



DIGITAL DRUM MACHINE

Owner's Manual

by
Daniel Sofer

SECOND EDITION JANUARY 1985

For Units With Serial Number H44801 or Above

CAUTION:

To Prevent fire or shock hazard do not expose this appliance to rain or moisture. Do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

WARNING:

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.



OBERHEIM ELECTRONICS, INC.

2250 South Barrington Avenue

Los Angeles, California 90064

USA

Telex 6831071 OBRHM

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Manual Design and Graphics by Daniel Sofer
Production: Kathy Weems
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INTRODUCTION

INTRODUCTION

WELCOME TO THE DX

You have just purchased a most powerful tool for composition and performance. The Oberheim DX Programmable Digital Drum Machine represents the latest in the Oberheim line of drum computers. The DX has been designed with the idea of giving you better sound, and better control of it, than has been previously available in a drum box, at a more economical price.

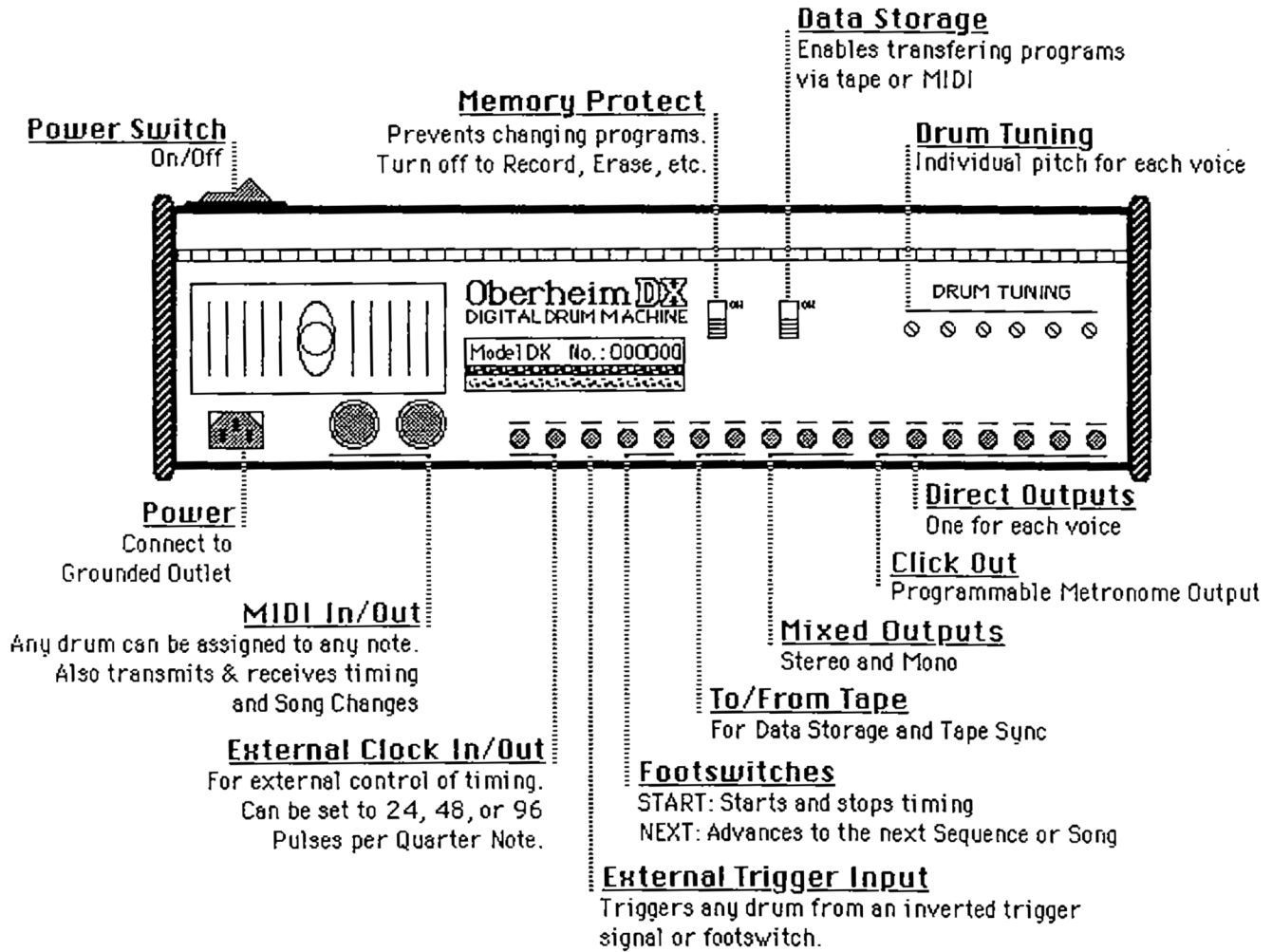
The DX generates the sounds of real drums. Actual drum recordings have been digitized, stored in computer memory, and are available at the touch of a button. A drum beat can be recorded in real time at any speed, remembered, and edited to make any beat of any length, tempo, or style—in short, any drum beat that you hear in your head, you can create on the DX. After you have created your drum beats, you can save them on tape for future use. Of course, the DX has a battery to keep the memory on when the power is off.

The DX has a MIDI Interface, which enables interconnections with other equipment such as sequencers, keyboards, drum pads, and other drum machines.

The DX operates like a tape recorder: press RECORD + PLAY to Record your rhythms; then press PLAY to hear it back. But there's more to it than that. There are features incorporated into the DX that actually give you more control over your music than a tape recorder allows. We recommend that you familiarize yourself with these features in order to get the most out of your DX.

The DX can make most any drum beat that an acoustic drummer can create. In fact, this rhythmic flexibility of the DX creates a new dilemma for the user: exactly WHAT makes a good drum beat? It is not within the scope of this manual to try to answer this question, but if you're not a drummer already, we strongly suggest spending some time listening and studying the rhythms of your favorite music. Listen to where the notes are and where they're *NOT*, where the accents are, when the beat is pushed or swung. If your drum machine sounds cold and robot-like, it's because you've programmed it that way. It takes a good sense of timing to create rhythms that really breathe.

Experiment! You'll never know what you'll discover.



MIXER: (FOR MIXED OUTPUTS)

Individual Volume fader for each voice and the Metronome, plus a Master Volume fader. These controls have no effect on the individual voice outputs.

EDIT PARAMETERS:

Many features are controlled with the Edit Parameters. This legend will help you interpret the display. See "EDIT PARAMETERS" (Page 19).

DX

EXIT PARAMETERS:
 00 COUNTDOWN --:0h
 01 TRIMMING SOURCE: INTERNAL 2, 4, 48, 95
 EXTERNAL 2, 4, 48, 95
 TAPE SYNC S MIDI D

MIDI:
 01 RECORD CHANNEL --:0h
 02 TRANSFER CHANNEL --:0h
 03 OWN MODE --:0h
 10 MIDI CLOCK OUT --:0h

MIDI:
 11 ECHO NOTES --:0h
 12 SONG CHANGES --:0h
 13 SET DRUMS TO MIDI NOTES --:0h
 14 SET TRANSPOSITION --:0h

DISPLAY:
Shows current settings.

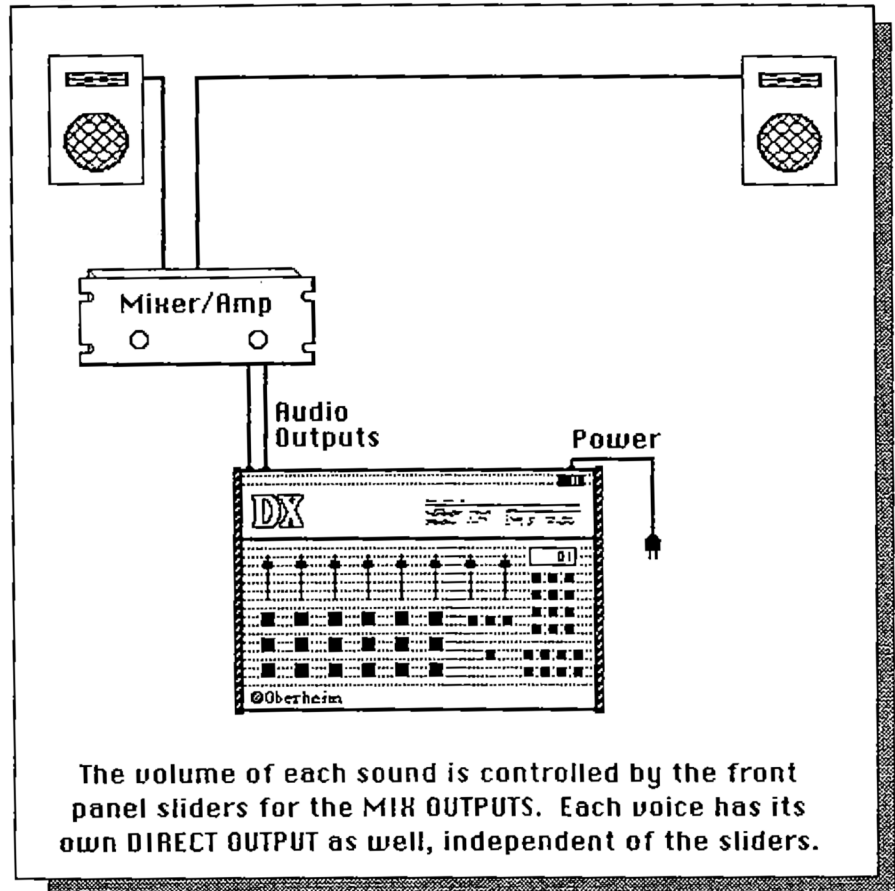
KEYPAD:
Enter numbers directly or use the arrow keys, to select Sequences, Songs, Tempos, etc.

DRUM BUTTONS:
Play the drums with these buttons. Big enough for two-finger operation.

OPERATION BUTTONS:
These buttons access the different modes of the machine, such as PLAY, STOP, RECORD, TEMPO, etc.



Sound Hookup



The volume of each sound is controlled by the front panel sliders for the MIX OUTPUTS. Each voice has its own DIRECT OUTPUT as well, independent of the sliders.

GETTING AROUND

SEQUENCES

Selecting A Sequence

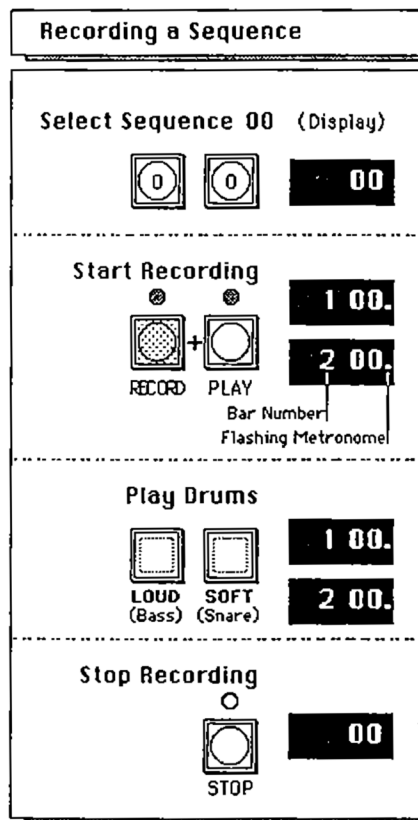
The DX can store up to 100 drum sequences, numbered 00 thru 99. Select one by pressing two numbers, or one of the arrow buttons. The display will show you which sequence you have selected.

