

YAMAHA
FM VOICE EDITOR

FED-1 Ver. 1.00

User's Guide

Thank you for purchasing a Yamaha FM Voice Editor FED-1. FED-1 is a software program that allows you to display the data of the built-in Voices of an HX-Series Electone, FVX-1 Voice Expander Module, or other device at a computer's screen so you can freely edit the various parameters of the FM Tone Generator. To take full advantage of the numerous functions offered by FED-1 under optimum operating conditions, please read through this User's Guide carefully before actual use.

- When using the FED-1 program, be sure to also refer to your computer's instruction manual as well as the User's Guide for the devices that make up your HX Expanded System.
- To avoid unexpected accidents, be sure to read "Handling Precautions" prior to actual use.
- The contents of this Guide are subject to change without advance notice.
- While every precaution has been taken to ensure the accuracy of this Guide, please contact the Yamaha Music Dealer where you purchased this unit in the case you have any questions or detect any error or omission.

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I-1 Handling Precautions

Compatible Personal Computer

- FED-1 can be used by loading it in the Toshiba personal computer model below:
 - ▶ **Toshiba T3100**
- To use the FED-1 program, you must install the Yamaha MIDI Interface Board MI-3100 in the expansion slot at the rear panel of the computer. (→page 3)

Compatible Disks

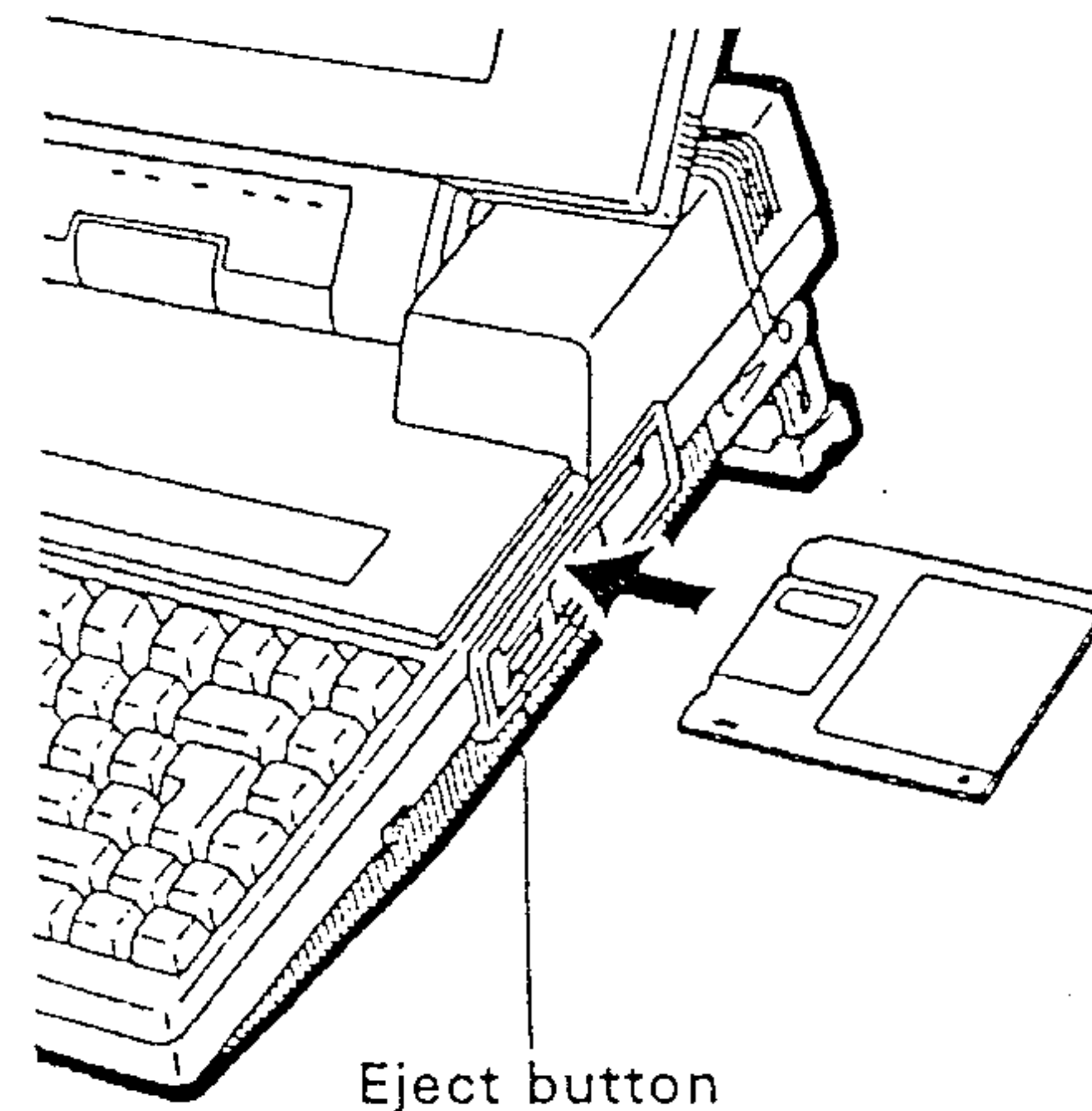
- Before initial use of FED-1, make a working copy of the FED-1 system disk by backing it up on an unformatted floppy disk (or the built-in hard disk). (→page 5)
- If you wish to save the edited Voice data on a disk separate from your working copy of the system disk or the hard disk, prepare a data disk. (→page 39)
- Use only the 3.5" microfloppy disk type indicated below for your working copy of the system disk and your data disks. Use of other types of disks may result in malfunctions of the computer or software program and in data errors.
 - ▶ **2DD 3.5" microfloppy disk**

Handling Your Floppy Disks

- Never open the shutter section of the disk. Data errors may be caused if dirt or dust contacts its internal magnetic surface.
- Do not place your disks close to any device that emits a strong magnetic field, such as a speaker or TV.
- Never expose the disks to direct sunlight or sources of high temperature.
- Do not place heavy objects, such as books, on top of the disks.
- Take care not to spill water or otherwise moisten the disks.
- Make sure to store the disks in the below environment:
 - ▶ Storage temperature: 39° to 127°F
 - ▶ Storage humidity: 8% to 90% RH
 - ▶ Area not exposed to dust, sand, smoke, etc.
- Apply the disk label in the proper position. If you wish to change the label, always remove the old label before applying a new one.

Installing or Removing a Disk

- To install a disk in the disk drive, insert it horizontally with the label facing upward as shown below. Press the disk into the drive until it clicks into place.

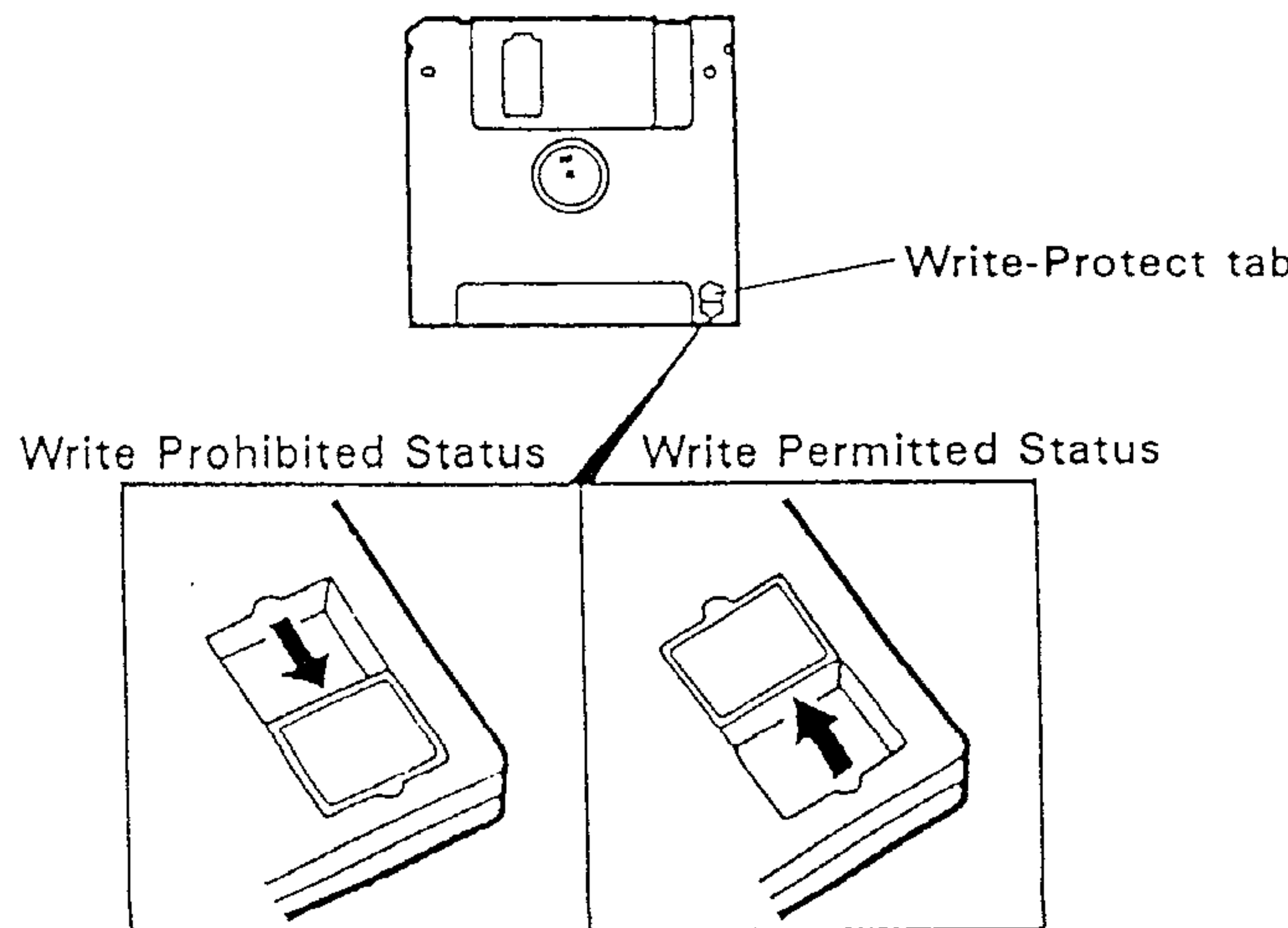


- To remove the disk from the drive, press the Eject button.

CAUTION: The Disk in Use lamp located below the screen lights up whenever data is being read or written, so never remove the disk while this lamp is lit.

The Disk's Write-Protect Feature

- **Write Prohibited Status:** If you slide the Write-Protect tab toward the disk's outer edge, writing of data to the disk is prohibited.
- **Write Permitted Status:** If you slide the Write-Protect tab toward the inside, data can be written to the disk.



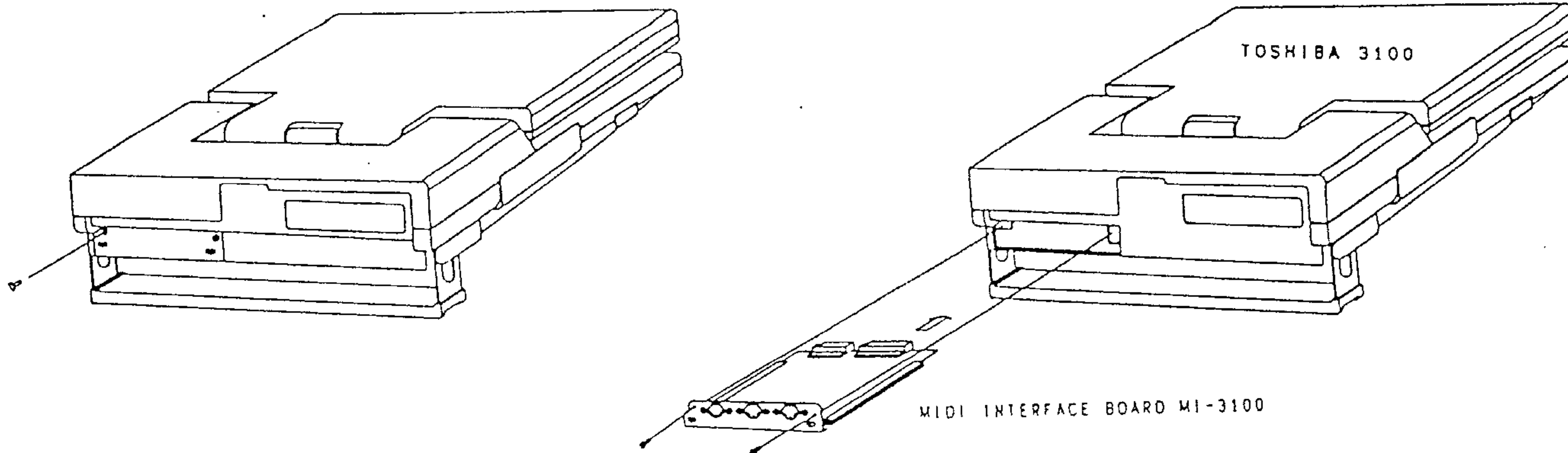
I-2

Connection Procedures

Installing the MIDI Interface Board

- As shown below, remove the two screws that secure the cover of the expansion slot at the rear panel of the computer, then remove the cover.

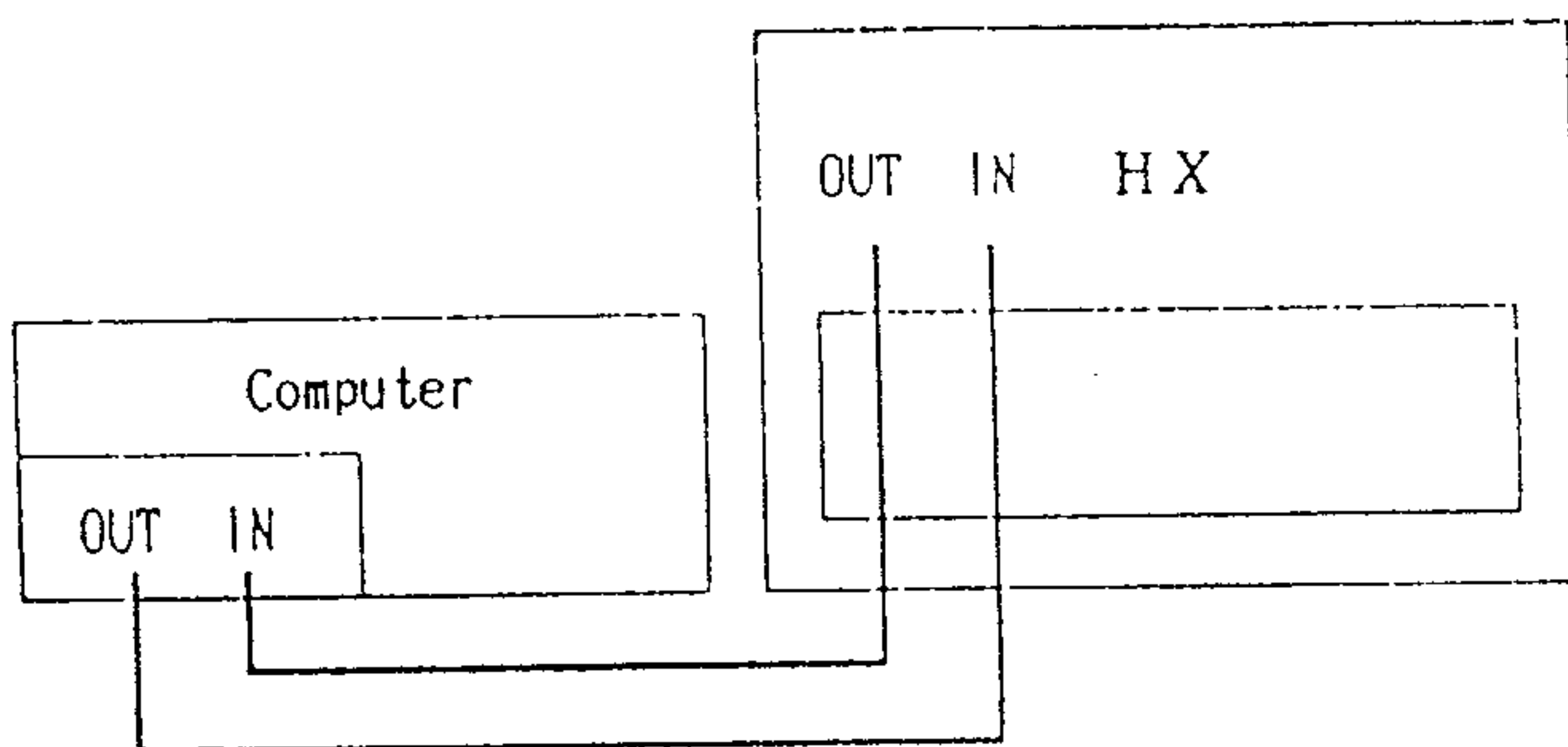
- Install the MIDI Interface Board MI-3100 in the expansion slot, then secure the expansion slot cover by tightening its two screws as shown below.



Connecting the Model to be Edited *The input/output of Audio signals have been omitted in the description below.

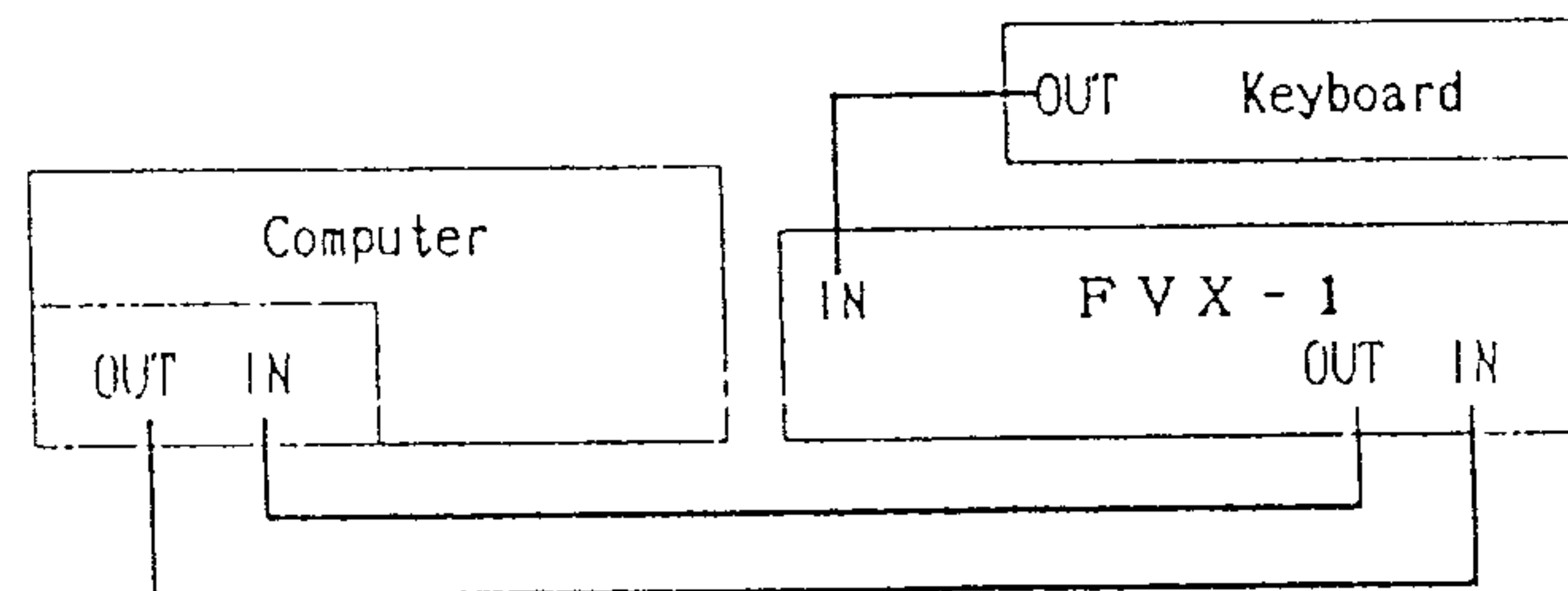
■ Connecting to HX

Respectively connect the MIDI IN/OUT jacks of the MIDI Interface Board to the MIDI IN/OUT jacks of HX.



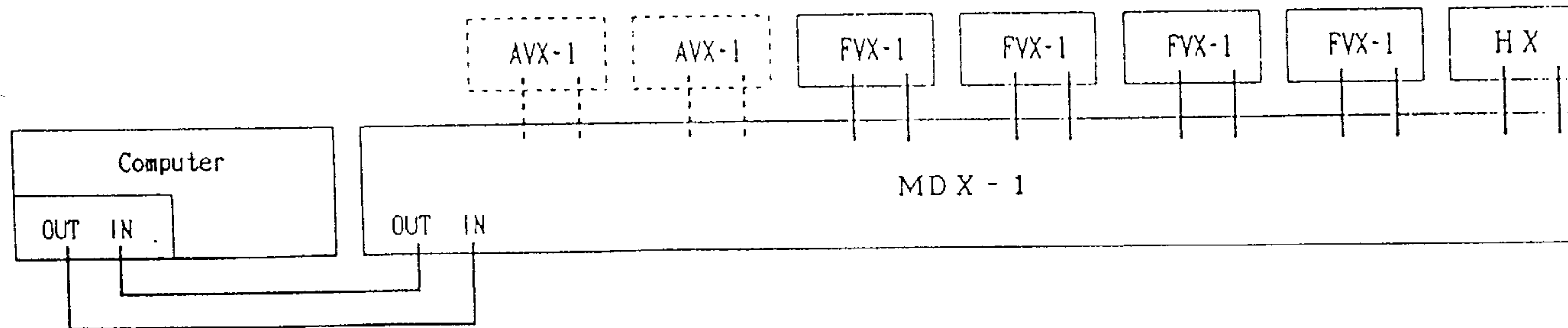
■ Connecting to FVX-1

Respectively connect the MIDI IN/OUT jacks of the MIDI Interface Board to the MIDI IN/OUT jacks on the FVX-1 rear panel; then connect the MIDI IN jack on the FVX-1 front panel to the MIDI OUT jack of the keyboard.



■ Connecting to MDX-1

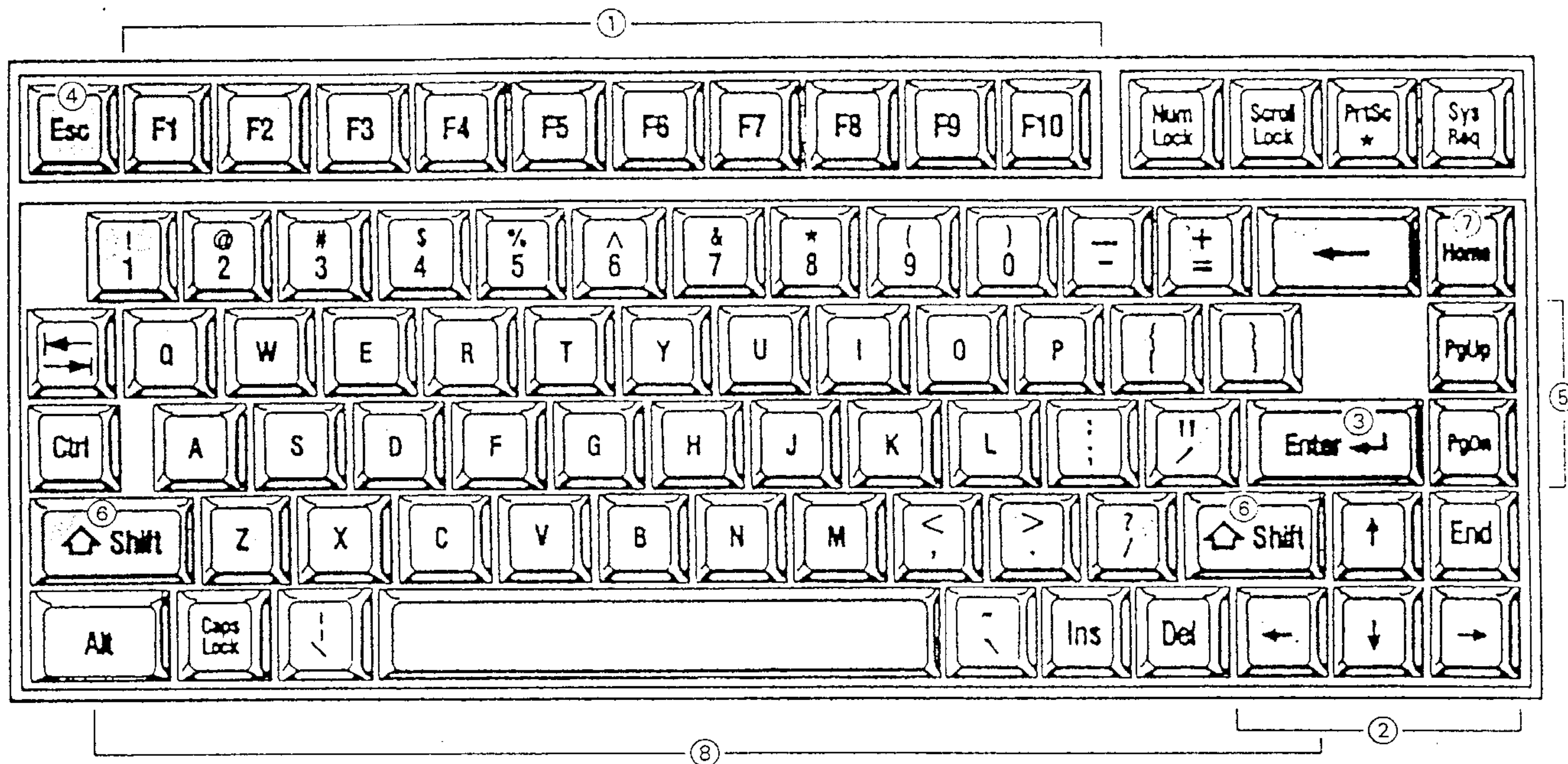
Respectively connect the MIDI IN/OUT jacks of the MIDI Interface Board installed in your computer to the CONTROL IN/OUT jacks of MDX-1. (For details, refer to the "HX-SERIES EXPANDED SYSTEM USER'S GUIDE.")



I-3 Description of the Keyboard

*While the computer is under FED-1 control, only the shaded areas of its keyboard can be used.

*For information on basic keyboard operation and other details, refer to your computer's instruction manual.



① Functions Keys [F1] to [F10]

These keys are used to execute various jobs, such as switching modes, selecting the Voice parameter group, saving/loading Voice data, and so on.

② Cursor Shift Keys [↑] [↓] [←] [→]

These keys are used to move the cursor on the screen in the direction indicated on each key. The cursor can only be moved to a parameter or menu position where the setting or editing of data is permitted.

③ Enter ↵ key

Press this key to start the operation indicated by the cursor, to input the data that was selected by another operation, and so on. This key can also be pressed after the "OK/Cancel" prompt to select "OK".

④ Escape key [Esc]

Press this key to cancel a job after pressing the wrong function key, to prevent a selected job (except the Mode Shift job) from being executed, etc. This key can also be pressed after the "OK/Cancel" prompt to select "Cancel."

⑤ UP/DOWN keys [PgUp]/[PgDn]

Press these keys to edit the setting of a parameter or other data indicated by the cursor. These keys let you increase/decrease numeric values, switch the ON/OFF status, switch the Parameter mode, and so on.

▶ [PgUp] key = UP

▶ [PgDn] key = DOWN

⑥ Shift Keys [Shift]

By pressing the UP or DOWN key while holding down a Shift key, you can change a data value by multiple units using single operation.

⑦ Home Key [Home]

Pressing this key in any mode activates the Help function.

⑧ Alphanumeric Keys

Besides being used for keying in the Voice Names and Voice filenames, the alphanumeric keys also perform the special functions below:

▶ [1] to [0]: Used to input the Voice No. during Load and Save jobs.

▶ [1] to [8]: Used to set the output level of a specific Operator to zero in the DIRECTORY, EDIT 1, EDIT 2, or ALGORITHM EDIT mode. During 4-Operator voice editing, note that only keys [1] to [4] can be used; in case of 16-Operator voice editing, keys [Q] to [I] are also used.

▶ [A] to [K]: Used to select the Operator to be edited in EDIT 1 mode. During 4-Operator voice editing, note that only keys [A] to [F] can be used; in case of 16-Operator voice editing, keys [Z] to [,] are also used.

▶ [O] and [C]: Used to respectively select OK and Cancel during Load/Save jobs of Voice data, and other operations.

• Other Keys

▶ Space Bar: Used to insert a space when keying in a Voice Name.

▶ Backspace Key [←]: Used to cancel an input character during the input of Voice Names, Voice filenames, etc.

Outline

► Before you can actually start up your FED-1 program, you must first make a working copy of the FED-1 system disk by following the procedure below. After you finish making the working copy, be sure to store the original system disk in a safe place and use your working copy for everyday use.

• The procedure below indicates only the commands to be input after you have turned on your computer. For details on the use of other commands, refer to the "MS-DOS Manual" provided with your computer.

Procedure

■ The Required Disks

- MS-DOS System Disk (2/2)
- A new, unused 3.5" microfloppy disk (2DD)
- FED-1 System Disk

① Turn ON the computer's POWER switch to start up MS-DOS.

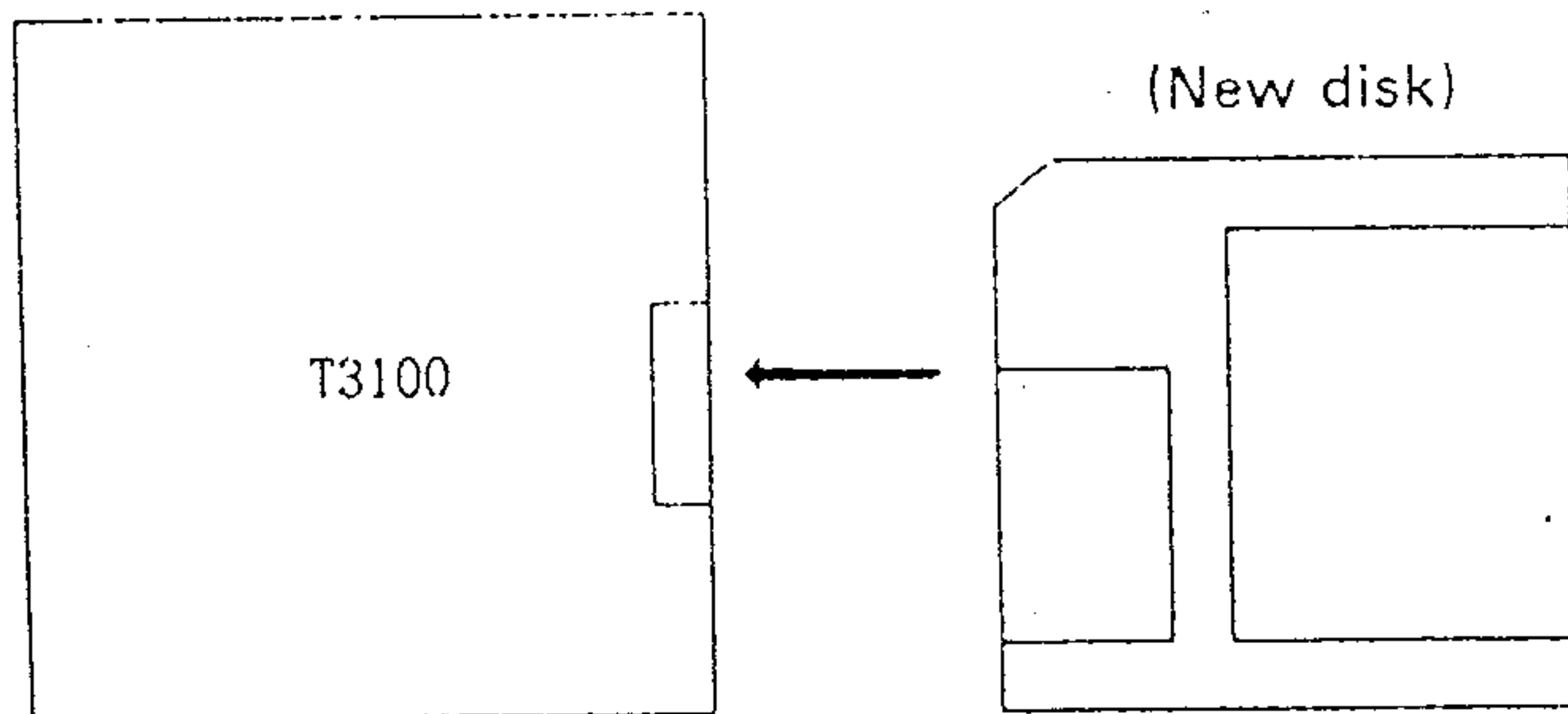
After inserting the MS-DOS system disk (2/2) in the disk drive, turn ON the computer to start up MS-DOS.

② Execute a FORMAT command.

After checking that the system prompt "A >" appears on the screen, input the command below then press the Enter ↵ key:

```
A>format b:/s/3
```

Following the instructions displayed on the screen, replace the MS-DOS system disk (2/2) with a new, unformatted disk.



Next, continue to follow the instructions displayed on the screen to format the new disk. After formatting is completed, remove the disk and re-insert the MS-DOS system disk (2/2).

