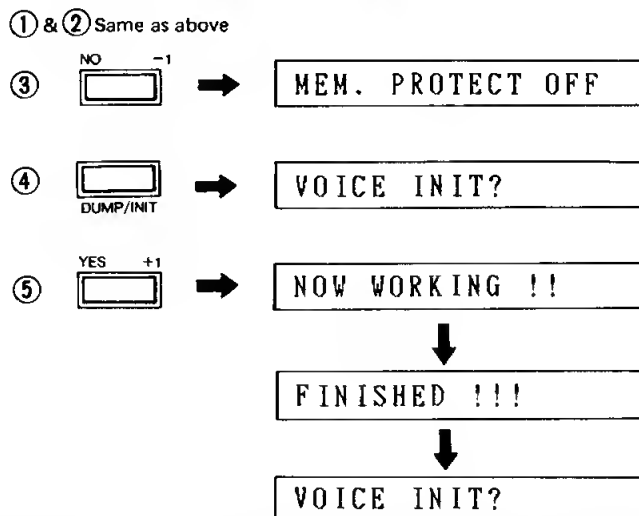
"FUNCTION COPY?"

This function copies the contents of the TX7 function edit buffer into all 32 TX7 function memories or all 32 DX function memories at once, effectively setting all function memories in the selected group to the same values.

To use this function, first turn the TX7 MEMORY PROTECT function OFF. Then, to determine whether the function edit buffer contents will be copied to all TX7 function memories or all DX function memories, call the CASSETTE SAVE/VERIFY "SAVE FUNC ? INT" display and select either "INT", to copy to all TX7 function memories, or "EXT", to copy to all DX function memories. Then return to the MIDI DUMP/INIT "FUNCTION COPY ?" display and press the YES/+1 button to execute the function copy operation.

*Be sure to turn the TX7 memory protect function back ON.

FUNCTION COPY operations

① & ② Same as above

③ **NO** **−1** ➡ | MEM. PROTECT OFF |

④ **SAVE/VERIFY** & **YES** **+1** or **NO** **−1**

➡ | SAVE FUNC? INT |

or

| SAVE FUNC? EXT |

⑤ **DUMP/INIT** ➡ | FUNCTION COPY? |

⑥ **YES** **+1** ➡ | FINISHED !!! |

⬇

| FUNCTION COPY? |
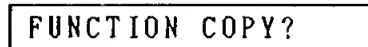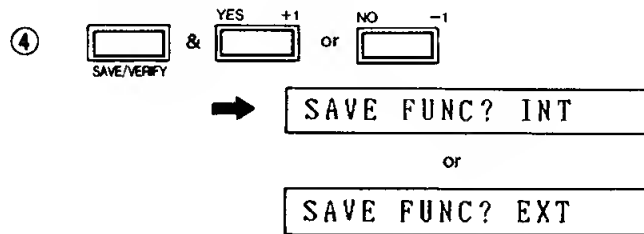
"EDIT VOICE OUT ?"

This function transmits the voice and function data in the TX7 voice and function edit buffers to the DX7 voice and function edit buffers, permitting the voice and function parameters to be checked on the DX7 LCD display.

First turn the DX7 internal memory protect OFF, and set the DX7 to "SYS INFO AVAIL". Then call the TX7 "EDIT VOICE OUT ?" display and press the YES/+1 button to begin the transmission. Once transmitted, the DX7 display will show the name of the transmitted voice, the voice data of which can then be checked on the DX7 display by calling the appropriate voice parameters in the DX7 edit mode.