Playing A Sequence

Press PLAY. The sequence will play over and over until you press STOP. You can also select another sequence while playing and the DX will play it immediately after the first sequence has finished.

Real Time Recording

There are two ways to record on the DX: REAL TIME and SINGLE STEP. In REAL TIME, the sequence plays over and over and you simply press the buttons where you want the drums to sound. In SINGLE STEP, the sequence advances one beat each time you press either of the arrow buttons, which allows you to record your drum beat slowly. The REAL TIME mode of recording is explained here. The SINGLE STEP mode of recording is explained in the section entitled STEP.



Press and hold RECORD and then press PLAY. The Metronome will click in eighth notes and the DX will record over and over on two measures. In RECORD, the DX does not ERASE, so you can build your drum beat as it loops over, playing the cymbal first, the bass drum, then the snare, etc., until you are finished. The DX will also Quantize or round off, your playing. When you have finished recording, press STOP.

You can add more parts to the sequence simply by recording once again. Erasing is a separate process.


► **REMEMBER:** The DX will not RECORD if the MEMORY PROTECT switch on the rear panel is ON.

Erasing A Sequence

If you have made a mistake, or would like to record over again, press and hold ERASE and while holding ERASE press RECORD. The current sequence will be erased, and you can record again from scratch. The DX will "beep" when the erasure actually takes place. The volume of the beep is controlled by the metronome volume control.

Erasing a Sequence:


Hold the ERASE key:





ERASE

And while holding,

Press RECORD:



ERASE RECORD




Erasing Notes Within A Sequence

You can erase any single drum (or cymbal) from the entire sequence. Hold ERASE and then press the drum you wish to erase.

Erasing a drum from the entire Sequence:

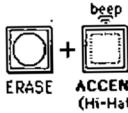
Hold the ERASE key:



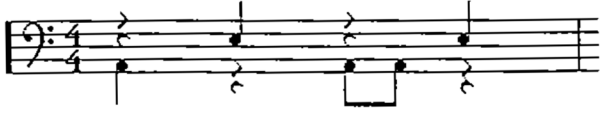

ERASE

And while holding,

Press the desired button:




ERASE ACCENT (Hi-Hat)



Setting the Tempo:

Enter TEMPO Mode: (Display)

 **80**


Set Tempo to 105 Beats/Minute

8 01

10

1 05

Exit TEMPO Mode:

 **00**

Tempo

The DX is normally set to a tempo of 80 Beats per Minute, but can be varied within a range of 25 to 250 Beats per Minute. You can change the tempo at any time by entering the tempo mode. Press TEMPO. The Tempo button will light and display will show the tempo currently selected. You can change the tempo by pressing the buttons with the arrows to increase or decrease the tempo, or you can enter the desired Beats per Minute on the keypad (3 digits). To exit the tempo mode press TEMPO once again.

To program the tempo in a sequence press TEMPO while in Record, set to the desired speed and press TEMPO once again to exit. Whenever that sequence is recalled, the DX will recall the tempo as well. You can change the tempo at any time, but the programmed tempo will be changed only when the tempo is set in record.


■ **NOTE:** Not every tempo marking between 25 and 250 Beats per Minute can be played. Near the high end of this range the tempo steps are larger than one Beat per Minute. If you enter a tempo which cannot be played, the DX will play the nearest valid tempo to the one which you entered. Also, if you try to RECORD an invalid tempo, the DX will actually record the nearest valid one.

If you enter a number that is out of the tempo range, the display will flash. You must set the tempo to be in range before you can exit from the tempo mode.

The arrow buttons will always step between valid tempos.

Setting the Sequence Length:

Enter LENGTH Mode: (Display)

 **2**


Select Length of 8 Bars:

20

8

(Flashes)

Set Length and Exit LENGTH Mode:

 **00**

Length

A sequence can be any length from 1 to 99 bars. The DX sets a length of 2 bars for each sequence unless you set it differently. To change the length of the current sequence press LENGTH. Then, using the arrow buttons or the number keys, choose the new length. The display will flash. The new length can be entered in memory by pressing the LENGTH key again. If any other key is pressed, the length will not change.

If you have recorded a sequence and then shorten the length, you will lose the bars you have cut. If you lengthen a sequence you have recorded, rests will appear at the end.

LENGTH sets the number of bars within a sequence. The length of each bar is set by SIGNATURE.

► **REMEMBER:** If the MEMORY PROTECT switch is on, the Length of a sequence cannot be changed, although the Length can be displayed.

GETTING AROUND

SONGS

One prominent feature of music is that it is organized into sections that repeat and alternate with each other. The Song Mode allows you to record each section of a piece as a separate sequence and then combine sequences into a complete composition.

A Song is a listing of sequences. The DX contains 50 Songs, numbered 00 thru 49, in addition to the 100 sequences. Unlike a sequence, a song does not remember the notes, only the order of sequences that you wish to play. There can be as many as 255 sequences contained within a song, and each sequence within a song can have its own tempo, length, or time signature. Songs make more efficient use of the DX memory. In fact, playing three sequences in a song uses as much memory space as a *single note* in a sequence.

Selecting A Song

To enter the song mode, press SONG. The Song button will light and the DX will select the song previously selected. To select a different Song simply press the number of the desired Song.

To go back to Sequence mode, press SONG again.

Playing A Song

Once the desired song has been selected, press PLAY and the selected song will play from beginning to end and then stop.

As the song plays through the different sequences in it, the sequence number on the display will change to reflect the actual sequence presently being played. Each sequence in the song is given an ascending PART number that reflects its order in the song.

Creating A Song

Creating a song is different than recording a sequence, because you are not playing any notes, just making a list of sequences.

To create a song press EDIT (while in Song mode—both SONG and EDIT buttons should be lit.). Once you enter SONG EDIT mode, the DX will ask you to select the sequences that will make up the song: the "Song List."

The arrow buttons can be used to "rewind" and "fast forward" through the song list to get to a particular part.

Function:	Enter SONG EDIT	ADD SEQ 01	Advance to Next Part	ADD SEQ 02	Advance to Next Part	ADD SEQ 01	Advance to Next Part	ADD SEQ 00
Press:								
Song List:	Part: Seq: 1 (Empty Song)	Part: Seq: 1 0 1	Part: Seq: 1 0 1 2	Part: Seq: 1 0 1 2 0 2	Part: Seq: 1 0 1 2 0 2 3	Part: Seq: 1 0 1 2 0 2 3 0 1	Part: Seq: 1 0 1 2 0 2 3 0 1 4	Part: Seq: 1 0 1 2 0 2 3 0 1 4 0 0

GETTING AROUND

There are four editing commands:

ADD: If the display shows the end of a song list (only a part number displayed on the left side — right side blank), you can add a sequence to the end of the song by entering the desired sequence number. If a song list is empty, the first part will be blank.

REPLACE: You can REPLACE any sequence currently displayed with another simply by entering the new sequence number.

INSERT: By pressing RECORD and EDIT, the DX will insert Sequence 00 into the song list before the sequence previously displayed. You can then REPLACE Sequence 00 with the desired sequence by entering its number.

ERASE: By pressing ERASE and EDIT, the DX will remove the displayed sequence from the song list.

To play the song you have just created, press PLAY.

■ **NOTE:** A song can have up to 255 parts in it. However, only the lowest two digits are shown in the display.

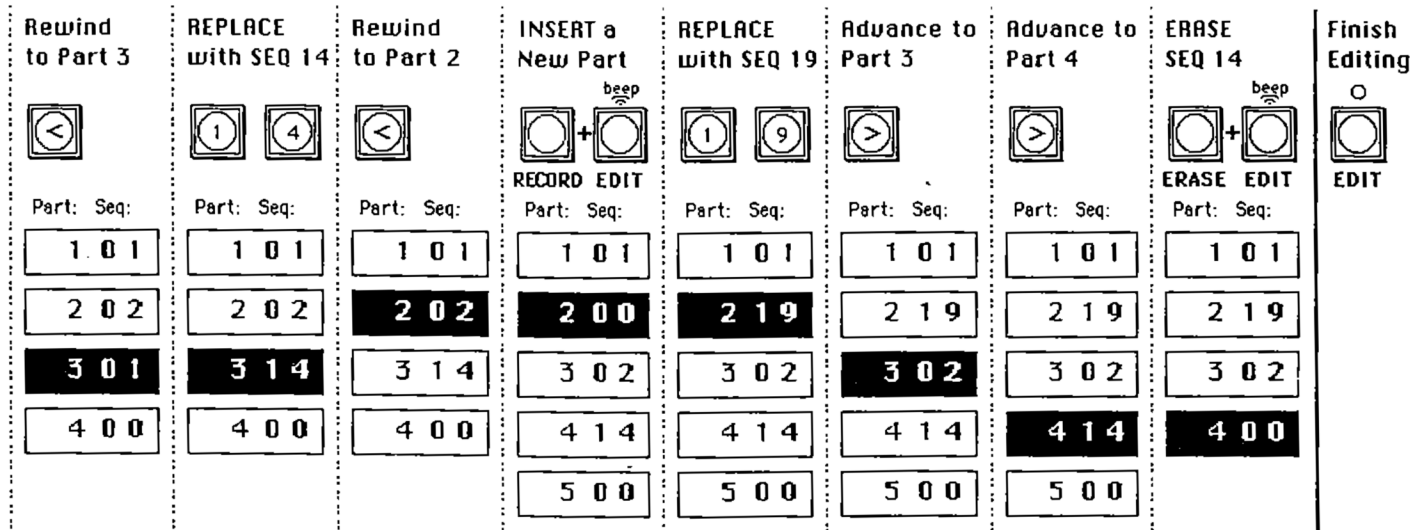
► **REMEMBER:** The DX will not EDIT a SONG if the MEMORY PROTECT switch on the rear panel is ON.

Erasing A Song

You can erase an entire song while in Song mode by holding ERASE and pressing RECORD. Individual sequences within the song list can be removed in the Song Edit mode (see Creating A Song).

Song Length

When in Song Mode, pressing LENGTH will display the number of parts contained in the song list.



The DX contains six sets of voices. Each voice has three variations, and some of the voices contain two completely different sounds. Only one voice variation can be played at a time. The sound of each voice is contained on one or several memory chips.

SOUNDS

The DX comes from the factory with the following voices and these variations:

BASS / Bass drum, with three volume levels.

SNARE / Snare drum, with three volume levels.

HI-HAT / A hihat, with a closed and an accented sound, plus a longer "open" sound.

TOMS / Toms with three pitches.

CYMBALS / A Ride cymbal, with two volumes, plus a Crash cymbal.

