

**YAMAHA**

# Utility Parameter Reference Guide



**DIGITAL PROGRAMMABLE ALGORITHM SYNTHESIZER**

**SUPPLEMENTAL BOOKLET**

# Welcome

This is the second in a series of booklets designed to provide a practical guide to creating your own sounds on the DX7 II. It describes all of the utility parameters and the procedures by which they are used. MIDI parameters are not discussed in this booklet. Please refer to the booklets entitled "MIDI Technical Data and Charts" and "Advanced MIDI Applications" for information concerning the MIDI functions found in the DX7 II.

Section 1 provides an introduction to the memory resources of the DX 7 II FD/D.

Section 2 describes the memory protect, edit recall, initialization, and tuning parameters accessed by the TUNE button.

Section 3 presents the cartridge parameters.

Section 4 lists the disk parameters (for the DX7 II FD only).

Section 4 describes the master tuning, microtuning, and initialization parameters.

For continuing information concerning the DX7 II FD/D, consult AfterTouch, the official publication of the Yamaha Users Group. Many advanced functions will be discussed in its pages in the coming months. There will also be information regarding the availability of other materials concerning more advanced applications. To receive a free copy of AfterTouch every month, send your request to AfterTouch, P.O. Box 7938, Northridge, CA 91327-7938. On your letter or postcard, be sure to indicate that you are the owner of a DX7 II FD/D.

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# 1

## **Introduction**

# About the DX7 II Memories

## *Internal*

The DX7 II uses four different types of memory for data storage. They are the internal memory, ROM cartridges, RAM4 cartridges, and 3.5 inch micro floppy disks (on the DX7 II FD only).

The internal memory is found inside the DX7 II itself. It can be used to store 64 voices, 32 performance configurations, 2 user defined microtunings, and the system setup data. The system setup data includes a number of basic MIDI settings in addition to the master tuning and cartridge bank number settings.

## *ROM Cartridge*

ROM cartridges such as the one supplied with the DX7 II contain four banks of data. The first bank contains a backup of the factory preset internal memory data. The second bank contains an alternate set of voice and performance data which can be used instead of the original factory preset data. The third bank contains 64 fractional scaling configurations. The fourth bank can contain up to 63 microtunings, although the fourth bank in the ROM shipped with the DX7 II is unformatted and contains no data. The procedure used to switch between these banks is described in a later section. Because this is ROM (read only memory), no user data can be saved on this type of cartridge.