EDIT VOICE OUT operations

DX7

① MEMORY PROTECT INTERNAL `x` & NO `-1` / OFF

➡ ```
MEMORY PROTECT
INTERNAL OFF
```

② FUNCTION `SPACE` & `8` a

➡ ```
FUNCTION CONTROL
SYS INFO UNAVAIL
```

③ YES `+1` / ON

➡ ```
FUNCTION CONTROL
SYS INFO AVAIL
```

④ NORMAL / SHIFT ➡ ```
= SHIFT MODE! =
```

⑤ DUMP/INIT ➡ ```
EDIT VOICE OUT?
```

⑥ YES +1 ➡ ```
FINISHED !!!
```

↓

```
EDIT VOICE OUT?
```
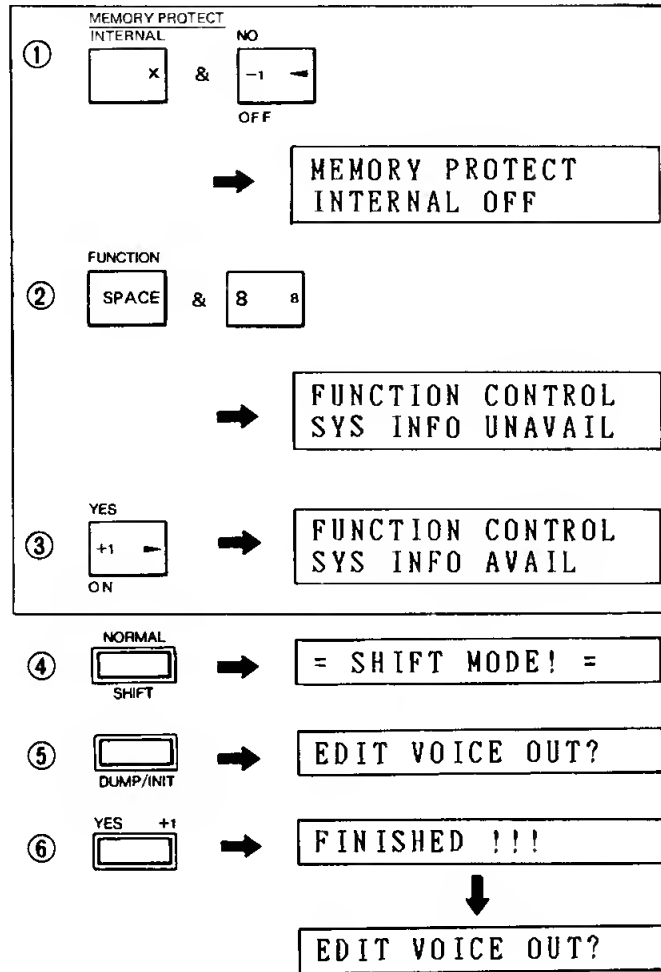
"MIDI TRANSMIT ?"

This function permits transmitting all 32 TX7 voice memories to the corresponding DX7 voice memories. To use this function, first turn the DX7 internal memory protect function OFF, and set the DX7 to "SYS INFO AVAIL". Then call the TX7 "MIDI TRANSMIT ?" display and press the YES/+1 button to begin transmission. The TX7 LCD will display "NOW WORKING !!" while the data is being transmitted, and the DX7 display will read "MIDI RECEIVED" once all the voice data has been received.

*Be sure to turn the DX7 internal memory protect back ON after using this function.

MIDI TRANSMIT operations

① ~ ③ same as EDIT VOICE OUT operations above

④ NORMAL / SHIFT ➡ ```
= SHIFT MODE! =
```

⑤ DUMP/INIT ➡ ```
MIDI TRANSMIT?
```
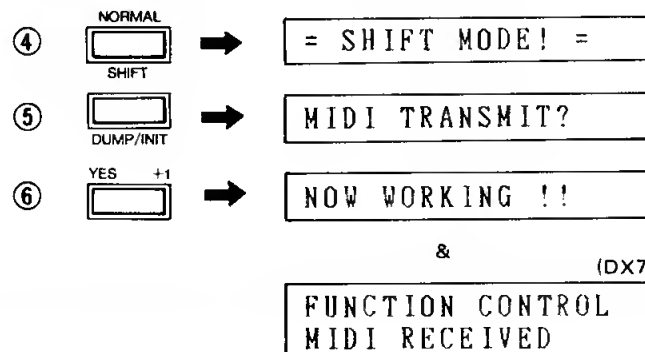
⑥ YES +1 ➡ ```
NOW WORKING !!
```

&
(DX7)