PERC / Two sounds: a shaker with accent, plus hand claps.

Tuning

The pitch of each of the voices can be tuned up or down half an octave by adjusting the pitch controls located on the rear panel of the DX.

Changing Sounds

The DX drum sounds are contained on computer memory chips. By changing the chips, you can customize your DX to your specific application.

SOUND LIBRARY

In addition to the sounds that come with the DX, the library of Sound Chips available include:

Bass Drums

Electronic Bass
Beat Kick

Snare Drums

Electronic Snare
Fat Snare
Beat Snare
Reggae Snare

Tom-Toms

Electronic Tom
Roto Tom

HiHats

Electronic Hihat
Long HiHat

Percussion

Cowbell
Tambourine/Rimshot
Conga
Timbale
Bones
Finger Snaps

Effects

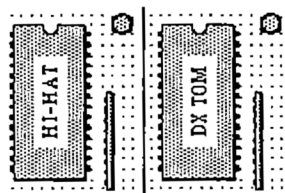
Scratch
Backwards Snare-Clap
Click/Clap
Punch/Zap
Noise

The Oberheim sound library is continually expanding. Check with your dealer for new sounds. Additional sounds for the DX are available from other manufacturers as well.

Changing Sound Chips



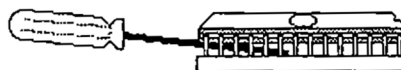
Remove Screws
and Lift up Front Panel



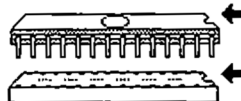
**Remove Power Cord
Before Doing ANYTHING!**

Then,
Open your DX...

Locate the Sound Chip
to be removed...



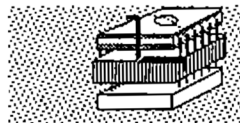
Using a small screwdriver
or Chip Extractor, **CAREFULLY**
lift the chip out of its socket,
from both sides.



Line up the new chip, making
sure that the notch on the chip
faces the same way as the
notch on the socket.



Press the chip firmly into
the socket. Check to make
sure that all of the pins have
mated correctly.



For easier chip changing, install
Zero Insertion Force ("ZIF")
sockets in your machine.

SOPHISTICATION

The DX incorporates several functions that change the time and feel of the machine, and enable programming one beat at a time. Utilizing them will increase your rhythmic possibilities and make programming faster and easier.

QUANTIZE

Quantizing automatically corrects your playing to the nearest beat. The quantizing value also establishes the smallest beat that can be recorded, and is used for establishing the value of a "Beat" as used in STEP and SWING.

The DX is normally set to quantize to a sixteenth note. To change the quantizing, press QUANTIZE. The display will show the value of quantizing currently set. You can now enter the note value that the DX will round off to by using the arrows to increase or decrease the number in the display.

Quantize is a record function. That is, it only corrects what you are recording. This enables you to record over and over on the same sequence in different quantize modes. Quantizing is also independent of the metronome. It is possible to quantize to the nearest quarter note, even though the metronome is clicking in sixteenth notes.

The Quantize value can be changed while in Record or Play as well.

QUANTIZE evens out your playing:

Quant = 1/16	1 . . . 2 . . . 3 . . . 4 . . .
As Played...	
QUANTIZED...	

SWING

Swing is similar to Quantize in that it corrects the timing of your recordings. However, Swing will alter the time so that the first half of the beat gets more than half of the time, creating a "shuffle" feel.

Press SWING. The display will show the current swing value which is normally set to 50% (the first half of the beat gets 50% of the time). To change the swing value, press the arrows to increase or decrease the percentage. Swing is a Record function. That is, it will record your playing corrected to the swing value you have selected.













You can apply the Swing function while Quantizing to any value from 1-2 to 1-48. If Quantize is set to 1-64, 1-96, or OFF, the DX will "beep" and the QUANTIZE button will light.

SWING jazzes up your playing:

Swing=70% Quant=1/16	1 . . . 2 . . . 3 . . . 4 . . .
Straight...	
with SWING...	

METRONOME

Quantize / Metronome Values

1- 2		Half Note
1- 3		Half Note Triplet
1- 4		Quarter Note
1- 6		Quarter Note Triplet
1- 8		Eighth Note
1- 12		Eighth Note Triplet
1- 16		Sixteenth Note
1- 24		Sixteenth Note Triplet
1- 32		Thirty-Second Note Triplet
1- 48		Thirty-Second Note Triplet
1- 64		Sixty-Fourth Note
1- 96		Sixty-Fourth Note Triplet
0 FF		1/192 High Resolution

The Metronome can be set to click in any note value between half-notes and one-hundred-ninety-second-notes (48 clicks per 1/4 note). The Metronome defaults to eighth notes and varies in speed according to the tempo. A dot representing the Metronome pulse also appears on the display.

To change the Metronome, press SIGNATURE. The current Metronome click value will appear on the display. The click value can be set to any standard note value by using the arrows buttons to increase or decrease the number in the display.

After you have set the desired click value, you may exit by pressing STOP; or you may continue to the time signature by pressing SIGNATURE once more. (See Signature.)

The Click Value can be changed in STOP, PLAY, or RECORD, in Sequence or Song modes.

The Metronome is heard through the mixed outputs of the DX while in Record. The click is accented on each downbeat. The Metronome also appears at the CLICK OUT jack on the rear panel in Record and Play and can be routed through an external mixer. The output of the CLICK OUT jack is not accented and has been designed to be used as a clock source for other devices, such as arpeggiators.

The DX can be set to countdown four metronome clicks before recording. See EDIT PARAMETER 00.

The Metronome can also be programmed to click only when a drum or combination of drums is played. This is useful for clocking other devices, such as the arpeggiator on the OB-8, in uneven patterns. See Programmable Metronome Click in the GOODIES section.

SIGNATURE

The SIGNATURE button is used to change the time signature.

The DX can be set to play in most any time signature. There can be between 1 and 99 beats per measure, and between a half note and 1/192 note can receive one beat.

Press SIGNATURE. The current Metronome value will appear on the display. (see METRONOME, above).

Press SIGNATURE once more. Now the current time signature will appear on the display, and the beats per measure will flash. You can use the arrows to increase or decrease the beats per measure or you can enter the desired value with the keypad.

Press SIGNATURE again, and the beat value will now flash. You can use the arrow buttons to increase or decrease the beat value to any common increment.

■ **NOTE:** Changing the time signature of a programmed sequence causes the length of the sequence to be redefined in terms of the new time signature. For example if a sequence of 3 bars of 4/4 (12 quarter notes) is changed to be 3/4, the length will be recalculated to become 4 bars of 3/4 (12 quarter notes). Changing the time signature can also create sequences that are longer than 99 bars.

STEP RECORDING

STEP enables Recording a Sequence one step at a time. STEP advances at a rate determined by the Quantize Value. Normally the Quantize Value is set to a sixteenth note, but this can be changed—see QUANTIZE. From stop, pressing STEP places you at the beginning of the sequence. To program a drum on a particular step, press the desired drum button while that step is displayed. Every time any drum button or *either* arrow button is pressed, the sequence *advances* one step. To record several drums on one step, hold the RECORD key while pressing the desired drum buttons — this keeps the DX from advancing to the next step. To exit step mode, press STEP once again. If you press STEP while in PLAY or RECORD, the sequence will step from its present location and go back to play or record when STEP is pressed again.

Recording in STEP Mode:

Enter STEP Mode and Play STEP 1:
STEP Display 1 1

Advance to STEP 2:
1 2

Hi-Hat on STEP 2:
Advance to STEP 3:
ACCENT (Hi-Hat) 1 3

Advance to STEP 4:
1 4

Bass Drum on STEP 4:
RECORD LOUD (Bass) 1 4

Hi-Hat on STEP 4:
Advance to STEP 5:
ACCENT (Hi-Hat) 1 5

While in STEP, you can erase any of the drums one step at a time. Holding ERASE and pressing the desired drum erases only that drum on that step. Holding down either arrow key will slowly play through the sequence.

■ **NOTE:** If STEP is entered from Play, recording or erasing will not be possible. The Record key will light if recording is attempted.

► **REMEMBER:** The DX will not RECORD if the MEMORY PROTECT switch on the rear panel is ON.

Erasing an Individual Note, in STEP:

Advance to the desired Step:
1 4

Erase Bass Drum:
ERASE + RECORD LOUD (Bass) 1 4

RECORDING**Countdown**

The DX can be set to countdown four metronome clicks before recording. EDIT PARAMETER 00 turns the countdown on and off. Remember that the metric value of the countdown clicks is determined by the Metronome setting. See "Metronome" & "EDIT PARAMETER 00:"

Punch-Out / Punch-In

Holding RECORD and pressing PLAY while recording a sequence "Punches Out" into Play mode. Once you have punched out of a sequence, if you have not changed sequences, you can "Punch In" by again holding RECORD and pressing PLAY. You can punch in any time, but the DX will not start Recording until the beginning of the sequence.

You cannot punch in from Play without having been in Record first.

Flams

While recording, flams ("grace notes") can be added whenever desired by holding the RECORD key while pressing the desired drum button. A second note is recorded right after the played note. This Flam feature is only active while the Quantizing is set to 1-64, 1-96, or OFF.

ERASING**Erasing Individual Notes While In Record**

You can erase individual notes "on-the-fly."

While in RECORD: holding ERASE and any drum button will remove all notes programmed with that button that occur *while they are held down*. Notes will continue to be erased until the button is released. Holding ERASE and RECORD will erase notes played on *all* drums while they are held down.

It is also possible to erase individual notes while in the STEP mode (see "STEP RECORDING").

Deleting A Sequence

In Stop, holding ERASE while pressing RECORD *once* erases all notes from the sequence, but retains length, tempo, and time signature information. At this point you may re-program the sequence, or use this feature to program blank spaces into songs. *Erasing the sequence a second time re-sets the sequence to the standard default condition of 2 bars, 80 beats per minute, 4/4 time signature.* The display will verify that this has happened by reading: "dEL ." and will completely remove the sequence from memory.

Erasing Everything

To erase the entire memory of the DX, hold ERASE and press both < > buttons. The display will show the message "CLr?," and the ERASE light will be on. Press the ERASE button and the DX will "beep" and flash all of the lights. This will clear memory, but will have no effect on the EDIT PARAMETERS.