## *RAM4 Cartridge*

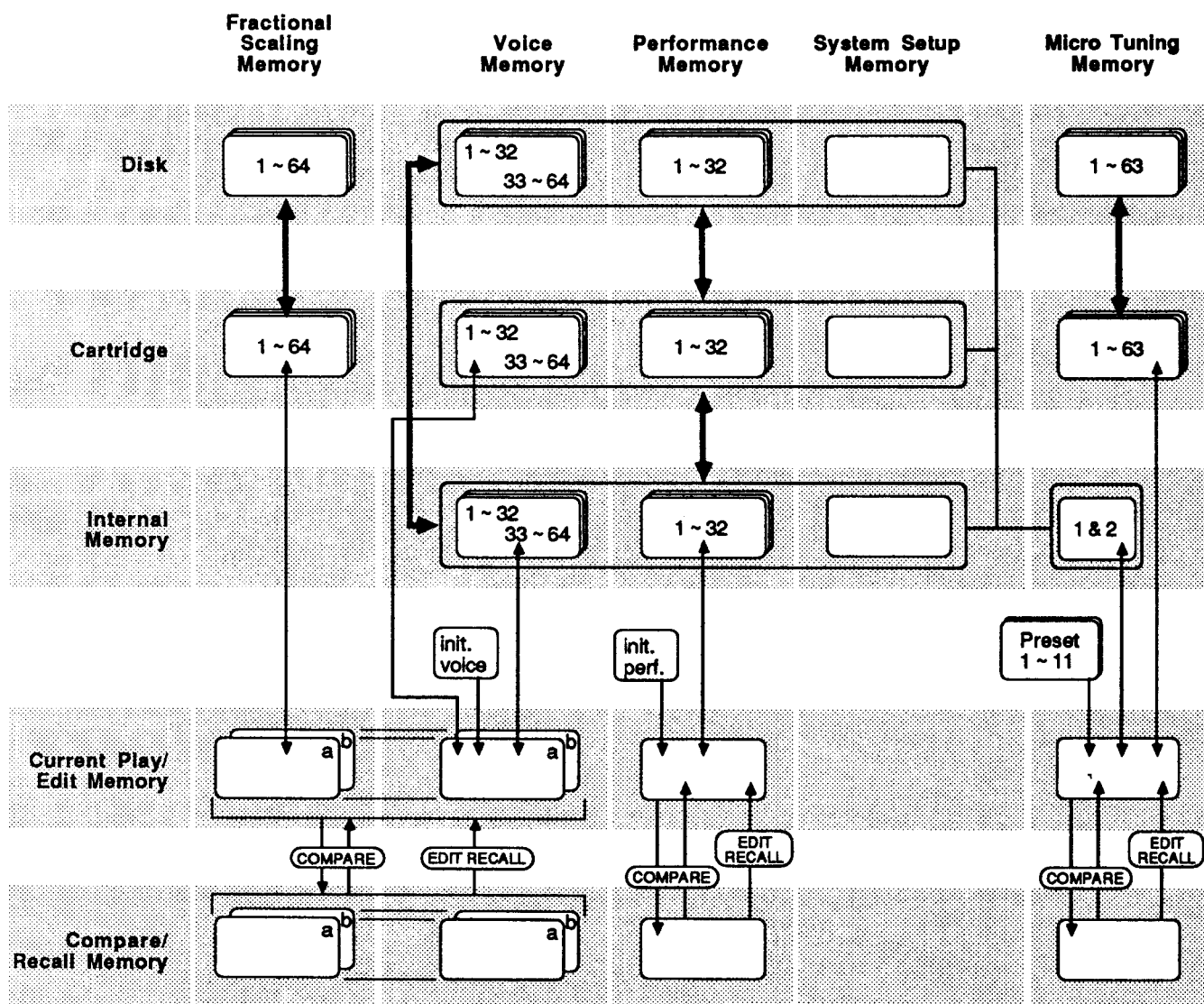
RAM4 cartridges contain only one bank of data. They are capable of storing the entire contents of the internal memory, 64 fractional scaling configurations, or 63 microtunings. These cartridges must be formatted according to the type of data to be stored. This procedure is described in the next section of this booklet. RAM4 cartridges also include a memory protect switch. If this switch is on, no new data can be saved on the cartridge.

## *Disk*

The DX7 II FD is equipped with a micro floppy disk drive for data storage and retrieval. A single 3.5 inch micro floppy disk can store up to 44 files of DX7 II data. Each file can consist of one of the following: the entire contents of a RAM4 cartridge (including any of the types of data outlined in the paragraph above), the entire contents of the internal memory, or the entire contents of one bank of a ROM cartridge. Disks cannot be used to store individual voices, performances, microtunings, or fractional scalings. This wholesale storage of entire memories in files is known as "bulk storage." The transfer of an entire memory to or from disk is called a "bulk dump." This procedure is described later in this booklet. (The disk drive on the DX7 II FD can also be used as a MIDI data recorder. These MDR functions are described in the booklet entitled "Advanced MIDI Applications.")

# Memory Layout Diagram

The memory layout of the DX7 II is illustrated in the following diagram. Notice that this diagram indicates the different types of memory and data, as well as the paths and directions by which data may be saved to different memory locations. Thin lines indicate that the contents of individual memory locations may be stored. Thick lines indicate bulk storage.



Any useful voice, performance, microtuning, or fractional scaling data you wish to retain should be immediately saved in a suitable memory location. Otherwise, all of your hard work will be lost forever as soon as you begin to edit another voice.