③ Copy the FORMAT.COM file to your newly formatted disk.

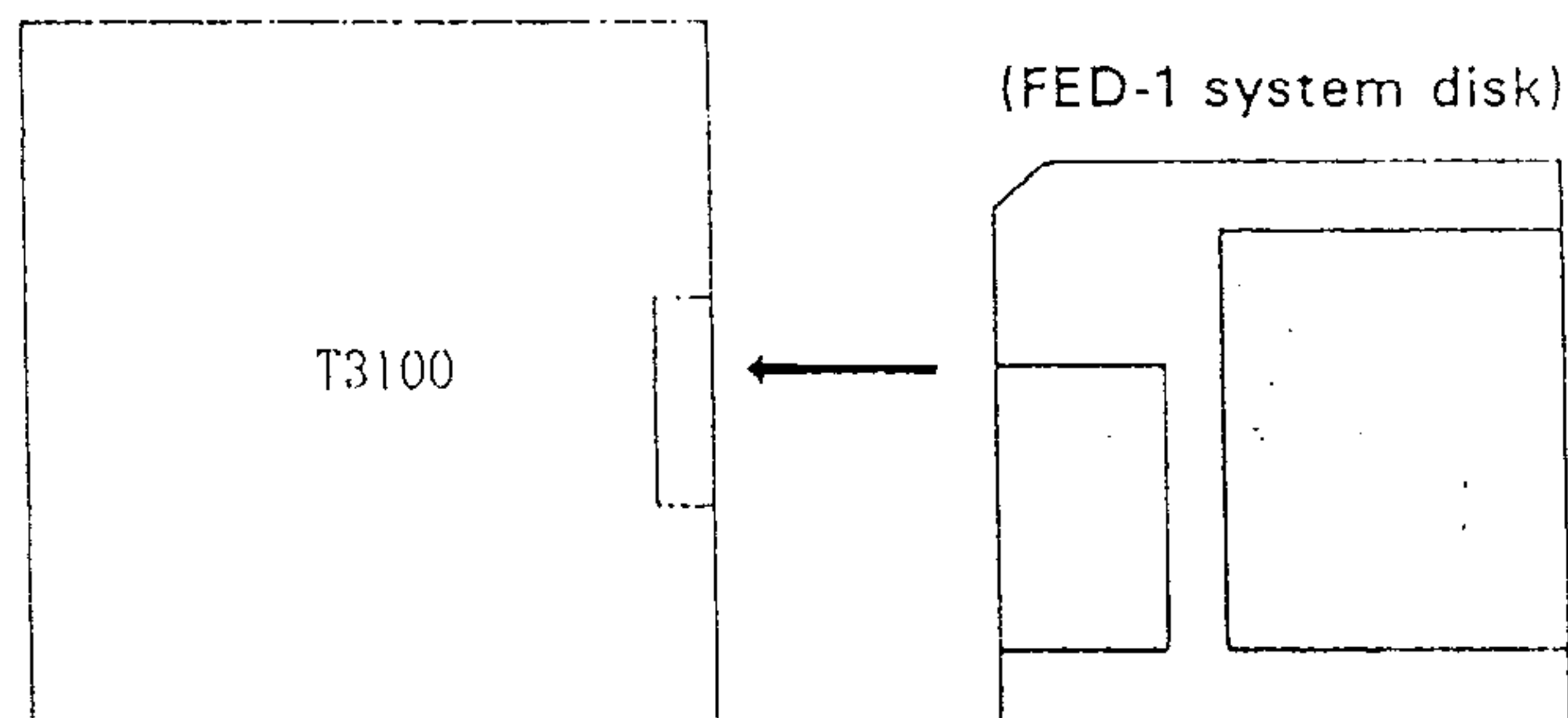
After checking that the system prompt "A >" appears on the screen, input the command below then press the Enter ↵ key:

```
A>copy format.com b:
```

Following the instructions displayed on the screen, replace the MS-DOS system disk (2/2) with the disk you formatted in Step ②, then press the Enter ↵ key. Now, the FORMAT.COM file will be copied to your new disk so you will be able to format data disks in UTILITY mode. (→page 39)

④ Make a backup copy of the FED-1 system disk.

First, insert the FED-1 system disk into the disk drive.



After checking that the system prompt "A >" appears on the screen, input the command below then press the Enter ↵ key:

```
A>backup b
```

Following the instructions displayed on the screen, alternately insert your newly formatted disk and the FED-1 system disk into the disk drive to back up the FED-1 system disk. (You will need to switch the disks a little over 10 times.) The above procedure creates a working copy of the FED-1 system disk that you insert in your computer for actual daily use.

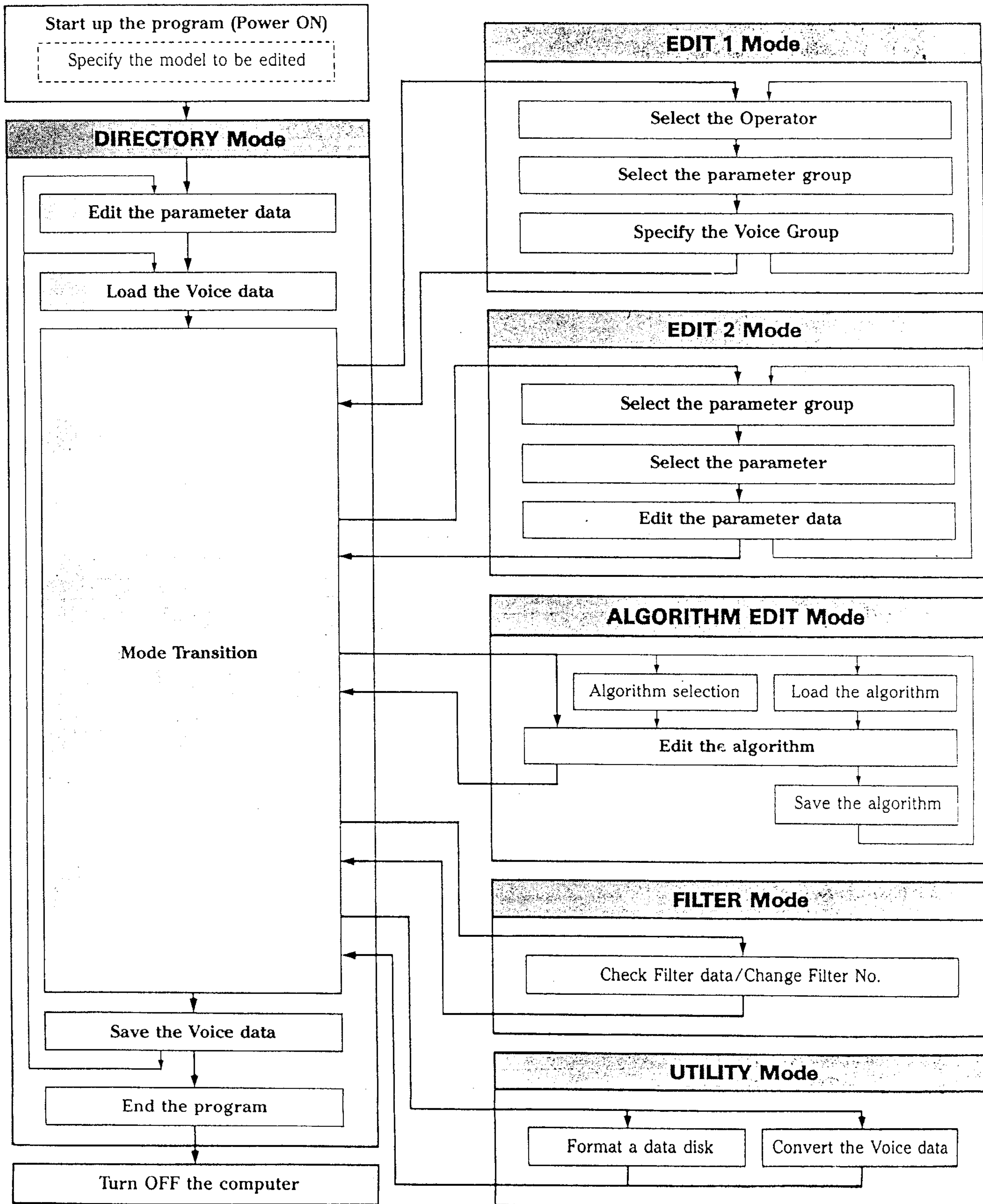
NOTE: To make a backup copy of the FED-1 program onto your hard disk, input [backup c] then press the ENTER ↵ key to execute the Backup operation. (For details on the Backup operation, refer to the "MS-DOS Manual" provided with your computer.)

NOTE: If your computer has two floppy disk drives, first insert the MS-DOS system disk (2/2) in Drive A, and turn on your computer to start up MS-DOS. Next, insert the unformatted disk in Drive B then consecutively execute the same FORMAT and COPY commands shown in Steps ② and ③. Now, insert the FED-1 system disk in Drive A and the newly formatted disk in Drive B, then execute the same BACKUP command shown in Step ④.

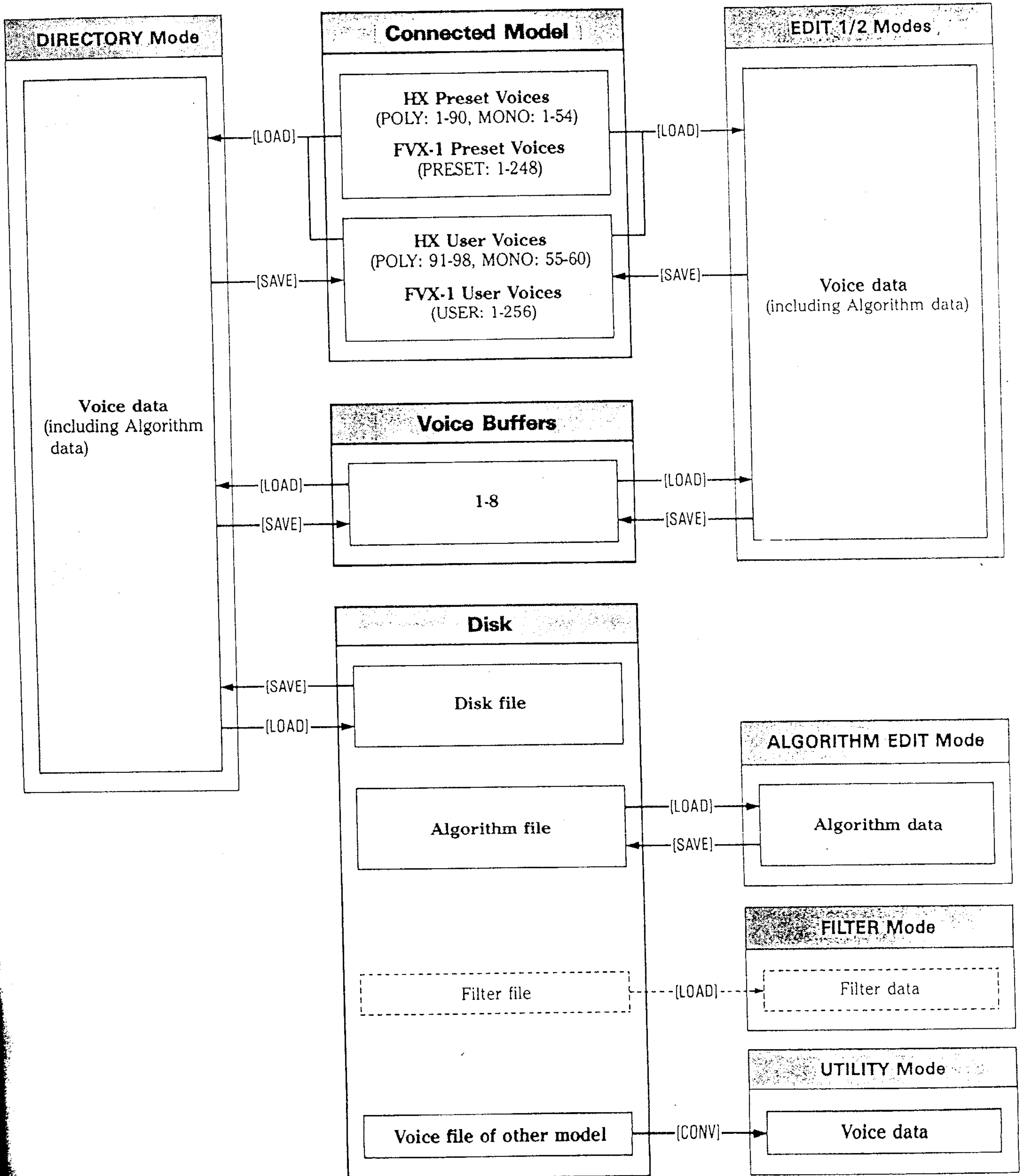
⑤ Remove the disk from the drive, then turn OFF your computer.

After making a working copy of the FED-1 system disk, write the disk's title on a label, and apply it to the disk.

Mode Transition and the Main Jobs in Each Mode



■ Loading/Saving the Data



II. STARTING UP THE PROGRAM

II-1 How to Start Up the Program

Outline

- By inserting your working copy of the FED-1 system disk and turning ON your computer, the FED-1 program starts up automatically.
- After program startup, the title display is shown then DIRECTORY mode is entered. If you have connected MDX-1, you will need to specify the model to be edited. (→page 9)

Procedure

① Check the connections.

Referring to the "Connection Procedures" described on page 3 of this Guide, make sure that the MIDI cables are properly connected.

② Turn ON the power of the connected device.

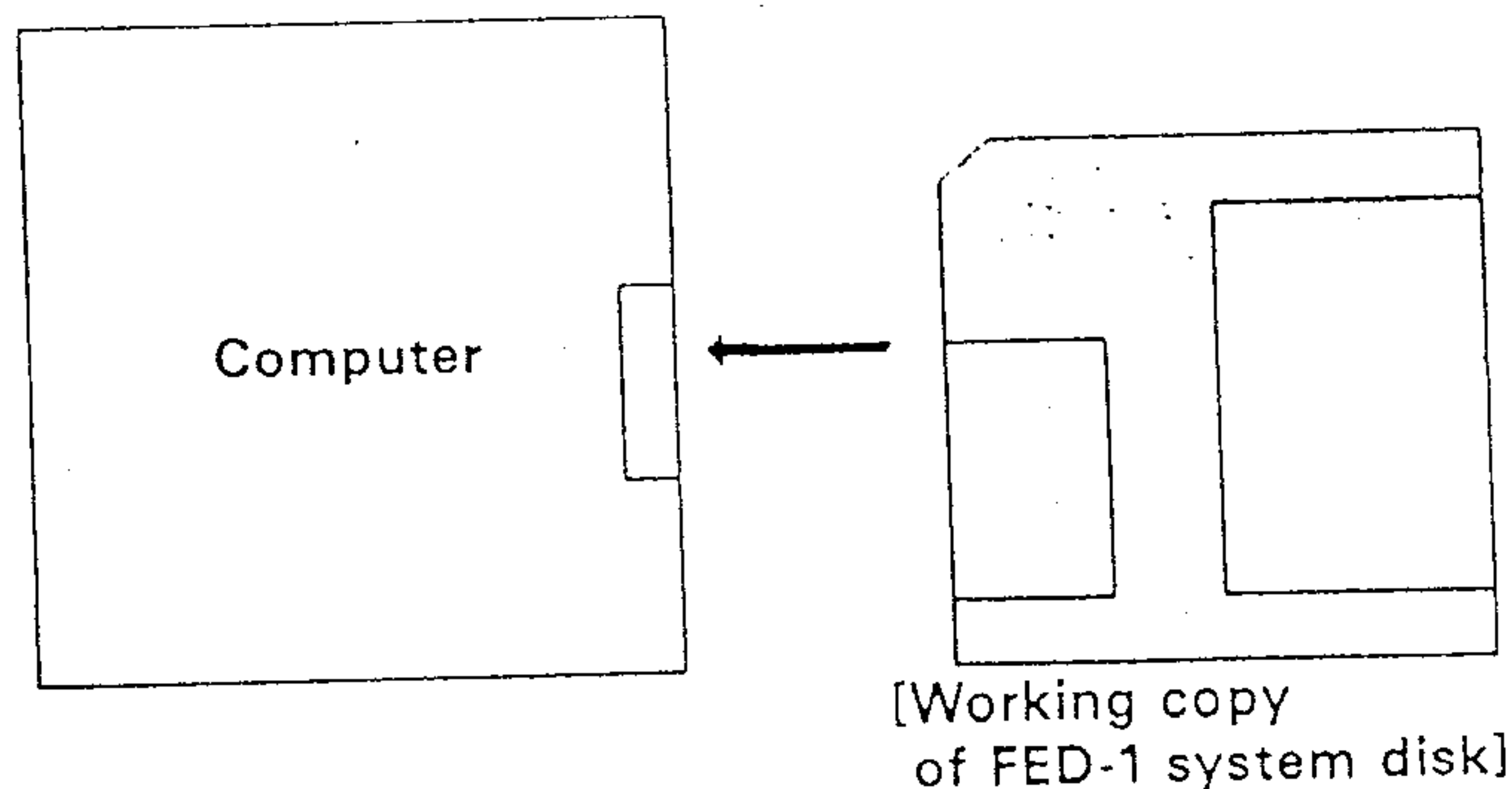
In case your computer is directly connected to HX or FVX-1, turn ON that connected device.

If your computer is connected to MDX-1, first turn ON the devices (HX, Voice Expander Module, etc.) connected to MDX-1; next, insert the MCP-1 system disk (2/2) in the MDX-1 disk drive, then turn ON the power of MDX-1.

CAUTION: Make sure the MCP-1 system disk (2/2) is inserted in the drive before turning ON MDX-1.

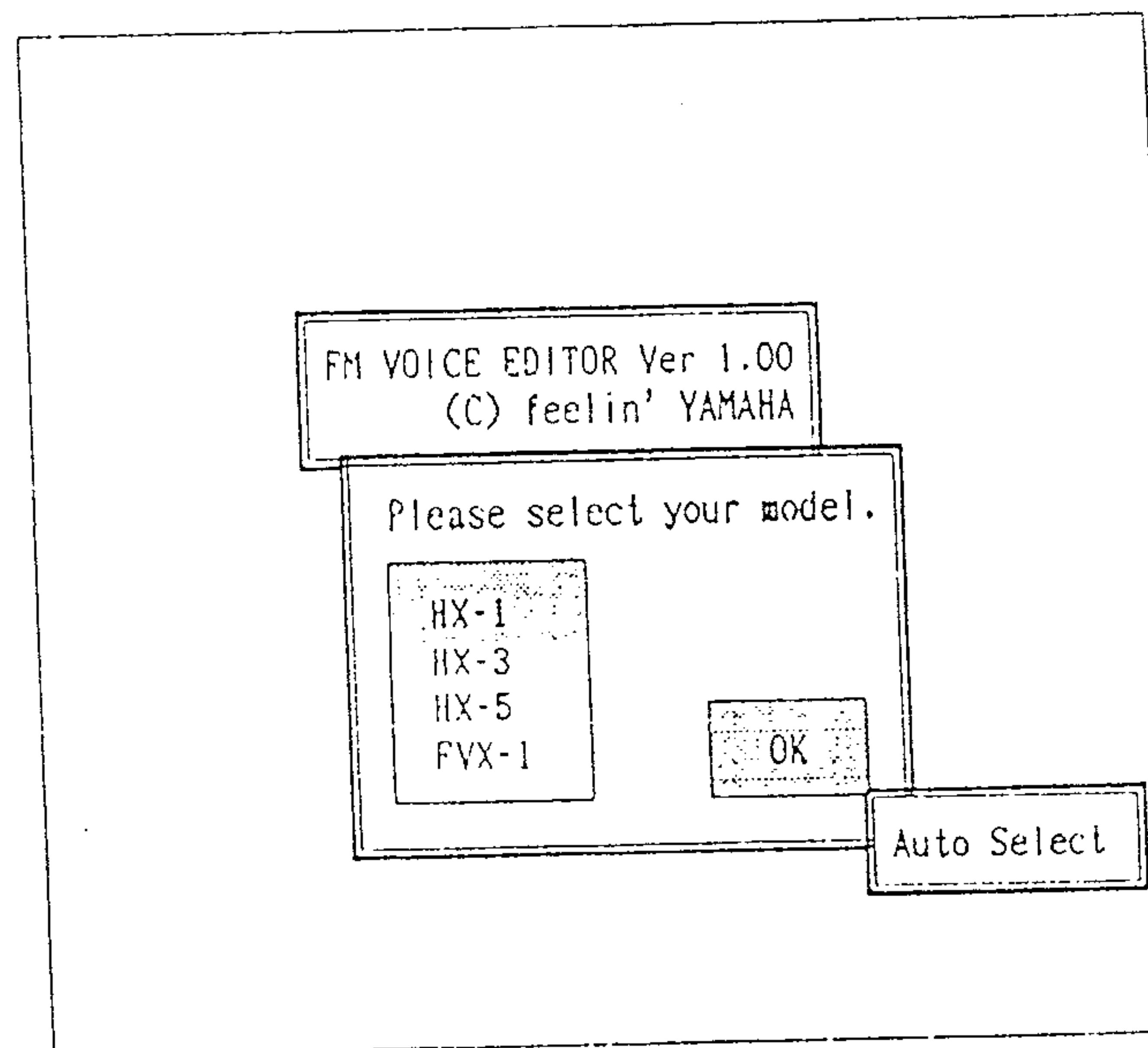
③ Insert your working copy of the FED-1 system disk into the disk drive of the computer.

Insert the working copy of the FED-1 system disk that you created according to the procedure on page 5 of this Guide. The original FED-1 system disk cannot be used.



④ Turn ON the computer.

When the computer is turned ON, the initial display of MS-DOS appears. After about 30 seconds, the welcome message of FED-1 is displayed. Next, the title display of FED-1 is displayed as shown below.



▶ In case of direct connection to HX or FVX-1: The connected device will be automatically selected as the model for which Voice editing is to be performed then, after a few seconds, the DIRECTORY mode is entered. (The figure above shows the case when HX is directly connected.)

▶ In case of connection to MDX-1: Specify the model for which Voice editing is to be performed as well as the keyboard (such as HX) to be used for sending Note ON/OFF data during editing. (→page 9)

NOTE: If you have turned ON your computer with the connected device turned OFF (or without any device connected), you must specify the model for which Voice editing is to be performed. (→page 9)

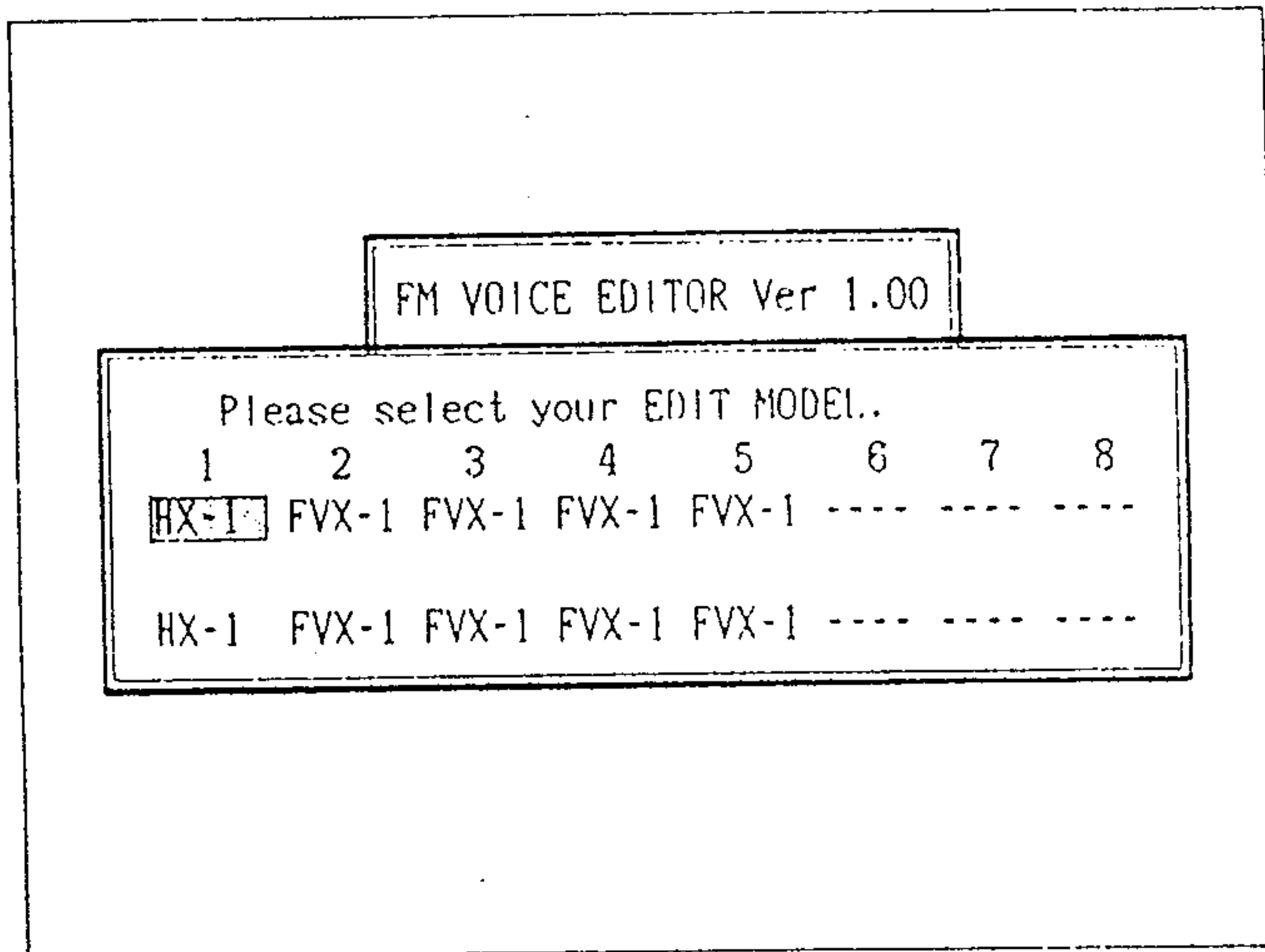
Outline

- In case your computer is connected to MDX-1, the devices connected to MDX-1 will be shown on the title display, so specify the model for which you wish to perform Voice editing.

- After specifying the target model, specify the keyboard you will use to sound the Voice while you are editing.

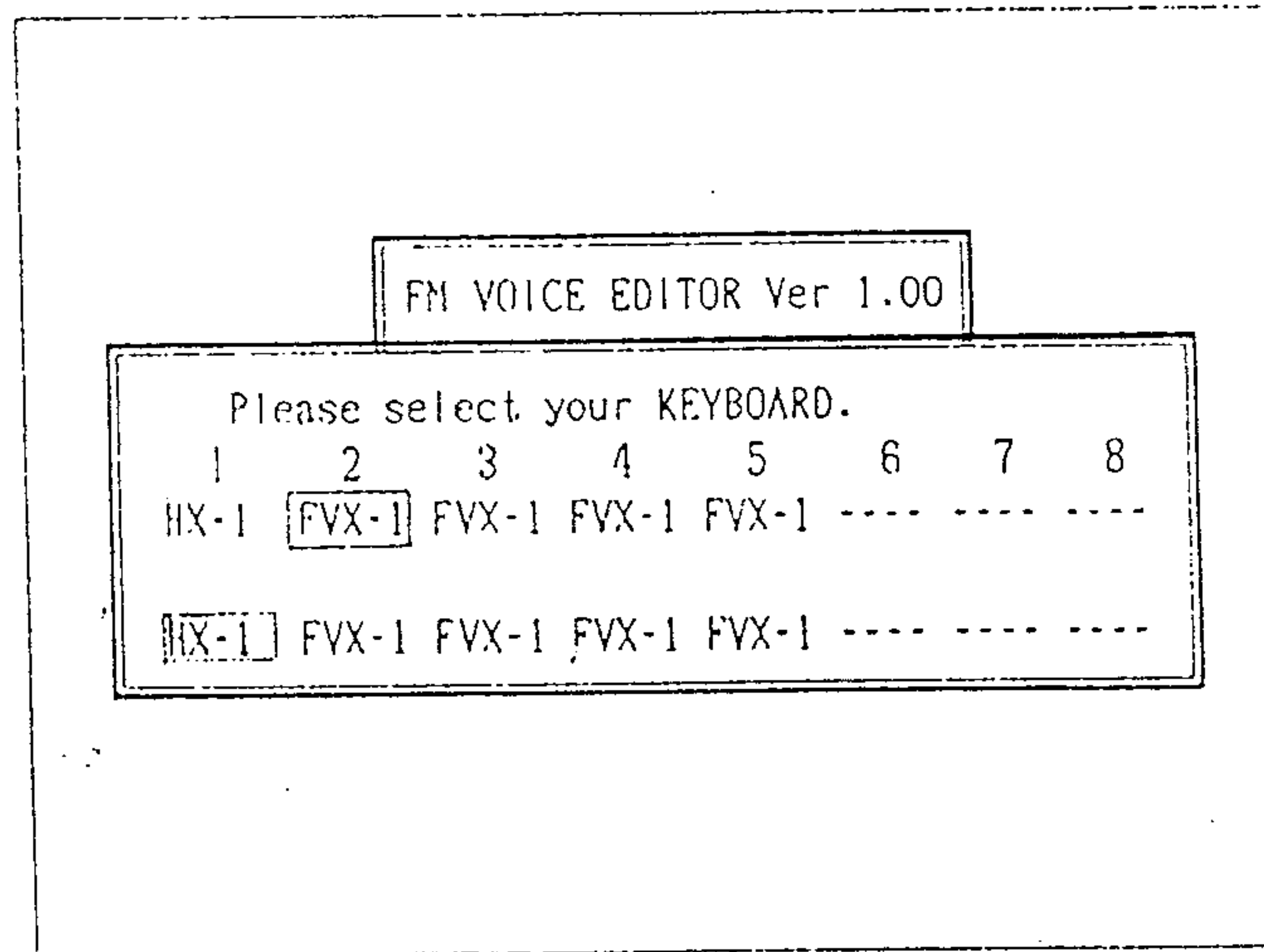
Procedure (When MDX-1 is connected)

- ① **Start up the FED-1 program.**
Following the instructions on page 8, turn ON the connected device and your computer to start up the FED-1 program.
- ② **Use the cursor shift keys to select the target model for editing, then press the Enter ↵ key.**
The message shown below appears at the title display and prompts you to specify the target model for editing. Move the cursor that is initially positioned at the top row to the model you wish to edit, then press the Enter ↵ key (or [O] key).



- ③ **Use the cursor shift keys to select the keyboard, then press the Enter ↵ key.**
After the target model for editing is selected, the cursor moves to the bottom row as shown below and prompts you to specify the keyboard you will use (for sending Note ON/OFF data) during editing. Move the cursor to the position of the desired keyboard, then press the Enter ↵ key (or [O] key). (For the usual connection shown below, you do not need to move the cursor.) After this step is completed, the DIRECTORY mode is automatically entered.

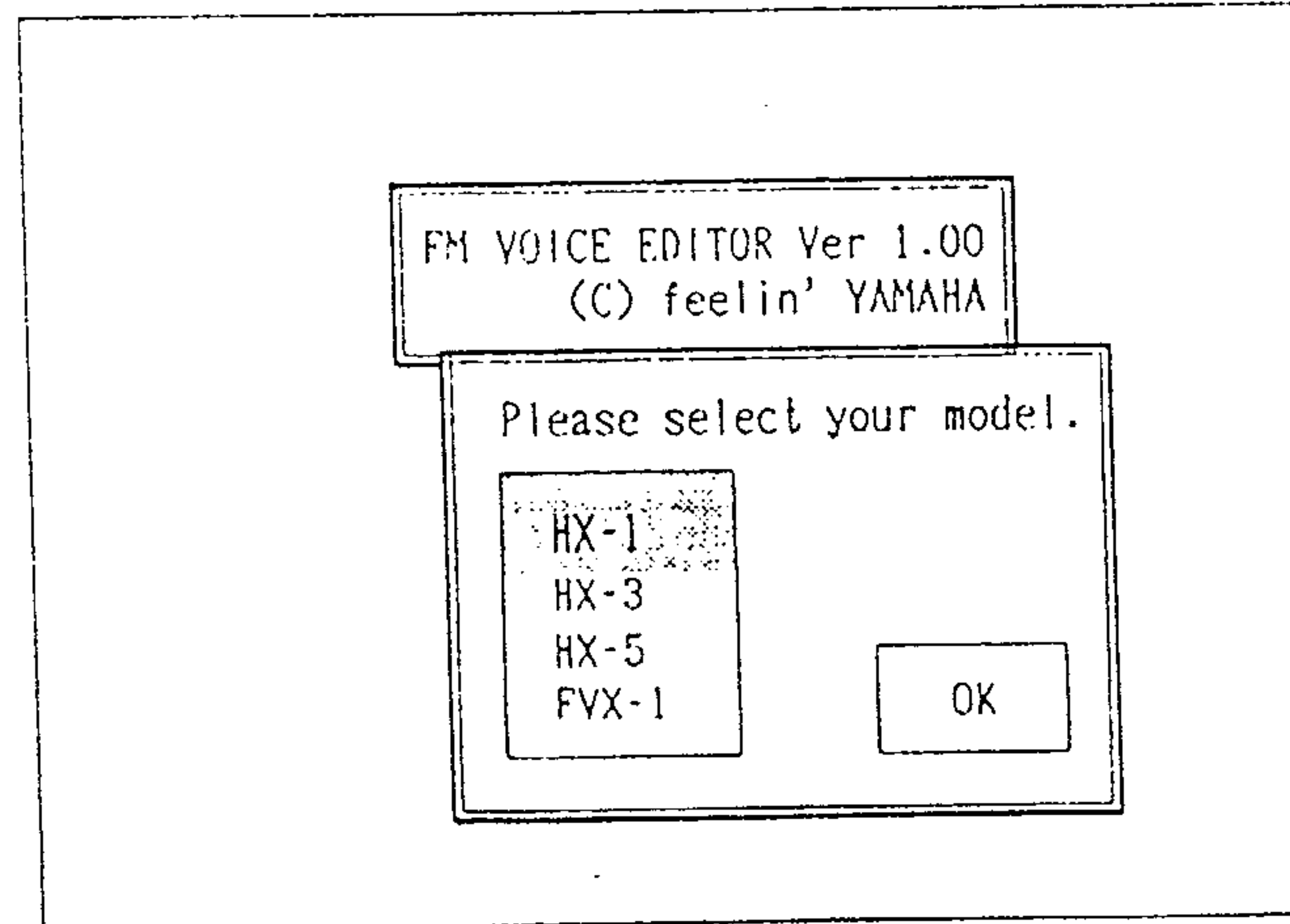
NOTE: If a MIDI-compatible keyboard other than HX is connected to MDX-1, the model name will not be displayed.