```
FUNCTION CONTROL
MIDI RECEIVED
```

SPECIFICATIONS

Sound Source .... FM Tone Generator (6 Operators)

Simultaneous Output Notes............. Polyphonic: 16 (first note priority)

                                               Monophonic: 1 (last note priority)

Internal Memory .... 32 PERFORMANCEs

                                               (32 VOICEs + 32 FUNCTIONs),

                                               32 DX FUNCTIONs

Control Panel .... PRESET VOLUME   (4)

                                               PROGRAM CHANGE/CASSETTE   (2)

                                               STORE/MIDI   (2)

                                               FUNCTION   (1)

                                               NORMAL/SHIFT   (1)

                                               DATA ENTRY   (2)

Display .... LCD (16 characters x 1 line)

Connection Terminals .... MIDI IN (DIN JACK 5P)

                                               MIDI OUT (DIN JACK 5P)

                                               MIDI THRU (DIN JACK 5P)

                                               CASSETTE (DIN JACK 8P)

                                               OUTPUT (PHONE JACK MONO)

                                               HEAD PHONE (PHONE JACK STEREO)

Power Requirements......................... US & Canadian models: 120 V 50/60 Hz

                                               General model: 220-240 V 50/60 Hz

Power Consumption .... US & Canadian models: 12W

                                               General model: 10W

Dimensions (W x H x D).................. 351 x 50 x 241 mm

                                               (13-5/6" x 2" x 9-1/2")

Weight... 2.3 kg (5 lbs. 1 oz.)

*All specifications are subject to change without notice.

ABOUT MIDI

The MIDI (Musical Instrument Digital Interface) system permits the transfer of various types of data between different musical instruments and other music-related equipment. The MIDI data format conforms to a world-wide standard. MIDI data can be broadly divided into CHANNEL INFORMATION and SYSTEM INFORMATION.

CHANNEL INFORMATION

This data group corresponds to actual performance events, and effectively permits "remote control" of one instrument from another.

The TX7 permits only reception of channel information data, and will ignore certain types of channel information data that it is not capable of utilizing.

Main CHANNEL INFORMATION DATA Parameters

*KEY ON/OFF
*KEY VELOCITY
*PROGR M CHANGE
*PITCH BENDER
*CONTROL CHANGE (modulation wheel, sustain switch, etc.)
*DATA ENTRY

SYSTEM INFORMATION

Within the SYSTEM INFORMATION category, the TX7 receives SYSTEM EXCLUSIVE INFORMATION and SYSTEM REALTIME INFORMATION.

SYSTEM EXCLUSIVE INFORMATION

This corresponds to actual voice and function data, and differs from manufacturer to manufacturer. The TX7 is capable of handling only YAMAHA standard SYSTEM EXCLUSIVE INFORMATION data.

Main SYSTEM EXCLUSIVE INFORMATION Data
*1 VOICE BULK DATA
*32 VOICE BULK DATA
*1 PERFORMANCE BULK DATA
*64 PERFORMANCE BULK DATA
*PARAMETER CHANGE (Individual voice or function data; receive only)

When the DX7 is set to "SYS. INFO AVAIL", transmission and reception of SYSTEM EXCLUSIVE INFORMATION is possible.

SYSTEM REALTIME INFORMATION

The TX7 has an ACTIVE SENSING function. This function automatically cancels audio output if the MIDI cable is disconnected or when the MIDI data is interrupted.

MIDI DATA FORMAT

1. RECEPTION CONDITIONS

Code	Description
$FE	ACTIVE SENSING
$80	NOTE OFF
$90	NOTE ON
$B0, $01	MOD. WHEEL
$B0, $02	BREATH CONTROL
$B0, $04	FOOT CONTROL
$B0, $05	PORTAMENTO TIME
$B0, $07	VOLUME
$B0, $40	SUSTAIN SWITCH
$B0, $41	PORTAMENTO SWITCH