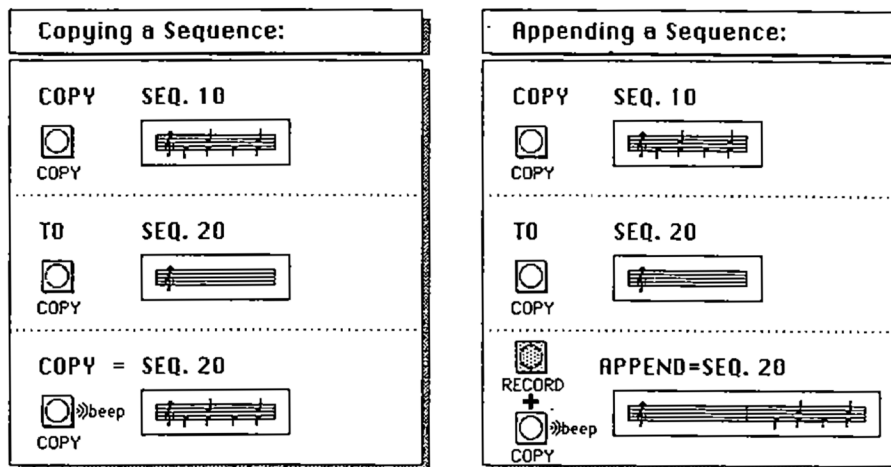
COPYING

Copying Sequences

The DX can copy a rhythm from one sequence to another. This is useful to make changes in a rhythm without erasing the original or starting over from scratch.

Press COPY. The display shows the sequence to be copied from (on the left.) Select the desired Sequence number. Press COPY again and the display will show the destination Sequence. Select the desired Sequence number. Press COPY a third time and the Copy will execute.

► **REMEMBER:** The DX will not copy if the MEMORY PROTECT switch on the rear panel is ON.



Appending Sequences

Appending a sequence is similar to copying them except that while *COPY REPLACES* the old sequence with the new one, *APPEND ADDS* the new sequence to the end of the old one. The process is the same as copying a sequence, but hold RECORD while pressing COPY the third time to execute.

Appending sequences is useful when the same set of rhythms is to be played over and over, for example in a composition having 3 bars of 4/4 followed by 1 bar of 7/8 as a basic phrase element. By making a sequence of 3 bars of 4/4, another of 1 bar of 7/8, and then appending the 7/8 onto the end of the 4/4, you have quickly created your basic phase element, which can then be repeated over and over, and combined with other sequences as part of a song.

It is possible to append a sequence to itself. This effectively doubles the length of the sequence. It is also possible to append sequences, one after another, to one sequence. Appended sequences can be of any time signature or length; however, the tempo and signature of the first part of the sequence will be applied to the rest of the sequence as well. If sequences of different time signatures are appended together, the length may not equal an exact number of measures and this will be reflected by a "P" (for Plus) in the length of the sequence. For example, appending a 7/8 sequence to a 4/4 sequence (each of 1 bar length) will cause the display to read:

"1 P"

because the length of the new sequence is not quite 2 bars of 4/4.

Copying And Appending Songs

Just as one can copy or append a rhythm from one sequence to another, a song list can be copied or appended from one Song to another.

The procedure is the same as copying or appending sequences *except* that it must be done from Song Mode.

► **REMEMBER:** The DX will not copy or append if the MEMORY PROTECT switch on the rear panel is ON.

OTHER TRICKS**Programmable Metronome Click**

The Metronome can also be programmed to click only when a drum or combination of drums is played. This is useful for clocking other devices, such as the arpeggiator on the OB-8, in uneven patterns.

Select EDIT PARAMETER 04 by pressing EDIT, then 04 (See the EDIT PARAMETER section for more information.) While in EDIT PARAMETER 04, holding down any combination of drums first, then pressing RECORD, will cause a Click output in play whenever that combination of drums occurs. The normal steady metronome click will still be given in record mode. The click can be set to normal by hitting RECORD while holding ERASE.

A drum button can be used to program the click without sounding by turning off that drum (see SET DRUM OUTS and EDIT PARAMETER 05.)

Turning Individual Drums On & Off

Individual drum buttons can be "muted" from the "SET DRUM OUTS" page of the EDIT PARAMETERS. A drum can still be recorded and erased even though it is turned off; only the audio output is disabled. It will transmit MIDI as well. Access EDIT PARAMETER 05 by pressing EDIT and then 05. While in EDIT PARAMETER 05, hitting a drum button while holding RECORD enables the output for that drum. Hitting a drum button while holding ERASE disables that drum. Hitting RECORD while holding ERASE enables all drums.

Cue Tempo Mode

In Stop, pressing TEMPO while holding RECORD enters Cue Tempo mode: Tempo may be set by pressing the STEP button or playing the external trigger in quarter notes at the desired speed. The tempo will be set to match that rate.

Song Tempo

Each sequence within a song will play at its programmed tempo, allowing tempo changes within a song. When in song mode, changing the tempo changes all of the tempos by a proportional amount, and the display will show the incremental change i.e., "10" or "- 10"

HOUSEKEEPING**Free Memory Display**

To check the amount of available memory, hold the RECORD button while in Stop (Sequence or Song Mode). After a moment, the display will show the percentage of memory left. The percentage of memory available at a given time varies depending on the length of the current sequence.

The DX has the capacity to store 2200 events. An event is any time that any or all the DX voices are playing. If all six voices are playing on every event, that adds up to 13,200 notes that can be stored. There are many ways this capacity can be divided amongst sequences. In general, it is best to take advantage of the repetitive nature of music by constructing songs from short sequences.

Each part of a song requires one-third as much memory as a single event in a sequence! A song consisting of one bar repeated eight times uses less than one fifth the memory of an eight bar sequence. Therefore, the most efficient use of memory is achieved by using the SONG mode whenever possible.

Data Check

One of the features of the DX is a data check routine that runs automatically when the unit is turned on and when leaving the Data Storage mode. The data check routine looks at each sequence and song to make sure that it is properly configured in memory.

Bad Sequences can appear in the DX's memory several ways, by loading a cassette tape with more than 2200 notes from a DMX into a DX, for example. If there is illegal information in a sequence, the Data Check routine will alternately flash the Sequence Number followed by "dEL?" and the ERASE key will light. If a bad Song is discovered, the Song key will light up as well. Press ERASE to delete the bad Sequence. If any other key is pressed the sequence in question will not be deleted, and it will look for more bad Sequences.

After checking all of the sequences and songs the DX will return to normal operation. However, if any bad sequences or songs remain in the memory (ones that you declined to delete), the display will flash "bAd" and the unit will "beep."

■ **Note:** Be careful when working with bad sequences (ones that you didn't delete). In particular, any attempt to alter a bad sequence by Recording, Erasing, etc. will almost always cause the DX to crash. See "If Your DX Gets Lost"

Ram Check

Besides the above mentioned Data Check routine, a Ram Check routine is run when the DX is turned on. This routine checks for random data in the memory. Random data of this type can result from a loss of power to the memory, for example. If the data in the memory is bad, the DX will "beep" and display "bAd," followed by a "CLr?" message while the ERASE key lights up. Pressing the ERASE key erases everything in memory and resets the Edit Parameters to their default values.

If Your DX Gets Lost

Under certain circumstances many computer based products can lock up. In particular, if the message "Err" appears unexpectedly, the DX has gotten lost. In this instance clearing memory will solve the lock up problem, but you will lose all your work too! If this condition ever happens, we *STRONGLY ADVISE* recording your memory on a cassette. Immediately enable cassette mode on the back panel and follow the directions in the CASSETTE INTERFACE section of this manual. When your memory is safely on cassette, proceed as follows: Press any key and the DX will attempt to proceed. It will usually succeed, but will occasionally lock up once again. If it locks up again, even turning the power off and then on again may not help.

When All Else Fails

If your DX does not respond to the above methods of resuscitation, turn the power off. Then while holding the ERASE key, turn the power on again. This Failsafe Erase Mode will clear memory and reset the Edit Parameters to their default values.

EDIT PARAMETERS

Many aspects of the DX can be customized by the user with a series of switches called EDIT PARAMETERS. These EDIT PARAMETERS can be accessed by pressing the EDIT button at any time except while in SELECT SONG mode where the EDIT key is used to edit songs. Use the < > keys to select the desired parameter or type in the number of the parameter to be changed. The STEP key is used to change parameters from ON ("On") to OFF ("—") and vice-versa.

There are 15 EDIT PARAMETERS, numbered 00-14:

00 COUNTDOWN (—, On)

Enables or disables a countdown in before recording. The countdown is 4 metronome clicks. The beat value of the clicks is set by the METRONOME function.

01 TIMING SOURCE (I, 24, 48, 96, S, d)

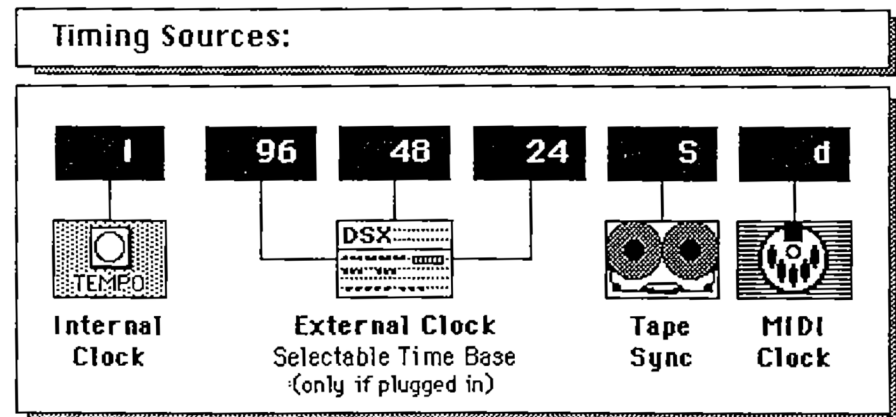
This selects the timing control source for the DX.

I Internal Clock / The internal clock is used when the DX is used by itself, or as the master clock source.

24, 48, 96 External Clock / Set the timing source to external clock when slaving the DX to another clocking source such as another Oberheim Drum Machine or Sequencer. The numbers select the rate of the external clock (pulses per quarter note); set this to 96 for Oberheim equipment. These external clock settings will not appear unless a jack is plugged into the CLOCK IN jack. For more information, see the INTERFACE GUIDE.

S Tape Sync / Set the timing source to tape sync when slaving the DX to its tape sync tone.

d MIDI / When using MIDI CLOCK to clock the DX, set the timing source to "d."



■ **NOTE:** If AUTO START is on, pressing PLAY while stopped will run the DX from the internal Clock, regardless of the clock source setting. This makes it easy to switch back and forth from internal to external timing.

02 AUTO START (—,On)

When this feature is on, external Timing Sources (EXTERNAL CLOCK, TAPE SYNC, or MIDI) will cause the DX to enter play mode automatically. Because the DX is always looking for a clock signal in this mode, any signal (even noise) that is present at the CLOCK IN or FROM TAPE jacks will place the DX into Play. This may cause occasional false starts. However, the DX will not false start once the leader tone is detected at the FROM TAPE input. When Auto Start is off, the DX will not detect external signals until you press PLAY. You can only Auto Start from Select Sequence or Select Song modes.

If AUTO START is on, pressing PLAY while stopped will run the DX from the Internal Clock. This makes it easy to switch back and forth from internal to external timing.

03 CLOCK OUT RATE (24, 48, 96)

This parameter sets the rate of the EXTERNAL CLOCK OUTPUT, used for slaving other equipment to the DX, such as other Oberheim Drum Machines or Sequencers. The numbers select the rate of the external clock (pulses per quarter note); set this to 96 for Oberheim equipment.