# 2

## Tune Button (#14)

*The Tune button (#14) provides access to a variety of utility parameters. As with most of the other buttons on the DX7 II, these parameters are presented in a series of LCD "screens." These screens are displayed by pressing the appropriate button repeatedly until the desired screen appears.*



# Memory Protect

*INT/CRT*

In order to protect existing voice and other data from accidental erasure, the DX7 II has a memory protect function, which is automatically activated whenever the instrument is powered on. This function must be turned off before any data can be stored or moved from one memory location to another.

The memory protect parameters are located in the same LCD display as the master tune parameter (which is described later in this section). In order to save data to the internal memory or to a RAM4 cartridge, the appropriate memory protect parameter must be turned off. To do so, simply move the cursor to the INT (internal) or CRT (cartridge) parameter and press the -1/NO button to deactivate the memory protection. If you wish to move data between the internal memory and a RAM4 cartridge, turn both parameters off. Remember that the RAM4 cartridge also includes a separate memory protect switch, which should also be turned off if you plan to store data there.

Once they are turned off, the memory protect parameters remain off until they are turned on again, or until the DX7 II is turned off. It is therefore a good idea to turn these parameters on again after you have saved your data unless you know that you are going to continue storing data very soon. This will avoid accidental erasure of your work.

## Recall Edit

If you have started to store voice, performance, or microtuning data and realize that you need to continue editing, simply release the STORE button before pressing the +1/YES button, press the EDIT button, and continue editing. However, if you have finished storing (or forgot to store) your voice, performance, or microtuning data and have called up different data, you can use the recall edit function to retrieve your previously edited data.

1. Press the EDIT button if you are not already in edit mode.
2. Press the TUNE button (#14) repeatedly until the recall edit screen is displayed in the LCD.
3. Depending on the type of data you wish to recall, move the cursor to the Voice, Perf., or Micro tuning parameter.
4. Press the +1/YES button. You will see the message “\*\*Are you sure?”
5. Press the +1/YES button again to confirm your action.

This recalls the data you were previously editing. You can now continue to edit or store the data.

## Initialize

This function allows you to initialize both A and B voices to INIT voice settings. These are the simplest and most basic settings a voice can have. In addition, a similar operation can be performed to initialize a performance configuration. This allows you to easily start creating voices and performances from scratch.

1. Press the EDIT button.
2. Press the TUNE button repeatedly until the Initialize screen appears.
3. Move the cursor to the element you wish to initialize and press the +1/YES button.
4. The message “\*\*Are you sure?” will appear.
5. Press the +1/YES button to confirm your action. Press the -1/NO button to cancel the initialization process.

## Master Tuning

The master tuning parameter determines the overall pitch level of the entire instrument. This allows you to play with other instruments that cannot be tuned to A3 = 440 Hz.

- 64 Lower overall pitch by 75 cents ( $\frac{3}{4}$  of a semitone).
- ⋮
- 0 Normal pitch level (A3 = 440 Hz.).
- ⋮
- +63 Raise overall pitch by 75 cents ( $\frac{3}{4}$  of a semitone).

Position the cursor at the master tune parameter and use the +1/-1 buttons or the data entry slider to specify its value.

### **Note:**

*The master tune parameter does not affect operators set to the fixed oscillator mode. Please refer to the first booklet in this series, “Voicing Parameter Reference Guide” for more information.*

## Microtuning

The TUNE button also provides access to the microtuning editor. The specification and saving of microtunings is described in the third booklet of the microtuning series, “The Acoustics of Microtuning.” Please refer to that booklet for details on the microtuning parameters displayed in this screen.



# 3

## Cartridge Button (#15)

*This section presents the parameters and procedures for saving the entire contents of the internal memory in a RAM4 cartridge. You'll recall that this process is called a "bulk dump." It also outlines the procedures for formatting RAM4 cartridges, and for accessing the various banks of DX7 II ROM cartridges.*

# Format

Before you can use a RAM4 cartridge, it must first be “formatted” according to the type of data you intend to put there. There are three different formats available.