$C0	PROGRAM CHANGE
$D0	AFTER TOUCH
$E0	PITCH BENDER
$B0, $60	INCREMENT
$B0, $61	DECREMENT
$B0, $06	DATA ENTRY
$B0, $06	DATA ENTRY = Volume
$F0, $43, $00, $02	64 PERFORMANCE BULK
$F0, $43, $00, $09	32 VOICE BULK
$F0, $43, $00, $00	I VOICE BULK
$F0, $43, $00, $01	I PERFORMANCE BULK
$F0, $43, $10	PARAMETER CHANGE
$F0, $43, $20	DUMP REQUEST
$B0, $7C	OMNI OFF
$B0, $7D	OMNI ON
$B0, $7E	MONO
$B0, $7F	POLY

CONTROL CHANGE RECEIVE SWITCH — ON

OMNI

MIDI channel # ?

MIDI IN

DATA ENTRY RECEIVE — ON / OFF

DATA ENTRY VOLUME — ON

MEMORY PROTECT — ON / OFF

MIDI channel # ?

NOTE:

> The meaning of letters used in byte numbers will only be given once, to save repetition. For example, the letter n in byte number 1000nnnn (Key Off Status) means MIDI channel number and will mean the same when it appears in all other byte numbers.

2-1. Reception Channel and Omni

The TX7 MIDI MODE selection function permits setting the OMNI reception mode ON or OFF. When the OMNI mode is OFF, MIDI reception is enabled only on the selected MIDI channel (1 ~ 16). When the OMNI mode is ON, MIDI reception is enabled on all channels.

2-2. Channel Voice Message

2-2-1. Key Off

Status	1000nnnn
	n = MIDI channel number
Note Number	0kkkkkkk
	k = 0 (note C-2) ~ 127 (note G8)
Key Velocity	0vvvvvvv
	v: ignore

2-2-2. Key On/Off

Status	1001nnnn
Note Number	0kkkkkkk
	k = 0 (note C-2) ~ 127 (note G8)
Key Velocity	0vvvvvvv
	v = 0 (key off)
	v = 1 ~ 127 (key on)

2-2-3. Control Change

Status	1011nnnn
Control Number	0ccccccc
	c = 0 ~ 127
Control Value	0vvvvvvv
	v = 0 ~ 127

(a) Control Numbers For Fixed Input

c = 1	Modulation Wheel	v = 0 ~ 127
c = 2	Breath Control	v = 0 ~ 127
c = 3	Foot Control	v = 0 ~ 127
c = 5	Portamento	v = 0 ~ 127
c = 7	Volume	v = 0 ~ 127
c = 64	Sustain Switch	v = 0, 127
c = 65	Portamento Switch	v = 0, 127

(b) Data Entry Receive Switch ON

c = 6	Data Entry
c = 96	Increment
c = 97	Decrement

You can alter voice or function parameters selected with Parameter Change in SYSTEM EXCLUSIVE DATA.

(c) Data Entry Volume ON

c = 6	Data Entry

The Data Entry data is received as volume control data.

2-2-4. Program Change

Status	1100nnnn
Program Number	0ppppppp
	Ignore the first two bits.
	Select 1 to 32.

Only received when the TX7 is in the COMBINED or INDIVIDUAL Program Change modes.

2-2-5. After Touch

Status	1101nnnn
Pressure	0vvvvvvv

2-2-6. Pitch Bend

Status	1110nnnn	
Value (LSB)	0uuuuuuu	
Value (MSB)	0vvvvvvv	8 bits resolution. MS 8 bits are recognized.

2-3. Channel Mode Message

Status	1110nnnn
	0ccccccc
	0vvvvvvv

c = 124	v = 0	Omni Mode OFF
c = 125	v = 0	Omni Mode ON
c = 126	v = 1	Mono Mode ON
c = 127	v = 0	Poly Mode ON

Omni status (ON/OFF) is controlled via the front panel (in the Omni ON/OFF sub-mode) and has final priority. Changes in mode are accompanied by a compulsory voice dump and cleaning of the Key Assigner.

2-4. System Real Time Message

Status	11111110	Active Sensing

When this code is received, sensing begins. If neither status nor data is received over an interval of 300 mS, the TX7 will stop sensing after first dumping all voices and clearing the Key Assigner, turning the sustain pedal OFF and the portamento switch ON.

2-5. System Exclusive Message

2-5-1. Bulk Dump

(i) 1 Voice Bulk Data

Status	11110000
I.D.	01000011
Sub-status/Ch.	0000nnnn
Format Number	00000000
Byte Count	00000001
Byte Count	00011011
Data	0ddddddd
	.
	0ddddddd
Check Sum	0eeeeeee

155 bytes of voice data sent $d = 0$ to 127

The 155 bytes of voice data go into the Edit buffer, replacing any existing data there.

(ii) 1 Performance Bulk Data

Status	11110000
I.D.	01000011
Sub-status/Ch.	0000nnnn
Format Number	00000001
Byte Count	00000000
Byte Count	01011110