■ **If FED-1 is started up with the connected device turned OFF:**

If you have started up FED-1 with the connected device turned OFF (or without any device connected), the message shown on the right is shown at the title display and prompts you to specify the model for which you will perform Voice editing.

Use the cursor shift keys to select the target model, then press the Enter ↵ key (or the [O] key). The DIRECTORY mode will then be automatically entered.



III-1 The DIRECTORY Display and Menu

After the FED-1 program is started up and the title display is shown, the DIRECTORY mode is entered and the below display appears.

The screenshot shows the 'EDIT MODEL display' with the following components:

- Top Header:** 'EDIT MODEL' followed by fields for 'VOICE GROUP', 'U. ORC.', and 'VOICE NAME'.
- Left Pane:** 'VOICE FILE' with 'A:\' and 'NEW FILE'.
- Right Pane:** 'ALGORITHM' and 'PRESET' (value 1). Below is a connection pattern: '8-7-6-5-4-3-2-1-CHI'.
- VOICE BUFFER:** A list of 8 items, numbered 1 through 8.
- Function Key display:** A row of function keys: ESC, EDIT1, EDIT2, SAVE, PRINT, LOAD, SAVE, END.

● EDIT MODEL display

Displays the model name of the device to be edited.

① VOICE GROUP display

Displays the Voice Group to be edited. It is also possible to change the Voice Group to be edited. During normal operation, the Voice Group is selected before loading the Voice data. (→page 11)

② VOICE NAME display

Automatically displays the Voice Name corresponding to the loaded Voice data. You can also change the Voice Name if necessary. (→page 17)

③ VOICE FILE display

The top right area displays the drive name (and the sub-directory name, if one has been set) of the currently selected disk drive.

If Voice data has been saved to the currently selected disk drive (and subdirectory), the larger area below displays the Voice filenames. (→pages 12, 14, & 15)

④ ALGORITHM display

The top right area displays the Algorithm No. (or USER) of the loaded Voice data. The Algorithm No. may be changed if necessary. (→pages 27 & 31)

The larger area below displays the connection pattern of the Operators which corresponds to the currently selected algorithm. If the connection pattern cannot be completely displayed within this area, concurrently press a Shift key and cursor shift key to scroll the display and check the rest of the connection pattern.

● VOICE BUFFER display

If Voice data has been saved to the Voice Buffers, the corresponding Voice Names are displayed here. (→pages 12 & 14)

● Function Key display

Displays the job that will be executed when a Function Key of the computer is pressed in DIRECTORY mode. The ESC feature is also displayed.

III-2

Specifying the Voice Group to be Edited

Outline

- During usual FED-1 operation, specify the Voice Group containing the voices to be loaded before loading the Voice data you wish to edit.

- After specifying the Voice Group, set the connected device to allow the Voice Group to be sounded if you wish to hear the Voice during editing.

Procedure

- ① Move the cursor to the VOICE GROUP position, then press the Enter ↵ key.

When you press the Enter key, the cursor moves to the right where the name of the Voice Group is displayed, permitting you to change the name of the Voice Group.

VOICE GROUP	U. ORC.
-------------	---------



VOICE GROUP	U. ORC.
-------------	---------

NOTE: While the cursor is located at the right of the VOICE GROUP position, the Function Keys do not function.

- ② Use the [UP]/[DOWN] keys to select the Voice Group. The displayed Voice Group name changes each time the [UP] or [DOWN] key is pressed, so select the Voice Group you wish to edit. The Voice Groups which can be selected are listed below:

Model	Display	Voice Group Name	Voice Data
HX-1	U.ORC. L.ORC. U/L PERC.	UPPER ORCHESTRAL LOWER ORCHESTRAL U/L PERCUSSIVE	8-Operator/POLY
	U/L LEAD BASS	U/L LEAD PEDALS BASS	16-Operator/MONO
HX-3 HX-5	U.ORC. L.ORC. U/L PERC.	UPPER ORCHESTRAL LOWER ORCHESTRAL U/L PERCUSSIVE	4-Operator/POLY
	U/L LEAD BASS	U/L LEAD PEDALS BASS	8-Operator/MONO
FVX-1	1	TONE GROUP 1	8-Operator/POLY
	2	TONE GROUP 2	
	3	TONE GROUP 3	
	4	TONE GROUP 4	

- ③ Press the Enter ↵ key to input the Voice Group. When the Enter key is pressed, the cursor returns to the VOICE GROUP position and the Voice Group to be edited is input.

[How to Sound the Specified Voice Group]

Before starting the Voice Edit operation, perform the settings described below then play the keyboard to make sure the specified Voice Group is sounded.

■ In case of direct connection to HX:

- ① At the ENSEMBLE section, set the button of only the specified Voice Group to ON.
- ② Raise the volume of the specified Voice Group.
- ③ Set the MASTER VOLUME and the Expression Pedal volume to appropriate levels.
- ④ Try sounding the specified Voice Group by playing its corresponding keyboard (the upper, lower, or pedal keyboard). (Any voice may be selected.)

■ In case of direct connection to FVX-1:

- ① Set the MIDI Receive Channel of the specified FVX-1 to match the MIDI Transmit Channel of the keyboard connected to FVX-1. (MIDI Enable=ON).
- ② Perform settings to prevent voices from being sounded at the keyboard.
- ③ Raise the volume of the specified Tone Group and the MASTER VOLUME.
- ④ Try sounding the specified Tone Group by playing the keyboard (Any voice may be selected.)

■ In case of connection to MDX-1:

- ① In case HX was specified as the model to be edited, perform settings according to "In case of direct connection to HX" above, then try sounding the specified Voice Group.
- ② In case FVX-1 was specified as the model to be edited, perform settings according to "In case of direct connection to FVX-1" above, then try sounding the specified Tone Group.

III-3 Reading the Voice Data

Outline

- The usual procedure for editing Voice data using FED-1 is to load (read) the Voice data to the computer before starting editing.

Procedure

① Press [F8].

When the [F8] key is pressed to select the [LOAD] job, the LOAD display is inverted at the Function Key display to indicate that Voice data can be loaded.

② Use the cursor shift keys to select the source of the data to be loaded, then press the Enter ↵ key.

After the [F8] key is pressed, the message below appears on the screen and prompts you select the source for loading the Voice data.

```
LOAD
from  DISK FILE
      VOICE BUFFER
      HX-1
to    CURRENT.

Cancel  OK
```

Move the cursor to the source from which you wish to load Voice data, then press the Enter key (or [O] key). Voice data can be loaded from one of the three sources described below.

■ DISK FILE

Select this item to load Voice data (a Voice file) which has been saved on a disk. If you saved the data on a specific drive and subdirectory, be sure to specify the drive and subdirectory used for that Save operation before you press the [F8] key to actually execute the Load job. (→page 15)
If the pertinent Voice files cannot all be displayed at once, move the cursor to the VOICE FILE position then use the [UP]/[DOWN] keys to switch the page.

■ VOICE BUFFERS

The Voice Buffers are areas reserved in the computer's memory which can be used to save the edited Voice data of up to eight Voices total. Before you can load Voice data from a Voice Buffer, you need to save Voice data there in advance. (→page 15)

■ Connected Device (HX or FVX-1)

The figure above shows the sample display in case HX-1 is the target model for editing. If another model has been specified for editing, its name will be displayed in place of "HX-1".

NOTE: If you accidentally press the [F8] key or you wish to cancel the Load job, press the [Esc] key (or [C] key) and quit the Load job.

- In DIRECTORY mode, you can also load Voice data from the connected device or a Voice Buffer, or even load a Voice file which has been saved on a disk.

③ Perform the Load operation according to the source selected in Step ②.

■ When the selected LOAD source is DISK FILE:
The message below is displayed and prompts you to select the Voice file to be loaded, so perform selection by following Steps ① to ③.

```
Select file to LOAD

Cancel  OK
```

- ① Move the cursor to the Voice file you wish to load.
CAUTION: Data cannot be loaded from "NEW FILE".

- ② Press the Enter key (or [O] key) to select "OK". When "OK" is selected, the message below is displayed to confirm whether you wish to load the selected Voice file.

```
LOAD from STRINGS1.HIP

Load this file.

Cancel  OK
```

- ③ To load that file, press the Enter key (or [O] key). To cancel the Load job, press the [Esc] key (or [C] key).

■ When the selected LOAD source is VOICE BUFFER:
The message below is displayed and prompts you to select the Voice Buffer to be loaded, so perform selection by following Steps ① and ②.

```
Select VOICE BUFFER.

Cancel  OK
```

- ① Move the cursor to the Voice Buffer that you wish to load.
② To load the selected Voice, press the Enter key (or [O] key). To cancel the Load job, press the [Esc] key (or [C] key).

- When the selected LOAD source is HX or FVX-1: The message below is displayed and prompts you to input the Voice No. to be loaded, so perform input by following Steps a) to c).

Voice No. to LOAD ?(1- 98) []

- a) Use the numeric keys [1] to [0] to key in the desired Voice No. As listed in the table below, the range of Voice Nos. which can be loaded varies with the target model and Voice Group you have specified. (For details on the correspondence between the Voice Nos. and Preset Voices, refer to "List of HX Voices" and "List of FVX-1 Preset Voices."

Model	Voice Group Name	Voice No. Range
HX-1	UPPER ORCHESTRAL	1-98
HX-3	LOWER ORCHESTRAL	(1-90 : Preset Voices)
HX-5	U/L PERCUSSIVE	(91-98: USER 1-8)
	U/L LEAD PEDALS BASS	1-60 (1-54 : Preset Voices) (55-60: USER 1-6)
FVX-1	TONE GROUP 1-4	1-256 (Preset/User)

- b) Press the Enter ↵ key (or [O] key). The message below is displayed to confirm whether you wish to load the selected Voice No.

LOAD from HX-1 Voice No. 1

Load this data.

Cancel OK

- c) To load that Voice No., press the Enter key (or [O] key). To cancel the Load job, press the [Esc] key (or [C] key).

NOTE: Before you can load the Voice data of FVX-1, you must first choose either Voice Bank A or B. When Voice Bank A is selected, Voice Nos. 1-248 correspond to Preset Voice Nos. 1-248; when Voice Bank B is selected, they correspond to User Voice Nos. 1-248. Note that Voice Nos. 249-256 correspond to User Voice Nos. 1-8 which are common to Voice Banks A and B.

III-4 Switching Modes

Outline

- After loading the Voice data that you wish to edit, you can perform editing of the Voice Parameters and other data by switching to another mode.
- After switching to another mode, if you wish to again switch to another mode, first return to DIRECTORY mode then select the mode that you wish to enter.

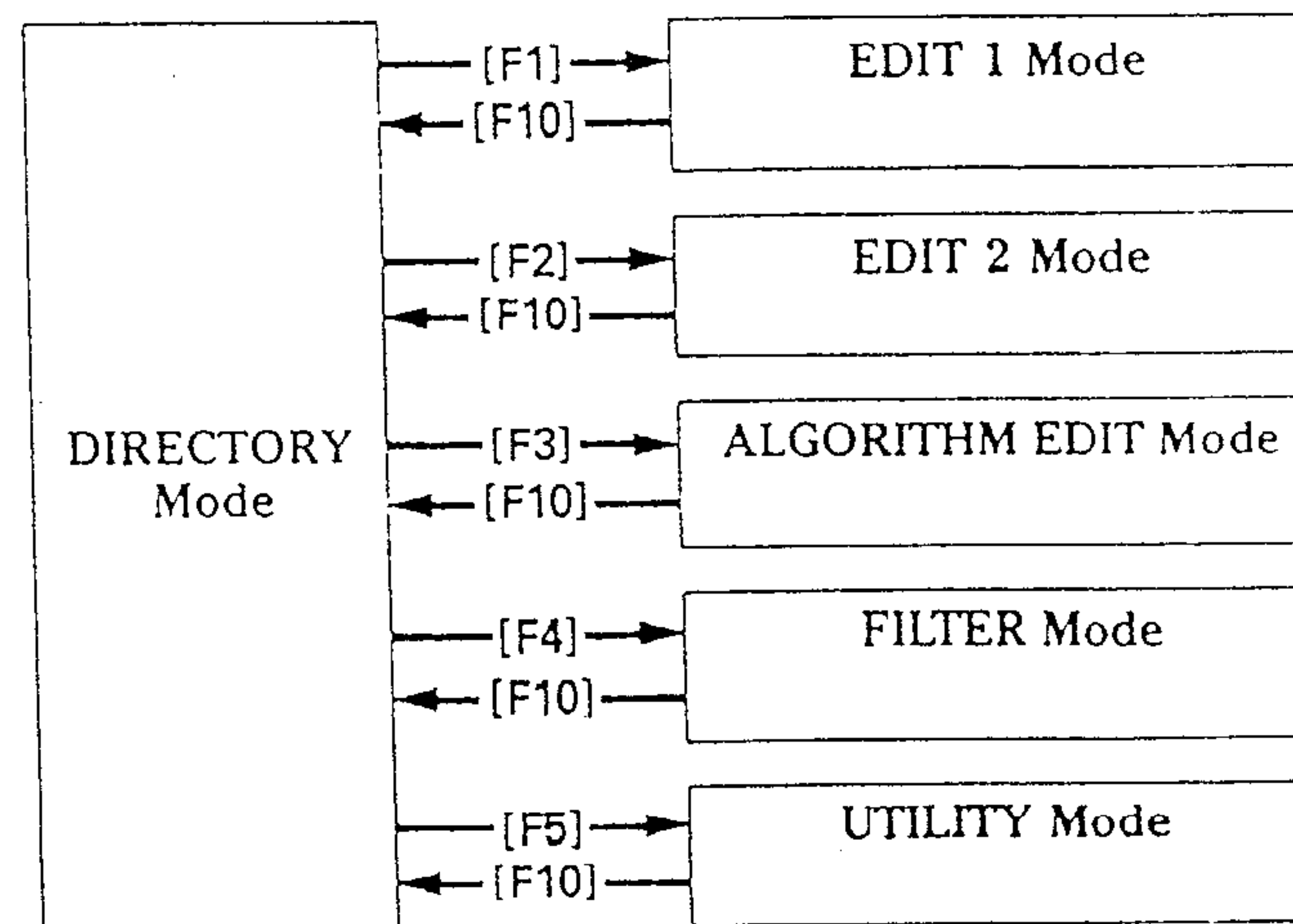
Procedure

- ① Press a Function Key from [F1] to [F5]. While looking at the Function Key display to check the mode that is selected by each Function Key, press a key from [F1] to [F5]. The program will shift from DIRECTORY mode to the mode corresponding to the pressed Function Key.

Key	Mode	Main Jobs in Each Mode
F1	EDIT 1	Editing of Voice data for individual Operators.
F2	EDIT 2	Editing of Voice data for individual parameters.
F3	ALGORITHM EDIT	Editing of algorithms.
F4	FILTER	Display of Filter data.
F5	UTILITY	Disk formatting and Voice data conversion.

- ② In the mode you have now entered, perform Voice editing or other operations.

- ③ After you are finished working in the current mode, press [F10]. After switching from DIRECTORY to another mode, the [F10] key corresponds to [DIR]. If you now wish to switch to another mode or execute a job in DIRECTORY mode, press [F10] to return to DIRECTORY mode.



III-5 Writing the Voice Data

Outline

- After you have switched from DIRECTORY to another mode in order to perform Voice editing or other operations and have finished work in that mode, return to DIRECTORY mode to save (write) the edited Voice data.

- Although data can be saved to a connected device or to the Voice Buffers in EDIT 1 or EDIT 2 mode, data can only be saved to a disk in DIRECTORY mode.

Procedure

① Press [F9].

When the [F9] key is pressed to select the [SAVE] job, the SAVE display is inverted at the Function Key display to indicate that Voice data can be saved.

② Use the cursor shift keys to select the destination for saving the Voice data, then press the Enter ↵ key.

After the [F9] key is pressed, the message below appears on the screen and prompts you to select the destination for saving the Voice data.

```
SAVE
from  CURRENT
to    DISK FILE: HX-1
      VOICE BUFFER.
      HX-1.

Cancel  OK
```

Move the cursor to the destination at which you wish to save the Voice data, then press the Enter key (or [O] key). Voice data can be saved to one of the three destinations described below.

■ DISK FILE

Select this item to save Voice data to a disk. In this case, you can also specify the destination drive and subdirectory before pressing the [F9] key, if so required. (→page 15)

If the pertinent Voice files cannot all be displayed at once, move the cursor to the VOICE FILE position then use the [UP]/[DOWN] keys to switch the page.

■ VOICE BUFFER

The Voice Buffers are areas reserved in the computer's memory which can be used to save the edited Voice data of up to eight Voices total. If you wish to edit various values of one Voice than compare the edited Voice with the original Voice, be sure to temporarily store its data in a Voice Buffer.

■ Connected Device (HX or FVX-1)

The figure above shows the sample display in case HX-1 is the target model for editing. If another model has been specified for editing, its name will be displayed in place of "HX-1".

NOTE: If you accidentally press the [F9] key or you wish to cancel the Save job, press the [Esc] key (or [C] key) and quit the Save job.

③ Perform the Save operation according to the destination selected in Step ②.

■ When the selected SAVE destination is DISK FILE:

The message below is displayed and prompts you to select the Voice file to be saved.

```
Select file to SAVE

Cancel  OK
```

► To save a NEW FILE:

- ① Move the cursor to the NEW FILE position, then press the Enter key (or [O] key).

```
File name ? [ ]
```

- ② Use the alphanumeric keys to input a File Name of up to eight characters, then press the Enter key. The message below is displayed to confirm whether you wish to save the Voice data under the input Voice filename.

```
File name ? [STRINGS]
SAVE to STRINGS1.HIP
Save this file.
Cancel  OK
```

NOTE: If you press the Enter key without inputting a filename, the first eight characters of the current Voice Name (→page 17) will automatically be input as the filename.

- ③ To save that file, press the Enter key (or [O] key). To cancel the Save job, press the [Esc] key (or [C] key).

► To overwrite a previously saved Voice file:

- ① Move the cursor to the Voice file for which you wish to overwrite the Voice data, then press the Enter key (or [O] key). The above message is displayed to confirm whether you wish to save the Voice data under that Voice filename.
- ② To save the file, press the Enter key (or [O] key). To cancel the Save job, press the [Esc] key (or [C] key).

■ When the selected SAVE destination is VOICE BUFFER:

The message below is displayed and prompts you to select the destination Voice Buffer.

```
Select VOICE BUFFER

Cancel  OK
```

- ① Move the cursor to the Voice Buffer to which you wish to save the data.

- ② To save the data to the selected Voice Buffer, press the Enter key (or [O] key). To cancel the Save job, press the [Esc] key (or [C] key).

III-6 Other Operations in DIRECTORY Mode

DELETE

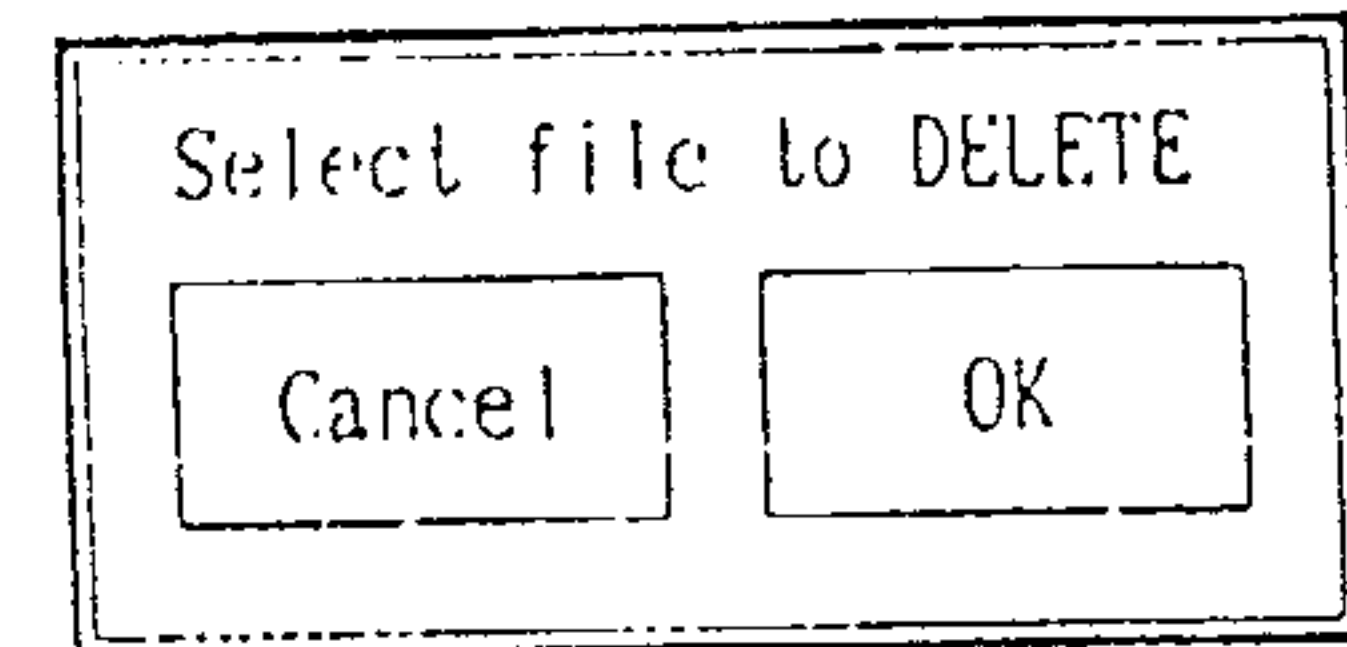
Follow the steps below to delete a Voice file that you have saved on a disk.

- ① **Display the Voice file that you wish to delete.**
If you changed the VOICE FILE specification (the drive or subdirectory) before saving the Voice file, you must first display the Voice file to be deleted according to instructions on page 15 in "How to Perform VOICE FILE Specification."

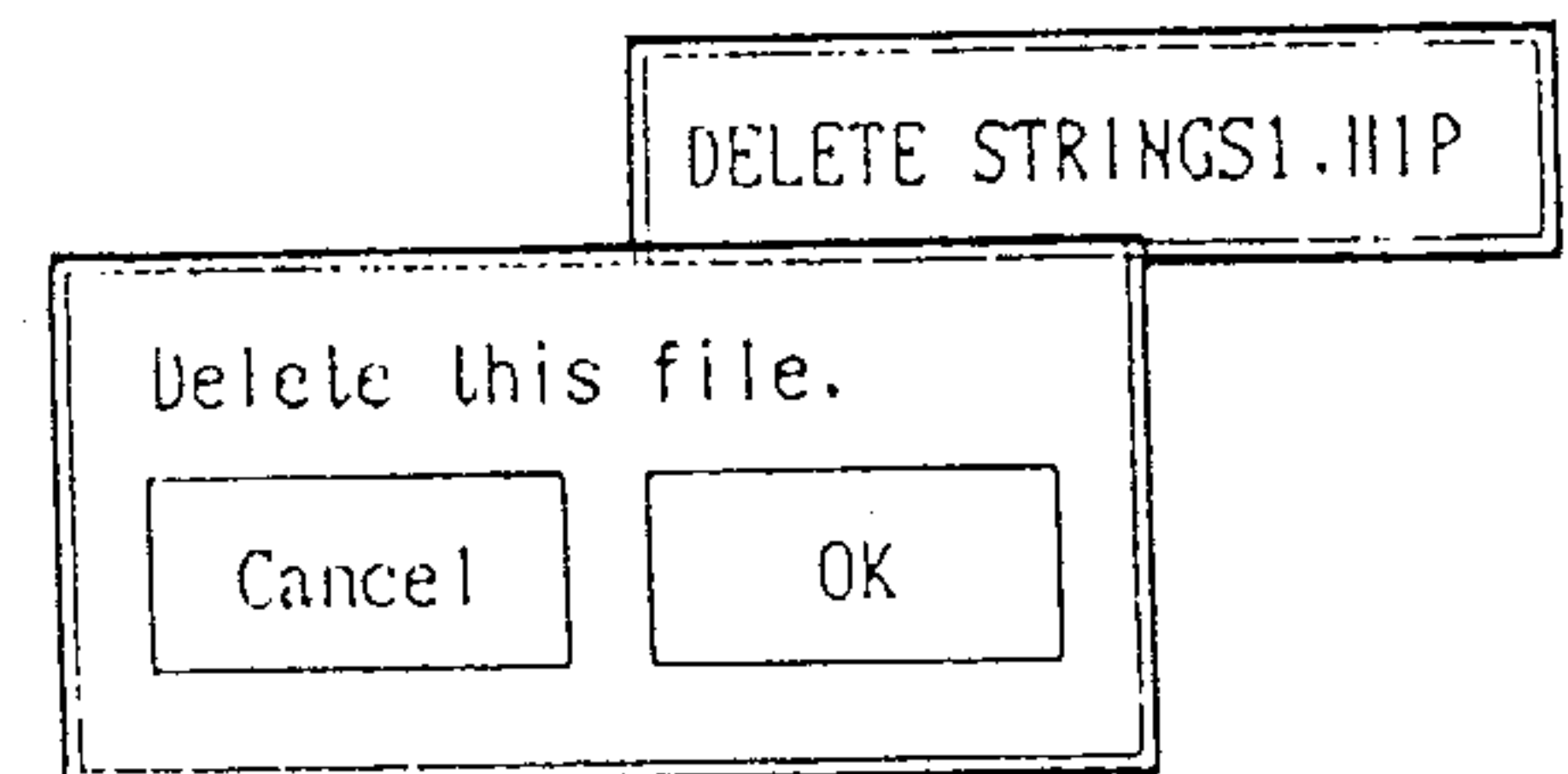
NOTE: To delete an entire subdirectory, exit the FED-1 program then perform deletion using an MS-DOS command. (For details, refer to the "MS-DOS Manual" provided with your computer.)

- ② **Press [F6].**
DELETE is shown as an inverted display at the Function Key display, indicating that a Voice file can be deleted.
- ③ **Use the cursor shift keys to select the Voice file to be deleted, then press the Enter key.**

When the [F6] key is pressed, the message below is displayed and prompts you to select the file to be deleted. Move the cursor to the desired file, then press the Enter key (or [O] key).



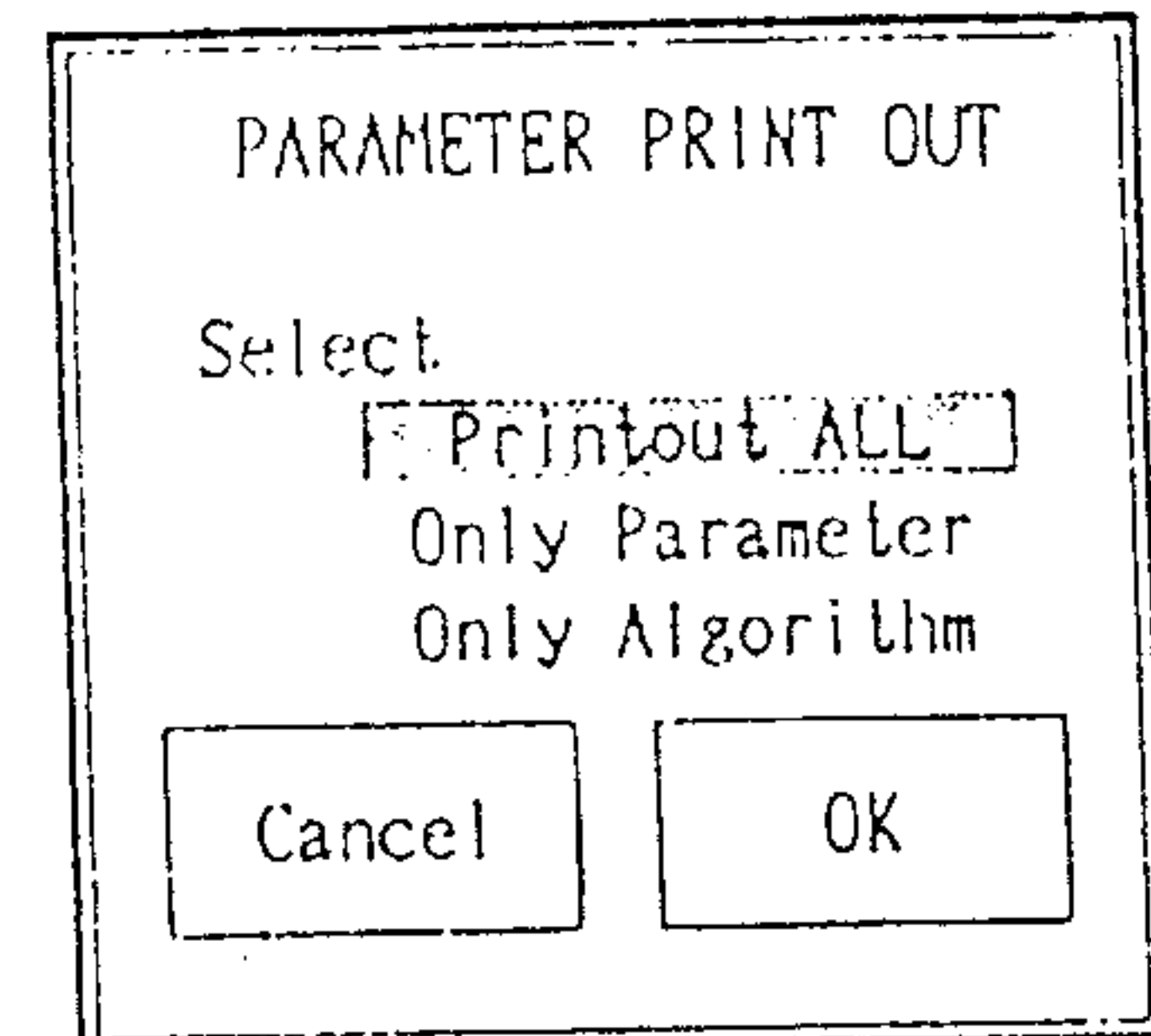
- ④ **Press the Enter key (or [O] key) again.**
The message below is displayed, so press the Enter key (or [O] key) to delete the selected file.



PRINT

If a printer is connected to your computer, you can print out the currently loaded data.

- ① **Set up the printer so that it is ready to print.**
Load paper in the printer, then set the printer to Ready status. Be sure to use a printer (with a Centronics-compatible parallel interface) that is capable of printing 136 columns across.
- ② **Press [F7].**
The PRINT display is inverted at the Function Key display, indicating that printing can be performed.
- ③ **Use the cursor shift keys to select the data to be printed out, then press the Enter key.**
The following message prompts you to select the data to be printed, so move the cursor to the desired item then press the Enter key (or [O] key).