- DX7 - 2 The voice & performance format provides storage for 64 voices, 32 performance configurations, 2 microtunings, and the system setup data.
- FKS - Y The fractional scaling format provides storage for 64 fractional scaling configurations.
- MTT - Y The microtuning format provides storage for 63 microtunings.

The procedure by which a RAM4 cartridge is formatted follows.

1. Turn the DX7 II cartridge memory protect off.
2. Turn the cartridge memory protect switch off.
3. Press the EDIT button if you are not already in the edit mode.
4. Press the CARTRIDGE button (#15) repeatedly. You will see four LCD screens labeled Voice & Perf., Fractional SC., Micro tuning, and Bank. Ignore the screen labeled Bank for now. Stop pressing the CARTRIDGE button when the screen corresponding to the type of data you wish to store or save appears. For example, if you plan to work with voice and performance data, press the CARTRIDGE button until the screen labeled Voice & Perf. appears.
5. Move the cursor to the format parameter.
6. Press the +1/YES button. The message “\*\* Are you sure?” will appear.
7. Press the +1/YES button again to confirm your action.

## Note:

*You'll recall that a RAM4 cartridge contains only one bank of data. Future RAM cartridges may contain more than one bank. In this case, you will need to select the bank you wish to format with the bank parameter which is described below.*

# Bank

Whenever you wish to access the contents of a ROM cartridge, store or save data to a RAM4 cartridge, or format any future RAM cartridges with multiple banks, you must first specify an appropriate bank. This is accomplished with the bank parameter appearing in all three of the formatting screens described above. RAM4 cartridges contain only one bank of data. The supplied ROM cartridge contains four banks. The value of the bank parameter ranges from 1 to 16. This will accommodate any future cartridges with larger capacities.

The following procedure illustrates cartridge banks, using the supplied ROM cartridge as an example.

1. Insert the ROM cartridge into the cartridge slot.
2. Press the EDIT button.
3. Press the CARTRIDGE button (#15) repeatedly until any one of the three format screens appears.
4. Position the cursor at the bank parameter. Use the +1/-1 keys to select different banks. Notice that banks 1 and 2 are in DX7-2 (voice & performance data) format. Bank 3 is in FKS-Y (fractional scaling data) format. The fourth bank is unformatted (indicated by "unfmt" under the format parameter label).

By selecting a cartridge bank in the DX7-2 format, the voice and performance data are accessible directly from the play mode by pressing the CARTRIDGE button (next to the INTERNAL button) followed by any of the number buttons. The microtuning and system setup data found in this format must be transferred to the internal memory in order to be used.

The microtunings in an MTT-Y cartridge bank can be used directly by pressing the MICRO TUNE button (#29) from the edit mode. Position the cursor at the table select parameter and use the +1/-1 keys or the data entry slider to select any one of the 63 microtunings (labeled CRT 1 through CRT 63). In addition, two of these microtunings can be transferred to the two user microtuning locations of the internal memory.

The 64 fractional scalings in a cartridge memory are associated with the 64 voice locations in the internal memory. If a voice patch is programmed with fractional scaling data, the STORE function saves the voice data to the specified number location; the fractional scaling data is saved to the same-numbered location in a properly-formatted (FKS-Y) RAM4 cartridge. (If no cartridge is inserted in the cartridge slot, the fractional scaling data will not be saved.) When the voice is called up in play mode, the DX7 II "looks" for the related fractional scaling data in a cartridge. If the cartridge is not inserted, the LCD tells you that something is missing; an inverse, lowercase "f" appears in the LCD next to the voice name.

When storing, saving, or loading data to a RAM4 cartridge, the format of the specified bank must correspond with the type of data being transferred. If it does not, the message "conflict!" will appear under the format parameter label. This indicates that the attempted operation is not possible.