Data	0ddddddd
	.
	0ddddddd
Check Sum	0eeeeeee

94 bytes of function data sent

Out of the 94 bytes sent, only the data corresponding to the TF1 goes into the Edit Buffer, altering the function data of any voice currently in the Edit Buffer. Channel A or B data are received according to the voice memory select flag in the data byte.

(iii) 64 Performance Bulk Data

Status	11110000
I.D.	01000011
Sub-status/Ch.	0000nnnn
Format Number	00000010
Byte Count	00100000
Byte Count	00000000
Data	0ddddddd
	.
	0ddddddd
Check Sum	0eeeeeee
EOX	

4096 bytes of data sent

These data can only be input when the Memory Protect is OFF. When received, the ⌐MIDI RECEIVED⌐ display will appear on the LCD panel. Only the first 32 of the 64 function data, segments are loaded in order into the function memories 1 thru 32.

Whether the data will be loaded into the DX or TX function memories will depend on the state of the LOAD FUNCTION parameter when the cassette load operation is initiated.

(iv) 32 Voice Bulk Data

Status	11110000
I.D.	01000011
Sub-status/Ch.	0000nnnn
Format Number	00001001
Byte Count	00100000
Byte Count	00000000
Data	0ddddddd
	4096 bytes of data sent
	0ddddddd
Check Sum	0eeeeeee

These data can only be input when the Memory Protect is OFF. When received, the ⌐MIDI RECEIVED⌐ display will appear on the LCD panel.

2-5-2. Parameter Change

Status	11110000	
I.D.	01000011	
Sub-status/Ch.	0001nnnn	
Parameter		
Group Number	0gggggghh	g = 0 ~ 4, h = 0, 1
Parameter No.	0ppppppp	p = 0 ~ 127
EOX	11110111	

Voice or function data in the Edit Buffer will be changed.

2-5-3. Dump Request

Status	11110000	
I.D.	01000011	
Sub-status/Ch.	0010nnnn	
Format Number	0fffffff	
	f = 0, 1, 2, 9, 125	
EOX	11110111	

The corresponding bulk data will be dumped through the MIDI OUT terminal.

3.TRANSMISSION DATA

Data is only transmitted when a dump request signal is received from an external source or by direct panel switching. Data is always sent via MIDI channel 1 and consists of System Exclusive voice and function data.

3-1. Transmission Conditions

(a) Transmission for Dump Request

The following five kinds of data dump can be done, according to the selected format number (f).

f = 0	1 Voice Bulk Data
	Transmits voice data in the Edit Buffer
f = 1	1 Performance Bulk Data
	Transmits function data in the Edit Buffer
f = 2	64 Performance Bulk Data
	Transmits all function data from programs 1 thru 32 in order.
f = 9	32 Voice Bulk data
	Transmits all voice data from programs 1 thru 32

(Formatting for the above is the same as for input).

f = 125	Condition Acknowledge

Status	11110000
I.D.	01000011
Sub-status/Ch.	00000000
Format Number	01111101
Byte Count	00000000
Byte Count	00010000
Data	0ddddddd
	0ddddddd
Check Sum	0eeeeeee
EOX	11110111

(b) Panel Switch [MIDI TRANSMIT] Mode

Data is transmitted when the YES/+1 button is pressed while [MIDI TRANSMIT?] is showing on the LCD display.

- 32 voice bulk data.

(c) Panel Switch [COMBIND] Mode

When a voice is selected on when a program change command is received in combined mode, the following data is transmitted.

- 1 performance data.

(d) Panel Switch [INDIVIDUAL] Mode

When a program change command is received in the individual mode, the following data is transmitted.

- 1 performance data.

(e) Panel Switch [EDIT VOICE OUT] Mode

When the YES/+1 button is pressed while the [EDIT VOICE OUT] display is showing, the following data is transmitted.

- 1 performance data.
- 1 voice data.

4-1. DX7 Voice Parameter Change (g = 0)

Sub-group Number h	Parameter Number P	Parameter	Data	Notes
0	0	OP6 EG RATE 1	0 ~ 99	
	1	OP6 EG RATE 2	0 ~ 99	
	2	OP6 EG RATE 3	0 ~ 99	
	3	OP6 EG RATE 4	0 ~ 99	
	4	OP6 EG LEVEL 1	0 ~ 99	