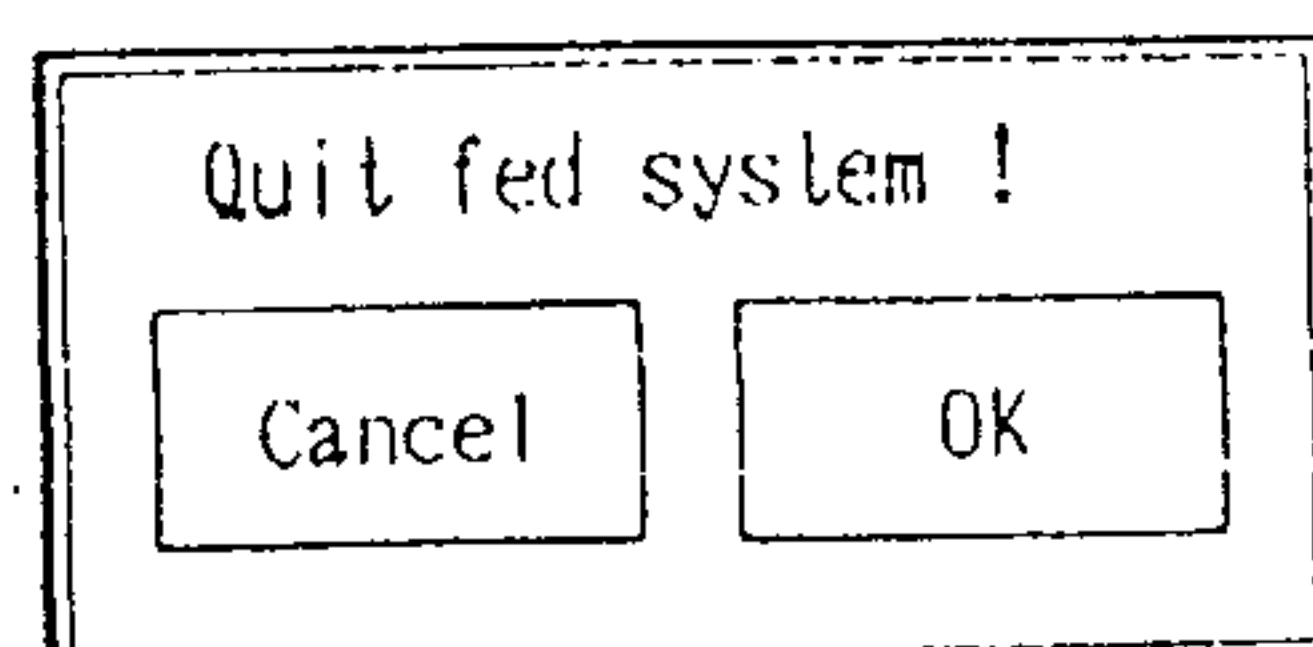


- ▶ "Printout ALL": The data of both the Voice parameters and the algorithm is printed.
- ▶ "Only Parameter": Only the data of the Voice parameters is printed.
- ▶ "Only Algorithm": Only the Algorithm data is printed.

END

After you are finished working with FED-1, terminate the FED-1 program before turning OFF your computer.

- ① **Press [F10].**
The END display is inverted at the Function Key display, and the message below is displayed.



- ② **Press the Enter key (or [O] key).**
The FED-1 program is terminated and the MS-DOS system prompt "A>" is displayed, so turn OFF your computer.

CAUTION: When the above steps are performed, any data being edited will be erased. Before you end the FED-1 program, be sure to save any essential data.

NOTE: After ending the program, if you wish to re-start the program without resetting your computer, just input "fedmain" after the system prompt then press the Enter key.

■ When the selected SAVE destination is HX or FVX-1: The message below is displayed and prompts you to input the Voice No. to which your Voice data is to be saved.

Voice No. to SAVE ?(91- 98)[]

- ① Use the numeric keys [1] to [0] to key in the desired Voice No. As listed in the following table, the range of Voice Nos. which can be saved varies with the target model and Voice Group that you have specified.

NOTE: When saving Voice data to FVX-1, the data will be saved in the User Voice area of Voice Bank B regardless of whether Voice Bank A or B has been selected.

Model	Voice Group Name	Voice No. Range
HX-1	UPPER ORCHESTRAL	91-98 (USER 1-8)
HX-3	LOWER ORCHESTRAL	
HX-5	U/L PERCUSSIVE	
	U/L LEAD PEDALS BASS	55-60 (USER 1-6)
FVX-1	TONE GROUP 1-4	1-256 (User Voice Area)

How to Perform VOICE FILE Specification

When saving Voice data to a disk, you can use one of two methods. You can either save the data without changing the initial drive and directory specification displayed at the VOICE FILE display, or you can save the data after changing the drive and/or setting a subdirectory.

[Saving Data Without Changing the Initial VOICE FILE Specification]

When FED-1 is started up and the DIRECTORY mode is entered, the VOICE FILE specification is automatically set to "A:\". In this case, your Voice data will be saved in the vacant area of the working copy of your system disk which is installed in Drive A, so be sure that its Write-Protect tab is set to OFF before inserting the disk. Since no subdirectory is set, note that your Voice data will be saved in the disk's root directory.

[Specifying a New Drive Before Saving Data]

If your computer has a built-in hard disk and you wish to save the data to the hard disk, change the drive specification as follows:

- ① Move the cursor to the VOICE FILE position, then press the Enter key.
- ② Check that the cursor is at the INPUT position, then press the Enter key (or [O] key). (If you have already created a subdirectory, move the cursor to the INPUT position, then press the Enter key.)
- ③ Press the [C] key to change the "A:\\" display to "C:\\" (root directory of Drive C), then press the Enter key.

NOTE: While the cursor is located at the right of the VOICE FILE position, the Function Keys do not function.

NOTE: If your computer has two floppy disk drives, you can insert the data disk in Drive B and save your Voice data to the Drive B disk by changing the drive specification to "B:\\".

[Creating a Subdirectory Before Saving Data]

If you wish to handle multiple related Voice files as a single group, it is useful to create a subdirectory. After checking the drive specification, perform the following Steps ① to ④. (For a full explanation of subdirectories, refer to the "MS-DOS Manual" provided with your computer.)

- ② Press the Enter key (or [O] key). The message below is displayed to confirm whether you wish to save your data to the selected Voice No.

SAVE to HX-1 Voice No. 1

Save this data.

Cancel OK

- ③ To save your data to that Voice No., press the Enter key (or [O] key). To cancel the Save job, press the [Esc] key (or [C] key).

- ① Move the cursor to the VOICE FILE position, then press the Enter key.
- ② Check that the cursor is at the INPUT position, then press the Enter key (or [O] key). (If you have already created a subdirectory, move the cursor to the INPUT position, then press the Enter key.)
- ③ Use the alphanumeric keys to input the new subdirectory name, then press the Enter key.

DIRECTORY STRINGS

- ④ The message below prompts you to confirm whether you wish to create a new subdirectory, so press the Enter key (or [O] key).

Create new directory ?

Cancel OK

By performing the above steps, a subdirectory is created so that you can save your Voice data to that subdirectory.

NOTE: When the FED-1 program is initially started up, the root directory is specified and no subdirectory is specified. To specify a previously created subdirectory, perform Steps ① and ② to select the subdirectory.

NOTE: If a subdirectory is specified at the VOICE FILE display, you can select another directory/subdirectory level by moving the cursor to the VOICE FILE position and pressing the Enter key.

- ▶ ". .": Selects the current subdirectory.
- ▶ ".. .": Selects the directory/subdirectory at the next highest level. If the current subdirectory is immediately below the root directory, selecting this level returns you to root directory.
- ▶ "INPUT": Select this item to create another subdirectory under the current subdirectory, then perform the above Steps ②, ③, and ④.

VOICE NAME

When Voice data is loaded, its corresponding Voice Name automatically appears at the VOICE NAME display. This Voice Name can also be changed if necessary.

- ① Move the cursor to the VOICE NAME position, then press the Enter key.

When the Enter key is pressed, the cursor moves over to the currently displayed Voice Name on the right so that another Voice Name can be input.

VOICE NAME	STRING1
------------	---------

NOTE: While the cursor is located at the right of the VOICE NAME position, the Function Keys do not function.

- ② Use the alphanumeric keys to key in the desired Voice Name.

VOICE NAME	STRINGS-NEW
------------	-------------

- ③ Press the Enter key to input the Voice Name. When the Enter key is pressed again, the cursor moves over to the VOICE NAME position on the left, indicating that the new Voice Name has been input.

NOTE: When Voice data is saved, the data of the input Voice Name will also be saved.

NOTE: When data is saved at FVX-1, a Voice Name of up to 12 characters can be memorized.

ALGORITHM

When the FED-1 program is started up, the connection pattern of Algorithm No. 1 is displayed according to the model and Voice Group which have been specified for editing. When Voice data is loaded, however, the Algorithm display shows the algorithm for the loaded Voice.

In addition, by moving the cursor to the right of the ALGORITHM position, you can switch to a different algorithm. (→pages 27 & 31)

HELP

If you wish to know the functions of the main keys in the DIRECTORY or EDIT modes, perform the steps below to display the HELP menu.

- ① Press [Home].
Pressing the Home key displays the names and functions of the main keys that can be used.
- ② To return to the previous display, press [Esc] (or [C]).

NOTE: The following key functions are displayed:

- ▶ [Enter]—[Esc]: The functions common to all modes are displayed.
- ▶ [F1]—[F10]: The functions of the Function Keys in DIRECTORY mode are displayed.
- ▶ [1]—[8] and [Q]—[I]: The functions in EDIT 1, EDIT 2, and DIRECTORY mode are displayed.
- ▶ [A]—[K] and [Z]—[,]: The functions in EDIT 1 mode are displayed.

[Filename Extensions]

When the Voice data and other data which have been edited using FED-1 are saved to a disk, an extension is automatically appended to each filename that you input.

- ▶ **In case of Voice data:** The appended extension varies with the target model and Voice Group (Polyphonic or Monophonic) that were edited.

Extension	Contents of Data
.H1P	Polyphonic Voice data of HX-1
.H1M	Monophonic Voice data of HX-1
.H3P	Polyphonic Voice data of HX-3
.H3M	Monophonic Voice data of HX-3
.H5P	Polyphonic Voice data of HX-5
.H5M	Monophonic Voice data of HX-5
.FVP	Voice data of FVX-1 (Polyphonic)

- ▶ **In case of Algorithm data:** The appended extension varies according to the number of Operators and whether it is of Polyphonic or Monophonic type.

NOTE: The VOICE FILE display as well as the ALGORITHM FILE display in ALGORITHM EDIT mode are designed to display Voice filenames appended with extensions that correspond to the currently selected target model and Voice Group to be edited.

Extension	Contents of Data
.A1P	4-Operator Polyphonic Algorithm data
.A2M	8-Operator Monophonic Algorithm data
.A2P	8-Operator Polyphonic Algorithm data
.A3M	16-Operator Monophonic Algorithm data

IV. EDIT MODES

IV-1 EDIT 1 Display and Menu

When the [F1] key is pressed during DIRECTORY mode, the program shifts to the EDIT 1 mode and the below display appears.

EDIT MODEL display

	① VOICE GROUP	U. ORC.	② VOICE NAME	STRING1								
③ OPERATOR	8											
④ SYNC	MODE	TOUCH-R										
AR	SUSTAIN	ON										
80	DIR	D2R	RR									
1	85	6	43									
AR-KSC	DIR-KSC	D2R-KSC	RR-KSC									
1	2	2	1									
AL	DIL	D2L	RL									
100	98	98	0									
	DIL-KSC											
	0											
		⑤ ALGORITHM	PRESET	3								
		VOICE BUFFER										
		<table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 50%;">1.</td><td style="width: 50%;">5.</td></tr> <tr><td>2.</td><td>6.</td></tr> <tr><td>3.</td><td>7.</td></tr> <tr><td>4.</td><td>8.</td></tr> </table>			1.	5.	2.	6.	3.	7.	4.	8.
1.	5.											
2.	6.											
3.	7.											
4.	8.											
Function Key display												
VOICE BUFFER display												

① VOICE GROUP display

Displays the Voice Group to be edited. It is also possible to change the Voice Group to be edited. During normal operation, the Voice Group is selected before loading the Voice data. (→page 11)

② VOICE NAME display

Automatically displays the Voice Name corresponding to the loaded Voice data. You can also change the Voice Name if necessary. (→page 17)

③ OPERATOR No. display

The top right area displays the number of the currently selected Operator. An Operator can be selected by simply pressing a key from [A] to [K] (in case of eight Operators). (→page 19)

④ Parameter Data display

Displays all of the parameters of the currently selected Operator and Parameter Group as well as the data values of those parameters. The data of a parameter can be changed by moving the cursor to the Data position of the parameter to be edited. (→page 19)

⑤ ALGORITHM display

The top right area displays the Algorithm No. (or USER) of the loaded Voice data. The Algorithm No. may be changed if necessary. (→pages 27 & 31)

The larger area below displays the connection pattern of the Operators which corresponds to the currently selected algorithm. If the connection pattern cannot be completely displayed within this area, concurrently press a Shift key and cursor shift key to scroll the display and check the rest of the connection pattern.

• VOICE BUFFER display

If Voice data has been saved to the Voice Buffers, the corresponding Voice Names are displayed here. (→pages 12 & 14)

• Function Key display

Displays the job that will be executed when a Function Key of the computer is pressed in EDIT 1 mode. The ESC feature is also displayed.

The Function Keys [F1] to [F5] correspond to the five Parameter Groups which can be selected.

IV-2 Parameter Editing in EDIT 1 Mode

Outline

- In EDIT 1 mode, you can edit the Voice parameters for individual Operators.
- The Operator and Parameter Group can be selected by pressing only one key each. And by moving the cursor to the parameter to be edited, you can change its data.

Procedure

① **Check that the Voice you wish to edit has been loaded.** If you loaded the Voice data in DIRECTORY mode before entering EDIT 1 mode, its Voice Name, algorithm, and a portion of its Voice parameters will be displayed. Even if you enter EDIT 1 mode without loading Voice data, you can load it by pressing the [F8] key (except if you wish to load data from a disk).

② **Select the Operator to be edited.** While checking the role of each Operator within the connection pattern in the ALGORITHM display, press one of the keys shown below to select the Operator to be edited.

A	S	D	F	G	H	J	K	
Z	X	C	V	B	N	M	,	

- ▶ **[A] to [K] keys:** Correspond to Operators [1] to [8]. (For a 4-Operator Voice, only the [A] to [F] keys which correspond to Operators [1] to [4] are used.)
- ▶ **[Z] to [,] keys:** Correspond to Operators [9] to [16]. (Used only for a 16-Operator Voice.)

NOTE: You can also select the Operator No. by moving the cursor to the area to the right of the OPERATOR display, then using the [UP]/[DOWN] keys.

③ **Select the Parameter Group.** Press one Function Key from [F1] to [F5] to select the group of parameters to be edited.

F1	F2	F3	F4	F5	
----	----	----	----	----	--

Key	Parameter Group
F1	The Parameter Group that is related to the EG (Envelope Generator). (→page 22)
F2	The Parameter Group that is related to OSC (Oscillator). (→page 23)
F3	The Parameter Group that is related to LEVEL. (→page 24)
F4	The Parameter Group that is related to LFO (Low Frequency Oscillator). (→page 25)
F5	The Parameter Group that is related to ETC (other miscellaneous parameters). (→page 26)

NOTE: The selection of the Operator and Parameter Group may be conducted in any sequence. Because the LFO and ETC Parameter Groups are common to all Operators, however, Operator selection is not necessary if LFO or ETC is selected.

④ **Move the cursor to the parameter to be edited, then change its value using [UP] and [DOWN].** After moving the cursor to the Data position of the parameter to be edited, you can change its data by using the [UP]/[DOWN] keys. Change the parameter data while playing the keyboard to check the resulting sound. (The meaning and variable setting range of each parameter are provided on pages 22 to 26.)

NOTE: Pressing the Home key displays the Help Menu, which lists the full name of each parameter according to the Parameter Group.

⑤ **Repeat Steps ② to ④ above to edit the Voice as necessary.** When you have completed the necessary editing, press the [F10] key to return to DIRECTORY mode, then either save your edited Voice data or switch to another mode. Voice data can also be saved in EDIT 1 mode (but not to a disk).

NOTE: During Voice editing, it is possible to switch OFF the output of a specific Operator (→page 27) or copy parameters (→page 28), if so required.

IV-3 EDIT 2 Display and Menu

When the [F2] key is pressed during DIRECTORY mode, the program shifts to the EDIT 2 mode and the below display appears.

EDIT MODE display

	①		②	
EDIT MODE	VOICE GROUP	U. ORC.	VOICE NAME	STRING1
③	PARAMETER		EG SYNC	
④	OP-8	OP-7	OP-6	OP-5
	ON	ON	ON	ON
	OP-4	OP-3	OP-2	OP-1
	ON	ON	ON	ON
	ALGORITHM		PRESET	3
	VOICE BUFFER			
	1.		5.	
	2.		6.	
	3.		7.	
	4.		8.	
Function Key display				
VOICE BUFFER display				

① VOICE GROUP display

Displays the Voice Group to be edited. It is also possible to change the Voice Group to be edited. During normal operation, the Voice Group is selected before loading the Voice data. (→page 11)

② VOICE NAME display

Automatically displays the Voice Name corresponding to the loaded Voice data. You can also change the Voice Name if necessary. (→page 17)

③ PARAMETER display

Displays the currently selected Voice parameter. The Parameter Group can be selected by pressing a Function Key from [F1] to [F5]. By moving the cursor to the area on the right of the PARAMETER position, you can select another parameter. (→page 21)

④ Parameter Data display

Displays the data of all Operators that correspond to the currently selected parameter. The data of an Operator can be changed by moving the cursor to the Data position of the Operator to be edited. (→page 21)

⑤ ALGORITHM display

The top right area displays the Algorithm No. (or USER) of the loaded Voice data. The Algorithm No. may be changed if necessary. (→pages 27 & 31)

The larger area below displays the connection pattern of the Operators which corresponds to the currently selected algorithm. If the connection pattern cannot be completely displayed within this area, concurrently press a Shift key and cursor shift key to scroll the display and check the rest of the connection pattern.

• VOICE BUFFER display

If Voice data has been saved to the Voice Buffers, the corresponding Voice Names are displayed here. (→pages 12 & 14)

• Function Key display:

Displays the job that will be executed when a Function Key of the computer is pressed in EDIT 2 mode. The ESC feature is also displayed.

The Function Keys [F1] to [F5] correspond to the five Parameter Groups which can be selected.

IV-4

Parameter Editing in EDIT 2 Mode

Outline

• In EDIT 2 mode, you can edit the Voice parameters by editing the data common to all Operators by individual parameters.

• The parameters for all Operators will be displayed concurrently, so you can perform editing while comparing the data settings of each Operator.

Procedure

① Check that the Voice you wish to edit has been loaded. If you loaded the Voice data in DIRECTORY mode before entering EDIT 2 mode, its Voice Name, algorithm, and one of its Voice parameters will be displayed. Even if you enter EDIT 2 mode without loading Voice data, you can load it by pressing the [F8] key (except if you wish to load data from a disk).

② Select the Parameter Group. Press one Function Key from [F1] to [F5] to select the group of parameters to be edited.

F1	F2	F3	F4	F5
----	----	----	----	----

Key	Parameter Group
F1	The Parameter Group that is related to the EG (Envelope Generator). (→page 22)
F2	The Parameter Group that is related to OSC (Oscillator). (→page 23)
F3	The Parameter Group that is related to LEVEL. (→page 24)
F4	The Parameter Group that is related to LFO (Low Frequency Oscillator). (→page 25)
F5	The Parameter Group that is related to ETC (other miscellaneous parameters). (→page 26)

One of the parameters belonging to the selected Parameter Group is displayed in the area to the right of the PARAMETER position, and the data of all Operators corresponding to that parameter is concurrently displayed.

NOTE: Because the LFO and ETC Parameter Groups are common to all Operators, only one set of data is displayed if LFO or ETC is selected. For the FEET parameter of the OSC Parameter Group, the data is displayed in Operator Group (four-Operator) units.

③ Select the parameter to be edited. By moving the cursor to the area to the right of the PARAMETER position, you can select the parameter to be edited.

PARAMETER	EG SYNC
-----------	---------

The displayed parameter is sequentially changed by pressing the [UP]/[DOWN] keys, so select the parameter you wish to edit.

NOTE: Pressing the Home key displays the Help Menu, which lists all of the parameters that belong to the currently selected Parameter Group.

④ Move the cursor to the Operator to be edited, then change its value using [UP] and [DOWN].

After moving the cursor to the Data position of the Operator to be edited, you can change its data by using the [UP]/[DOWN] keys. Change the Operator data while playing the keyboard to check the resulting sound. (The meaning and variable setting range of each parameter are provided on pages 22 to 26.)

⑤ Repeat Steps ② to ④ above to edit the Voice as necessary.

When you have completed the necessary editing, press the [F10] key to return to DIRECTORY mode, then either save your edited Voice data or switch to another mode. Voice data can also be saved in EDIT 2 mode (but not to a disk).

NOTE: During Voice editing, it is possible to switch OFF the output of a specific Operator (→page 27) or copy parameters (→page 28), if so required.

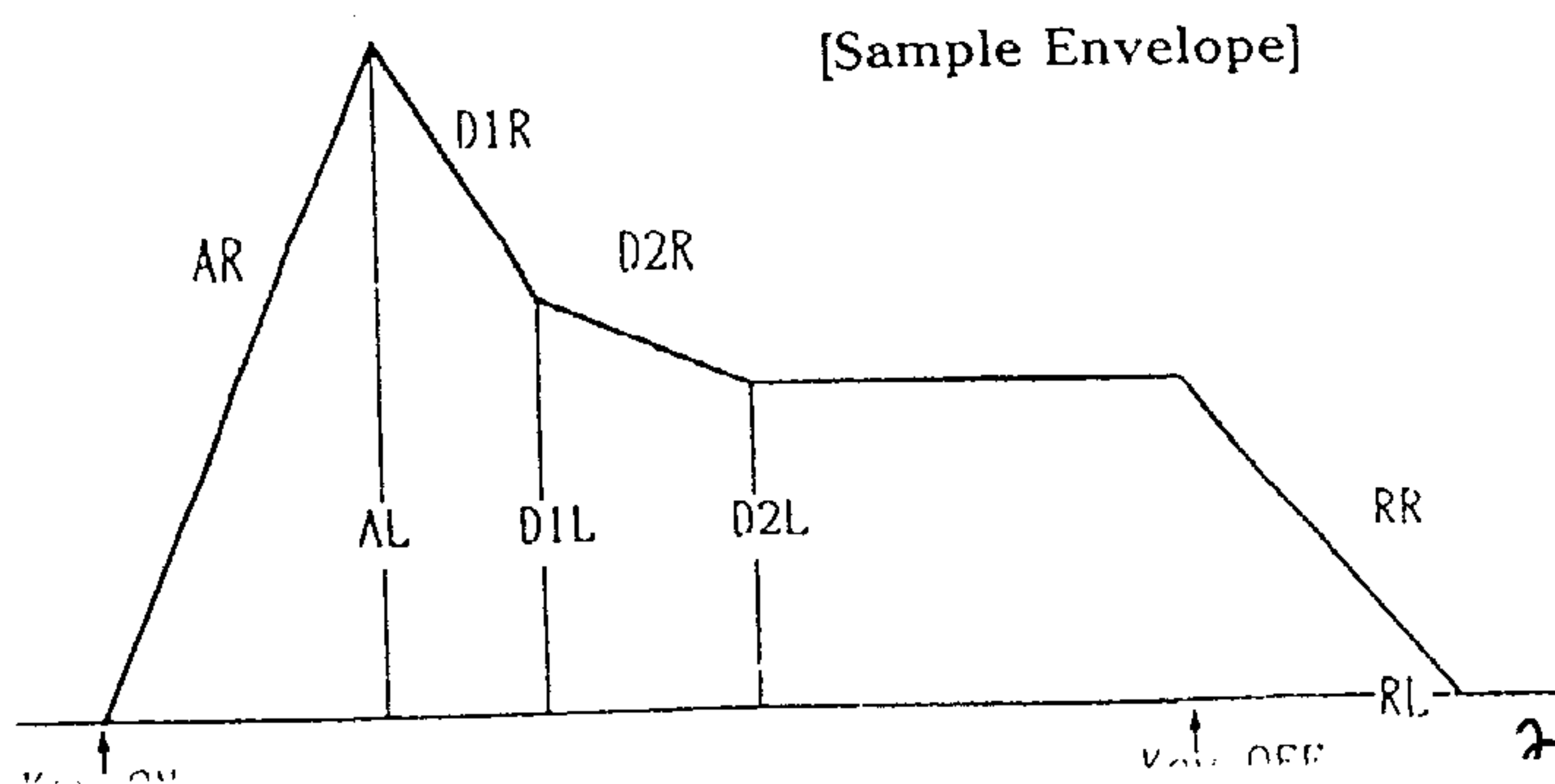
List of EG (Envelope Generator) Parameters

- This group consists of the parameters for individual Operators that set the fluctuations in volume and timbre over time, from the moment a note begins sounding until it fades out.
- If the Operator to be edited is a carrier, the volume is changed over time; if the Operator is a modulator, the timbre is changed over time.

- The parameters of the Oscillator and Level Groups are usually set to different values for each Operator. Even if their Envelope Generator parameters are set to the same values, therefore, the way in which their volume or timbre changes over time will vary.

Display	Parameter Name	Description	Variable Range
SYNC	EG SYNC	Selects whether to set a certain key to OFF and synchronize the Key ON timing of the next note to the level of the note still being sounded, then drop it to the Release Level (normally Level 0). It is usually set to ON (SYNC ON).	ON/OFF
MODE	EG MODE	Selects the attenuation mode to be used after Key OFF. SUSTAIN: When SUSTAIN is ON, the attenuation conforms to the Sustain Length set at the instrument; when OFF, it conforms to the Release Rate. PERCUS: When SUSTAIN is ON, attenuation conforms to the Decay 2 Rate. GATE: Regardless of the SUSTAIN ON/OFF setting, attenuation conforms to the Release Rate. ONE SHOT: Regardless of the Key OFF timing and SUSTAIN ON/OFF setting, attenuation is performed.	SUSTAIN/ PERCUS/ GATE/ ONE SHOT
TOUCH-R	TOUCH RATE	Selects whether Initial Touch will affect the Attack Rate. When TOUCH-R is ON, strong key pressure speeds up the attack of its note.	ON/OFF
AR	ATTACK RATE	Sets the speed from Key ON to the Attack Level.	0-100
D1R	DECAY 1 RATE	Sets the speed from the Attack Level to the Decay 1 Level.	0-100
D2R	DECAY 2 RATE	Sets the speed from the Decay 1 Level to the Decay 2 Level.	0-100
RR	RELEASE RATE	Sets the speed from Key OFF to the Release Level.	0-100
AR-KSC	ATTACK RATE KEY SCALE	These four Key Scale parameters respectively change the preceding four rates according to each key's scale position. When set from "1" to "3", the higher the note, the faster the movement toward the next level and the shorter the sound. The OFF setting is "0", and the higher the numeric value, the faster the rate.	0-3
D1R-KSC	DECAY 1 RATE KEY SCALE		0-3
D2R-KSC	DECAY 2 RATE KEY SCALE		0-3
RR-KSC	RELEASE RATE KEY SCALE		0-3
AL	ATTACK LEVEL	Sets the Attack Level of the notes, after which attenuation begins.	0-100
D1L	DECAY 1 LEVEL	Sets the intermediate level between the Attack Level and Decay 2 Level.	0-100
D2L	DECAY 2 LEVEL	Sets the level at which sustaining of the note begins.	0-100
RL	RELEASE LEVEL	Sets the final level after Key OFF. (Normally set to 0)	0-100
D1L-KSC	DECAY 1 LEVEL KEY SCALE	This parameter sets the Decay 1 Level to become progressively lower along the key scale toward the higher notes.	0-3
SL MODE *	SLIDE MODE	When LEAD SLIDE is ON at HX and the Portamento affect is applied, SL MODE selects how the Envelope Generator will move. OFF: The preceding note's EG remains valid, but the pitch slides. Other settings: After moving at the currently set Slide Rate from the preceding note's EG to the Slide Level, the EG moves to one of three specified levels then the note begins. The EG moves either to the Attack Level if "ATTACK" is set, to the Decay 1 Level if "DECAY" is set, or to the Decay 2 Level when "SUSTAIN" is set.	OFF/ ATTACK/ DECAY/ SUSTAIN
SLR *	SLIDE RATE	When SL MODE is set to from 1 to 3, SLL sets the intermediate level until sliding to the next note, and SLR sets the speed to that level.	0-100
SLL *	SLIDE LEVEL		0-100

*Only applicable to Monophonic Voices.



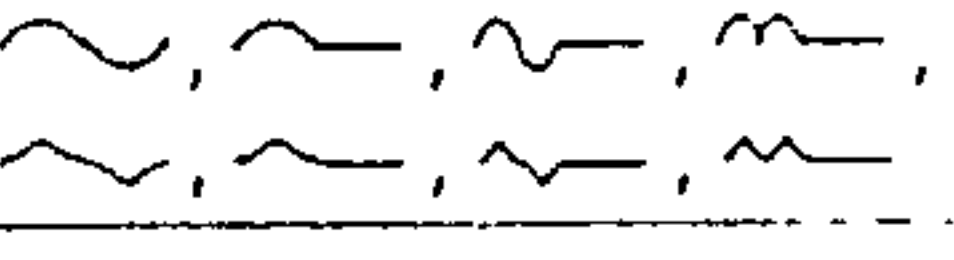
- ▶ The "Rate" signifies the speed of movement from one level to another and is in inverse proportion to the time required.
- ▶ Even without changing the Rate setting, you can change the time required for movement by changing the level at both ends.
- ▶ If the envelopes of the carrier and modulator are set to extremely different values, the timing for fluctuations in volume and timbre will deviate. Unless you want to produce a special Voice effect, therefore, try to set their envelopes as similarly as possible.
- ▶ Please note that when the input level, output level, etc. are set to "0", the volume and timbre will not be changed even if the EG data is edited. (For certain Preset Voices of FVX-1, the output level of specific carriers is set to "0".)

List of OSC (Oscillator) Parameters

• This group consists of the parameters that set the frequency (pitch), waveform, phase, etc. of the signals that are output by each Operator.

When you wish to change the mood, basic features, or other aspects of a Voice, edit the parameters in this group.

• The frequency of each Operator plays an especially important role in determining the characteristic sound of a Voice. By changing the frequency ratio between Operators or setting the Detune feature, you can create a variety of original sounds.

Display	Parameter Name	Description	Variable Range
FEET	FEET	Selects the basic frequency to be output. Four levels can be set in octave units for each Operator Group (in 4-Operator units).	32', 16', 8', 4'
SYNC	OSC SYNC	Selects whether to synchronize the phase of the waveform output to the Key ON timing. OFF: Since synchronization is OFF, pressing a chord may cause subtle changes in the timbre. ON: Each Key ON always begins from the phase position that is set by PHASE. Even if a chord is pressed, there are no fluctuations in its timbre. TO BEFORE: At Key ON, the Operator is synchronized with the phase of the preceding Operator.	OFF/ ON/ TO BEFORE
WAVE	WAVEFORM	Selects the basic waveform to be output by each Operator. 1 of 8 waveforms, such as sine waves, can be set for each Operator. (See "Waveforms" below.)	
PHASE	PHASE	Sets the starting phase position for Key ON. Especially when this setting is changed for an attenuated sound, the timbre will be subtly changed.	0°-360° (15° units)
FREQ-MODE	FREQUENCY MODE	Selects whether to generate a frequency according to each key or a fixed frequency. RATIO: Generates a frequency that corresponds to each key (the normal mode). FIXED: Only generates a fixed frequency regardless of the key pressed.	RATIO/FIXED
FREQ-MUL	FREQUENCY MULTIPLIER	These parameters set the frequency to be output by each Operator when FREQ-MODE is set to RATIO.	× 1 - × 18
DETUNE-C	DETUNE COARSE	FREQ-MUL: Sets a multiplied frequency. "× 1" is standard pitch, "× 2" is one octave above, and "× 4" is two octaves above.	-450, -300, -150, 0 150, 300, 450
DETUNE-F	DETUNE FINE	DETUNE-C: Coarsely sets the frequency in 150-cent (1.5-step) units. DETUNE-F: Finely sets the frequency in units of 1.1 to 1.2 cents.	-148.9 to 0 to 148.9
FIXED-FREQ	FIXED FREQUENCY	Sets the fixed frequency to be output when FREQ-MODE is set to FIXED.	0.38148-24984.7
PITCH-KSC	PITCH KEY SCALE	Changes the deviation in the frequency according to the key scale position. In RATIO mode: Changes with respect to the DETUNE-F value. The higher the value, the progressively smaller the frequency deviation up the key scale toward the higher notes. In FIXED mode: Changes with respect to the FIXED-FREQ value. The higher the value, the progressively larger the frequency deviation up the key scale toward the higher notes.	-7 to 0 to 7


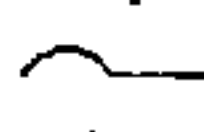

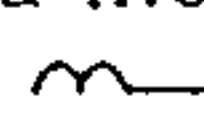


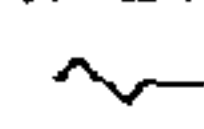

[Relation Between the Frequency Ratio and the Timbre]

The FM Tone Generator creates a variety of harmonic components by changing the frequency of each Operator.