## Save

The entire contents of the internal memory can be saved to a RAM4 cartridge. The following procedure describes this process. Be sure that the DX7 II cartridge memory protect function and the RAM4 cartridge memory protect switch are set to off when performing such a bulk dump.

1. Assure that the single bank in the RAM4 cartridge is formatted appropriately.
2. Press the CARTRIDGE button (#15) repeatedly until the bank screen is displayed.
3. Position the cursor at the save parameter.
4. Press the +1/YES button. The message "\*\*\*Are you sure?" will be displayed.
5. Press the +1/YES button again to confirm your action.

The entire contents of the internal memory is now saved in the RAM4 cartridge.

## Load

The entire contents of a DX7-2 formatted cartridge bank can also be loaded from the cartridge to the internal memory. In this case, be sure that the DX7 II internal memory protect function is turned off.

1. Press the CARTRIDGE button (#15) repeatedly from the edit mode until the Voice & Perf. screen appears.
2. Position the cursor at the bank parameter and use the +1/-1 buttons to select the bank you wish to load from.
3. Press the CARTRIDGE button (#15) repeatedly until the bank screen is displayed.
4. Position the cursor at the load parameter.
5. Press the +1/YES button. You will see the message "Load without system?"
  - a. Press the +1/YES button to load all data except the system setup data.
  - b. Press the -1/NO button to load all data including system setup data.
6. The message "\*\*\*Are you sure?" will be displayed.
7. Press the +1/YES button again to confirm your action.

The entire contents of the selected cartridge bank (with or without the system setup data) is now loaded into the internal memory.

# 4

## Disk Button (#16)

*The DX7 II FD includes a 3.5 inch micro floppy disk drive. Disks can be used for bulk storage of any type of data. This section describes the many uses of floppy disks on the DX7 II FD.*



# About Floppy Disks

*Memory Protect Switch*

## Formatting

Floppy disks are available in various sizes and formats. The DX7 II <sup>FD</sup> uses 3.5 inch (double sided, double density) micro floppy disks such as Yamaha MF2-2DD disks.

### **PRECAUTIONS:**

- *Do not place disks near speakers, television sets, or other electronic equipment generating strong magnetic fields as this could erase saved data.*
- *Avoid storing disks in extremely hot or cold places or where they would come into contact with dust or smoke.*
- *Do not leave disks in direct sunlight.*
- *Never bend micro floppy disks or apply pressure to them.*
- *Do not attempt to open the auto shutter.*

Like cartridges, micro floppy disks include a memory protect switch. When the small window above the switch is open, no data can be recorded on the disk. Closing the window by sliding the switch turns memory protect off, enabling data to be recorded. Unless otherwise indicated, the procedures in this section should be performed with the memory protect switch off.

Before a new disk can be used for data storage, it must be formatted. Unlike RAM cartridges, one type of formatting accommodates all types of data. Formatting a disk entirely erases any data previously stored there. This operation can therefore be used to clear old disks containing unnecessary data.

1. Press the EDIT button.
2. Press the DISK button (#16) repeatedly until the Format/Backup/Free bytes screen is displayed.
3. Position the cursor at the format parameter. The message “\*\*Set disk and push [yes]” will appear.
4. Insert the disk you wish to format and press the +1/YES button. The message “\*\*Are you sure?” will appear.
5. Press the +1/YES button to confirm your action. You can press the -1/NO button to cancel the formatting process.

Formatting takes a few moments. When it is finished, the message “Completed!” will be displayed.

# Files

Instead of storing information in banks like a RAM cartridge, the disk drive keeps track of different sets of data by recording them as separate files. Each file has a number and a name. The theoretical maximum number of files that can be saved on one disk is 99. The actual maximum number of files will depend on the volume of data each file contains. One disk can hold 44 fully-packed files of DX7 II data.