	5	OP6 EG LEVEL 2	0 ~ 99	
	6	OP6 EG LEVEL 3	0 ~ 99	
	7	OP6 EG LEVEL 4	0 ~ 99	
	8	OP6 KEYBOARD LEVEL SCALING BREAK POINT	0 ~ 99	* 1
	9	OP6 KEYBOARD LEVEL SCALING LEFT DEPTH	0 ~ 99	
	10	OP6 KEYBOARD LEVEL SCALING RIGHT DEPTH	0 ~ 99	
	11	OP6 KEYBOARD LEVEL SCALING LEFT CURVE	0 ~ 3	* 2
	12	OP6 KEYBOARD LEVEL SCALING RIGHT CURVE	0 ~ 3	* 2
	13	OP6 KEYBOARD RATE SCALING	0 ~ 7	
	14	OP6 AMPLITUDE MODULATION SENSITIVITY	0 ~ 3	
	15	OP6 KEY VELOCITY SENSITIVITY	0 ~ 7	
	16	OP6 OPERATOR OUTPUT LEVEL	0 ~ 99	
	17	OP6 OSCILLATOR MODE	0 ~ 1	* 3
	18	OP6 OSCILLATOR FREQUENCY COARSE	0 ~ 31	* 4
	19	OP6 OSCILLATOR FREQUENCY FINE	0 ~ 99	* 4
	20	OP6 OSCILLATOR DETUNE	0 ~ 14	* 5
	21 ~ 41	OP5		
	42 ~ 62	OP4		
	63 ~ 83	OP3		
	84 ~ 104	OP2		
	105 ~ 125	OP1		
1	126	PITCH EG RATE 1	0 ~ 99	
	127	PITCH EG RATE 2	0 ~ 99	
	0 (128)	PITCH EG RATE 3	0 ~ 99	
	1 (129)	PITCH EG RATE 4	0 ~ 99	
	2 (130)	PITCH EG LEVEL 1	0 ~ 99	
	3 (131)	PITCH EG LEVEL 2	0 ~ 99	
	4 (132)	PITCH EG LEVEL 3	0 ~ 99	
	5 (133)	PITCH EG LEVEL 4	0 ~ 99	
	6 (134)	ALGORITHM SELECT	0 ~ 31	
	7 (135)	FEEDBACK	0 ~ 7	
	8 (136)	OSCILLATOR KEY SYNC	0 ~ 1	
	9 (137)	LFO SPEED	0 ~ 99	
	10 (13B)	LFO DELAY	0 ~ 99	
	11 (139)	LFO PITCH MODULATION DEPTH	0 ~ 99	
	12 (140)	LFO AMPLITUDE MODULATION DEPTH	0 ~ 99	
	13 (141)	LFO KEY SYNC	0 ~ 1	
	14 (142)	LFO WAVE	0 ~ 5	* 6
	15 (143)	LFO PITCH MODULATION SENSITIVITY	0 ~ 7	
	16 (144)	TRANSPOSE	0 ~ 48	Concert
	17 (145)	VOICE NAME 1	ASCII	pitch at 24
	⟨ ⟩	⟨		
	26 (154)	VOICE NAME 10	ASCII	
1	27 (155)	OPERATOR ON/OFF	xeeeeee	* 7
	28 (156)	OPERATOR SELECT	0 ~ 5	* 8

*1 BREAK POINT

BREAK POINT	0	1	2	3	4	5	15	27	39	51	63	75	87	99
MIDI NOTE #	21	22	23	24	25	26	36	48	60	72	84	96	108	120
NOTE	A_1	A_1#	B_1	C_0	C_0#	D_0	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8

*2 KEYBOARD LEVEL SCALING CURVE

	0	1	2	3
CURVE	−LIN	−EXP	+EXP	+LIN

*3 OSCILLATOR MODE

"0" .... frequency ratio
"1" .... fixed frequency

*4 FREQUENCY COARSE FINE

i) For Frequency Ratio

When FINE = 0

COARSE	0	1	2	3	10	30	31
FREQUENCY RATIO	0.5	1	2	3	10	30	31

When Coarse = 1

FINE	0	1	2	3	10	50	99
FREQUENCY RATIO	1.00	1.01	1.02	1.03	1.10	1.50	1.99

ii) For Fixed Frequency

When FINE = 0

COARSE	0	1	2	3	4	5	6	7		31
FREQUENCY (Hz)	1	10	100	1000	1	10	100	1000		1000

When Coarse = 0

FINE	0	1	2	3	4	5	10	20	50	99
FREQUENCY (Hz)	1.000	1.023	1.047	1.072	1.096	1.122	1.259	1.585	3.162	9.772

*5 DETUNE

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
DETUNE	−7	−6	−5	−4	−3	−2	−1	0	1	2	3	4	5	6	7

*6 LFO WAVE

	0	1	2	3	4	5
WAVE	TRIANGLE	SAW DOWN	SAW UP	SQUARE	SINE	SAMPLE/HOLD

*7 OPERATOR ON OFF

BIT	b_5	b_4	b_3	b_2	b_1	b_0
OP	OP1	OP2	OP3	OP4	OP5	OP6

Bit Map
"0"...OFF "1"...ON

*8 OPERATOR SELECT

	0	1	2	3	4	5
OPERATOR	OP6	OP5	OP4	OP3	OP2	OP1

4-2. DX Performance Parameter Change (g = 1) (h = 0)

Parameter Number P	Parameter	Data	Notes
0			
1	SOURCE SELECT	1 ~ 16	* 3
2	POLY/MONO	0 ~ 1	
3	PITCH BEND RANGE	0 ~ 12	
4	PITCH BEND STEP	0 ~ 12	
5	PORTAMENTO TIME	0 ~ 99	
6	PORTAMENTO/GLISSANDO	0 ~ 1	
7	PORTAMENTO MODE	0 ~ 1	* 1
8			
9	MODULATION WHEEL SENSITIVITY	0 ~ 15	
10	MODULATION WHEEL ASSIGN	0 ~ 7	* 2
11	FOOT CONTROLLER SENSITIVITY	0 ~ 15	
12	FOOT CONTROLLER ASSIGN	0 ~ 7	* 2
13	AFTER TOUCH SENSITIVITY	0 ~ 15	
14	AFTER TOUCH ASSIGN	0 ~ 7	* 2
15	BREATH CONTROLLER SENSITIVITY	0 ~ 15	
16	BREATH CONTROLLER ASSIGN	0 ~ 7	* 2
17			
18			
19			
20			
21			
22			
23			
24			
25			
26	AUDIO OUTPUT LEVEL ATTENUATOR	0 ~ 7	
27			
28			
29			
30			
31			
32			
33			
34			
63			Concert
64	MASTER TUNING	0 ~ 127	pitch at 64

*1 PORTAMENTO MODE

"0" ... sustain-key pitch retain

"1" ... sustain-key pitch follow

*2 EFFECT ASSIGN

Bit	b_2	b_1	b_0
ASSIGN	EG BIAS	AMPLITUDE	PITCH

*3 SOURCE SELECT

Selects MIDI receive channel 1 to 16