■ **NOTE:** The Clock Out Rate cannot be faster than the Clock In Rate. For example, if the Timing Source is set to MIDI (which uses a clock rate of 24 pulses per quarter note), the Clock Out Rate cannot be faster than 24.

04 SET PROGRAMMABLE CLICK

The Metronome Click can be set to click when one or several particular drum buttons are pressed. This allows the click to be used as a programmable trigger output. Holding down any combination of drums first, *then pressing RECORD* will cause a Click output in play only when that combination of drums occurs together. The normal steady metronome click will still be given in record mode. The Click can be set to normal (steady) by hitting RECORD *while holding ERASE*.

05 SET DRUM OUTS

"DRUM OUTS" act like mutes for the sound of each button. Hitting a drum button while holding RECORD enables the output for that drum. Hitting a drum button while holding ERASE disables that drum. Hitting RECORD while holding ERASE *enables* all drums. *Note that these drums can still be recorded and erased; only the audio is disabled.*

06 SET TRIGGER IN

The External Trigger Input on the rear panel can be set to play any of the drum buttons or a combination of buttons. To set which ones are to be triggered, select this parameter and hold the desired drum button or buttons, *then trigger* the input. The drums will play and the DX will "beep." To remove the trigger setting, hold ERASE and then trigger the input. For more information, see "EXTERNAL TRIGGER."

MIDI EDIT PARAMETERS

(also see "ABOUT MIDI")

07 RECEIVE CHANNEL (1-16)

This sets the MIDI Channel that the DX receives on. If OMNI MODE (Parameter 09) is on, the DX will receive on ALL channels.

08 TRANSMIT CHANNEL (1-16)

This sets the MIDI Channel that the DX sends MIDI information on.

09 OMNI MODE (—,On)

When OMNI MODE is on, the DX will receive MIDI information on ALL 16 channels. When off, the DX will only receive information on the RECEIVE CHANNEL, set on EDIT PARAMETER 07. This OMNI MODE command is also received and transmitted via MIDI, on the RECEIVE and TRANSMIT channels set above.

10 MIDI CLOCK OUT (—,On)

This turns on the MIDI timing clock, for slaving other Sequencers and Drum Machines via MIDI. See the INTERFACE GUIDE for more information.

11 ECHO NOTES (—,On)

If on, any notes that appear at the MIDI IN will be retransmitted to the MIDI OUT. The Song Select message will be echoed as well.

12 SONG CHANGES (—,On)

This enables the Song Select MIDI command. When on, Song numbers are transmitted and received by the DX. This way, the master MIDI controller can select a particular Song to be played by slaved machines. Song Select does not transmit or receive Sequence numbers, and will only select Songs when in Stop.

13 SET DRUMS TO MIDI NOTES

On MIDI drum machines, the drum buttons are transmitted as MIDI notes. This function allows you to set a MIDI note to particular drum button. Playing a note into the MIDI IN while holding a drum button sets the note to that drum. Playing a note into the MIDI IN while holding ERASE sets the note not to play any drums. A drum can be programmed to several notes, but a note can only be programmed to one drum. These MIDI notes must be within a 32 note range.

Pressing RECORD and COPY resets the notes to default settings (see the diagram in the "INTERFACE/MIDI NOTES" section). Pressing RECORD and ERASE clears all settings.

14 SET TRANSPOSITION

The range of the MIDI notes can be set with this edit parameter. Hold RECORD and press the note desired to be the bottom of the range. The MIDI note number will appear in the display.

See the "INTERFACE/MIDI NOTES" section for more information.

■ **NOTE:** The phrase "any combination of drums" means any combination of up to 6 drums with a limit of one drum per voice. Thus pressing LOUD BASS and SOFT BASS has the same effect as only pressing LOUD BASS (on all columns of drum buttons, the lowest button has priority).

The DX Data Storage feature permits off-line backup storage of all of your rhythm programs.

Making backups of your work is something that you should do frequently, with all your machines. You'll find that keeping copies of your programs will help speed up your work and eliminate duplication of effort.

"What was that rhythm I had before?" No matter, if you've got it stored. You can load it back into your DX (or anyone else's for that matter) and get on with it.

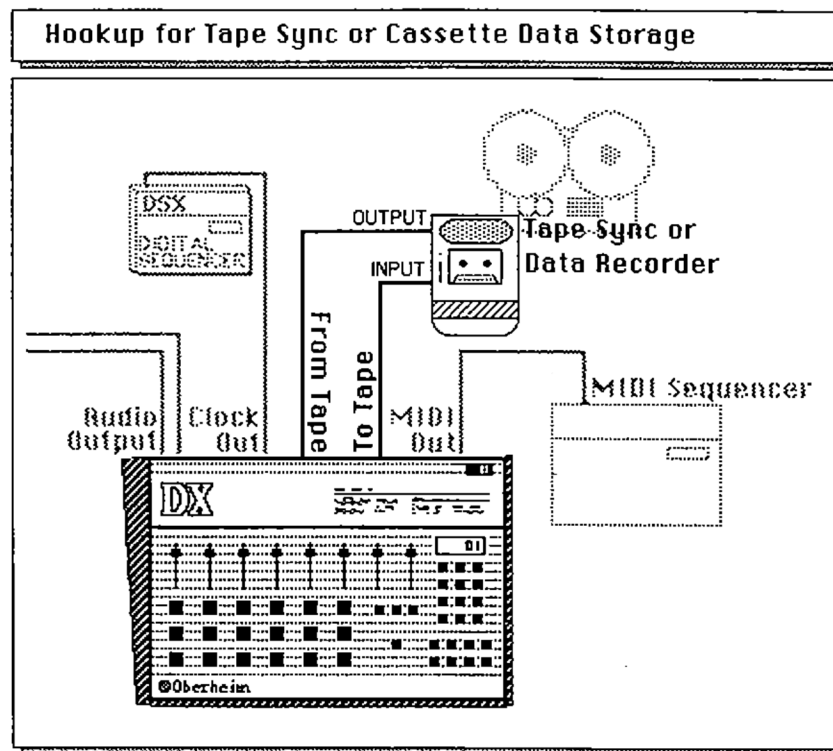
The DX can store its memory in two ways: via the TAPE jacks onto Cassette, or via MIDI to another DX or other MIDI device.

TAPE INTERFACE

The DX's Cassette Interface allows programs to be stored externally on an audio cassette. The tape recorder should have a Line or Aux Input if possible; either Line Level or Speaker Level (Earphone) outputs.

Connection

Connect the Speaker or Line Output of your cassette recorder to the jack labeled "FROM TAPE" on the rear of the DX. Connect the "TO TAPE" jack on the rear panel of the DX to the Line or Aux input of your cassette recorder. Connect both cables so that you can monitor the tape through the DX.



► **IMPORTANT:** Disconnect your cassette recorder when not using the Cassette Interface to prevent random noise from triggering the DX.

Access

Enable the Cassette Interface by turning on the DATA STORAGE switch on the rear panel. The display will now read "CASS:"

Save It

Press the RECORD switch on the tape recorder. You should now hear a steady tone through the MIXED OUTPUTS of the DX. The volume of the tone is controlled by the Metronome control.

Press the CASSETTE SAVE button on the DX. After the SAVE button is pressed, seven seconds of the steady "leader" tone will be sent out followed by the actual memory information. The SAVE button will be lit during the leader tone and then flash as each sequence is transferred. After all of the memory information has been transferred, the SAVE button light will go out, the DX will "beep," and the display will read "CASS" once again.

It is very important to CHECK a tape after recording. See "Check To Be Sure," below.

Check To Be Sure

The CHECK function of the Cassette Interface checks a tape for valid data without actually transferring the data into the DX's memory. A tape should always be checked after recording.

Press the PLAY switch on the tape recorder. You will now be able to monitor the tape through the MIXED OUTPUTS of the DX.

As soon as the "leader" tone is heard, press the CASSETTE CHECK button on the DX. At least three seconds of the "leader" tone must come between pressing CHECK and the rough sound of the memory information. When the leader tone is detected, the CHECK light will go out, and then will flash as each sequence is loaded. When the data has finished, the DX will "beep" and "CASS" will reappear on the display.

If an error is detected, the DX will "beep" and the display will read "Err." See "ERRORS," below.

■ **NOTE:** Once the leader tone has started the cassette interface must complete its cycle. The only way to stop it is to turn the DX off and then on again.

Load In

Press the PLAY switch on the tape recorder. You will now be able to monitor the tape through the MIXED OUTPUTS of the DX.

As soon as the "leader" tone is heard, press the LOAD ALL button on the DX. At least three seconds of the "leader" tone must come between pressing LOAD ALL and the rough sound of the memory information. When the leader tone is detected, the LOAD ALL light will go out, and then will flash as each sequence is loaded. When the data has finished, the DX will "beep" and "CASS" will reappear on the display.

If an error is detected, the DX will "beep" and the display will read "Err." See "ERRORS," below.

► **REMEMBER:** The DX will not LOAD if the MEMORY PROTECT switch on the rear panel is ON.

One At A Time

The cassette format of the DX codes the location of each Sequence and Song, which allows an individual sequence or Song to be loaded from a tape. The cassette interface does not write an individual sequence onto the tape, but can read a single sequence from the entire cassette.

Loading a single Sequence or Song is the same as loading all of the data except that you press LOAD ONE. The left side of the display will show the sequence to be loaded from tape. Use the keypad to enter the desired Sequence number. To load from a Song, press the SONG button and then enter the desired Song number. Then press LOAD ONE again. The right side of the display will now show the destination for the tape sequence. Use the keypad to enter the desired Sequence number. Press LOAD ONE again, and the display will go dark and the DX will wait for tape data.

► **REMEMBER:** Loading a Song loads only the list of sequences contained within the Song, not the actual sequence data.

Compatibility

The DX can read tapes recorded on other Oberheim drum machines. See the accompanying chart for compatibility.

When reading a tape from a Rev.3 DMX, only Sequences 0-99 and Songs 0-49 will be read in. In addition, only the first 2200 notes of the 5000 note DMX memory will be read in. If the DX's memory capacity is exceeded, the DX will "beep" and the display will read "FULL!"

Individual Sequences and Songs can only be read from Revision 3 tapes, produced by Rev.3 DMXs and MIDI DXs. However, reading in an older cassette and then recording it back onto tape will change the format to allow an individual Sequence or Song to be read.

Drum Machine Tape Compatibility

Tape From:	Loads To:		DMX	
	DX		Rev.3 5000 Notes	Rev.2 2000 Notes
DX w/MIDI	YES ¹	NO	YES ¹	NO
DX wo/MIDI	YES	YES	YES	YES
DMX Rev.3	YES ^{1,2,3}	NO	YES ¹	NO
DMX Rev.2	YES ²	YES ²	YES	YES

Notes:

- ¹ Individual Sequences and Songs can be loaded from tape.
- ² The DX ignores the DMX drums TOM2 and PERC1.
- ³ Only DMX Sequences 0-99 and Songs 0-49 will be loaded, subject to available memory space. If the DX's memory capability is exceeded, the display will read "FULL" and the DX will "beep".