Files are automatically numbered in the order in which they are saved. This means that, in general, you cannot specify a file's number at the time it is saved. However, you can select the number of a file that has been deleted and assign it to a new file if you wish. File names can be input at will as explained below. The names of deleted files do not appear in the display, although their number does. This indicates that the number is available for reassignment.

## *Note:*

*A disk file always contains the entire contents of the internal memory or a cartridge bank except when files are used to store external MIDI data.*

## Saving Internal Memory Data to Disk

1. Insert the disk into the disk drive.
2. Press the EDIT button.
3. Press the DISK button (#16) repeatedly until the INT screen appears.
4. Move the cursor to the Dir parameter and press the +1/YES button.
5. Select a file number using the +1/-1 buttons or the data entry slider. This is where the data will be stored. A file number followed by a file name indicates that the file is presently storing data; a file number followed by eight periods (.....) indicates that the file is blank or deleted. (It is possible to save new data on top of old data. If this is done, the old data will be lost when it is replaced by the new data.)
6. Move the cursor to the Save parameter and press the +1/YES button. The message "input file name" will appear.
7. Press and hold the CHARACTER button. Input a file name of up to eight characters. Periods or spaces cannot be used as part of a file name.
8. Press the +1/YES button. The message "\*\*\*Are you sure?" will be displayed.
9. Press the +1/YES button again to confirm your action. Press the -1/NO button to cancel the save.

## Loading Disk Data to Internal Memory

Data recorded on a disk from the internal memory can be loaded back into the internal memory from the disk. However, it is not possible to load data into the internal memory that has been saved to the disk from a cartridge.

1. Insert the disk into the disk drive.
2. Press the EDIT button.
3. Press the DISK button (#16) repeatedly until the INT screen appears.
4. Move the cursor to the Dir parameter and press the +1/YES button. A file number and name will appear after a moment.
5. You can now select the file you wish to load into the internal memory using the +1/-1 buttons or the data entry slider.
6. After selecting the desired file, move the cursor to the Load parameter and press the +1/YES button. The message "Load without system?" will appear.
  - a. Press the +1/YES button to load all data except the system setup data.
  - b. Press the -1/NO button to load all data including the system setup data.
7. The message "\*\*\*Are you sure?" will be displayed.
8. Press the +1/YES button again to confirm your action. Press the -1/NO button to cancel the load.

## Saving Cartridge Data to Disk

The disk saving procedure for cartridge data is very similar to that for the internal memory. All of the data in a cartridge bank is saved in a single disk file.

1. Insert the disk into the disk drive.
2. Press the EDIT button.
3. Press the DISK button (#16) repeatedly until the CRT screen appears.
4. Move the cursor to the Dir parameter and press the +1/YES button.
5. Select a file number using the +1/-1 buttons or the data entry slider. This is where the data will be stored. A file number followed by a valid file name indicates that the file is presently storing data; a file number followed by eight periods (.....) indicates that the file is blank or deleted. (It is possible to save new data on top of old data. If this is done, the old data will be lost when it is replaced by the new data.)

## Loading Disk Data to RAM Cartridge

6. Move the cursor to the Bank parameter and use the +1/-1 buttons or the data entry slider to select the bank you wish to save.
7. Move the cursor to the Save parameter and press the +1/YES button. The message "input file name" will appear.
8. Press and hold the CHARACTER button. Input a file name of up to eight characters. Periods or spaces cannot be used as part of a file name.
9. Press the +1/YES button. The message "\*\*\*Are you sure?" will be displayed.
10. Press the +1/YES button again to confirm your action. Press the -1/NO button to cancel the save.

Only data recorded to disk from a cartridge can be loaded back into a RAM4 cartridge from the disk. Be sure that the cartridge memory protect switch is off.