- ▶ Generally speaking, the frequency of a carrier-type Operator determines the pitch of each output note, and the frequency ratio between the carrier and modulator determines the timbre.
- ▶ To set the frequency for individual Operators, set FREQ-MODE to RATIO, then set the data using the FREQ-MUL, DETUNE-C, or DETUNE-F parameters.
- ▶ When the frequency ratio is a whole number (when DETUNE is set to "0" and the frequency is only changed by FREQ-MUL), whole harmonics can be obtained so a transparent, relatively well-balanced Voiced is produced.
- ▶ When the frequency ratio is not a whole number (when the frequency is changed by DETUNE-C or DETUNE-F), a sound containing irregular harmonics is obtained so that the resulting Voice has a metallic characteristic.
In general, the higher the frequency, the more metallic the voice and the more conspicuous its treble notes.
- ▶ If the SYNC parameter of an Operator is set to TO BEFORE, the Key ON timing is synchronized with the PHASE value of the preceding Operator; therefore, the DETUNE-C and DETUNE-F settings become invalid.
- ▶ When FREQ-MUL is set to "0", the Operator will not be sounded.

[Waveforms]

With the FM Tone Generator system of HX and FVX-1, sine waves or one of seven other types of waveforms can be output from each Operator. Numerous Voice variations can be achieved by changing the waveform, even without changing the frequency data.

- ▶  : The sine wave is the most typical waveform. The majority of Preset Voices in HX and FX-1 are designed to output sine waves.
- ▶  : If you wish to produce a Strings-type Voice without using feedback, set this waveform for a carrier.
- ▶  : If you wish to produce the Voice of a Guitar or a reed instrument, such as Harmonica, set this waveform for a modulator.
- ▶  : This setting is effective for emphasizing the higher harmonics.
- ▶  : When used alone, it is the Woodwind-type Voice. Compared to the sine wave, it places slightly more stress on the high notes.
- ▶  : Set this waveform for a modulator when you wish to produce the Voice of a plucked-string instrument, such as a Guitar, Harp, etc.
- ▶  : This waveform is effective for producing the voice of a reed instrument, such as Harmonica or Accordion.
- ▶  : Use this waveform when you wish to stress the higher harmonics or to produce the Voice of a reed instrument.

List of LEVEL Parameters

- This group mainly consists of parameters that are related to the level of the signals which are input and output by each Operator.
- The way in which the volume and timbre fluctuate varies according to whether the Operator to be edited is a carrier or modulator and whether feedback is applied.
- AM-POL and AM-SENS are actually LFO-related parameters. Because they can be set for individual Operators, however, they are described below within the LEVEL Group.

Display	Parameter Name	Description	Variable Range
IN-LVL	INPUT LEVEL	Sets the ratio at which the Modulation signals are input to each Operator. Normal Operators: Modulation signals are input at a ratio of one ("0"), two ("1"), four ("2") or eight ("3") times the level that is output by the preceding Operator. Operators with feedback: Feedback signals are input at a ratio of OFF ("0") or one ("1"), two ("2") or four ("3") times the level that is output.	0-3
OUT-LVL	OUTPUT LEVEL	Sets the maximum output level for each Operator. Each EG level is based on a percentage of this output level which is regarded as 100.	0-255
L-CURVE	LEFT CURVE	These parameters determine the key scale of the output level, and enable a mountain-shaped level slope to be set. (See the figure below.) B-POINT: Sets the crest of the mountain-shaped level slope using the name of a note. L-CURVE, R-CURVE: Selects the downward curve of the left and right levels. L-DEPTH, R-DEPTH: Sets the slope of the left and right levels.	LIN/EXP
B-POINT	BREAK POINT		CO # - A7 #
R-CURVE	RIGHT CURVE		LIN/EXP
L-DEPTH	LEFT DEPTH		0-15
R-DEPTH	RIGHT DEPTH		0-15
TOUCH-SENS	TOUCH SENSITIVITY	Sets the extent to which key touch pressure (both Initial and After Touch) affects the output level. The higher the value, the more key touch affects fluctuations in volume and timbre.	0-15
EXP-COEF	EXPRESSION COEFFICIENT	Sets the extent to which pressure on the Expression Pedal affects the output level. The higher the value, the more Expression Pedal pressure affects fluctuations in volume and timbre.	0-7
BRI-COEF	BRILLIANCE COEFFICIENT	Sets the extent to which the BRILLIANCE switch setting affects the output level. The higher the value, the more the BRILLIANCE setting affects fluctuations in volume and timbre.	0-127
AM-POL	* AMPLITUDE MODULATION POLARITY	Sets the polarity (+/-) of the amplitude modulation (for the Tremolo or Wah effect) by the LFO for individual Operators. INC sets the polarity to positive, and DEC sets it to negative. With an 8-Operator Polyphonic Voice, an automatic panning effect can be achieved by setting two Operator Groups which respectively output to left and right so that their parameter settings are identical, then setting only their polarity to opposite settings.	INC/DEC
AM-SENS	* AMPLITUDE MODULATION SENSITIVITY	Sets the degree of sensitivity at each Operator to the amplitude modulation by the LFO. The higher the value, the greater the sensitivity. ("0" is OFF.)	0-3

*Only applicable to Polyphonic Voices.

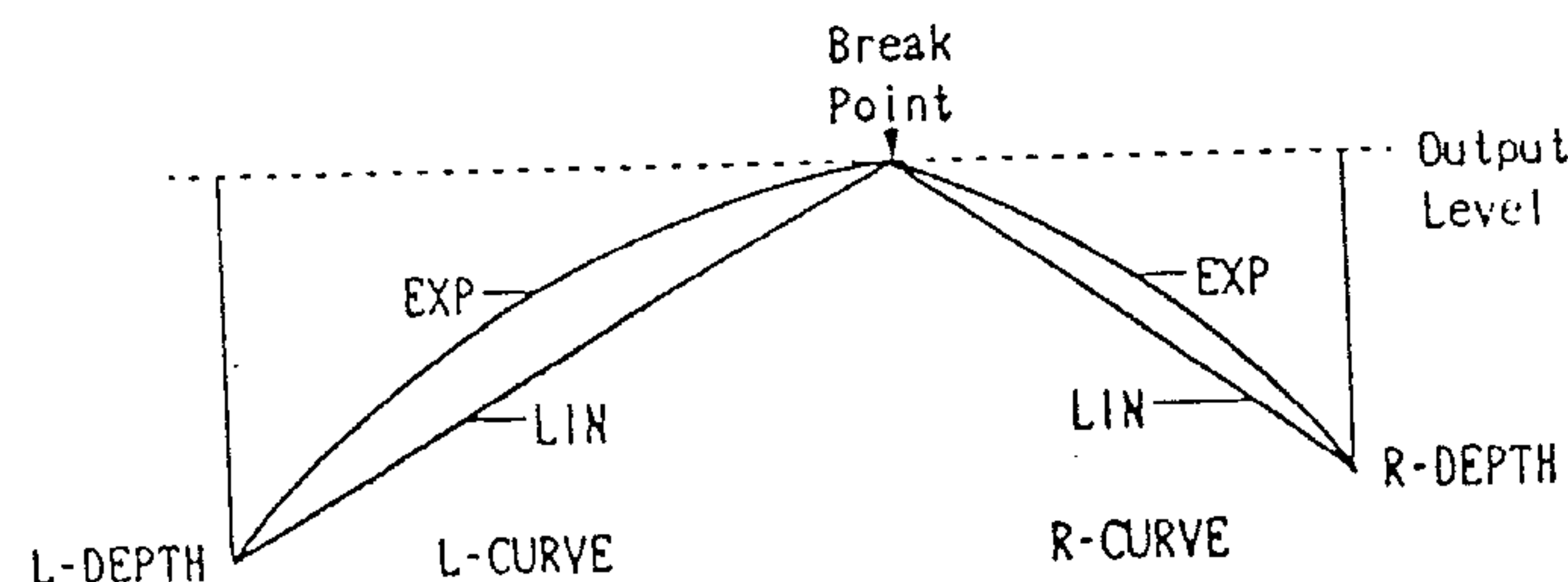
[The Input Level and Output Level]

The input level determines the ratio of the output level of Modulation signals at which such signals will be input to each Operator. The output level determines the maximum output level of each Operator as an absolute value.

- ▶ For normal Operators, an increase in the input level of an Operator has the same effect as substantially increasing the output level of the modulator that modulates that Operator. The higher the input level, the greater the fluctuations in timbre.
- ▶ For an Operator that is subjected to feedback, the input level determines the feedback level. Raising the feedback level generally emphasizes the higher harmonics, which is effective for creating the such sounds as Brass and Strings.
- ▶ If the Operator is a carrier, the output level controls the volume.
- ▶ If the Operator is a modulator, the output level controls the timbre. The higher the output level, the brighter and more flashy the Voice becomes. Lowering the output level produces a mellower sound.

[The Key Scale of the Output Level]

The key scale parameters enable fluctuations in volume and timbre to occur in accordance to the position of the pressed key along the key scale so that a natural sound is produced.



List of LFO (Low Frequency Oscillator) Parameters

• This group consists of parameters that are related to the LFO (Low Frequency Oscillator) which modulates all of the Operators. These parameters let you control the preset effects, such as Vibrato, Tremolo or Wah, of the Voice being edited.

• PM parameters set the Vibrato effect; AM parameters set the Tremolo (periodic fluctuations in volume) or Wah (periodic fluctuations in timbre) effect; and ATP parameters are used to apply a fast Vibrato or a short Pitch-Bend effect during the attack of notes.

■ PM (Pitch Modulation) Parameters

Display	Parameter Name	Description	Variable Range
DL-TIME	DELAY TIME	Sets the interval after Key goes ON and the ATP effect goes OFF until Vibrato starts being applied (see the figure below). The higher the value, the longer the Delay Time. The Attack Time from the start of Vibrato until its maximum depth (or modulation level) is automatically determined in proportion to the Delay Time.	0-100
RR	RELEASE RATE	Sets the speed from Key OFF until the moment at which Vibrato is no longer applied.	0-100
SPEED	SPEED	Determines the speed (modulation frequency) of Vibrato.	0-100
DEPTH	DEPTH	Determines the depth (modulation level) of Vibrato.	0-100
DL-TIME-KSC*1	DELAY TIME KEY SCALE	These parameters vary the way in which Vibrato is applied according to the key scale position. The higher the value, the progressively longer the DELAY TIME, faster the SPEED, and deeper the DEPTH up the key scale toward the higher notes.	-15 to 0 to 15
SPD-KSC *1	SPEED KEY SCALE		-15 to 0 to 15
DEPTH-SKC *1	DEPTH KEY SCALE		-15 to 0 to 15
OFFSET	PITCH OFFSET	Only while Vibrato is being applied, OFFSET finely raises or lowers the pitch of all Operators that are being modulated by LFO. (Normally set to a slightly high pitch.)	-127 to 0 to 127

■ AM (Amplitude Modulation) Parameters

Display	Parameter Name	Description	Variable Range
SPEED *2	SPEED	Sets the speed (modulation frequency) of Tremolo or Wah.	1-255
DEPTH *2	DEPTH	Sets the depth (modulation level) of Tremolo or Wah. A positive numeric value sets positive polarity, and a negative one sets negative polarity.	-127 to 0 to 127

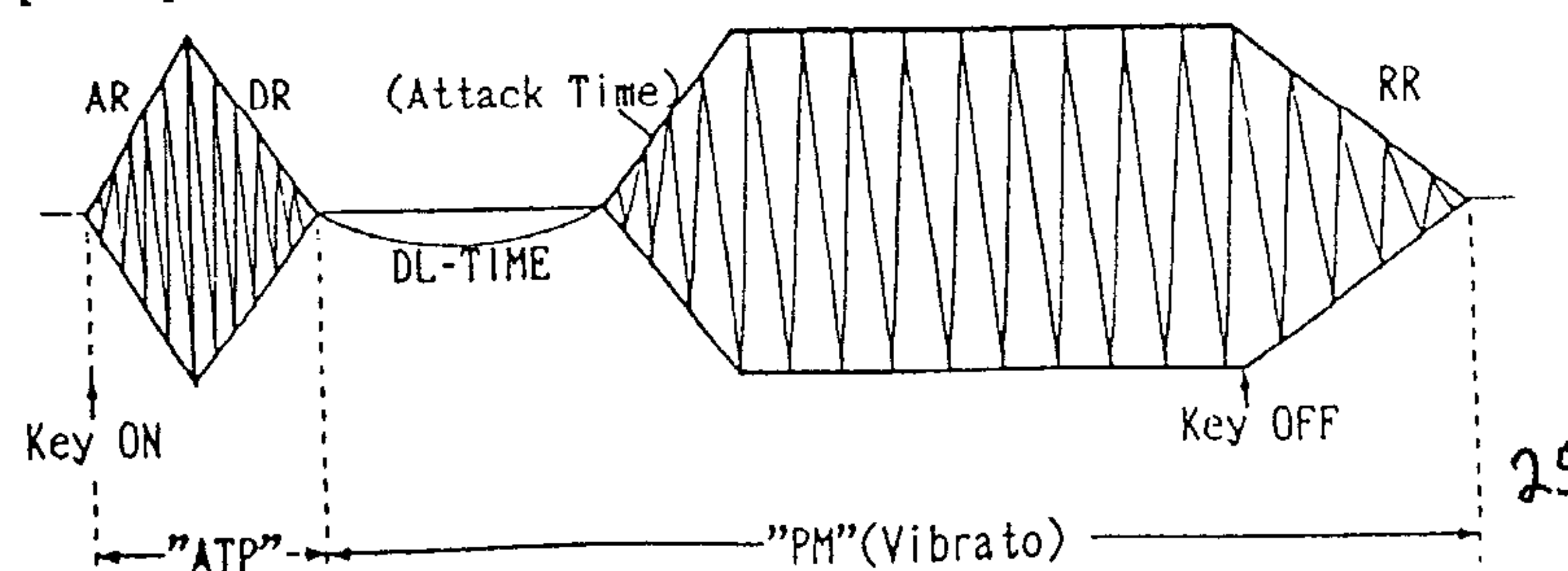
■ ATP (Attack Pitch Modulation) Parameters

Display	Parameter Name	Description	Variable Range
MODE	MODE	Selects the effect to be applied by ATP. MODULATE: Applies a short, fast Vibrato effect during the attack of notes. BEND: Applies a short Pitch-Bend type effect during the attack of notes. The upward or downward bending of the pitch is set by the + / - setting of DEPTH.	MODULATE/ BEND
AR	ATTACK RATE	Sets the speed from Key ON until the effect produced by ATP reaches its maximum depth (or modulation level).	0-100
DR	DECAY RATE	Sets the speed from the ATP effect's maximum depth (or modulation level) until it goes OFF.	0-100
SPEED	SPEED	Sets the speed (modulation frequency) of the ATP effect when MODE is set to MODULATE.	0-255
DEPTH	DEPTH	Sets the depth (modulation level) of the ATP effect in the case the TOUCH TONE switch is ON.	-127 to 0 to 127
AR-KSC *1	ATTACK RATE KEY SCALE	These parameters change the way the ATP effect is applied according to the key scale position. The higher the value, the progressively faster the speed up the key scale toward the higher notes.	-15 to 0 to 15
DR-KSC *1	DECAY RATE KEY SCALE		-15 to 0 to 15
DEF-DEPTH	DEFAULT DEPTH	Sets the depth (modulation level) of the ATP effect in the case the TOUCH TONE switch is OFF.	-127 to 0 to 127

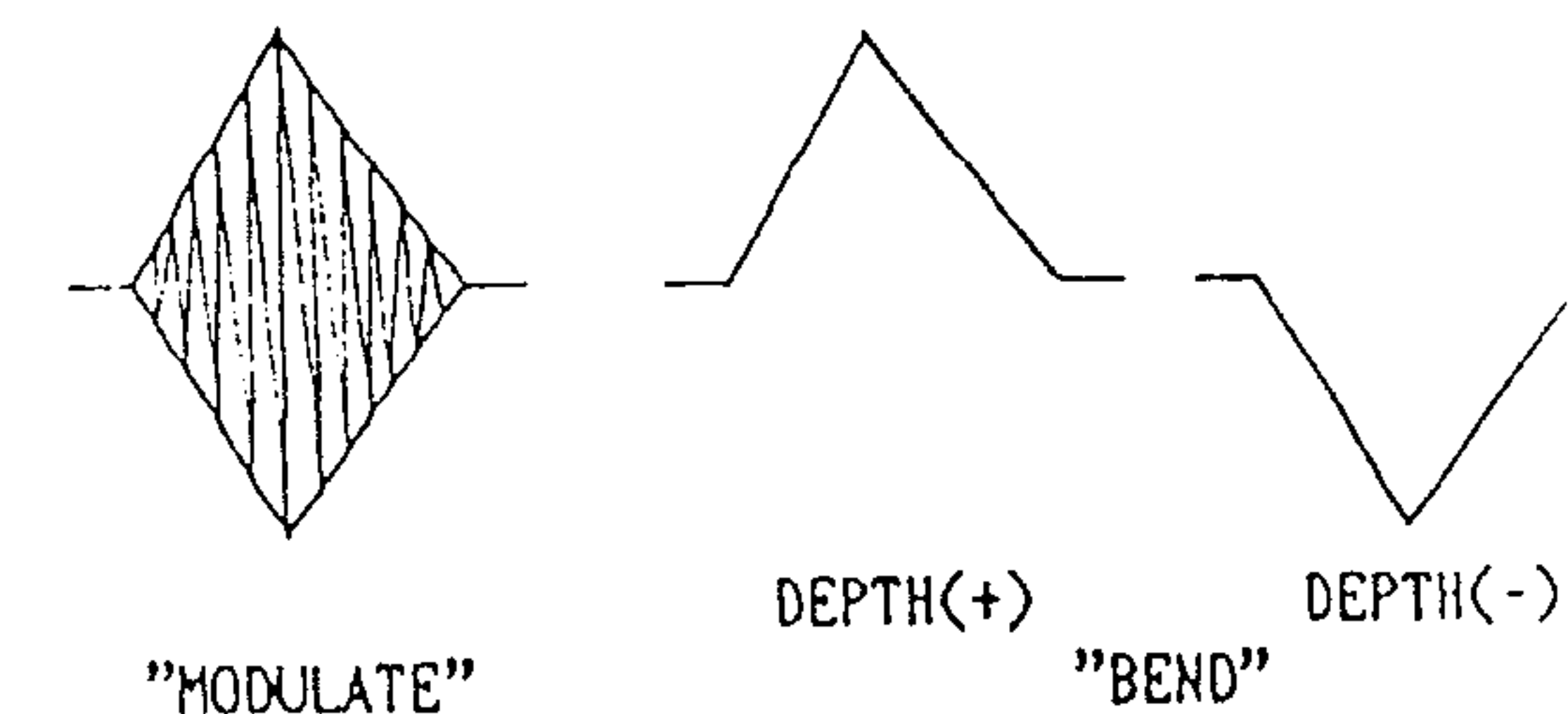
*1-Only applicable to 16-Operator and 8-Operator Voices.

*2-Only applicable to Polyphonic Voices.

[Example of ATP and PM Parameter Settings]



[ATP Modes]



List of ETC (Miscellaneous) Parameters

• This group consists of parameters that can be set for Operator Groups or for all Operators, such as parameters related to Touch data, to effects for Voice output, and so on.

• A Voice that is provided with two output channels has two separate sets of parameters related to the Filter, Pan, and (HX only) Reverb, which can be set for the respective channels.

Display	Parameter Name	Description	Variable Range
TOUCH	TOUCH MODE	Selects the type of key touch to be used on each Operator Group to change the volume and timbre. For 4 Operators, TOUCH-1 (GRP-1) corresponds to Operators 1-4. For 8 Operators, TOUCH-1 (GRP-1) corresponds to Operators 8-5 and TOUCH-2 (GRP-2) to Operators 4-1. For 16 Operators, TOUCH-1 (GRP-1) corresponds to Operators 16-13, TOUCH-2 (GRP-2) to Operators 12-9, TOUCH-3 (GRP-3) to Operators 8-5, and TOUCH-4 (GRP-4) to Operators 4-1. INT: The volume and timbre change only with Initial Touch. (Attenuated sounds) INT+AFT: The volume and timbre change both with Initial and After Touch. (Sustained sounds)	INT/ INT+AFT
REP-MODE *1	REPEAT MODE	Selects the Repeated Note mode, used for instruments such as the Mandolin or Marimba. OFF: Normal Voice without repeated notes. MODE1: When each chord is pressed, all notes except the highest one are concurrently repeated. MODE2: Normal repetition of notes in which all notes of a chord are concurrently repeated. MODE3: When each chord is pressed, the highest note is repeated alternately with the other notes to produce a twin-mallet effect.	OFF/ MODE1/ MODE2/ MODE3
REP-SPEED *1	REPEAT SPEED	Sets the speed of repetition when REPEAT MODE is set from 1 to 3.	0-255
EF-MODE	EFFECT MODE	Selects the digital effector through which the Voice will be output. The type of effector which can be selected varies with the target model of editing. OFF: Effector OFF. SYM (SYMPHONIC), CEL (CELESTE), PHA (PHASER), DEL (DELAY): Selectable for all models. WAH: Selectable for HX-1, HX-3, and FVX-1. FLA (FLANGER): Selectable for HX-1 and FVX-1. TRE (TREMOLO), CHO (CHORUS), PE1-4 (PROGRAM EFFECTOR 1-4): Selectable for FVX-1.	OFF, SYM, CEL, PHA, FLA, DEL, WAH, TRE, CHO, PE1, PE2, PE3, PE4
EF-LVL *2	EFFECT LEVEL	Sets the volume for output via the effector set by EF-MODE. Because volume sounds as if it is increased when passed through an effector, the volume is usually set to a slightly lower level in most cases. Set EF-LVL to "15" when you do not wish to output sound via an effector. The lower the value, the smaller the volume. "0" sets the volume to OFF.	0-15
SL-SPEED *3	SLIDE SPEED	When LEAD SLIDE is ON at HX and the Portamento affect is applied, SL-SPEED sets the speed for sliding the pitch to the next note. (The EG parameters of SL-MODE, SLR, and SLL set the Slide Envelope for individual Operators.)	0-63
DEF-VEL	DEFAULT VELOCITY	Sets the fixed velocity for Key ON status when the TOUCH TONE switch is OFF.	0-63
FLT	FILTER NUMBER	Selects the digital filter through which the Voice will be output. A Voice with two output channels has two sets of data which can be separately set for the respective channels. You can also select the digital filter in FILTER mode. (→page 36) OFF: Output does not pass a filter. 1-48: Selects the digital filter corresponding to the respective numbers. Based on the number selected, preset default values are automatically set for the IN-LVL, OUT-GAIN, and OUT-LVL.	OFF, 1-48
IN-LVL	FILTER INPUT LEVEL	Sets the input level to the filter. The level is raised by setting a positive numeric value; it is lowered by setting a negative numeric value.	-4 to 0 to 3
OUT-GAIN	FILTER OUTPUT GAIN	Sets the output level from the filter. OUT-LVL: Coarsely sets the output level.	0-31
OUT-LVL	FILTER OUTPUT LEVEL	OUT-GAIN: Finely sets the output level that was set by OUT-LVL.	-4 to 0 to 3
PAN-L	PAN LEFT	Sets the left and right levels of the Pan data (the direction of output from the speakers) for each channel. (Valid only when EF-MODE is set to OFF.)	0-15
PAN-R	PAN RIGHT		0-15
REV-L *2	REVERB LEFT	Sets the input level to the HX Reverb. For Voices having two output channels, these parameters can be set for each channel.	0-15
REV-R *2	REVERB RIGHT		0-15

*1-Only applicable to Polyphonic Voices.

*2-Only applicable to HX-1, HX-3, and HX-5.

*3-Only applicable to Monophonic Voices.

► The effector that is set by EF-MODE will become a preset value for an individual Voice. If that Voice is later selected at HX or FVX-1, therefore, that effector setting automatically becomes valid.

► The PAN setting for an FVX-1 Voice will only be valid when the Pan Mode Select function of FVX-1 is set to PRESET mode (004).

IV-5 | Changing the Algorithm

Outline

- Though each Preset Voice of HX and FVX-1 has been set with an algorithm (pattern of Operators) that is suitable to each Voice, you can select another algorithm if necessary.

- Although if the algorithm of a Voice is changed, the parameter settings of each Operator remain unchanged. Changing the algorithm may, therefore, totally transform the Voice in some cases.

Procedure

- ① Move the cursor to the right of the ALGORITHM position.

The Algorithm No. of the Voice data currently loaded by FED-1 is displayed to the right of the ALGORITHM position. After moving the cursor to this Algorithm No. position, you can change the Algorithm No.

NOTE: If the algorithm of your loaded Voice was edited in ALGORITHM EDIT mode, USER is displayed at this position to distinguish it from a preset algorithm.

NOTE: The algorithm can be changed not only in the EDIT 1 and EDIT 2 modes, but also in the DIRECTORY and ALGORITHM EDIT modes.

- ② Use [UP]/[DOWN] to select the Algorithm No. Each time the [UP] or [DOWN] key is pressed, the Algorithm No. is respectively increased or decreased by one. After changing the Algorithm No., a connection pattern corresponding to the newly selected algorithm is displayed.

NOTE: By pressing [UP] or [DOWN] while holding down a Shift key, you can change the Algorithm No. by ten units at a time.

As listed below, the number of preset algorithms varies with the model and Voice Group. Even if the number of algorithms is identical, the connection pattern of the algorithms is usually different. (The Polyphonic Voices of HX-1 and FVX-1 share the same algorithms.)

Model	Voice Group	Algorithm No. Range
HX-1	Polyphonic	1-63
	Monophonic	1-63
HX-3	Polyphonic	1-16
HX-5	Monophonic	1-63
FVX-1	(Polyphonic)	1-63

NOTE: If the connection pattern of an algorithm cannot be completely displayed, press a Shift key and a cursor shift key to scroll the display.

NOTE: It is possible to change a USER algorithm to a preset algorithm. When you attempt to do so, however, a warning message will be displayed.

How to Turn OFF a Specific Operator

When editing the settings of Voice parameters, it is possible to temporarily turn OFF (output level=0) a specific Operator. By using this feature, you can know how much each Operator affects the entire Voice and thereby facilitate your editing work.

- ① Press the key(s) corresponding to the Operator(s) to be turned OFF.

Check the role of each Operator in the connection pattern of the ALGORITHM display, then press the key(s) that correspond to the Operator(s) to be turned OFF. The display of the OFF Operator will now be inverted in the connection pattern.

1	2	3	4	5	6	7	8	
	Q	W	E	R	T	Y	U	I

- ▶ Keys [1] to [8]: Correspond to Operators 1 to 8. (For a 4-Operator Voice, only keys [1] to [4] which correspond to Operators 1 to 4 are used.)
- ▶ Keys [Q] to [I]: Correspond to Operators 9 to 16, and are only used for 16-Operator Voices.

- ② To turn the Operator(s) back ON, press the same key(s) again.

NOTE: This feature temporarily sets the output level of a specific Operator to "0" (OFF) in order to facilitate editing, but does not affect the actual settings of the output level. Even if you save your Voice data with an Operator turned OFF, therefore, the data will be saved with that Operator in ON status.

NOTE: This Operator OFF operation can be performed not only in the EDIT 1 and 2 modes, but also in the DIRECTORY and ALGORITHM EDIT modes.

IV-6 Copying Parameters

Outline

- While editing a Voice, the data of one Operator can be copied exactly to another Operator. This COPY feature is useful when you wish to change multiple Operators to the same settings, to match the Envelope data of multiple Operators, and so on.
- There are two functions for copying parameters. The Operator Copy function copies the parameter settings of the EG, OSC, and LEVEL groups. The EG Copy function copies the settings of only the EG parameters.

Procedure

- ① **Set the source parameter of the Copy operation.**
Following the instructions on pages 18 to 26, set the parameters of the Operator which will be copied.

NOTE: Because the parameters of the LFO and ETC groups are common to all Operators, the LFO and ETC parameter settings will not be changed by performing a Parameter Copy operation.

- ② **Press [F6] or [F7].**
The display of OP CP or EG CP is inverted at the Function Key display, indicating that the pertinent parameters can be copied.

- ▶ **[F6]:** Copies the settings of the parameters belonging to the three Parameter Groups of EG, OSC, and LEVEL. (Only FEET of the OSC group is set in Operator Group units, so the FEET setting is not copied.)
- ▶ **[F7]:** Copies the settings of the parameters belonging to the EG Parameter Group. When you wish to keep the OSC and LEVEL parameters unchanged and only copy the Envelope parameters so that two Operators will share common EG parameters, press [F7] to perform EG Copy.

- ③ **Set the source Operator of the Copy operation.**
When the [F6] or [F7] key is pressed, the message below is displayed and prompts you to input the number of the Operator to be copied.

OP No. from ? []

Use the numeric keys [1] to [0] to key in the source Operator No., then press the Enter key.

- ④ **Specify the destination Operator of the Copy operation.**

After you key in the source Operator No. and press the Enter key, the message below is displayed and prompts you to input the number of the destination Operator.

From 8 to ? []

Use the numeric keys [1] to [0] to key in the destination Operator No., then press the Enter key. The parameter settings of the source Operator are now copied to the destination Operator.

IV-7 Other Operations in EDIT Modes

LOAD

Even in EDIT 1 or EDIT 2 mode, it is possible to load Voice data from a connected device or a Voice Buffer.

- ① **Press [F8].**
- ② **Use the cursor shift keys to select the LOAD source, then press the Enter key.**

The message below is displayed and prompts you to select the source from which Voice data is to be loaded.

LOAD
from VOICE BUFFER
HX-1
to CURRENT.
Cancel OK

Move the cursor to the desired LOAD source, then press the Enter key (or [O] key).

- ③ **Perform the Load job according to the selected LOAD source.**

■ **When the LOAD source is VOICE BUFFER**
Move the cursor to the Voice Buffer you wish to load, then press the Enter key (or [O] key). (→page 12)

■ **When the LOAD source is HX or FVX-1**
Use numeric keys to key in the Voice No. to be loaded, then press the Enter key (or [O] key). The rest of this Load job is identical to that in DIRECTORY mode. (→page 13)

SAVE

Similarly to the Load job, Voice data can be saved to a connected device or to a Voice Buffer even in EDIT 1 or EDIT 2 mode.

Press [F9].

- Use the cursor shift keys to select the SAVE destination, then press the Enter key.

The message below is displayed and prompts you to select the destination to which Voice data is to be saved.

```
SAVE
from  CURRENT
to    VOICE BUFFER
      HX-1.
[Cancel] [OK]
```

Move the cursor to the desired SAVE destination, then press the Enter key (or [O] key).

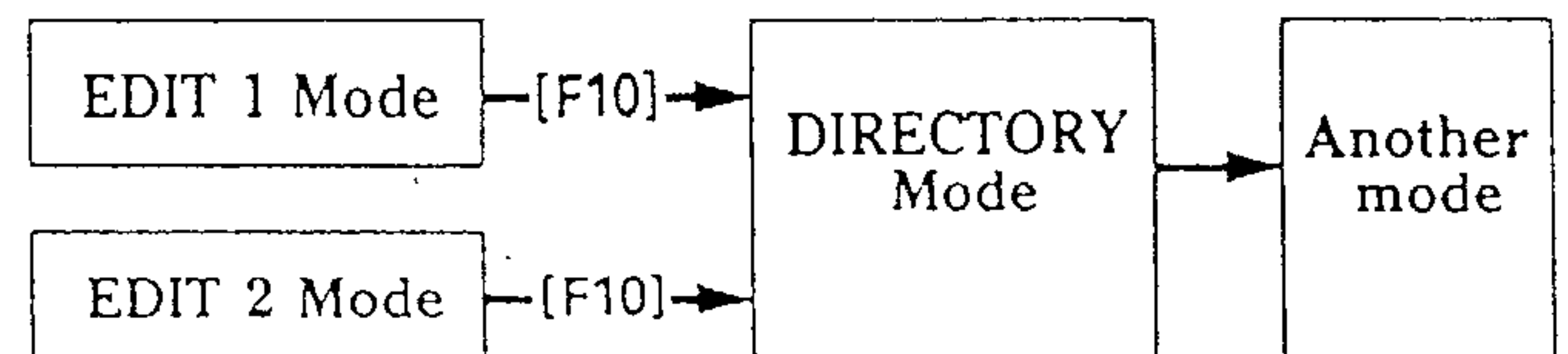
- Perform the Save job according to the selected SAVE destination.

■ When the SAVE destination is VOICE BUFFER
Move the cursor to the Voice Buffer at which you wish to save the data, then press the Enter key (or [O] key). (→page 14)

■ When the SAVE destination is HX or FVX-1
Use numeric keys to key in the destination Voice No., then press the Enter key (or [O] key). The rest of the Save job is identical to that in DIRECTORY mode. (→page 15)

DIRECTORY

After you finish your editing work in the EDIT 1 or EDIT 2 mode, press the [F10] key to switch to DIRECTORY mode. From DIRECTORY mode, you can now switch to another mode or perform jobs in DIRECTORY mode (saving data to disk, ending the program, etc.).



HELP

During EDIT 1 or EDIT 2 mode, you can display the Help menus by following the steps below:

- Select the Parameter Group, then press [Home].
A Help menu corresponding to the selected Parameter Group is displayed.
- To restore the usual display, press [ESC] (or [C]).