Errors

If the DX cannot read the tape properly, the display will read "Err;" for ERRor in data. If this happens, one of the following might be responsible:

Tape playback volume. Getting the DX to read the data properly and reliably generally is a function of the proper playback level. The best level should be as loud as possible without distortion. Some trial and error is probably necessary, however. Some users find that the cassette interface reads the data the best when the playback level is turned all the way up. The data *can* be distorted to a certain extent and still playback properly. If the playback volume is too low, or if the tape recorder is connected incorrectly, the DX will not acknowledge the data at all.

The leader tone is too short. At least three seconds of the "leader" tone should come between pressing PLAY and the rough sound of the memory information. Generally, if the leader tone is too short, the DX will immediately read "Err."

The tone control may be set improperly. It is important that the tone control(s) be set so that the high frequencies are not attenuated. Some trial and error is involved here too.

Many cassette recorders invert the phase of the signal in the process of recording and playing back. If tapes made on your cassette recorder NEVER check properly and result in the "Err" message, inverted phase may be the problem. To set the DX to read inverted data, press the 0 button before pressing PLAY or LOAD. The display will read "-CAS;" indicating that the DX is expecting inverted data.

The Batteries in the cassette machine are too weak.

The **playback head azimuth** of the tape recorder may be out of alignment. This will only affect recordings made on other tape recorders. A minor head adjustment may be required.

There is a **bad spot** (dropout) on the tape.

The **tape heads are dirty**. Clean and degauss the tape heads, and clean the tape capstan and pinch roller.

Sometimes tape errors are caused by poor recordings. Use a LINE or AUX input if available. MIC inputs seem to work better if the DX "TO INPUT" signal is attenuated approximately 10-20db before recording. Many consumer electronics companies sell cables with built-in attenuators.

Hints

The cassette interface can be very frustrating at first. Some trial and error is usually required to get the cassette interface to read data reliably with a particular tape deck. But once you get your recorder to work, the interface is very reliable. Experiment with the recording or playback levels, tone controls, and types of tape. Some users like to use computer grade cassettes because of their lack of dropouts. Others prefer high bias (CRO2) tapes because of their extra high frequency response. Once you have arrived at the proper settings for the controls, you may want to mark them to ease future use.

The DX is designed to work with data recorders and professional walkman-type recorders as well as standard home cassette decks.

One cassette recorder that is used at Oberheim is the Superscope C-200 LP. This recorder seems to work well and does not invert the cassette data.

MIDI DATA TRANSFER

The DX can also transfer its memory via MIDI. This is especially useful for sending data from one DX to another, or to a MIDI storage device.

Connection

The only connection required is a MIDI cable from the MIDI OUT of the source unit to the MIDI IN of the destination unit.

Access

Enable DATA STORAGE with the switch on the rear panel. The display will read "CASS." Both source and destination units must be in Data Storage Mode to transfer data.

► **REMEMBER:** The DX will not receive a data transfer if its MEMORY PROTECT switch on the rear panel is ON.

Sending All Sequences

To send all of the sequences, press MIDI SEND ALL. The ALL button will light during the data transfer. If a DX is used as the destination unit, its ALL button will light as well. When the data has finished the light will go out and the display will once again read "CASS."

Sending One Sequence Or Song

To send a single Sequence or Song, press MIDI SEND ONE. The left side of the display will show the sequence to be transferred from the DX. Select the desired sequence (or Song, by pressing the Song button), then press ONE again. The right side of the display will show the location that the sequence will be transferred to. Select the desired destination, then press ONE again. The ONE light will be on while the data transfer is taking place (short time). The light then will go out and the display will again read "CASS."

BATTERY BACKUP

The DX contains a lithium battery that maintains power to the memory even when the DX is unplugged. This way you can turn off the power and not lose your sequences.

With normal use, battery should last 5 years before needing replacement. However, you should always save important sequences via Cassette or MIDI, using the Data Storage function of the DX.

TALK TO THE WORLD

The DX can be connected to most other electronic musical instruments, as well as computers and tape recorders. The DX can operate in sync with other equipment by interconnecting timing signals, and notes can be exchanged via MIDI or trigger pulses.

The DX is designed to operate synchronously with a variety of other devices. The DX can start automatically from these devices as well as slave to its own tape sync pulse while driving other devices.

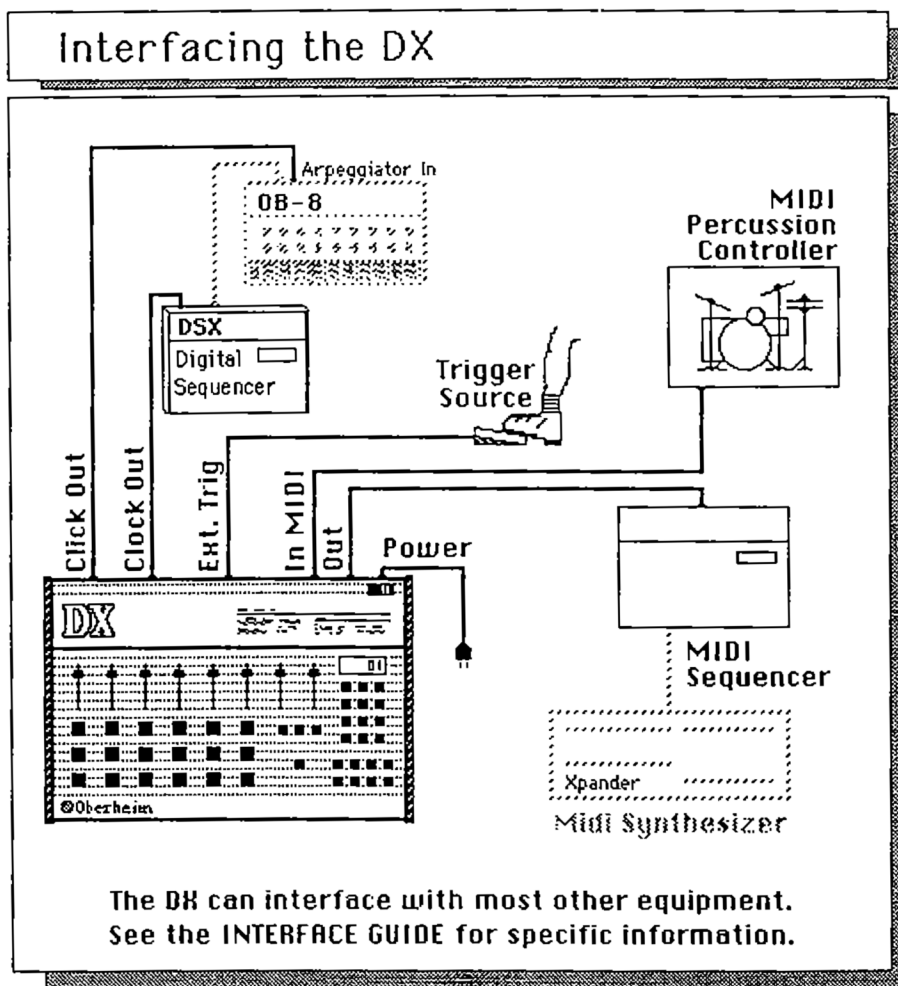
The DX sounds can be played from other sources, such as trigger pulses and MIDI notes. Notes played on another MIDI drum machine can actually be recorded on the DX.

Using The DX With Oberheim Sequencers and Drum Machines

The DX, DSX Polyphonic Sequencer, and DMX Drum Machine have been designed to operate in sync with each other. When the DX runs in tandem with a DSX or another drum machine, one unit must be the master and the others, slaves.

Other Sequencers and Drum Machines

There are a variety of ways that the DX can be connected to other equipment. Consult the INTERFACE GUIDE as well as the manual for your other equipment for the optimum hookup for your application.



SYNCHRONIZING WITH THE EXTERNAL CLOCK

The External Clock generally provides the "tightest" sync between machines and is the recommended timing source if you have a choice of hookups. The DX can be set to three different clock rates: 96, 48, or 24 Pulses per Quarter note. Most equipment uses one of these standards. The external clock can be used for timing at the same time that MIDI is used for notes.

Setup

For best results, turn off both units before connecting. Using a cable with a 1/4" phone plug at each end, connect the CLOCK OUT jack on the rear panel of the unit to be the master to the CLOCK IN jack on the rear panel of the unit to be the slave.

The DX can be interfaced with other Oberheim components using the tape jacks instead of the clock jacks. Try this hookup if you experience excessive noise.

DX As Master

Set EDIT PARAMETER 01 (TIMING SOURCE) to "I" for Internal Clock. Set EDIT PARAMETER 03 (CLOCK OUT RATE) to "96;" to transmit the Oberheim System Clock standard of 96 pulses per quarter note; or the appropriate setting for equipment that needs a different clock rate.

DX As Slave

Set EDIT PARAMETER 01 (TIMING SOURCE) to "96;" to respond to the Oberheim System Clock standard of 96 pulses per quarter note; or the appropriate setting for equipment that needs a different clock rate. For AUTO START operation, set EDIT PARAMETER 02 to "On."

Operation

Each unit will operate the same as before with the following exceptions:

The TEMPO is controlled by the master. Increasing the tempo on the master will increase the tempo on slave as well. The DX and DSX/DMX have the same TEMPO programming. Recordings may be made separately and synchronized later.

Auto Start

If a slaved DX has its Auto Start function turned on, it will recognize incoming clock pulses and automatically enter the PLAY mode whenever clock pulses start. If it does not see any pulses for 125 milliseconds (1/8 second), it will automatically STOP. These features allow the DX to be remotely started and stopped by the external clock pulse.

Note that pressing STOP will not stop the DX if clock pulses continue; the DX will recognize the continuing clock pulses and jump back into PLAY after the STOP button is released. To stop the slave DX, it is necessary to stop the master.

If Auto Start is turned off, PLAY or RECORD must be pressed on the slave unit before starting the master.

Recording as Master

Press RECORD and PLAY as before. The slave units will start as soon as the master DX starts recording.

Recording as Slave

Follow this procedure: Turn AUTO-START OFF (Edit Parameter 02); Place the DX into Record by pressing RECORD and PLAY; Then start the master clock source.

SYNCHRONIZING WITH THE MIDI CLOCK

Utilizing the MIDI Timing Clock provides an easy method of interconnecting MIDI devices.

Setup

For best results, turn off both units before connecting. Using a standard MIDI cable, connect the MIDI OUT jack on the rear panel of the unit to be the master to the MIDI IN jack on the rear panel of the unit to be the slave.

DX As Master

To use the DX as the master, set EDIT PARAMETER 02 to "I" for Internal Clock, and turn "ON" EDIT PARAMETER 10 (MIDI Clock Out).

DX As Slave

To slave the DX to another MIDI timing source, set EDIT PARAMETER 02 (Timing Source) to "d" for MIdI. For AUTO START operation, set EDIT PARAMETER 02 to "On."