1. Insert the disk into the disk drive.
2. Press the EDIT button.
3. Press the DISK button (#16) repeatedly until the CRT screen appears.
4. Move the cursor to the Dir parameter and press the +1/YES button. A file number and name will appear after a moment. Select the file you wish to load using the +1/-1 buttons or the data entry slider.
5. The bank parameter is invariably set to 1 when loading into a RAM4 cartridge. For larger RAM cartridges, move the cursor to the bank parameter and select the bank into which you wish the file to be loaded.
6. Move the cursor to the Load parameter. The screen will indicate the current format of the specified bank and ask you to confirm this information. If the format of the specified bank differs from that of the data to be loaded, the format of the bank will be changed accordingly.
7. Press the +1/YES button.
8. The message "\*\*\*Are you sure?" will be displayed.
9. Press the +1/YES button again to confirm your action. Press the -1/NO button to cancel the load.

## Remaining Disk Memory

After recording a number of files on a disk, you will want to check the remaining available space. This can help you determine how many more files you will be able to save on the disk.

1. Insert the disk into the disk drive.
2. Press the EDIT button.
3. Press the DISK button (#16) repeatedly until the Format screen appears.
4. Move the cursor to the Free bytes parameter and press the +1/YES button. A message appears indicating the remaining memory space in kilobytes (kb). It also indicates the number of internal or cartridge bank files that can still be saved on the disk. One disk can hold up to 44 files of DX7 II data.

## Disk Directory

You can check the names and numbers of internal (INT) or cartridge (CRT) files stored on any disk with the directory function. This function also allows you to select the numbers of deleted files for new file storage.

1. Insert the disk into the disk drive.
2. Press the EDIT button.
3. Press the DISK button (#16) repeatedly until the INT or the CRT screen appears.
4. Move the cursor to the Dir parameter and press the +1/YES button. A file number and name will appear after a moment.
5. You can now review the internal (INT) or cartridge (CRT) files on the disk using the +1/-1 buttons or the data entry slider. Both kinds of files can be stored on one disk, but only one directory (INT or CRT) can be viewed at one time.

## Deleting Files

Files that are no longer needed can be deleted from the disk in the following manner.

1. Follow the directory procedure above and select the file you wish to delete.
2. Move the cursor to the Del (delete) parameter and press the +1/YES button.
3. The message "\*\*\*Are you sure?" will be displayed.
4. Press the +1/YES button again to confirm your action. Press the -1/NO button to cancel the deletion.

## Renaming Files

1. Follow the directory procedure above and select the file you wish to rename.
2. Move the cursor to the Rename parameter and type a new name while holding the CHARACTER button.
3. Press the +1/YES button. The message "\*\*\*Are you sure?" will be displayed.
4. Press the +1/YES button again to confirm your action. Press the -1/NO button to cancel the name change.

## Backup Disks

It is always a good idea to make duplicate copies of disks containing important data. This will prevent the total loss of valuable data in the unlikely event of disk failure. Such duplicates are called backup copies.

Before a backup copy of a disk can be made, the duplicate disk must first be formatted, as described above. The backup procedure follows.

1. Press the EDIT button.
2. Press the DISK button (#16) repeatedly until the Format/Backup/Free bytes screen is displayed.
3. Position the cursor at the Back up parameter.
4. Press the +1/YES button. The message "\*\*\*Are you sure?" will appear.
5. Turn the original disk's memory protect switch on and insert it into the disk drive.
6. Press the +1/Yes button. The message "\*\*\*Set duplicate disk and push [yes]" will appear after a few moments.
7. Insert the duplicate disk and press the +1/YES button. If the message "\*\*\*Set original disk and push [yes]" should appear again, remove the duplicate disk and repeat steps 5-7.
8. Repeat steps 5-7 until the message "\*\*\*Completed!" appears, which indicates that the original disk has been successfully duplicated.

Backup copies should be kept in a safe place and only used if the data on the original disk is somehow destroyed. We therefore recommend that you switch the duplicate disk's memory protection on immediately after making the backup copy.

## Using the Disk Drive as a MIDI Data Recorder

The MIDI data recorder functions for the disk drive are accessed via the "MDR" LCD screen. These functions are explained in the supplemental booklet entitled "Advanced MIDI Applications."

## Notes

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