4-3. Function Parameter Change (g = 2) (h = 0)

Parameter Number P	Parameter	Data	Notes
64	POLY/MONO	0 ~ 1	
65	PITCH BEND RANGE	0 ~ 12	
66	PITCH BEND STEP	0 ~ 12	
67	PORTAMENTO MODE	0 ~ 1	
68	PORTAMENTO/GLISSANDO	0 ~ 1	
69	PORTAMENTO TIME	0 ~ 99	
70	MODULATION WHEEL SENSITIVITY	0 ~ 99	* 1
71	MODULATON WHEEL ASSIGN	0 ~ 7	
72	FOOT CONTROLLER SENSITIVITY	0 ~ 99	* 1
73	FOOT CONTROLLER ASSIGN	0 ~ 7	
74	BREATH CONTROLLER SENSITIVITY	0 ~ 99	* 1
75	BREATH CONTROLLER ASSIGN	0 ~ 7	
76	AFTER TOUCH SENSITIVITY	0 ~ 99	* 1
77	AFTER TOUCH ASSIGN	0 ~ 7	

*1 EFFECT SENSITIVITY

Data received over a range of 0 ~ 99 is in the memory on a scale of 0 ~ 15

4-4. TX Function Parameter Change (g = 4)(h = 1)

Parameter Number P	Parameter	Data	Notes
0	DATA ENTRY RECEIVE SWITCH	0, 1	
1	CONTROL CHANGE RECEIVE SWITCH	0, 1	
2	DATA ENTRY VOLUME SWITCH	0, 1	
3	COMPUTE COMMUNICATION SWITCH	0, 1	
4	COMBINED (0) OR INDIVIDUAL (1)	0, 1	
5	NOTE LIMIT LOW	0 ~ 127	
6	NOTE LIMIT HIGH	0 ~ 127	
7	MEMORY PROTECT OFF/ON	0, 127	
11	LOAD FUNCTION SELECT INT/EXT	0, 127	

4-5. 1 Voice Bulk Data

155 bytes of data. The arrangement of this data is the same as in diagram 4-1, parameters 0 thru 154.

4-6. 1 Performance Bulk Data (f = 1)

Parameter Number P	Parameter	Data	Notes
0			
1			
2	VOICE A POLY/MONO	0 ~ 1	
3	VOICE A PITCH BEND RANGE	0 ~ 12	
4	VOICE A PITCH BEND STEP	0 ~ 12	
5	VOICE A PORTAMENTO TIME	0 ~ 99	
6	VOICE A PORTAMENTO/GLISSANDO	0 ~ 1	
7	VOICE A PORTAMENTO MODE	0 ~ 1	
8			
9	VOICE A MODULATION WHEEL SENSITIVITY	0 ~ 15	
10	VOICE A MODULATION WHEEL ASSIGN	0 ~ 7	
11	VOICE A FOOT CONTROLLER SENSITIVITY	0 ~ 15	
12	VOICE A FOOT CONTROLLER ASSIGN	0 ~ 7	
13	VOICE A AFTER TOUCH SENSITIVITY	0 ~ 15	
14	VOICE A AFTER TOUCH ASSIGN	0 ~ 7	
15	VOICE A BREATH CONTROLLER SENSITIVITY	0 ~ 15	
16	VOICE A BREATH CONTROLLER ASSIGN	0 ~ 7	
17			
18			
19			
20			
21			
22			
23			
24			
25			
26	VOICE A AUDIO OUTPUT LEVEL ATTENUATOR	0 ~ 7	
27			
28			
29			
30 ≀ 59	VOICE B		
60			
61	VOICE MEMORY SELECT FLAG	0 ~ 1	
62			
63			
64	PERFORMANCE NAME 1	ASCII	
65	PERFORMANCE NAME 2	ASCII	
≀	≀	ASCII	
92	PERFORMANCE NAME 29	ASCII	
93	PERFORMANCE NAME 30	ASCII	

4-7. 64 Performance Bulk Data (f = 2)

Data are listed in order for the 64 performances in units of 64 bytes (64 performance). The TX7 uses the first 32 performance groups.

Address	6	5	4	3	2	1	0	Parameter	Data	Parameter	Data
0	P/M							VOICE A POLY/MONO	0 ~ 1		
1	PBS(LO)			PBR				VOICE A P. BEND STEP	0 ~ 12	PITCH BEND RANGE	0 ~ 12
2	PTIM							VOICE A PORTA. TIME	0 ~ 99		
3						M	GL	VOICE A PORTA. MODE	0 ~ 1	PORTAMENTO/GLISSANDO	0 ~ 1
4	MWA			MWS				VOICE A MOD. WHEEL ASN.	0 ~ 7	MOD. WHEEL SENS.	0 ~ 15
5	FCA			FCS				VOICE A FOOT CONT. ASN.	0 ~ 7	FOOT CONT. SENS.	0 ~ 15
6	ATA			ATS				VOICE A AFTER TOUCH ASN.	0 ~ 7	AFTER TOUCH SENS.	0 ~ 15
7	BCA			BCS				VOICE A BREATH CON ASN.	0 ~ 7	BREATH CON. SENS.	0 ~ 15
8											
9											
10											
11											
12											
13											
14				ATN				VOICE A ATTENUATION	0 ~ 7		
15	PBS (HI)							VOICE A PITCH B. STEP	(MSB)		
16 ι 31	VOICE B										
32			ı	VMS	KMOD			VOICE MEMORY SELECT	0 ~ 1	KEY ASSIGN MODE	0 ~ 2
33											
34	PNAM 1							PERFORMANCE NAME 1	ASCII		
ι									ASCII		
63	PNAM 30							PERFORMANCE NAME 30	ASCII		
	6	5	4	3	2	1	0				

With the Key Assign in Single mode (KMOD = 0) Voice A or B are loaded with VMS.
With Key Assign in DUAL, SPLIT (KMOD = 1, 2), VOICE A is always loaded.

4-8. 32 Voice Bulk Data (f = 9)
Data are listed in order for the 32 programs in units of 128 bytes.

Address	6	5	4	3	2	1	0	Parameter	Data	Parameter	Data
0				R1				OP6 EG RATE 1	0~99		
1				R2				OP6 EG RATE 2	0~99		
2				R3				OP6 EG RATE 3	0~99		
3				R4				OP6 EG RATE 4	0~99		