Auto Start

If a slaved DX has its Auto Start function turned on, it will automatically enter the PLAY mode whenever a MIDI Start Command is recognized. The DX will stop when a MIDI Stop Command is received or the STOP button pressed, even if MIDI timing pulses continue.

If Auto Start is turned off, PLAY or RECORD must be pressed on the slave unit before starting the master.

Song Select

Turning on SONG CHANGES (EDIT PARAMETER 12) enables remote selection of Songs (not Sequences) via MIDI. The DX transmits and receives Songs 00-49.

Recording as Master

Press RECORD and PLAY as before. The slave units will start as soon as the master DX starts recording.

Recording as Slave

Follow this procedure: Turn AUTO-START OFF (Edit Parameter 02); Place the DX into Record by pressing RECORD and PLAY; Then start the master clock source.

METRONOME AS CLOCK SOURCE

The DX has also been designed to slave sequencers and arpeggiators, using the metronome output. The CLICK OUT outputs the metronome at all times for this reason. The Tempo as well as the Click Value of the Metronome will control the rate of the metronome pulses. The Metronome output is + 12 Volts DC, 900 milliseconds duration.

The Metronome can be set to click in a programmable rhythm instead of a steady click. See EDIT PARAMETER 04 (SET PROGRAMMABLE CLICK).

SYNCHRONIZING TO TAPE

You can record a sync tone from the DX onto tape, and then use the sync tone on tape to control the DX. Sync to Tape is achieved by recording a sync tone from the TO TAPE jack on the Rear Panel on to a track of a tape recorder, and then playing it back to the FROM TAPE jack.

Recording The Sync Tone Onto Tape

When monitoring your tape recorder, you should hear a steady tone which is the Leader Tone. Record the leader tone at a level of between - 5db and 0 db. Some experimentation will give the best results for your particular setup. After recording 5 to 10 seconds of leader tone, press PLAY on the DX at the point you wish the sequence to start. The leader tone will give way to a chattering sound much like the sound of the cassette data. This is the timing data. When the DX stops playing the leader tone will return.

The DX will output the timing data only while in RECORD or PLAY. In STOP or other modes, the output will be the leader tone. Make sure the tempo that is set on the DX is the proper tempo, because the tempo will be controlled by the sync tone when playing back. (Because the DX is reading timing information from the tape, the DX will follow changes in the tape speed within a range of about 20% up or down.)

Playing The Sync Tone To Sync The DX

Connect the LINE OUT of the tape recorder to the FROM TAPE jack of the DX.

Set the TIMING SOURCE to "S" for tape Sync (EDIT PARAMETER 01), and turn AUTO START "ON" (EDIT PARAMETER 02). Start the tape recorder. The DX recognize the sync tone, and will start when the timing data on the tape begins and will stop when the timing data ends.

If the DX does not respond to the sync tone or if it loses time, adjust the level of the sync tone from the tape recorder. Generally louder is better.

Note that pressing STOP on the DX will not stop it if timing data continues; the DX will recognize the continuing timing data and jump back into PLAY after the STOP button is released. To stop the DX, it is necessary to stop the tape.

► **IMPORTANT:** TO and FROM TAPE should be disconnected when using Timing Sources other than tape to avoid timing errors caused by noise.

Hints

A word of advice: Getting sync to tape to work properly will probably require a bit of trial and error. So don't get frustrated if it doesn't work perfectly the first time. Once you get it right, mark your settings so that it will work easily next time.

Record the Sync Tone First / Because syncing the DX or any other computer device to a previously recorded track (such as piano) is difficult, it is best to record the DX first, and then record the other tracks while listening to the DX. Once the sync tone is recorded, the drum machine can be reprogrammed and rerecorded at any time if desired.

A good way to achieve great drum parts is to first program a drum beat with the basic feel of the piece. Record this beat and the sync tone first. Then, after the other parts have been recorded while playing along to the basic beat, the drums can be reprogrammed to work with the recorded parts. Because the sync tone has been recorded first, the drum machine can be recorded last or several times during the recording sessions, and maintain perfect sync.

Check the Sync Tone / There is nothing worse than discovering that the sync tone doesn't sync after everything else has already been recorded. So, make sure that the DX reads the sync tone properly before recording anything else.

Set the Tape Recorder to Sync / Remember to use the Sync Playback setting if you have one (sometimes called sel-sync or simul-sync) when playing back on your tape recorder. This tape recorder feature allows playback of the tape from the record head which keeps the timing straight when overdubbing parts. Most three head multi-track tape recorders have this setting.

Tape Dropouts / Tape dropouts can be a problem when using sync to tape, especially on multi-track cassette recording systems. Use fresh, good quality tape for best results.

Crosstalk and Signal Bleed / The sync tone is definitely susceptible to crosstalk from adjacent tracks of a multi-track tape recorder. Depending on the recorder, blank adjacent tracks may be necessary to maintain sync. However, the use of noise reduction may eliminate the need for a blank adjacent track.

Bleedthrough of the sync tone to other tape tracks is also a problem, but a major cause of "bleeding sync tone" is the electronics between the drum machine and the tape. On many mixing consoles, routing the sync tone through any of the mix busses frequently causes the sync tone to bleed into *all* the busses. The best way is to patch the sync tone directly in and out of the tape recorder and keep it out of the board altogether. If more gain is needed for proper recording level, use a microphone input or an outboard amplifier to increase the gain. Other electronics, such as multi-channel noise reduction systems may also contribute to crosstalk.

Noise Reduction / Generally, sync to tape will work better without noise reduction. Noise reduction won't record the sync signal better, since the level of the sync tone doesn't change appreciably the way that music does. However, using noise reduction may reduce crosstalk between the sync signal and adjacent tracks. This is another one of those things to experiment with!

Recording Sync instead of the DX / Many musicians working with 4 and 8 track tape recorders don't record the drum machine on tape at all—they record only the sync track, and then use the sync tone to slave the drum machine when overdubbing other parts and during mixdown.

TRIGGERED NOTES

The DX has an external trigger jack which enables you to control any drum or any combination of drums from an external source, such as a footswitch or a GATE from a sequencer such as the Oberheim DSX.

The External Trigger Input acts essentially the same as pressing one of the drum buttons on the front panel. When in record, triggering any of the voices externally will cause them to be recorded subject to the same correction schemes (QUANTIZE and SWING) that would apply to the buttons on the front panel.

The Trigger Input is designed for a switch closure, or an inverted Moog S-Trig type trigger. To utilize an acoustic signal such as a live drum or Simmons type drum pad, it is necessary to utilize one of the trigger interface devices on the market.


Programming the Trigger Input

The External Trigger can be set to play any of the drum buttons, or a combination of buttons. To set which ones are triggered, select EDIT PARAMETER 06 (see EDIT PARAMETERS), hold the desired drum button or buttons, *then* trigger the input. The drums will play and the DX will "beep." To remove the trigger setting, hold ERASE and then trigger the input.

Several drum buttons can be assigned to be triggered by the external input. Realize that only one of the three buttons on each voice can be played at a time, so that if, for example, you attempt to assign two of the Toms to be triggered at once, only one will sound.

TRIGGER INPUT Programming:

Access EDIT PARAMETERS:



00 0n

EDIT


**Select EDIT PARAMETER 06:
(SET TRIGGER IN)**

0

6

06


**Select Drum(s)
to be Triggered:**




(Hold Down...)

LOUD
(Bass)


Set Trigger:





TRIG IN

Exit:



00

EDIT

MIDI NOTES

The DX can transmit and receive notes played via MIDI. Drum notes are the same as melodic notes. This means that a DX can be played from a keyboard, MIDI drum pads, or even another DX. MIDI notes such as these can also be recorded and played back as well.

Note that playing notes on synthesizers from MIDI drum machines usually does not work, because drum notes have a shorter duration than most synthesizers are capable of playing.

Setting Notes to Drums

Since correlating drums with keys on a keyboard is a matter of personal taste, the DX enables programming a MIDI note to any of the DX drum buttons. This can be done using EDIT PARAMETERS 13 & 14.

Connect the MIDI OUT from a controller such as a keyboard or another DX to the MIDI IN of the DX. All notes must be within a two and one-half octave range, starting at the transposition setting, so change the transposition setting if the notes are not within the desired range (EDIT PARAMETER 14). Hold RECORD and press the note desired to be the bottom of the range. The MIDI note number will appear in the display.


Next, select EDIT PARAMETER 13. Playing a note into the MIDI IN while holding a drum button sets the note to that drum. Playing a note into the MIDI IN while holding ERASE sets the note not to play any drums. Several notes can be assigned to a particular drum button but each note cannot be assigned to more than one drum. Pressing RECORD and ERASE clears all settings.

There is an informal standard arrangement used by other drum machines which is incorporated within the DX's default configuration shown in the accompanying keyboard diagram. The DX can be reset to this configuration by pressing RECORD & COPY while in EDIT PARAMETER 13.

When using the DX to transmit drum buttons to another instrument, only the highest note programmed to that drum will be transmitted.

Setting MIDI Notes to DX Drums:

Access EDIT PARAMETERS:



00 On

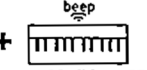
Select EDIT PARAMETER 14:
(SET TRANSPOSITION)

1
4
14 36

Parameter Number Current Setting (MIDI Note#)

Hold RECORD;
Play MIDI Source to
Set Lowest Trigger Note:


+




Play MiddleC
14 60

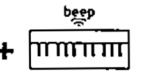
beep New Setting

Select EDIT PARAMETER 13:
(SET DRUMS TO MIDI NOTES)

1
3
13

Hold down Drum to be Set;
Play Desired Notes on MIDI Source:



+



Play MiddleC
13

beep

Exit:


00

Default MIDI Note Assignments

		MIDI Note#s		
		67		
		65		
		64		
		62		
		60		
	Middle C	59	Snare 1	
	Shaker 1	57	Snare 2	
	Shaker 2	55	Bass 1	
		53	Bass 2	
		52	Ride 1	
	Ride 2	50	High Tom	
	Crash	48		
		47	Mid Tom	
	Hi-Hat Open	45		
	Accent	43	Low Tom	
	Closed	41		
		40		
	Claps	38	Snare 3	
	Claps	36	Bass 3	

REALTIME MIDI RECORD

One additional feature of the DX is the ability to transfer sequences between *different brands* of drum machines. This is done by recording on the DX while slaved to another drum machine. The second machine sends notes across MIDI as it plays them, and the DX simply records the notes that are received.

To transfer sequences this way:

Connect the two drum machines so that the DX is the slave unit.

Set the EDIT PARAMETERS on the DX:

00	COUNTDOWN	—(off)
01	TIMING SOURCE	d (MIDI)
02	AUTOSTART	— (off)
07	RECEIVE CHANNEL	same as master
09	OMNI MODE	probably On

Set the master drum machine to transmit MIDI timing. Make sure that the Tempo, Length, and Quantize settings of the slave are appropriate for the sequence to be recorded. Press RECORD and PLAY on the slave unit, then start the master.

Remember that the DX will record the assigned MIDI notes, which are not necessarily the same drums on both machines. Make sure that the drums of the master machine are assigned to appropriate buttons on the slave. See "Setting Note to Drums;" above.