NOTE: The contents of the displayed Help menus are as follows:

- ▶ EDIT 1 mode: The full names of the parameters are displayed for each Parameter Group.
- ▶ EDIT 2 mode: A list of all parameters belonging to each Operator Group is displayed.

VOICE GROUP/VOICE NAME

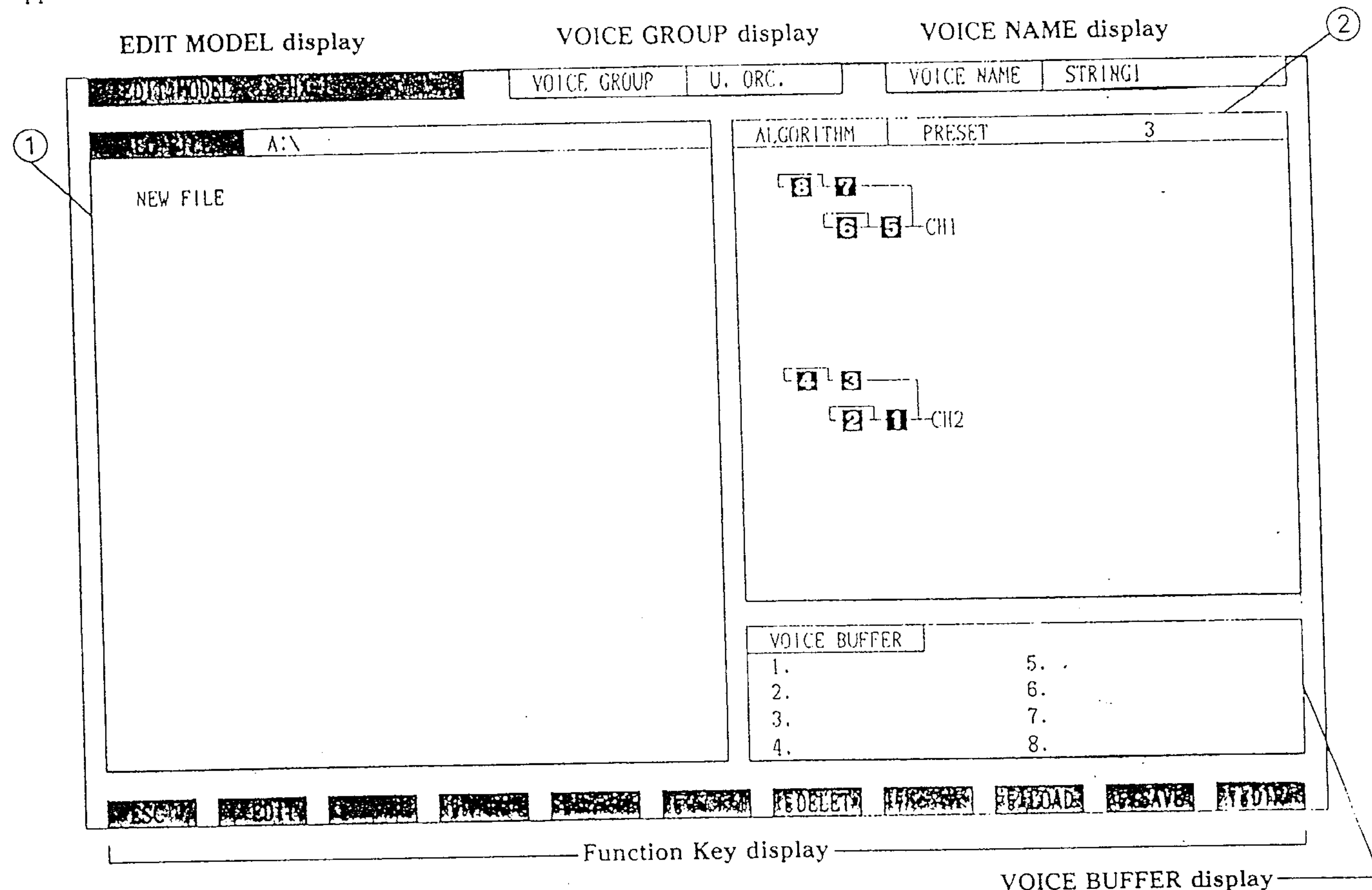
In EDIT 1 or EDIT 2 mode, it is also possible to specify the Voice Group or change the Voice Name. The procedures for these operators are identical to those in DIRECTORY mode.

- ▶ Voice Group (→page 11)
- ▶ Voice Name (→page 17)

NOTE: If the Voice Group is changed during editing, you will be able to load new Voice data. In this case, the Voice data of the previous Voice Group is stored in the computer's internal memory without being erased, so you can recall the previous Voice data by simply setting the previous Voice Group again.

V-1 ALGORITHM EDIT Display and Menu

When the [F3] key is pressed during DIRECTORY mode, the program shifts to the ALGORITHM EDIT mode and the below display appears.



● **VOICE GROUP display**

Displays the Voice Group to be edited. (→page 11)

● **VOICE NAME display**

Automatically displays the Voice Name corresponding to the loaded Voice data (or the new Voice Name that you have input). (→page 17)

① **ALGORITHM FILE display**

The top right area displays the currently specified disk drive (and subdirectory, if one has been created). While you are editing an algorithm, the ALG FILE display changes to ALG NAME, permitting you to input the name of the algorithm you are editing.

If algorithm data has been saved to the disk in the currently specified drive (and subdirectory), the larger area below displays the saved filename(s). During the editing of an algorithm, the connection data of the algorithm being edited is also displayed.

② **ALGORITHM display**

The top right area displays the Algorithm No. (or the new Algorithm Name that you have input) of the loaded Voice data. The Algorithm No. can be changed if necessary.

The larger area below displays the connection pattern of the Operators which corresponds to the currently selected algorithm. If the connection pattern cannot be completely displayed within this area, concurrently press a Shift key and cursor shift key to scroll the display and check the rest of the connection pattern.

● **VOICE BUFFER display**

If Voice data has been saved to the Voice Buffers, the corresponding Voice Names are displayed here. (→pages 12 & 14)

● **Function Key display**

Displays the job that will be executed when a Function Key of the computer is pressed in ALGORITHM EDIT mode. The ESC feature is also displayed.

Note that, after you press the [F1] key to edit an algorithm, this Function Key display will change.

Outline

- Before you can edit an algorithm, the algorithm to be edited must be loaded. If you want to edit the data of the currently displayed algorithm, however, you can immediately begin the editing process.

- In addition to editing the currently displayed algorithm, it is also possible to either load the data of another preset algorithm or load (read) algorithm data that has been saved on a disk, then perform editing of that algorithm.

Procedure

- ① **Decide which algorithm data you wish to edit.**
If you plan to edit the connection data of an algorithm, you can edit one of the three types of algorithm data below:

■ Data of the current algorithm

An algorithm appears at the ALGORITHM display as soon as you enter ALGORITHM EDIT mode. If you wish to edit the displayed algorithm, simply press the [F1] key which lets you edit that algorithm's connection data. (→page 32)

■ Data of another preset algorithm

FED-1 is preset with various types of algorithm data which correspond to the models and Voice Groups which can be selected for editing. To edit preset algorithm data, replace the current algorithm data with the desired set of preset algorithm data.

■ Data of an algorithm saved on a disk

Algorithm data can be saved on a disk separately from the Voice data (→page 34). To edit algorithm data that has been saved on a disk, you must first load its algorithm file.

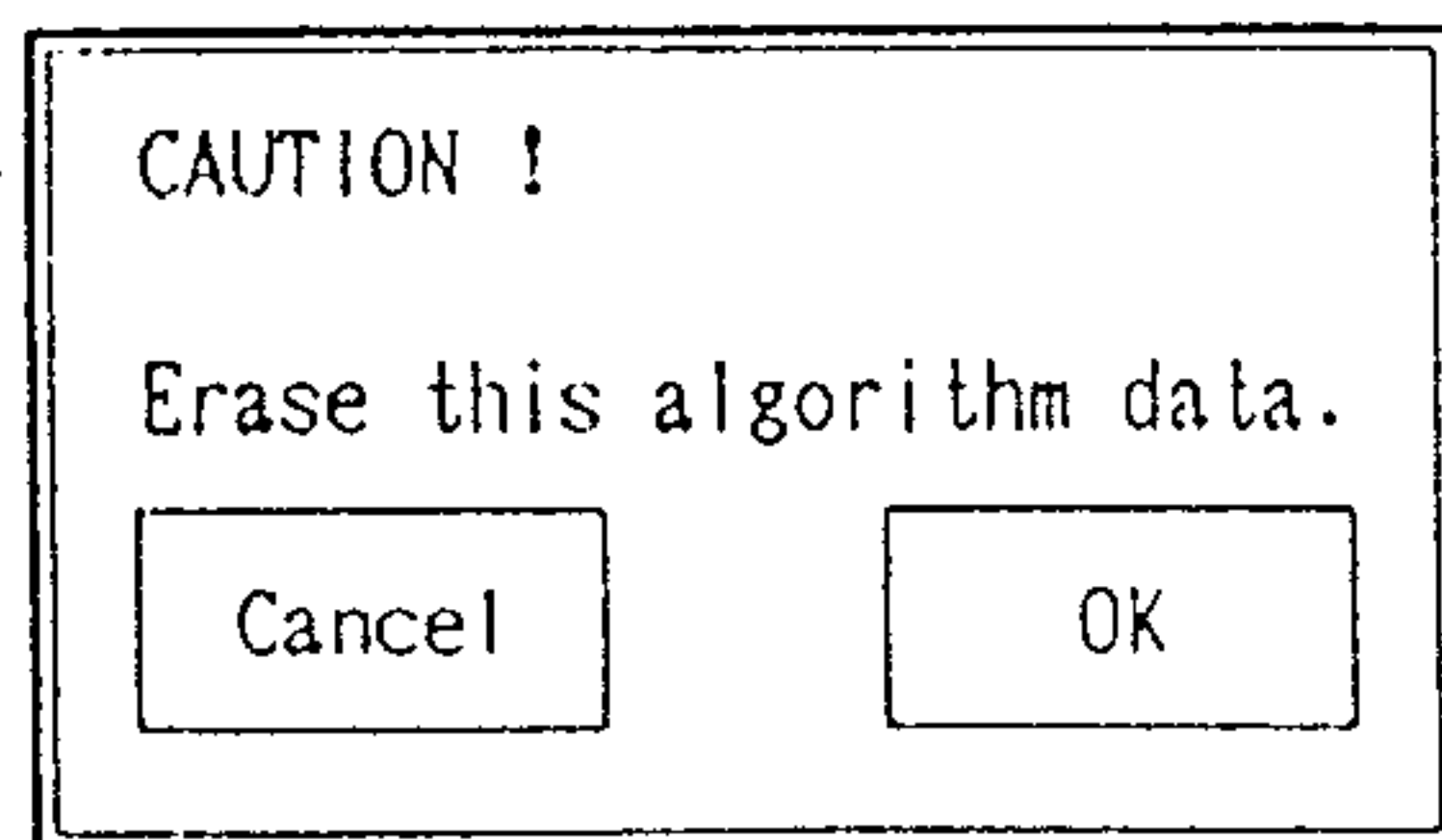
- ② **To edit the data of an algorithm other than the current algorithm, load the algorithm data using the proper procedure.**

■ Changing to other preset algorithm data

Immediately after entering ALGORITHM EDIT mode, perform the steps below. (→See page 27 for more details.)

- Make sure that the cursor is positioned to the right of the ALGORITHM position.
- Use the [UP]/[DOWN] keys to select the number of the preset algorithm you wish to edit.

NOTE: If the currently algorithm data has been previously edited and you attempt to load the data of another preset algorithm, the warning message below is displayed. To change the algorithm data from this status, press the Enter key (or [O] key).

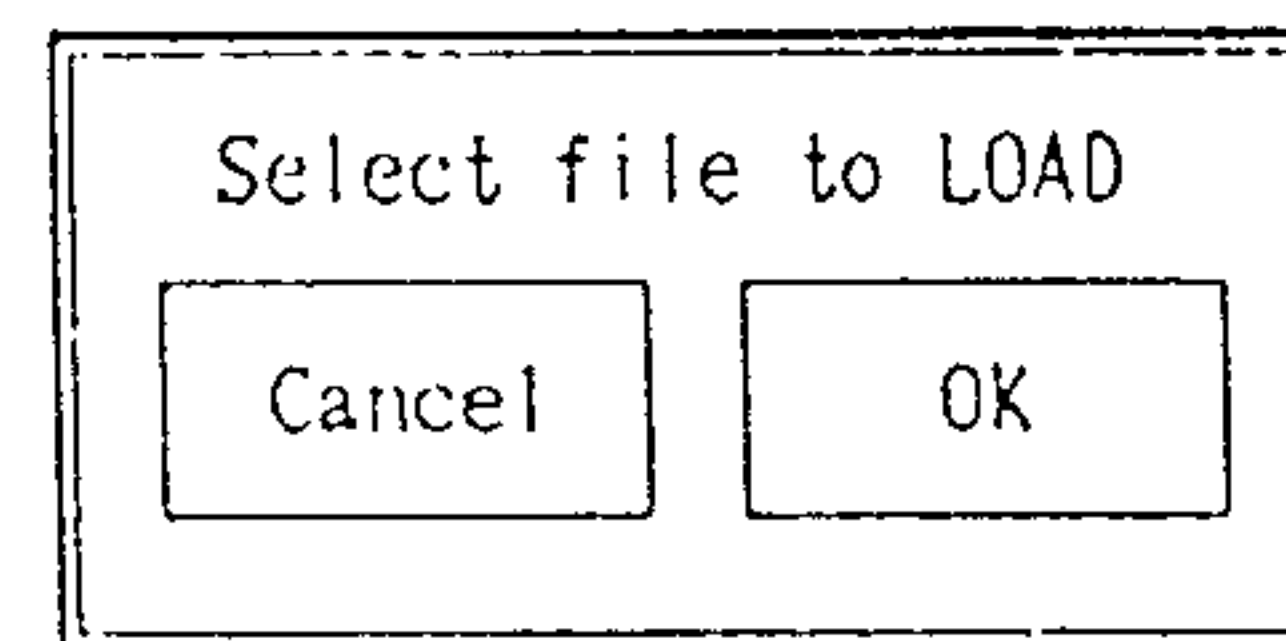


■ Loading algorithm data from a disk

Immediately after entering ALGORITHM EDIT mode, perform the steps below.

- Press [F8].

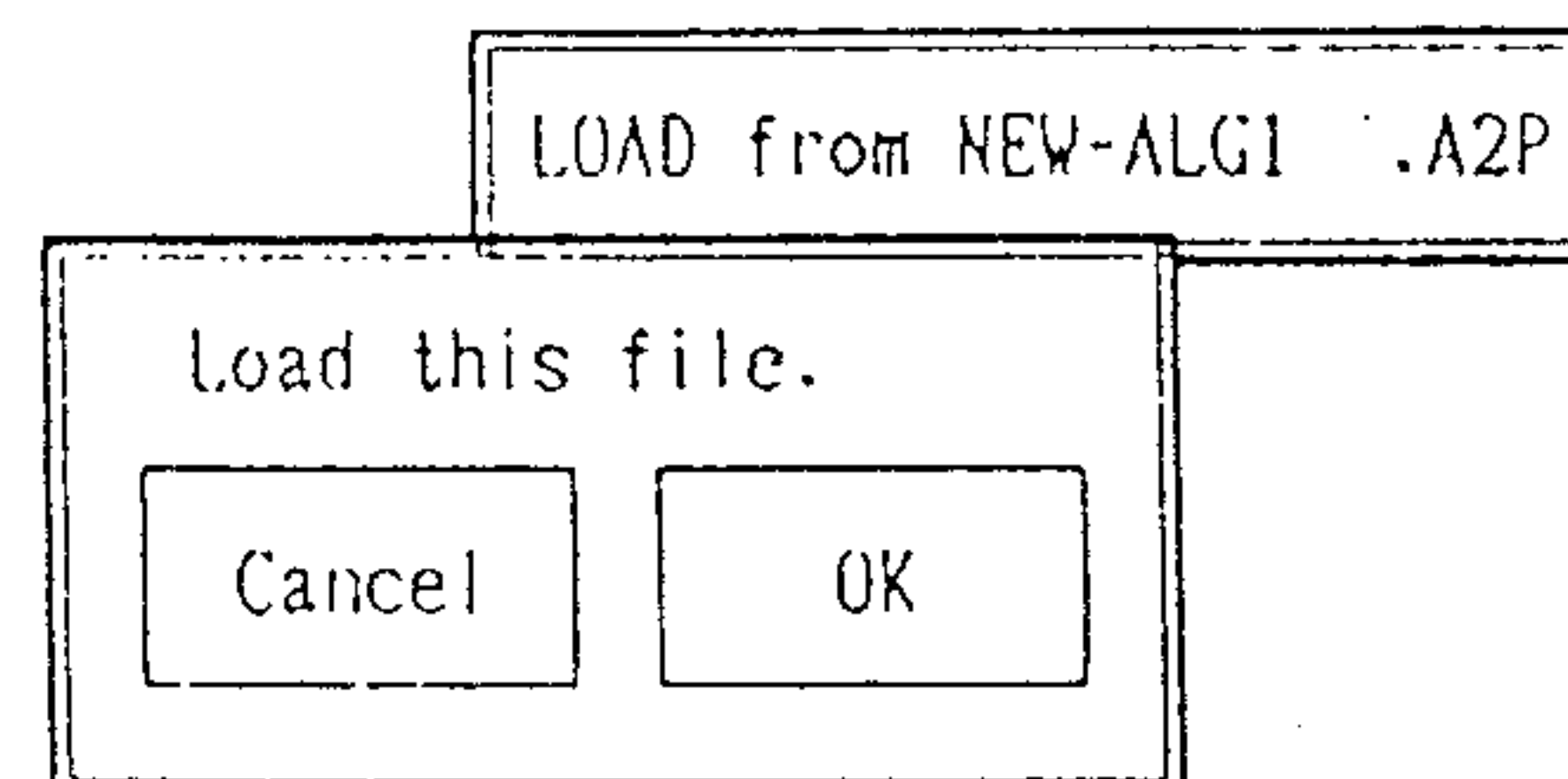
The below message is displayed and prompts you to select the algorithm file to be loaded.



- Move the cursor to the algorithm file you wish to load.

- Press the Enter key (or [O] key) to select "OK".

When "OK" is selected, the message below is displayed to confirm whether you want to execute the Load job for the selected algorithm file.



- To load the file, press the Enter key (or [O] key). To cancel the Load job, press the Esc key (or [C] key).

NOTE: If a drive and subdirectory were specified before saving the desired algorithm data on the disk, you must perform the following steps before pressing [F8] in Step ① above:

Move the cursor to the ALG FILE position, then press the Enter key. Next, specify the drive and subdirectory to which the algorithm data was saved. (→pages 15 & 34)

NOTE: If the currently algorithm data has been previously edited and you attempt to load the data of another preset algorithm, a warning message is displayed. To load the selected algorithm data from this status, press the Enter key (or [O] key).

NOTE: If all the Algorithm files saved on the disk cannot be displayed at once, move the cursor to the ALG FILE position then press the [UP]/[DOWN] keys to switch the page.

V-3 Editing an Algorithm

Outline

• Pressing the [F1] key after entering ALGORITHM EDIT mode allows you to edit the connection data of the currently loaded algorithm.

• The data which determines the connection of the Operators is called a "register." By locating the registers at the prescribed set positions, you can easily create a new algorithm.

Procedure

① Press [F1].

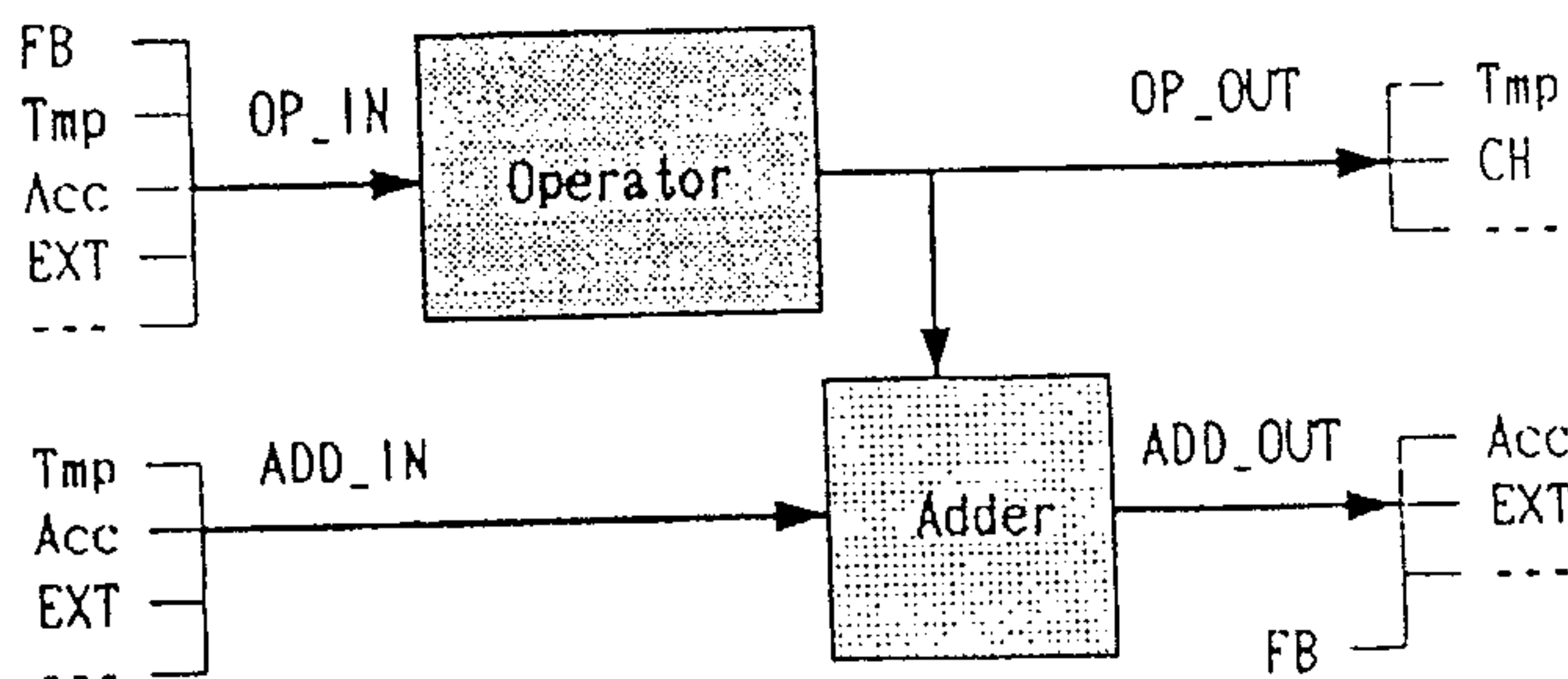
At the ALGORITHM FILE display, the algorithm connection data shown below is displayed, indicating that you can now edit the currently loaded algorithm.

ALG EDIT	ALG NAME				
OP	OP_IN	ADD_IN	ADD_OUT	OP_OUT	
8	FB1	---	--- FB1	--- Tmp	---
7	Tmp	---	---	---	CH1
6	FB2	---	Acc FB2	---	---
5	Acc	---	---	---	CH1
4	FB1	---	--- FB1	--- Tmp	---
3	Tmp	---	---	---	CH2
2	FB2	---	Acc FB2	--- Tmp	---
1	Acc	---	---	---	CH2

- **First row (OP_IN, ADD_IN, ADD_OUT, OP_OUT):** Displays the names of the positions for setting the registers (the data which determines the Operator connection pattern).
- **Subsequent rows:** Display the register or "---" (OFF) setting at each set position for the individual Operators.

② Move the cursor to the position of the register you wish to change.

Each Operator is equipped with an Adder circuit which adds the signals of its Operator with the signals of another Operator which are input to the Adder, then outputs the signals. The figure below shows the relationship between the Operator and Adder as well as the set positions of the registers.



- **OP_IN (Operator Input Select):** Sets a register to select the input source of signals to an Operator.
- **ADD_IN (Adder Input Select):** Sets a register to select the input source of signals to an Adder.
- **ADD_OUT (Adder Output Select):** Sets a register to select two (Monophonic) or three (Polyphonic) destinations for signal output from an Adder.
- **OP_OUT (Operator Output Select):** Sets a register to select two destinations for signal output from an Operator.

③ Use [UP]/[DOWN] to change the register setting.

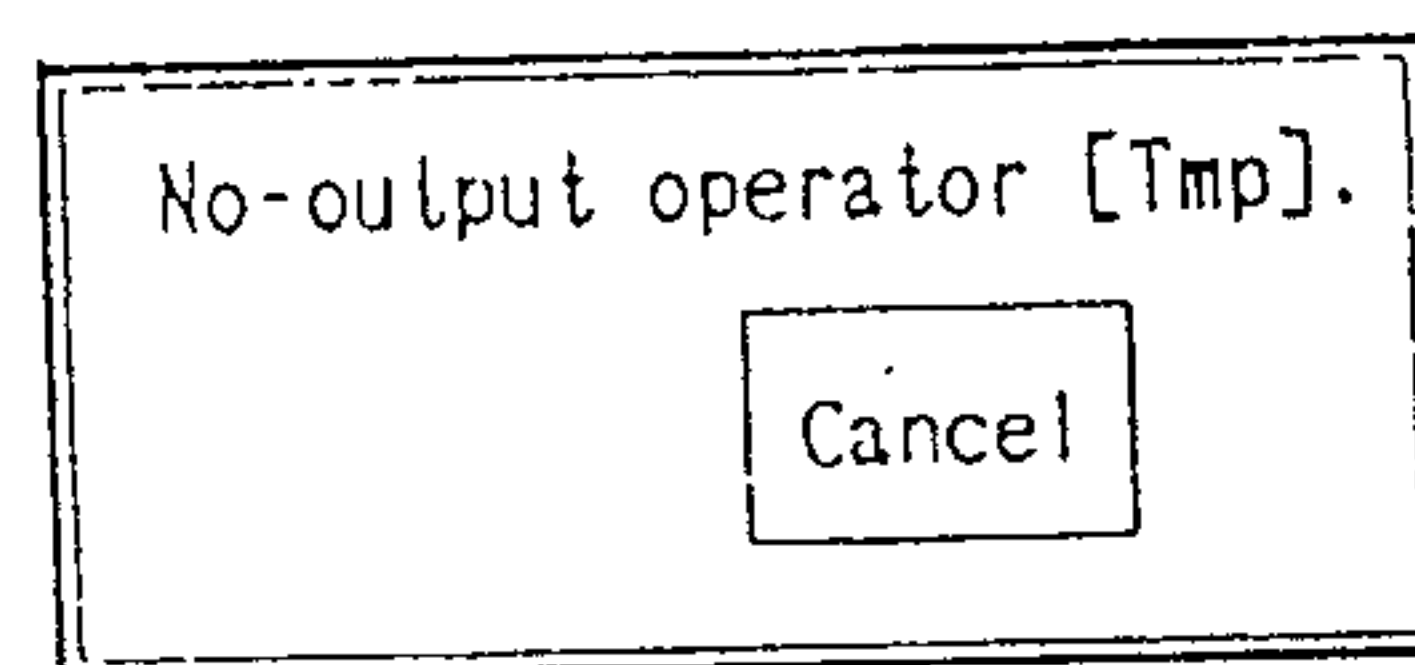
While referring to "Register Functions According to the Set Position" on page 33 and to the currently displayed connection pattern, move the cursor to the register to be changed then change its setting. Repeat this process for each register setting you wish to change.

NOTE: Pressing the Home key displays a Help menu that provides information on algorithm editing.

④ Press [F8] to check the connection pattern of the edited algorithm.

While editing, if you wish to check how the algorithm's connection pattern has changed, press the [F8] key to execute the DISP job. This displays an updated connection pattern which reflects any changes you have made.

NOTE: If the register settings have not been correctly changed (for example, you forget to set only the output side of two registers which should have been set as an input/output pair), the warning message below is displayed when you press the [F8] or [F10] key. In this case, press the Esc key (or [C] key) then correct your mistake.



⑤ Input the Algorithm Name.

To distinguish between edited algorithms and preset algorithms, you can give an Algorithm Name to an edited algorithm. Move the cursor to the right of the ALG NAME position, then use the alphanumeric keys to key in the desired name and press the Enter key.

NOTE: If no Algorithm Name is input, the area to the right of ALG NAME will remain blank.

⑥ After editing is completed, press [F10].

When the [F10] key is pressed to execute the ALG job and if all registers have been correctly set, the program exits the status in which connection data can be edited, allowing you to proceed to saving the algorithm data, switching to another mode, and so on. Note that the Algorithm Name you input is displayed to the right of the ALGORITHM position and the updated connection pattern is displayed below it.

NOTE: If you wish to cancel your edited connection data and return to the initial status before you began editing, press the Esc key instead of the [F10] key.

Register Functions According to the Set Position

Display	Register Name	Register Description and the Functions at Each Set Position
FB FB1 *1 FB2 *1	FEEDBACK	The feedback register transfers the output from an Adder to OP_IN of the same Operator (or the closest preceding Operator). By setting a pair of its registers, feedback is applied to a specific Operator. For a Monophonic Voice, only one pair of registers can be set per Operator Group (in 4-Operator units). For a Polyphonic Voice, one pair each of FB1 and FB2 can be set per Operator Group. ADD_OUT (center): Outputs feedback signals to OP_IN of the same Operator (or the closest preceding Operator). OP_IN: Inputs the feedback signals that are output from ADD_OUT of the same Operator (or the closest subsequent Operator).
Tmp	TEMPORARY	The Temporary register transfers the output from an Operator to either OP_IN or ADD_IN of a subsequent Operator. OP_OUT (left): Outputs Modulation signals, without crossing the Adder, to OP_IN or ADD_IN of the closest subsequent Operator. If "Tmp" is not set for OP_OUT of any Operators along the way, Modulation signals can be output to multiple Operators. OP_IN: Directly inputs the Modulation signals that are output from OP_OUT of the closest preceding Operator to the current Operator, which is modulated by the input signals. ADD_IN: Inputs the Modulation signals that are output from OP_OUT of the closest preceding Operator to the Adder. Since the signals are input to the Adder and not to the Operator, the current Operator is not modulated.
Acc	ACCUMULATOR	The Accumulator register transfers the output from an Adder to either OP_IN or ADD_IN of a subsequent Operator. ADD_OUT (left): Outputs Modulation signals, via the Adder, to OP_IN or ADD_IN of the closest subsequent Operator. If "Acc" is not set for ADD_OUT of any Operators along the way, Modulation signals can be output to multiple Operators. OP_IN: Directly inputs the Modulation signals that are output from ADD_OUT of the closest preceding Operator to the current Operator, which is modulated by the input signals. ADD_IN: Inputs the Modulation signals that are output from ADD_OUT of the closest preceding Operator to the Adder. Since the signals are input to the Adder and not to the current Operator, the current Operator is not modulated.
EXT *2	EXTERNAL	For an 8-Operator Polyphonic Voice, the External register transfers the output from the Operator Group of Operators 8-5 to the Operator Group of Operators 4-1. For an 8-Operator Polyphonic Voice, signal transfer between Operator Groups cannot be performed by Tmp or Acc. ADD_OUT (right): Outputs the Modulation signals to OP_IN or ADD_IN of one Operator from 4 to 1. OP_IN: Inputs the Modulation signals that are output from ADD_OUT of one Operator from 8 to 5 and directly inputs them to the current Operator. ADD_IN: Inputs the Modulation signals that are output from ADD_OUT of one Operator from 8 to 5, then inputs them to the Operator's Adder.
CH1 CH2 *3	OUTPUT CHANNEL	Outputs the signals of a specific Operator as Audio signals. The Operator at which an Output Channel register is set becomes a carrier. For an 8-Operator Polyphonic Voice or 16-Operator Monophonic Voice, the setting of both CH1 and CH2 enables signal output using two channels. OP_OUT (right): The signals that are output from the current Operator are output to the specified external channel.
---	(OFF)	In case no register is set at a set position, "---" is displayed to indicate an OFF setting.

*1 - Applicable only to Polyphonic Voices. *2 - Applicable only to 8-Operator Polyphonic Voices. *3 - Applicable only to 8-Operator Polyphonic and 16-Operator Monophonic Voices.

Connection Data Example 1

(4-Operator Polyphonic PRESET 1)

OP	OP_IN	ADD_IN	ADD_OUT	OP_OUT
4	FB1	---	--- FB1	Tmp ---
3	Tmp	---	---	--- CH1
2	Tmp	---	---	--- CH1
1	Tmp	---	---	--- CH1

- ▶ **OP4:** FB1 is set at OP_IN and ADD_OUT to apply feedback. So that the Modulation signals which have been subjected to feedback can be output to another Operator, Tmp is set at OP_OUT. In this algorithm, OP4 is a modulator.
- ▶ **OP3:** Tmp is set at OP_IN so that the Modulation signals which are output by OP4 are directly input. To externally output Audio signals, CH1 is set at OP_OUT.
- ▶ **OP2:** By setting OP2 similarly to OP3, the Modulation signals output by OP4 are directly input, then Audio signals are externally output.
- ▶ **OP1:** By setting OP1 similarly to OP3 and OP2, the Modulation signals output by OP4 are directly input, then Audio signals are externally output.