4				L1				OP6 EG LEVEL 1	0~99		
5				L2				OP6 EG LEVEL 2	0~99		
6				L3				OP6 EG LEVEL 3	0~99		
7				L4				OP6 EG LEVEL 4	0~99		
8				BP				SCALING BREAK P.	0~99		
9				LO				SCALING LEFT OEPTH	0~99		
10				RO				SCALING RIGHT OEPTH	0~99		
11				RC		LC		SCALING RIGHT CURVE	0~3	LEFT CURVE	0~3
12		PO			RS			OSCILLATOR OETUNE	0~14	RATE SCALING	0~7
13			KVS			AMS		KEY VELOCITY SENS.	0~7	AMPLITUOE MOO. SENS.	0~3
14				OL				OUTPUT LEVEL	0~99		
15			FC				M	FREQUENCY COARSE	0~31	OSCILLATOR MOOE	0~1
16				FF				FREOUENCY FINE	0~99		
17) 33				OP5							
34) 50				OP4							
51) 67				OP3							
68) 84				OP2							
85) 101				OP1							
102				PR1				PITCH EG RATE 1	0~99		
103				PR2				PITCH EG RATE 2	0~99		
104				PR3				PITCH EG RATE 3	0~99		
105				PR4				PITCH EG RATE 4	0~99		
106				PL1				PITCH EG LEVEL 1	0~99		
107				PL2				PITCH EG LEVEL 2	0~99		
108				PL3				PITCH EG LEVEL 3	0~99		
109				PL4				PITCH EG LEVEL 4	0~99		
110				ALS				ALGORITHM SELECT	0~31		
111			OKS		FB			OSCILLATOR KEY SYNC	0~1	FEEOBACK	0~7
112				LFS				LFO SPEEO	0~99		
113				LFD				LFO OELAY	0~99		
114				LPMO				LFO PITCH MOO OEPTH	0~99		
115				LAMO				LFO AMP MOD OEPTH	0~99		
116	LPMS		LFW			LFKS		LFO PITCH MOO SENS.	0~7	WAVE / KEY SYNC	0~5 / 0~1
117				TRNP				TRANSPOSE	0~48		
118				VNAM1				VOICE NAME 1	ASCII		
119				VNAM2				VOICE NAME 2	ASCII		
120				VNAM3				VOICE NAME 3	ASCII		
121				VNAM4				VOICE NAME 4	ASCII		
122				VNAM5				VOICE NAME 5	ASCII		
123				VNAM6				VOICE NAME 6	ASCII		
124				VNAM7				VOICE NAME 7	ASCII		
125				VNAM8				VOICE NAME 8	ASCII		
126				VNAM9				VOICE NAME 9	ASCII		
127				VNAM10				VOICE NAME 10	ASCII		

6 5 4 3 2 1 0

4-9. Condition Acknowledge (f = 125)

Address	Parameter	Data	Notes
0	CLASSIFICATION ASCII ' L '	$4C	
1	CLASSIFICATION ASCII ' M '	$4D	
2	CLASSIFICATION ASCII ' ⊔ '	$20	
3	CLASSIFICATION ASCII ' ⊔ '	$20	
4	MODEL NAME ASCII ' 8 '	$38	
5	MODEL NAME ASCII ' 9 '	$39	
6	MODEL NAME ASCII ' 5 '	$35	
7	MODEL NAME ASCII ' 0 '	$30	
8	MODEL NAME ASCII ' ⊔ '	$20	
9	MODEL NAME ASCII ' ⊔ '	$20	
10	SOFTWARE VERSION #	V	
11	SOFTWARE REVISION #	R	
12	CONDITION DATA 1 * 1		
13	CONDITION DATA 2 RECEIVE CH	0 ~ 15	
14	CONDITION DATA 3 BATTERY VOLT		1 unit =
15	CONDITION DATA 4	0	0.1 volts

*1 Bit Arrangement

bit	Parameter	Data	Notes
b0	PERFORMANCE ECHO BACK MODE	0	*2
b1	COMPUTER COMMUNICATION MODE	1	*3
b2	VOLUME CONTROL BY DATA ENTRY LEVER	0	*4
b3	CONTROL CHANGE RECEIVE	1	*5
b4	OMNI MODE	0/1	*6
b5	MEMORY PROTECT	0/1	*7
b6	DATA ENTRY RECEIVE	0/1	*8

*2 only in COMBINED MODE
*3 only in INDIVIDUAL MODE, CONTROL CHANGE RECEIVE, DATA ENTRY RECEIVE MODES
*4 only in DATA ENTRY VOLUME ON MODE
*5 only when CONTROL CHANGE RECEIVE SWITCH IS ON
*6 only when OMNI MODE IS ON
*7 only when MEMORY PROTECT SWITCH IS ON
*8 only when DATA ENTRY RECEIVE SWITCH IS ON

Function ...	Transmitted	Recognized	Remarks
:Basic Default	x	1 - 16 X	X memorized
:Channel Changed	x	1 - 16 X	
:Mode Default Messages	x x	1,2,3,4 X POLY,MONO(M=1) OMNIon,OMNIoff	not altered
:Note :Number : True voice	x XXXXXXXXXXXXX	0 - 127 0 - 127	
:Velocity Note ON Note OFF	x x	o x	
:After Key's :Touch Ch's	x x	x o	
:Pitch Bender	x	o	
:Control 1	x	o	:Modulation wheel:
2	x	o	:Breath control
4	x	o	:Foot controller
:Control 5	x	o	:Portamento time
6	x	o	:Data entry knob
:Change 7	x	o	:Volume
64	x	o	:Sustain foot sw
65	x	o	:Portamento f sw
96	x	o	:Data entry +1
97	x	o	:Data entry -1
:Prog	x	o 0 - 127	
:Change : True #	XXXXXXXXXXXXX	0 - 31	
:System Exclusive	o	o	:Voice parameters:
:System : Song Pos	x	x	
: : Song Sel	x	x	
:Common : Tune	x	x	
:System :Clock	x	x	
:Real Time :Commands:	x	x	
:Aux :Local ON/OFF :	x	x	
: :All Notes OFF:	x	x	
:Mes- :Active Sense :	x	o	
:sages:Reset	x	x	
:Notes			