Some other models of drum machines can also record from the DX via MIDI. If the drum machine can read MIDI notes from the DX, it should be able to record them. For more information, refer to the INTERFACE GUIDE as well as the owner manuals of the other drum machines.

FOOTSWITCHES

On the rear panel are two jacks for footswitches. These inputs are designed to be used with switches with a MOMENTARY CLOSED configuration such as those available from Oberheim.

Start Footswitch

When in sequence mode (all button lights off) pressing the START footswitch will play the sequence from the beginning. Pressing it again will stop it. Pressing it once more will restart the sequence from the beginning.

When in song mode (Song button light on) the switch works a bit differently. From STOP, pressing the footswitch starts the song from the beginning. Pressing it again will stop it. If the footswitch is pressed once more, the song will continue from where it stopped.

Next Footswitch

When in sequence mode (all button lights off) pressing the NEXT footswitch advances the DX to the next sequence. When playing a sequence, the DX will wait until the sequence currently being played is finished before starting the next sequence.

When in song mode (Song button light on) the switch works a bit differently. From STOP, pressing the footswitch advances the DX to the next song. While playing a song, if the NEXT footswitch is held down at the end of a sequence, the DX will "vamp," that is, repeat the current sequence, and *not* advance to the next sequence in the song. Releasing the switch will allow the song to continue.

MORE INFORMATION

ABOUT MIDI

MIDI (Musical Instrument Digital Interface) is designed to allow computer controlled musical instruments such as the DX to communicate with each other.

Messages

There are several different types of data messages that are transmitted via MIDI:

VOICE / These are messages about notes. MIDI transmits a NOTE ON and a NOTE NUMBER when a note is played on a keyboard or drum machine. On some devices, velocity is transmitted as well. When the note is released, a NOTE OFF is transmitted.

Levers, Wheels, Program Changes, Footswitches, and Pressure are also transmitted as Voice Messages, however these are not utilized by the DX.

COMMON / Among the Common Messages is Song Select, used to change from one Song to another.

REALTIME / These are commands that control sequencer timing and start/stop information, that tell a slaved sequencer or drum machine when to start and at what tempo to play.

EXCLUSIVE / Exclusive messages are used for data storage and anything else specific to a particular machine. Each manufacturer has its own System Exclusive ID.

Channels

MIDI transmits on 16 independent channels at once, which means that information for many different machines can be transmitted on the same MIDI cable. The DX can transmit on any channel, and receive on any channel. EDIT PARAMETER 07 sets the receive channel, EDIT PARAMETER 08 sets the Transmit Channel.

Omni Mode

The DX can be set to receive on all 16 channels at once by turning OMNI MODE on. EDIT PARAMETER 09 turns on Omni Mode.

Timing

MIDI sends start and stop commands for running sequencers and drum machines. Timing pulses are also transmitted at a rate of 24 pulses per quarter note. The exact rate depends upon the master Tempo setting. Set EDIT PARAMETER 01 to "d" to slave the DX to MIDI. Turn on EDIT PARAMETER 10 to transmit MIDI timing. To receive MIDI timing set EDIT PARAMETER 01 to "d".

Song Select

The SONG SELECT command enables remote selection of Songs (not Sequences) via MIDI. The DX responds to Songs 00-49.

ABOUT DIGITAL AUDIO

The DX is not a Synthesizer. It does not synthesize sound. What it does is play back sounds from its memory. These sounds are stored as numbers, inside special integrated circuits called ROMs (Read Only Memory) which are pre-programmed. Before explaining how digital audio works, let's digress for a minute and discuss how regular analog audio works:

Sound, as far as your ears are concerned, is caused by very small but regular changes in atmospheric pressure. The air moves back and forth, over and over, alternately pushing and pulling on your eardrums and the rest of your body. When these waves of air occur between 20 and 20,000 times per second, your brain perceives them as sound. Anything that makes noise must ultimately disturb the air in this sort of regular way. Look at the low frequency speaker in your sound system. If you turn the volume way up (don't damage your speakers, though!) you will see the speaker (and feel the air near it) moving in and out, in exactly this sort of regular movement.

So what any analog audio system does, is provide a pattern of regular movement (oscillation) for the speaker to move in, so that you feel the air moving in this same pattern so that your brain can translate all this into sound and you can HEAR! Look at a phonograph record very closely and you will see the same repeating wiggles that are amplified by your amplifier to move your speakers.

Digital audio stores, not the oscillations that move your speakers, but a series of numbers that represents those oscillations. Take the groove from that phonograph record and, in your mind, stretch it out in a straight line and place it on a piece of graph paper. Now if you went from the left end of the graph to the right, and every centimeter wrote down a number that represented how far that phonograph wiggle moved up and down, you would become a recorder of digital audio. Now, if you took another piece of graph paper and plotted all those numbers that you just wrote down, you would do what a digital audio recorder does to play back.

So what is programmed inside an ROM in the DX is a series of numbers (lots of numbers!) that represents the sound of a snare drum. Another one has the representation of the sound that a cymbal makes, and so on, for all of the sounds.

INTERFACE GUIDE

INTERFACE GUIDE

Use this chart to find the optimum way to connect your DX to your other equipment.

INSTRUMENT	EXTERNAL CLOCK		MIDI CLOCK		MIDI NOTES	MIDI SONGS
	DX Master	DX Slave	DX Master	DX Slave		
Oberheim						
DX	96	96	YES	YES	YES	YES
DMX	96	96				
DSX (via OB-8)	96	96	NO	NO	Transmits	
EMu						
EmulatorII	24	24	NO	NO	YES	NO
Drumulator	96	24	YES	YES	YES	NO
Fairlight						
CMI (W/ General Interface Card)	96	96	NO	NO	YES	NO
Kurzweil						
250	96	96	NO	NO	YES	NO
Linn						
LinnDrum (New Version)	48	96				
9000	48	48	YES	YES	NO	NO
PPG						
Wave 2.3	NO	48	NO	NO	YES	NO
Roland						
MSQ-700	NO	NO	YES	YES	YES	NO
MSQ-100	NO	NO	YES	YES	YES	NO
TR-909	NO	NO	YES	YES	YES	YES
TR-707	NO	NO	YES	YES	YES	YES
SCI						
SixTrak	96	NO	YES	YES	Receives	NO
DrumTracks	96	NO	YES	YES	YES	YES
64 Sequencer	96	NO	NO	NO	YES	NO
Yamaha						
RX-15	96	96	YES	YES	Transmits	NO
RX-11	96	96	YES	YES	YES	YES

This Glossary contains definitions of terms as used in the DX Manual.

Address

A location in memory that contains DATA.

Beat Value

The note value of the time signature. In a time signature of 3/4, the BEAT VALUE is equal to a quarter note, and there are three quarter notes per measure.

Click Value

The note value of the metronome click. The CLICK VALUE can be the same or different than the BEAT VALUE.

Control Voltage

An electrical signal which can be used as an input to Voltage Controllable devices such as Oscillators, Filters, Amplifiers, etc.

Data

DATA is the information that is processed by the MICROPROCESSOR. It is stored in an ADDRESS.

Default

The result of not making decisions concerning parameters in the DX. If you do not specify how long a sequence is to be for example, the DX will DEFAULT and specify that the length is to be two bars.

Event

Any number of drums that are played on the same beat. The DX has the capacity to store 2200 EVENTS, each of which can contain between 1 and 6 notes.

Gate

An electrical signal which can be used to trigger Envelope Generators and other time dependent devices.

Master

The unit that provides timing, notes, or other data to control slave units that are connected to it. Changing the master will generally change all of the slave units as well.

Microprocessor

The MICROPROCESSOR is the "brain" of the DX. It looks at the SOFTWARE instructions and then carries them out, reading DATA from the proper ADDRESSES, performing the instructed function, and then writing the result in the proper ADDRESS.

Part

In the DX the term PART refers to a segment of a Song. Each Sequence recorded in a Song adds another PART to the Song. There can be up to 255 PARTS contained in a Song, each PART can be one of the one hundred sequences.

Punch Out / Punch In

Switching from Play to Record (punch in) or Record to Play (punch out) without stopping. A recording studio term.

Quantize

A process of rounding off, in the case of the DX the rhythms that are played, to the closest specified increment. In the DX, your recordings can be QUANTIZED to the nearest Half note, Quarter note, Eighth note, or other smaller subdivisions down to a 1/192 note.

RAM

RAM or Random Access Memory acts like a piece of scratch paper for the MICROPROCESSOR. Unlike Read Only Memory (ROM, PROM, or EPROM), RAM can be read from AND written into by the MICROPROCESSOR. RAM is usually used in a computer system to store information that is constantly changing. In the case of the DX, that includes notes, tempos, sequences, etc.

ROM

This acronym stands for Read Only Memory, which is exactly what it is, a memory chip that can only be read by the MICROPROCESSOR, and can not be written into like the Random Access Memories (RAM).

Sequence

A succession of events stored in the DX as numbers. The DX will remember the events as played and then will repeat them upon command.

Slave

A unit that is controlled from another source. The remote source can provide timing, notes, or other data to control slave units that are connected to it.

Software

The computer program or instructions that the computer follows to do its assigned task. In the DX and other Oberheim products, the SOFTWARE is stored in ROMS located on the circuit boards.

Song

A combination of sequences.

SPECIFICATIONS

SPECIFICATIONS

Voices	6
Sounds	18
Frequency Response	10-16,000 Hz (varies among voices and is dependent upon tuning)
Dynamic Range	80 Db
Maximum Number Of Notes	2200 Events, each of which can contain as many as six notes occurring simultaneously
Sequences	100
Songs	50
Maximum Typical Sequence	6 Minutes of 1/8 Notes at 80 Beats/Minute
Maximum Sequence Length	Over 5 Hours at 25 Beats/Minute
Maximum Song Length	254 Sequences
Tempo Range	25-250 Beats per Minute (programmable with each sequence and song)
Recording Modes	REAL TIME: Records rhythm as buttons are pressed. Selectable Quantize Mode rounds off rhythms from 1/192 notes to 1/2 notes. STEP: Notes and rests are programmed separately, one beat at a time. Value of beat can be between 1/2 note and 1/192 note.
Inputs	External Trigger: S-Trig (Inverted), >4.7KOhm Impedance External Clock: 5 Volt positive pulse, TTL compatible Tape: 350mV or more (Line or Speaker Level) Footswitches: Start/Stop, Next Sequence; contact closure to ground
Outputs	Signals: Stereo and Mono mixed outputs, individual voice outputs; Level + 4dBm (nominal), 50 Ohms Impedance, unbalanced Metronome: + 12VDC Pulse, 900Ms. External Clock: 5 Volts, TTL compatible Tape: 350mV rms (line level)
Power	(North America/Japan): 95-130 VAC, 21W (Rest of World): 190-260 VAC, 21W
Dimensions	8"L X 11.8"W X 5"H 45.7cm.L X 30.0cm.W X 12.7cm.H
Weight	12 Lbs. / 5.4 Kg