Connection Data Example 2

(4-Operator Polyphonic PRESET 14)

OP	OP_IN	ADD_IN	ADD_OUT	OP_OUT
4	FB1	---	--- FB1	Tmp ---
3	Tmp	---	Acc ---	---
2	---	Acc	Acc ---	---
1	Acc	---	---	--- CH1

- ▶ **OP4:** FB1 is set at OP_IN and ADD_OUT to apply feedback. Tmp is set at OP_OUT to output the Modulation signals.
- ▶ **OP3:** Tmp is set at OP_IN so that the Modulation signals which are output by OP4 are directly input. Acc is set at ADD_OUT to output the Modulation signals.
- ▶ **OP2:** Acc is set at ADD_IN to input the Modulation signals which are output by OP3 to the Adder. Because no register is set at OP_IN, the Modulation signals of OP3 are not input to OP2. Acc is set at ADD_OUT so the Modulation signals of OP3 and OP2 are added and then output.
- ▶ **OP1:** To directly input the Modulation signals that are output by the Adder of OP2 (the Modulation signals of OP2 and OP3), Acc is set at OP_IN. CH1 is set at OP_OUT to externally output Audio signals.

NOTE: You can achieve the same Operator connection above even by changing the settings as follows:

*At OP3 instead of setting Acc at ADD_OUT set Tmp at OP_OUT

V-4 Writing the Algorithm Data

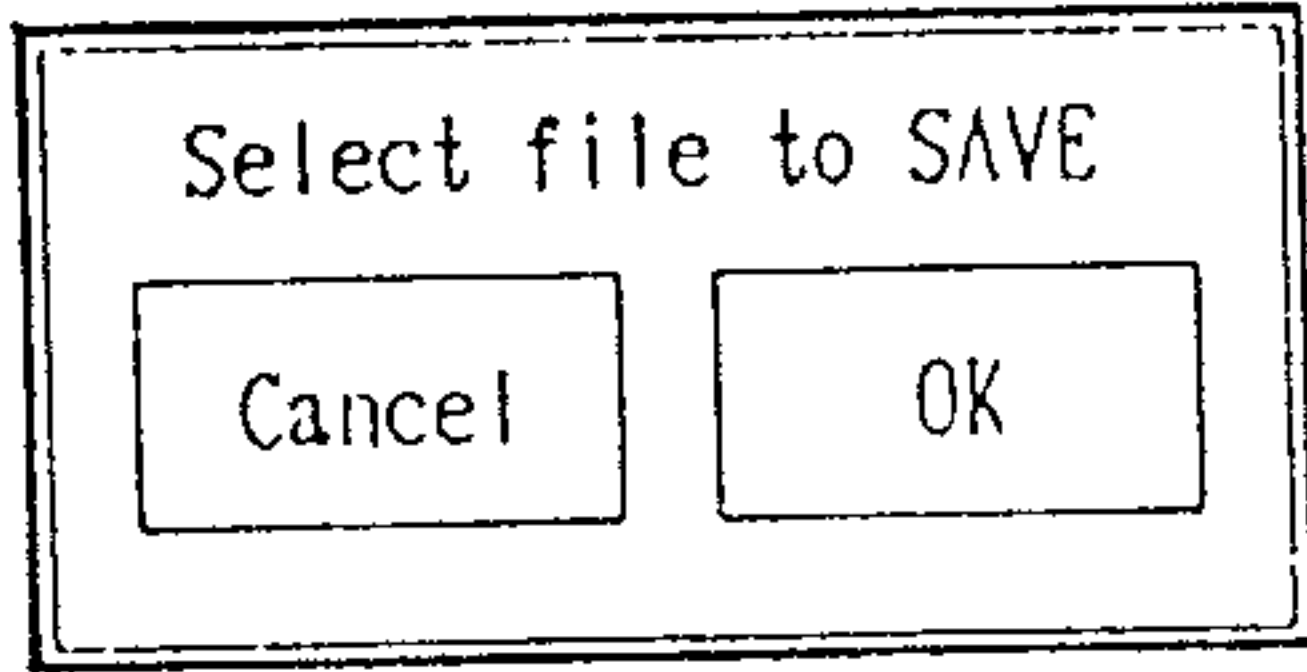
Outline

- The edited connection data of an algorithm can be saved to a disk separately from the Voice data. Algorithm data can only be saved in ALGORITHM EDIT mode.
- In case you return to DIRECTORY mode after editing of the algorithm is completed and save the Voice data, the edited connection data of its algorithm will be saved together with that Voice data.

Procedure

① Press [F9].

The message below is displayed and prompts you to select the algorithm file to be saved.



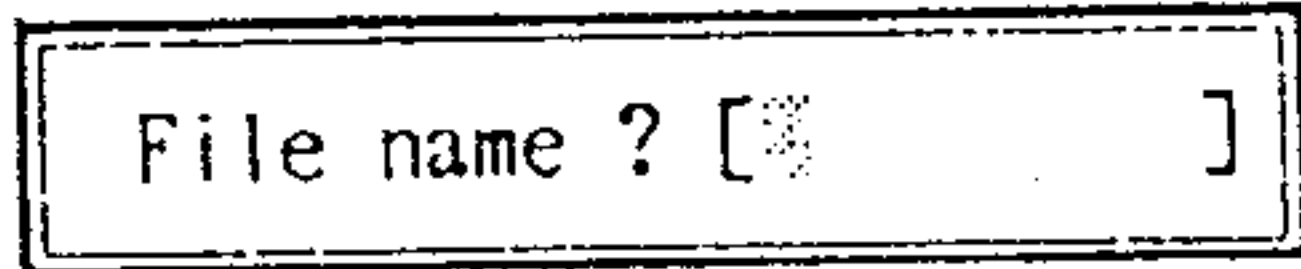
NOTE: To specify a drive and subdirectory before saving the algorithm data on a disk, you must perform the following steps before pressing [F9]:

Move the cursor to the ALG FILE position, then press the Enter key. Next, specify the drive and subdirectory to which you wish to save the algorithm data. Specification is performed similarly to the procedure for saving Voice data in DIRECTORY mode. (→page 15)

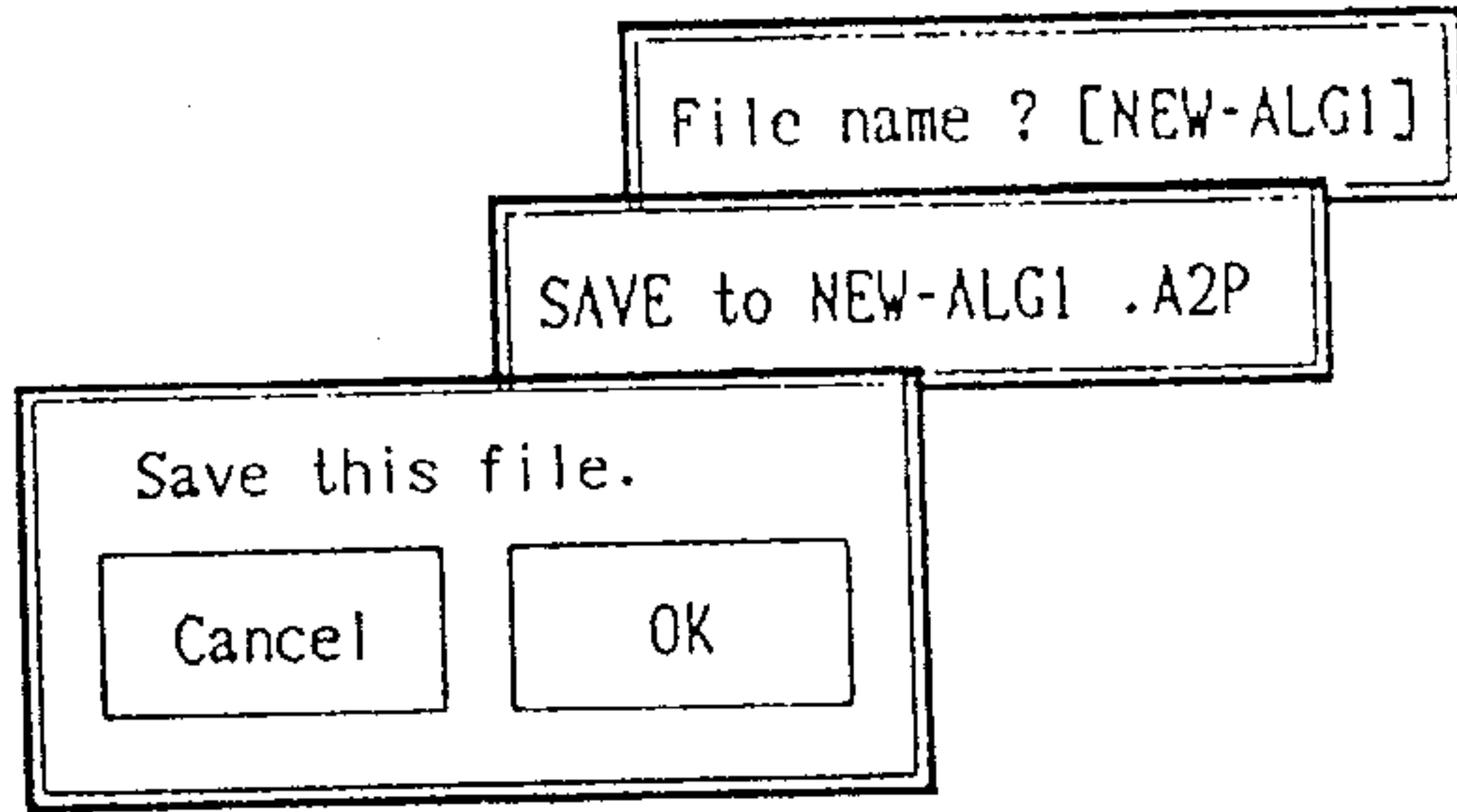
② Save the data to a NEW FILE or a previously created algorithm file.

► To save the data in a NEW FILE

- ① Move the cursor to the NEW FILE position, then press the Enter key (or [O] key). The message below is displayed and prompts you to enter a filename.



- ② Use the alphanumeric keys to key in a filename, then press the Enter key. The confirmation message below appears.



NOTE: If the Enter key is pressed without entering a filename, the first eight characters of the input Algorithm Name are automatically input as the filename.

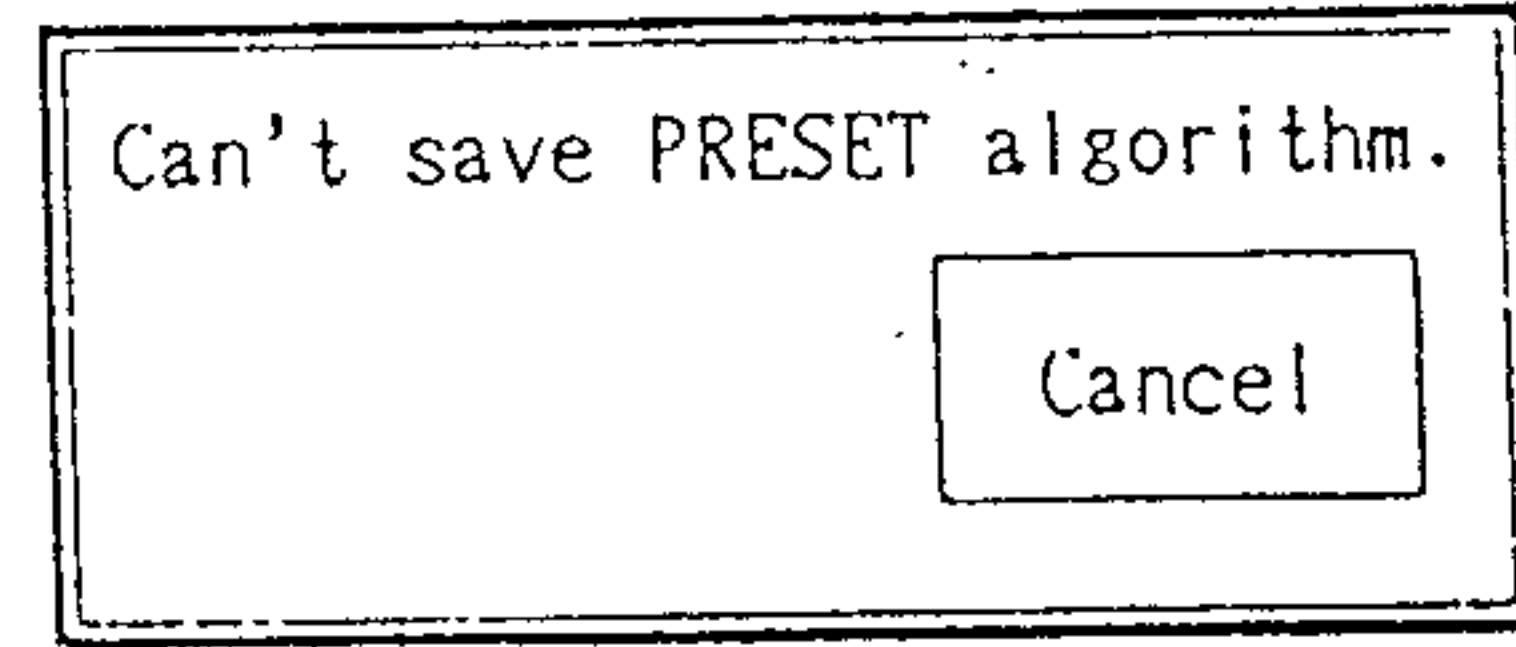
- ③ To save the data under the input filename, press the Enter key (or [O] key). To cancel the Save job, press the Esc key (or [C] key).

► To overwrite a previously created file

- ① Move the cursor to the algorithm file to which you wish to save your edited data, then press the Enter key (or [O] key). The same confirmation message appears that is displayed when saving to a NEW FILE.
- ② To save the data in the selected algorithm file, press the Enter key (or [O] key). To cancel the Save job, press the Esc key (or [C] key).

NOTE: When algorithm data is saved on a disk, an extension is automatically appended to the input filename. (→page 17)

NOTE: Preset algorithm data cannot be saved as an algorithm file. If you try to save preset algorithm data without editing its connection data, the message below is displayed. Press the Esc key (or [C] key) to clear the message, change the connection data, then repeat the Save job. Also, if your algorithm's edited connection data is unintentionally identical to that of any preset algorithm, the message below is also displayed.



■ To save algorithm data together with the Voice data

After finishing editing in ALGORITHM EDIT mode, if you return to DIRECTORY mode and save the Voice data, the edited connection data is saved as a part of the Voice data. In this case, the data can be saved to a Voice file on a disk, to a Voice Buffer, or to a connected device.

NOTE: When Voice data is saved, its algorithm's connection data is also saved but the data related to your input Algorithm Name is not saved.

V-5 Other Operations in ALGORITHM EDIT Mode

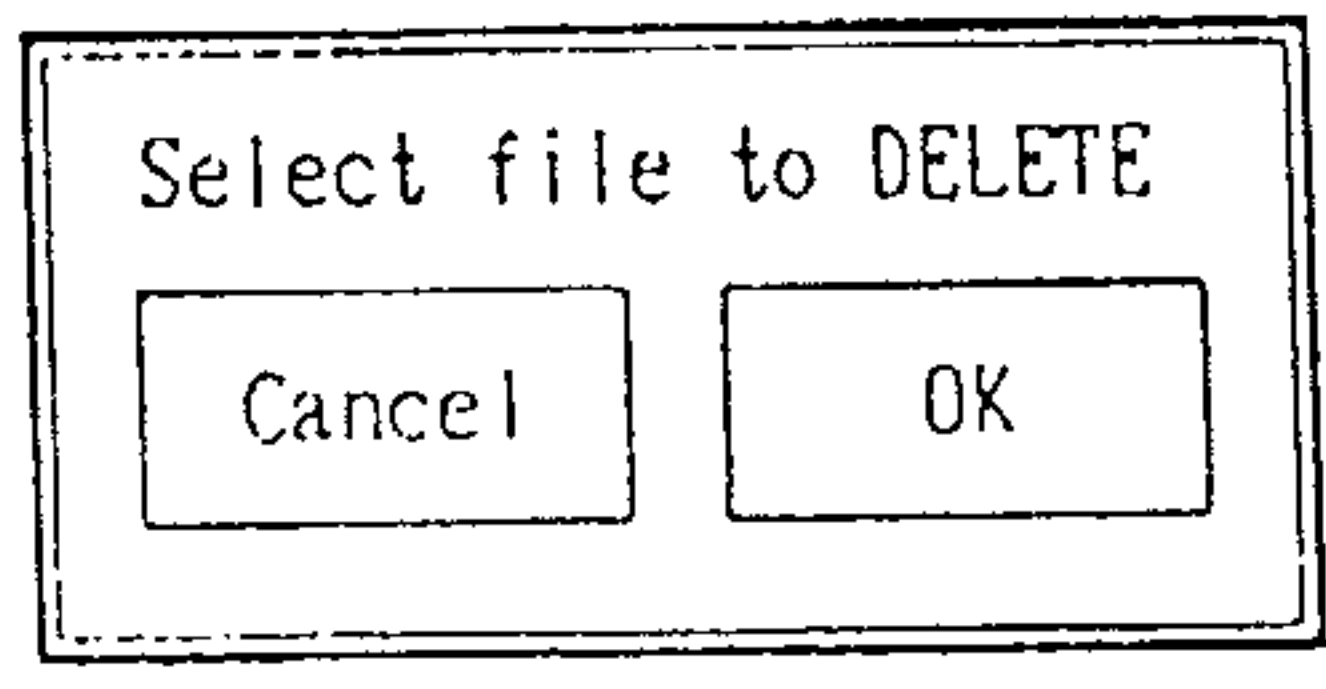
DELETE

Follow the steps below to delete an algorithm file that you have saved on a disk.

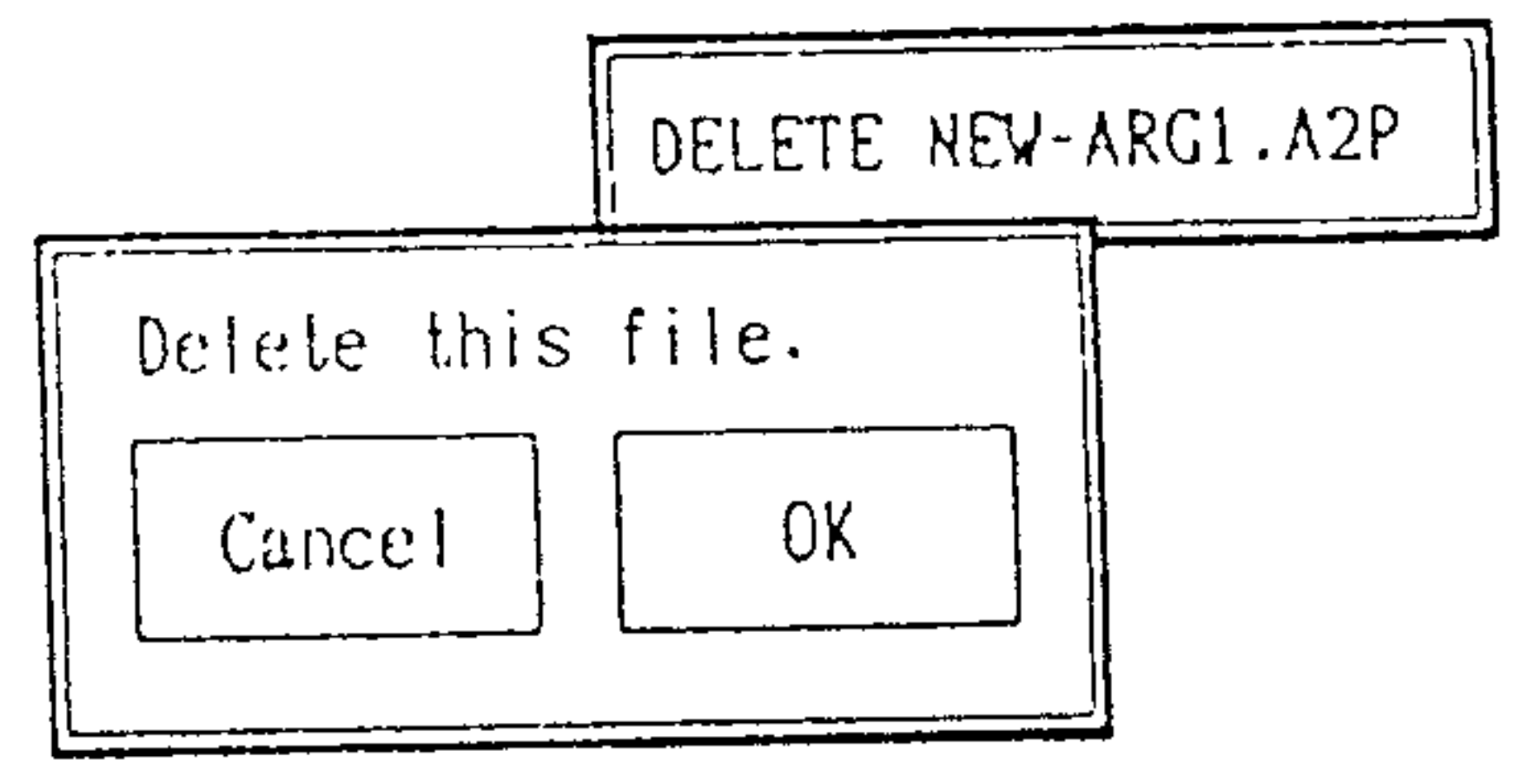
① **Display the algorithm file that you wish to delete.**
If you changed the disk drive or subdirectory before saving that algorithm file, refer to "How to Perform VOICE FILE Specification" on page 15 for instructions on how to display the algorithm file.

② **Press [F6].**
DELET is inverted at the Function Key display, indicating that an algorithm file can be deleted.

③ **Use the cursor shift keys to select the algorithm file to be deleted, then press the Enter key.**
The message below is displayed and prompts you to select the file to be deleted. Move the cursor to the desired file, then press the Enter key (or [O] key).

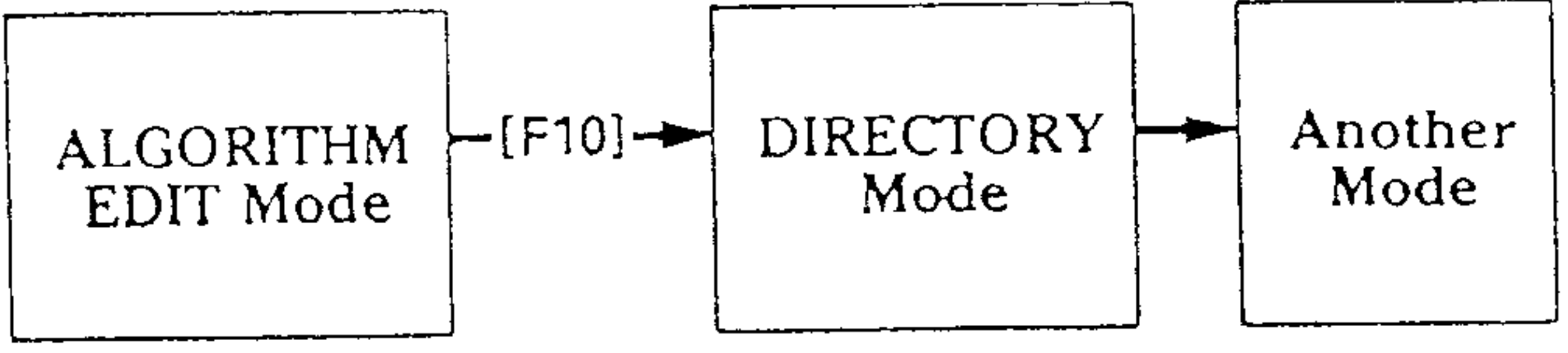


④ **Press the Enter key (or [O] key) again.**
The confirmation message below is displayed, so press the Enter key (or [O] key) to delete the selected file.



DIRECTORY

After you finish your editing in ALGORITHM EDIT mode, press the [F10] key to switch to DIRECTORY mode. From DIRECTORY mode, you can now switch to another mode or perform jobs in DIRECTORY mode (saving data to disk, ending the program, etc.).



HELP

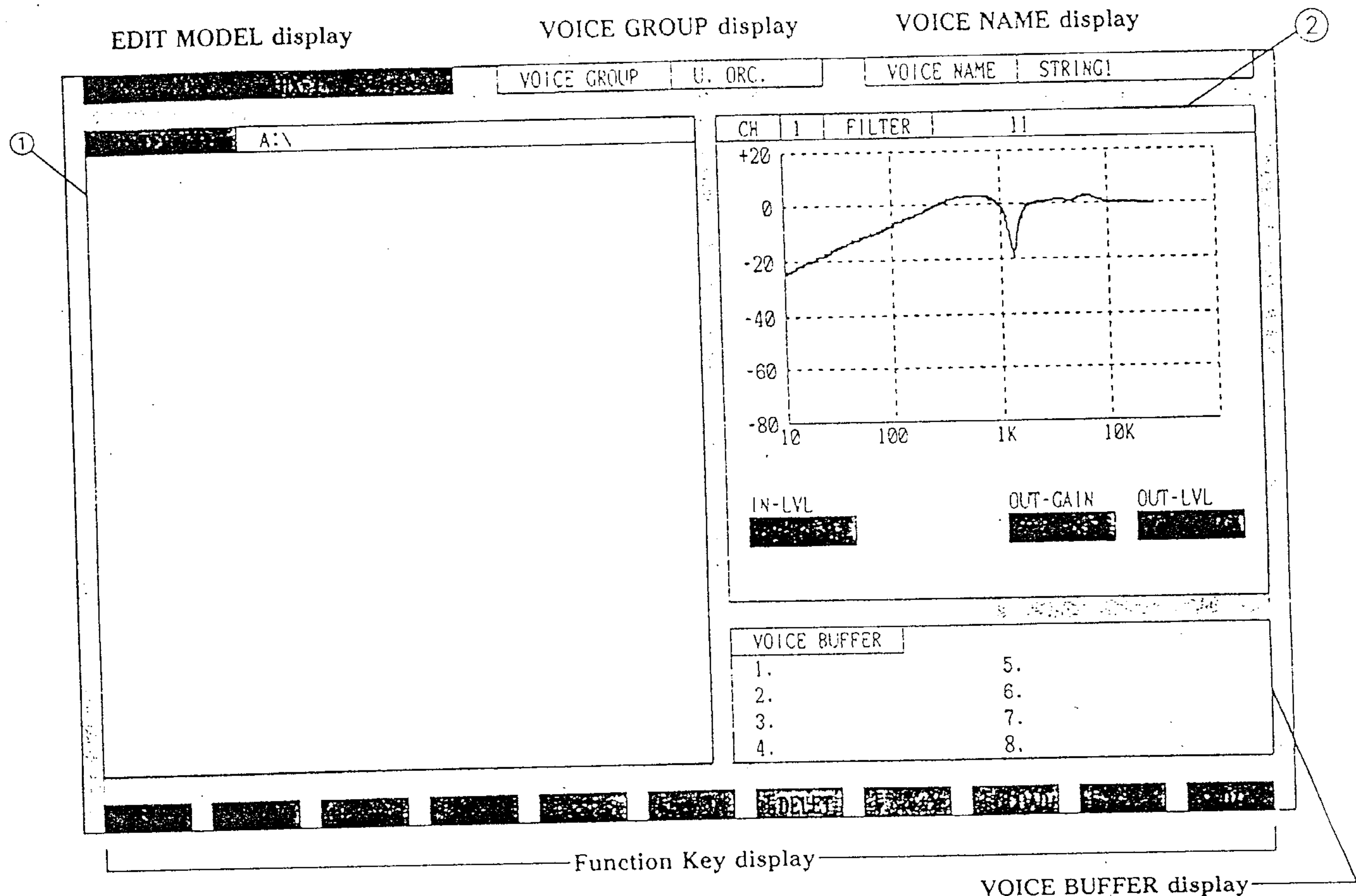
During ALGORITHM EDIT mode, you can display one of two Help menus by following the steps below:

① **Before you begin editing, press [Home].**
If you press the Home key before pressing the [F1] key to begin editing, a Help menu is displayed that lists the functions of the main keys used in ALGORITHM EDIT mode. To restore the usual display, press the Esc key (or [C] key).

② **During the editing of an algorithm, press [Home].**
After you press the [F1] key to begin editing, pressing the Home key displays the names and a diagram of the input positions for the registers as well as the register names. To restore the usual display, press the Esc key (or [C] key).

VI-1 FILTER Display and Menu

When the [F4] key is pressed during DIRECTORY mode, the program shifts to the FILTER mode and the below display appears.



● **VOICE GROUP display**

Displays the Voice Group to be edited. (→page 11)

● **VOICE NAME display**

Automatically displays the Voice Name corresponding to the loaded Voice data (or the new Voice Name that you have input). (→page 17)

① **FILTER FILE display**

The top right area displays the currently specified disk drive (and subdirectory, if one has been created).
If filter data has been saved to the disk in the currently specified drive (and subdirectory), the larger area below displays the saved filename(s).

② **FILTER DATA display**

The area to the right of the CH position displays the currently selected Output Channel No.

The area to the right of the FILTER position displays the currently selected Filter No. (or OFF).

The larger area below displays a graph of the currently selected filter and the settings of the parameters related to the input/output levels.

● **VOICE BUFFER display**

If Voice data has been saved to the Voice Buffers, the corresponding Voice Names are displayed here. (→pages 12 & 14)

● **Function Key display:**

Displays the job that will be executed when a Function Key of the computer is pressed in FILTER mode. The ESC feature is also displayed.

VI-2 Operations in FILTER Mode

Outline

In FILTER mode, the data of the currently selected digital filter can be visually checked.

- You can also change the Filter No. to set another digital filter if necessary.

Procedure

① Select the Output Channel.

Each 8-Operator Polyphonic Voice and 16-Operator Monophonic Voice is provided with two output channels. For these Voice types, the channel can be selected by performing the Steps ① and ② below. (For other Voices, the Channel No. is fixed to "1".)

- ① Move the cursor to the right of the CH position.
- ② Use the [UP]/[DOWN] keys to select "1" or "2".

② Check the filter settings at the displayed graph and parameter data.

At the larger area below the CH and FILTER positions, the filter settings for the Voice being edited are displayed as a graph and as numeric values.

- ▶ **Graph:** The values displayed vertically represent the level (in dB units), with "0" as the level in case the filter is not passed through. The values displayed horizontally represent the frequency (in Hz units), with the bass range on the left and the treble range on the right. This graph lets you check the output level at each sound range.

- ▶ **Input/Output level data:** With respect to the currently selected filter, either the preset level data or the level data set during an EDIT mode is displayed. (Each of these parameters are described on page 26.)

③ Select another filter if necessary.

To change the currently set filter, perform Steps ① and ② below. For a Voice having two channels, a different filter can be set for each channel.

- ① Move the cursor to the right of the FILTER position.
- ② Use the [UP]/[DOWN] keys to select another Filter No. (Variable range: OFF, 1-48)

NOTE: When the filter is changed, the data values of the input/output levels that are preset for the newly selected filter are automatically set. If you switch to an EDIT mode, these input/output levels can also be changed. (→page 26)

LOAD

To load a filter file that has been saved on a disk (that has been saved using software other than FED-1), perform the following steps.

① Display the file to be loaded.

If your computer has a built-in hard disk, change the drive specification to "C" in order to load the filter file that has been saved on the hard disk.

If your computer has two microfloppy disk drives, change the drive specification to "B", then insert the disk containing the desired filter file in Drive B.

② Press [F8].

A message is displayed that prompts you to select the file to be loaded.

③ Use the cursor shift keys to select the file to be loaded, then press the Enter key.

A message is displayed that prompts you to confirm whether the selected file is to be loaded.

④ Press the Enter key (or [O] key) again.

To load the selected file, press the Enter key (or [O] key).

DELETE

Follow the steps below to delete a filter file that you have saved on a disk.

① Display the filter file that you wish to delete.

Display the filter file using the same procedure in Step ① of "LOAD" above.

② Press [F6].

A message is displayed that prompts you to select the file to be deleted.

③ Use the cursor shift keys to select the file to be deleted, then press the Enter key.

A message is displayed that prompts you to confirm whether to delete the selected file.

④ Press the Enter key (or [O] key) again.

To delete the selected file, press the Enter key (or [O] key).

DIRECTORY

After you finish working in FILTER mode, press the [F10] key to switch to DIRECTORY mode. From DIRECTORY mode, you can now switch to another mode or perform jobs in DIRECTORY mode (saving data to disk, ending the program, etc.).

HELP

If you press the Home key during FILTER EDIT mode, a Help menu is displayed that lists the functions of the main keys used in FILTER mode.

To restore the usual display, press the Esc key (or [C] key).

VII-1 UTILITY Display and Menu

When the [F5] key is pressed during DIRECTORY mode, the program shifts to the UTILITY mode and the below display appears.

EDIT MODEL display

① VOICE GROUP display

② VOICE NAME display

③ VOICE FILE display

④ ALGORITHM display

VOICE BUFFER display

Function Key display

FED UTILITY
Select and Push Function Key.

VOICE GROUP	U. ORC.	VOICE NAME	STRING1
FVSTR1	.FVP	02-14-1988 02:15 PM	
FVBR1	.FVP	02-14-1988 03:45 PM	
FVV01	.FVP	02-14-1988 04:31 PM	
FVNSTR1	.FVP	02-14-1988 05:05 PM	
FVPSFX	.FVP	02-15-1988 09:25 AM	
FV8BIT	.FVP	02-15-1988 10:43 AM	

ALGORITHM	PRESET
	3

VOICE BUFFER	
1.	5.
2.	6.
3.	7.
4.	8.

① VOICE GROUP display

Displays the Voice Group to be edited. The Voice Group selection can be changed if necessary. (→page 11)

② VOICE NAME display

Automatically displays the Voice Name corresponding to the loaded Voice data. The Voice Name selection can be changed if necessary. (→page 17)

③ VOICE FILE display

The top right area displays the currently specified disk drive (and subdirectory, if one has been created).
If Voice data of a model other than the currently selected EDIT MODEL has been saved to the disk in the currently specified drive (and subdirectory) and if that Voice data can be converted to the Voice data used by the currently selected EDIT MODEL and Voice Group, the filenames are displayed in the larger area below.

④ ALGORITHM display

The top right area displays the Algorithm No. (or USER) of the loaded Voice data. The Algorithm No. can be changed if necessary. (→pages 27 & 31)

The larger area below displays the connection pattern of the Operators which corresponds to the currently selected algorithm.

● VOICE BUFFER display

If Voice data has been saved to the Voice Buffers, the corresponding Voice Names are displayed here. (→pages 12 & 14)

● Function Key display:

Displays the job that will be executed when a Function Key of the computer is pressed in UTILITY mode. The ESC feature is also displayed.

VII-2 Formatting a Data Disk

Outline

Instead of saving your edited data on your working copy of the FED-1 program disk, you may wish to either format microfloppy disks for exclusive use as data disks or (if you have not done so already) format your hard disk so you can save data there. (Note that formatting a disk will destroy any previously saved data on that disk.)

- If your computer has a built-in hard disk, the drive specification will vary depending on the type of drives your computer has and whether your FED-1 program resides on a microfloppy disk or on the hard disk.

Procedure

- ① Press [F1].
FORMA is inverted at the Function Key display, and the message below is displayed.

```
Please Select
FORMAT  Drive A
        Drive B
        Drive C
[Cancel] [OK]
```

- ② Insert a new disk in the disk drive.
If your working copy of the FED-1 program disk is in the disk drive and you wish to format a new disk, replace the FED-1 program disk with the new, unformatted microfloppy disk (.5" 2DD type).

NOTE: If you wish to format the built-in hard disk in order to save your data there, there is no need to insert a new microfloppy disk.

NOTE: If your computer has two microfloppy disk drives, insert the new microfloppy disk in Drive B (on the left).

- ③ Use the cursor shift keys to select a drive, then press the Enter key (or [O] key).

```
Please Select
FORMAT  Drive A
        Drive B
        Drive C
[Cancel] [OK]
```

- ▶ **Drive A:** If the FED-1 program resides on your computer's built-in hard disk, select "Drive A" to format a new microfloppy disk.
- ▶ **Drive B:** If the FED-1 program resides on a microfloppy disk, select "Drive B" to format a new microfloppy disk.
- ▶ **Drive C:** If you wish to format your built-in hard disk so your data can be saved there, select "Drive C" to format the hard disk.

NOTE: If your computer has two microfloppy disk drives, be sure to insert your new disk in Drive B then select "Drive B".

- ④ Press the Enter key (or [O] key) again.
After you select the drive and press the Enter key (or [O] key), the warning message below is displayed.

```
CAUTION :
ALL Data in Drive B: will be erased !
[Cancel] [OK]
```

To proceed with formatting, press the Enter key (or [O] key) again. Formatting will begin and a message that indicates that formatting is in process will be displayed. To cancel the formatting job, press the Esc key (or [C] key).

NOTE: If you specify a non-existent disk drive, attempt to format a disk with its Write-Protect tab set to ON, etc., formatting cannot be executed. In such case, a message describing the reason is displayed, so press the Esc key (or [C] key) to clear the message then repeat the formatting procedure.

- ⑤ When formatting is completed, re-insert your working copy of the FED-1 program disk.

A message is displayed to inform you when formatting is completed. After it appears, the program returns to the status prior to when you pressed the [F1] key. If the FED-1 program resides on a microfloppy disk and you just used Drive A to format a disk, replace the newly formatted disk with the FED-1 program disk. Now you are ready to proceed to other program operations.

NOTE: Be sure to leave the Write Protect Tab of your data disk to the OFF position or you will be unable to save (write) data to the disk.

NOTE: For a microfloppy disk that was formatted by specifying Drive B in Step ③, be sure the drive specification is "B:" before you attempt to save or load your edited data to or from that disk. (→page 15)

VII-3 Converting Voice Data

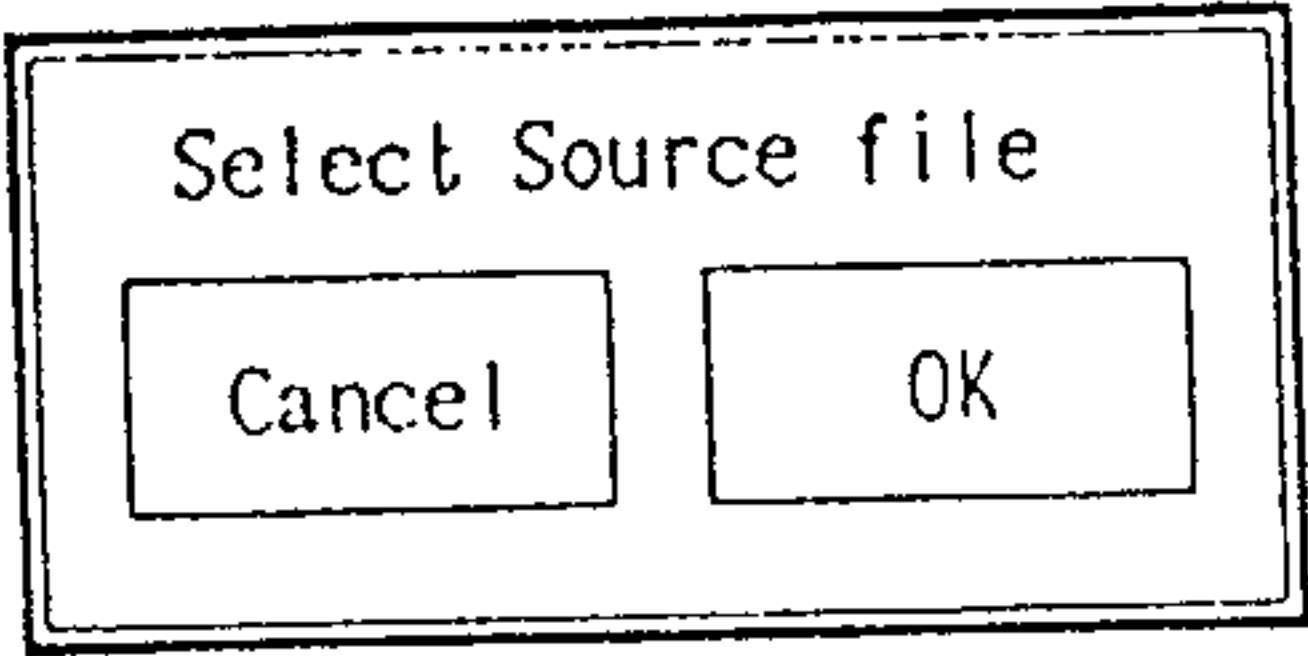
Outline

• This feature lets you load the Voice file of a device of a model different from the currently selected model and convert its data to the format of the model (and Voice Group) selected for editing.

• If a set of Voice data has the same number of Operators and the same Polyphonic/Monophonic status as the Voice being edited, its Voice file can be automatically displayed and loaded.

Procedure

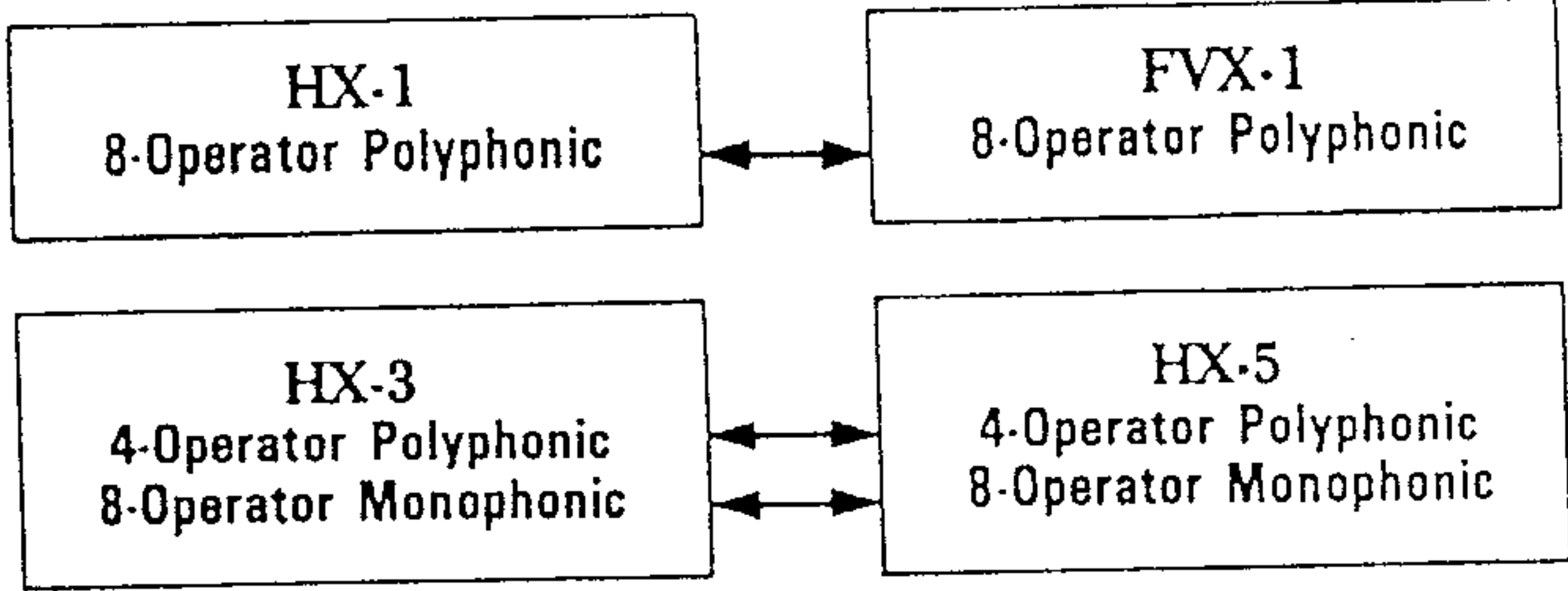
① Press [F7].
CONVE is inverted at the Function Key display, and the message below is displayed.



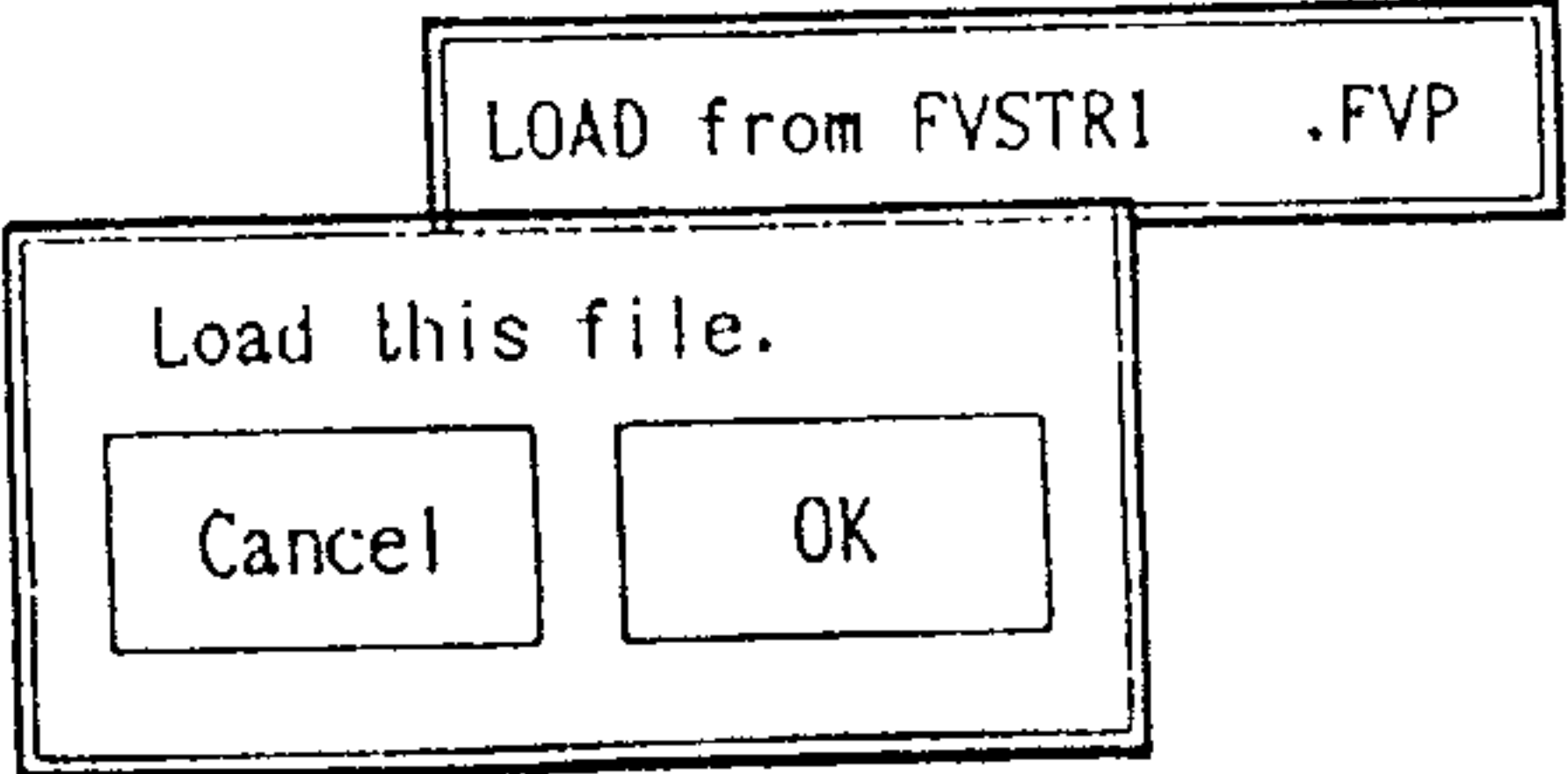
NOTE: If the Voice file to be loaded and converted was saved after specifying a drive and subdirectory: Before pressing the [F7] key, you must first change the drive/subdirectory specification to match the one used when you saved the file. You can perform this specification after moving the cursor to the VOICE FILE position then pressing the Enter key. (→page 15)

NOTE: If the number of Operators and the Polyphonic/Monophonic status of the Voice file to be loaded and converted are different from that of the currently selected Voice Group: You must change the Voice Group specification before pressing the [F7] key. You can perform this specification after moving the cursor to the VOICE GROUP position then pressing the Enter key. (→page 11)

NOTE: The models and Voice data (number of Operators and Polyphonic/Monophonic status) between which Voice data can be converted are shown below.

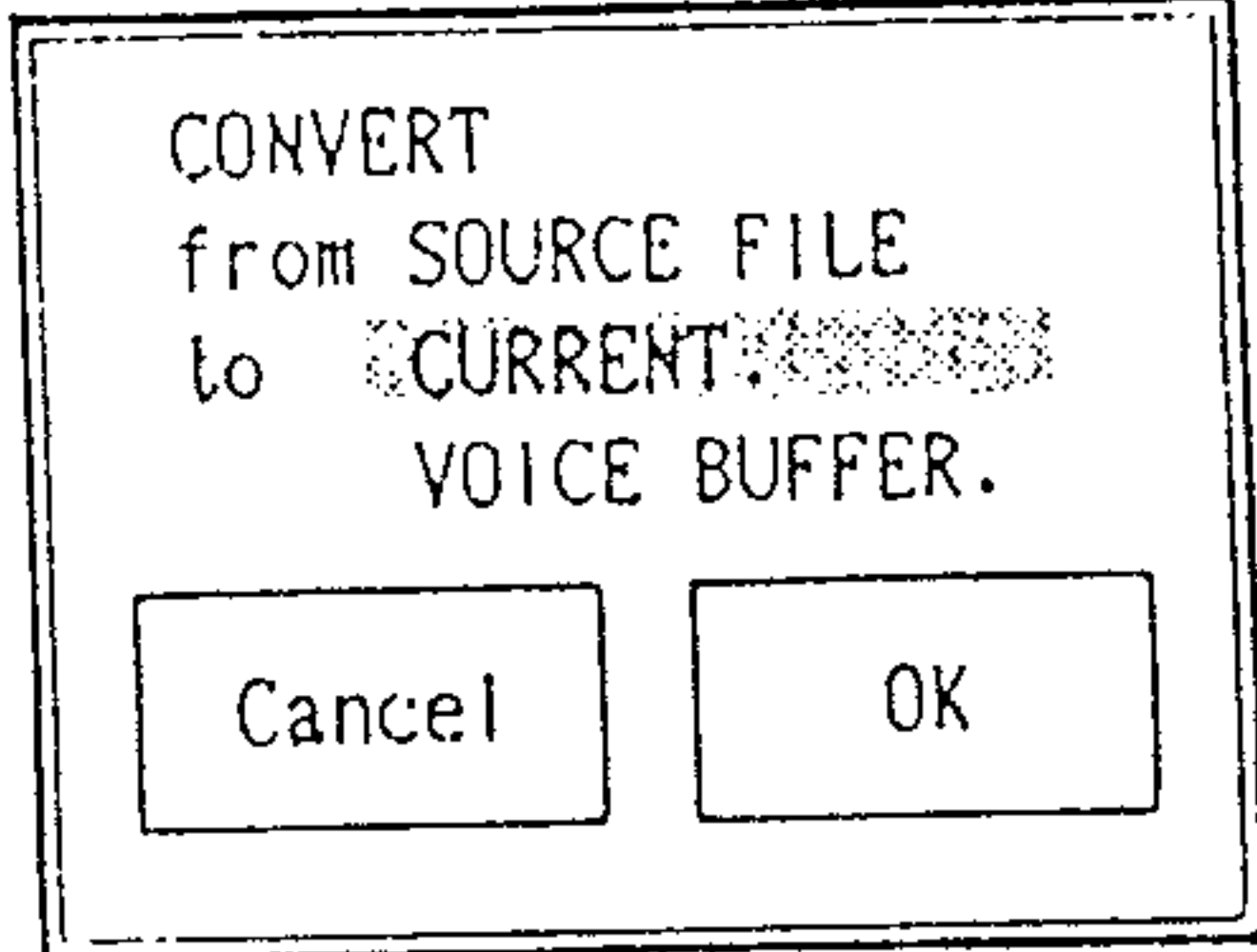


② Move the cursor to the Voice file to be loaded, then press the Enter key (or [O] key).
The message below is displayed to confirm whether you wish to load the selected file.



③ Press the Enter key (or [O] key) again.

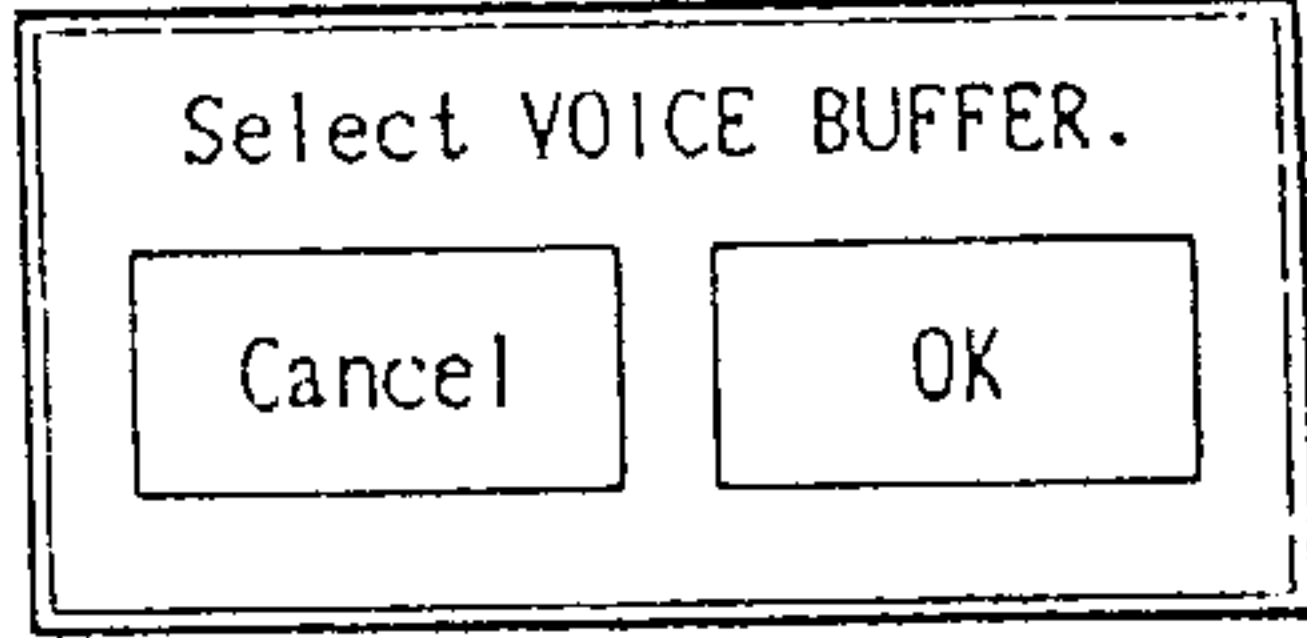
④ Select the LOAD destination, then press the Enter key or [O] key.
If "OK" is selected at Step ③, the message below is displayed and prompts you select the destination to which the selected file is to be loaded.



► **CURRENT:** To directly load the file to the current working area of FED-1, move the cursor to CURRENT then press the Enter key (or [O] key). The message below is displayed when the Voice data has been loaded and converted.



► **VOICE BUFFER:** To load the file to a Voice Buffer, move the cursor to VOICE BUFFER then press the Enter key (or [O] key). The message below is displayed and prompts you to select the Voice Buffer to which the file is to be loaded.



Move the cursor to the desired Voice Buffer No., then press the Enter key (or [O] key). The Voice data will now be loaded and converted.

DIRECTORY

After you finish working in UTILITY mode, press the [F10] key to switch to DIRECTORY mode. From DIRECTORY mode, you can now switch to another mode or perform jobs in DIRECTORY mode (saving data to disk, ending the program, etc.).

Warnings and Error Messages

Messages	Meaning of Message and the Remedy
System-file not found! Algorithm file not found!	Because a System file or System Algorithm file is not present, FED-1 does not start up. Reset your computer, repeat the procedure to make a working copy of the FED-1 System disk, then start up the computer again.
File name duplicated. Over write OK?	The filename that was input during a Save operation is identical to the name of a previously saved file. If you wish to overwrite the data in the file with the duplicate name, select "OK"; if not, select "Cancel".
Please Set Printer!	The printer was not in Ready status when you tried to print. Printing will begin as soon as the printer is set to Ready status. To cancel the Print operation, press the [Esc] key.
CAUTION! Erase this algorithm data.	This warning appears if you either attempt to change an algorithm being edited into a preset algorithm or press the [Esc] key during ALGORITHM EDIT mode. If you wish to erase the current algorithm data, select "OK"; if not, select "Cancel".
No-output operator [***]. (***represents "Tmp", "Acc", "FB", "FB1", "FB2", or "EXT")	A violation of one of the restrictions below during an Algorithm Edit operation has resulted in an improper [***] register setting. Press the [Esc] key, then correct the improper setting. ① When setting the [***] input, the corresponding output must also be set. ② "Tmp" and "Acc" can only receive data from the Operator with the highest numeric value within the same Operator Group.
Writing [***]. (***represents "FB", "FB1", "FB2", or "EXT")	A violation of one of the restrictions below has resulted in an improperly set [***] register setting. Press the [Esc] key, then correct the improper setting. ① Only one set each of "FB", "FB1" and "FB2" registers can be set for the same Operator Group. ② Only one "EXT" register can be set.
Can't save PRESET algorithm.	The preset Algorithm data cannot be saved as an Algorithm file.
Can't FORMAT FED System drive	Disk formatting cannot be performed using the drive used for starting up FED-1. Press any key, then change the drive specification.
All Data in Drive *: will be erased! (*represents the drive name)	This warning appears after the FORMAT command is issued. If you wish to execute the FORMAT operation, select "OK"; if not, select "Cancel".
Can't use 'CONVERT' in MONO mode!	The Conversion function for Voice data cannot be used for Monophonic Voice Groups of HX-1.
Drive not found 'C'. Not ready error reading drive 'C'. Sense operation file drive 'C'. Reset fail drive 'C'. Seek error drive 'C'. Undefine error drive 'C'. Bad command drive 'C'. Bad controller drive 'C'. Bad track flag detect drive 'C'. Uncorrectable ECC error drive 'C'. Correctable ECC error drive 'C'. Record not found drive 'C'. DMA boundary error drive 'C'. Bad address mark detect drive 'C'. Cannot initialize drive 'C'.	If your computer has a built-in hard disk, these messages appear to indicate that an error has occurred when you tried to save/load data to or from the hard disk, to start up the FED-1 program that resides on your hard disk, etc. Program execution will be stopped, so press the [Esc] key then remedy the error as required. For details on the meaning of each message and their remedy, refer to your computer's operating manual.
Drive not found '*'. Not ready error reading drive '*'. DMA overrun drive '*'. Seek error drive '*'. Bad command drive '*'. FDC error drive '*'. CRC error drive '*'. Record not found drive '*'. DMA boundary error drive '*'. Address mark not drive '*'. Write protect drive '*'. Media change error drive '*'.	These messages appear to indicate that an error has occurred when you tried to save/load data to or from a microfloppy disk in drive [*], to start up the FED-1 program from your working copy that resides on a microfloppy disk, etc. Program execution will be stopped, so press the [Esc] key then remedy the error as required. For details on the meaning of each message and their remedy, refer to your computer's operating manual.

Specifications

Media

3.5-inch microfloppy disk

• Compatible computer

Toshiba T3100

(mounted with MIDI Interface Board MI-3100)

• Operating System

MD-DOS Ver. 2.11 and above

• Models/Voice Groups that can be edited

HX-1	8-Operator/POLY:	UPPER ORCHESTRAL LOWER ORCHESTRAL, U/L PERCUSSIVE
	16-Operator/MONO:	U/L LEAD, PEDALS BASS
HX-3/5	4-Operator/POLY:	UPPER ORCHESTRAL LOWER ORCHESTRAL, U/L PERCUSSIVE
	8-Operator/MONO:	U/L LEAD, PEDALS BASS
4) FVX-1	8-Operator/POLY:	Tone Groups 1, 2, 3, 4

Blank Voice Data Chart (1): 8-Operator (POLY/MONO)

EDIT MODEL		VOICE GROUP		VOICE NAME		DATE	
------------	--	-------------	--	------------	--	------	--

■ EG

	SYNC	MODE	TOUCH RATE	EG								AR KSC	D1R KSC	D2R KSC	RR KSC	D1L KSC	SLIDE #1		
				AR	D1R	D2R	RR	AL	D1L	D2L	RL						MODE	RATE	LVL
OP 8																			
OP 7																			
OP 6																			
OP 5																			
OP 4																			
OP 3																			
OP 2																			
OP 1																			

*1 = Monophonic only

■ OSC

	FEET	SYNC	WAVE	PHASE	FREQ MODE	FREQ MUL	DETUNE		FIXED FREQ	PITCH KSC
							COARSE	FINE		
OP 8	GRP-1									
OP 7										
OP 6										
OP 5										
OP 4	GRP-2									
OP 3										
OP 2										
OP 1										

■ LEVEL

	INPUT LEVEL	OUTPUT LEVEL	LEFT		BREAK POINT	RIGHT		TOUCH SENS	EXP COEF	BRI COEF	AM #2 POL	AM #2 SENS
			DEPTH	CURVE		CURVE	DEPTH					
OP 8												
OP 7												
OP 6												
OP 5												
OP 4												
OP 3												
OP 2												
OP 1												

*2 = Polyphonic only

■ LFO

	DELAY TIME	RR	DEPTH	SPEED	DELAY KSC	SPEED KSC	DEPTH KSC	OFFSET
PM								

	SPEED	DEPTH
AM #2		

*2 = Polyphonic only

	MODE	AR	DR	SPEED	DEPTH	DEF DEPTH	AR KSC	DR KSC
ATP								

■ ETC

TOUCH MODE		REPEAT #2		EFFECTOR		SL- #1	DEF
GRP-1	GRP-2	MODE	SPEED	MODE	LVL #3	SPEED	VEL

	FILTER				PAN-L	PAN-R	REV-L #3	REV-R #3
	FLT	IN-LVL	OUT-G	OUTLVL				
CH1								
CH2 #2								

*1 = Monophonic only *2 = Polyphonic only *3 = HX-1, HX-3 and HX-5 only

Blank Voice Data Chart (2): 4-Operator/POLY

EDIT MODEL		VOICE GROUP		VOICE NAME		DATE	
------------	--	-------------	--	------------	--	------	--

■ EG

	SYNC	MODE	TOUCH RATE	EG								AR KSC	DIR KSC	D2R KSC	RR KSC	D1L KSC
				AR	D1R	D2R	RR	AL	D1L	D2L	RL					
OP 4																
OP 3																
OP 2																
OP 1																

■ OSC

	FEET	SYNC	WAVE	PHASE	FREQ MODE	FREQ MUL	DETUNE		FIXED FREQ	PITCH KSC
							COARSE	FINE		
OP 4	GRP-1									
OP 3										
OP 2										
OP 1										

■ LEVEL

	INPUT LEVEL	OUTPUT LEVEL	LEFT		BREAK POINT	RIGHT		TOUCH SENS	EXP COEF	BRI COEF	AM POL	AM SENS
			DEPTH	CURVE		CURVE	DEPTH					
OP 4												
OP 3												
OP 2												
OP 1												

■ LFO

	DELAY TIME	RR	DEPTH	SPEED	OFFSET
PM					

	SPEED	DEPTH
AM		

	MODE	AR	DR	SPEED	DEPTH	DEF DEPTH
ATP						

■ ETC

TOUCH MODE	REPEAT		EFFECTOR		DEF VEL
	MODE	SPEED	MODE	LEVEL	

	FILTER				PAN-L	PAN-R	REV-L	REV-R
	FLT	IN-LVL	OUT-G	OUTLVL				
CHI								

Blank Voice Data Chart (3): 16-Operator/MONO

EDIT MODEL	HX-1	VOICE GROUP		VOICE NAME		DATE	
------------	------	-------------	--	------------	--	------	--

■ EG

	SYNC	MODE	TOUCH RATE	EG								AR KSC	DIR KSC	D2R KSC	RR KSC	DIL KSC	SLIDE		
				AR	DIR	D2R	RR	AL	DIL	D2L	RL						MODE	RATE	LYL
OP16																			
OP15																			
OP14																			
OP13																			
OP12																			
OP11																			
OP10																			
OP 9																			
OP 8																			
OP 7																			
OP 6																			
OP 5																			
OP 4																			
OP 3																			
OP 2																			
OP 1																			

■ OSC

	FEET	SYNC	WAVE	PHASE	FREQ MODE	FREQ MUL	DETUNE		FIXED FREQ	PITCH KSC
							COARSE	FINE		
OP16	GRP-1									
OP15										
OP14										
OP13										
OP12	GRP-2									
OP11										
OP10										
OP 9										
OP 8	GRP-3									
OP 7										
OP 6										
OP 5										
OP 4	GRP-4									
OP 3										
OP 2										
OP 1										

■ LEVEL

	INPUT LEVEL	OUTPUT LEVEL	LEFT		BREAK POINT	RIGHT		TOUCH SENS	EXP COEF	BRI COEF
			DEPTH	CURVE		CURVE	DEPTH			
OP16										
OP15										
OP14										
OP13										
OP12										
OP11										
OP10										
OP 9										
OP 8										
OP 7										
OP 6										
OP 5										
OP 4										
OP 3										
OP 2										
OP 1										

■ LFO

	DELAY TIME	RR	DEPTH	SPEED	DELAY KSC	SPEED KSC	DEPTH KSC	OFFSET
PM								

	MODE	AR	DR	SPEED	DEPTH	DEF DEPTH	AR KSC	DR KSC
ATP								

■ ETC

TOUCH MODE				EFFECTOR		SLIDE SPEED	DEF VEL
GRP-1	GRP-2	GRP-3	GRP-4	MODE	LEVEL		

	FILTER				PAN-L	PAN-R	REV-L	REV-R
	FLT	IN-LVL	OUT-G	OUTLVL				
CH1								
CH2								