# DSX

# OWNER'S MANUAL

OBERHEIM ELECTRONICS, INC.

# DSX OWNER'S MANUAL

by

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Covering units with Software Revision 2.22

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CONGRATULATIONS!

You have just purchased a most powerful tool for synthesizer composition and performance. The Oberheim DSX Polyphonic Digital Sequencer represents a new concept in synthesizer control. The complementary products in the Oberheim product line, the OB-Xa, OB-X, and OB-SX Polyphonic Synthesizers, provide you with complete memory and instant access to the sounds you create on them; the addition of the DSX provides complete memory and access to the notes you play on them.

The DSX has been designed by the Oberheim staff with the idea of giving it all the functions that one would want in a polyphonic sequencer, and then some.

The DSX is actually a complete microcomputer system, with the microprocessor, memory, input and output ports, cassette data storage, controls and display for interactive communication, and most of all, the computer program or "software".

To use the DSX most effectively requires some new additions to your synthesizer techniques, mainly the learning of some basic computer functions. If you own an Oberheim Synthesizer, you are already using computers (each of the X-Series has its own microcomputer system, too). The difference is that now you will find that you have more control.

And isn't more control what synthesizers are all about?

## DSX SOFTWARE REVISIONS

The computer program software in the DSX has undergone several revisions since the DSX was first introduced. A brief description of these revisions follows.

| REVISION | MARKING | DESCRIPTION |
|---|---|---|
| DSX 1.00 | B | This is the original software release for 3000 note sequencers, shipped in units starting in October 1981. |
| DSX 1.01 | BX | This is the original software release for 6000 note sequencers, shipped in units starting November 1981. Note that except for the original release, all software can be used in either 3000 or 6000 note models. |
| DSX 2.00 | C | The DSX software Revision 2.00 (shipped in units starting with serial numbers A20801-Feb. 1982) features improved synchronization capability as well allowing selection of play tracks or another sequence while playing a sequence. |
| DSX 2.10 | CA | The Revision 2.10 (shipped in units starting with serial number A22011-May 1982) makes a number of minor changes in Revision 2.00 including 6000 note merges, allowing the synchronization with a mono phone cord (2.00 needed a stereo cord), and elimination of extra notes when recording with the external CVs. All play tracks are also turned on whenever a sequence is selected while in PLAY. |
| DSX 2.22 | CD | Many tape recorders invert the phase of the signal during the recording process, causing problems during data transfers. This software version (shipped in units starting with serial number A23301-Aug. 1982) enables inverted data to be read properly by the DSX Cassette Interface. To set the DSX to read inverted data, press the STEP button after pressing CHECK or PLAY but before starting the tape (while the display reads "START DATA TAPE"). The STEP button will stay on, indicating that the DSX is expecting inverted data.<br><br>Version 2.22 also contains improvements to Track 0, and allows the option of resetting the play tracks when changing sequences. |

To display the software version contained in the DSX, press "3", "5", and "7" simultaneously.

Note that this edition of the Owner's Manual describes the operation of software Version 2.22 only. Some features operate differently with different software.

Any DSX may be retrofitted with new software at no charge by bringing the unit to one of Oberheim's authorized service centers.

TO PLAY THE OBERHEIM DEMONSTRATION:
Press PLAY.

TO RECORD
1) To Record you must choose which track to record on:

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Access Record Assignment | SEQUENCE<br>SEQUENCE | SELECT SEQUENCE<br>SELECT RECRD TRK |
| Select Track 1 to Record On | 1 | SELECT VOICES |
| Exit Record Track Assignment | STOP | * OBERHEIM DSX * |

2) Place the DSX into RECORD and then play the keyboard:

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Set Record Ready | RECORD<br>(RECORD light will flash) | * OBERHEIM DSX * |
| Start Recording | PLAY<br>(The DSX gives you 4 beats free) | COUNT DOWN--4<br>COUNT DOWN--3<br>COUNT DOWN--2<br>COUNT DOWN--1 |
| Play the Keyboard | | NOTE NUMBER 0000<br>(starts counting) |
| Finish Recording | STOP | * OBERHEIM DSX * |

TO PLAY WHAT YOU HAVE JUST RECORDED:
Press PLAY.

TO OVERDUB:
1) Choose another Record Track the same as above:

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Access Record Assignment | SEQUENCE<br>SEQUENCE | SELECT SEQUENCE<br>SELECT RECRD TRK |
| Select Track 2 to Record On | 2 | SELECT VOICES |
| Exit Record Track Assignment | STOP | * OBERHEIM DSX * |

2) Press RECORD then PLAY just as above.

## SELECT SECTION

SEQUENCE: Selects sequence, tracks, voices
MODE: Selects recording mode, metronome mode
MERGE: Selects combination of sequences

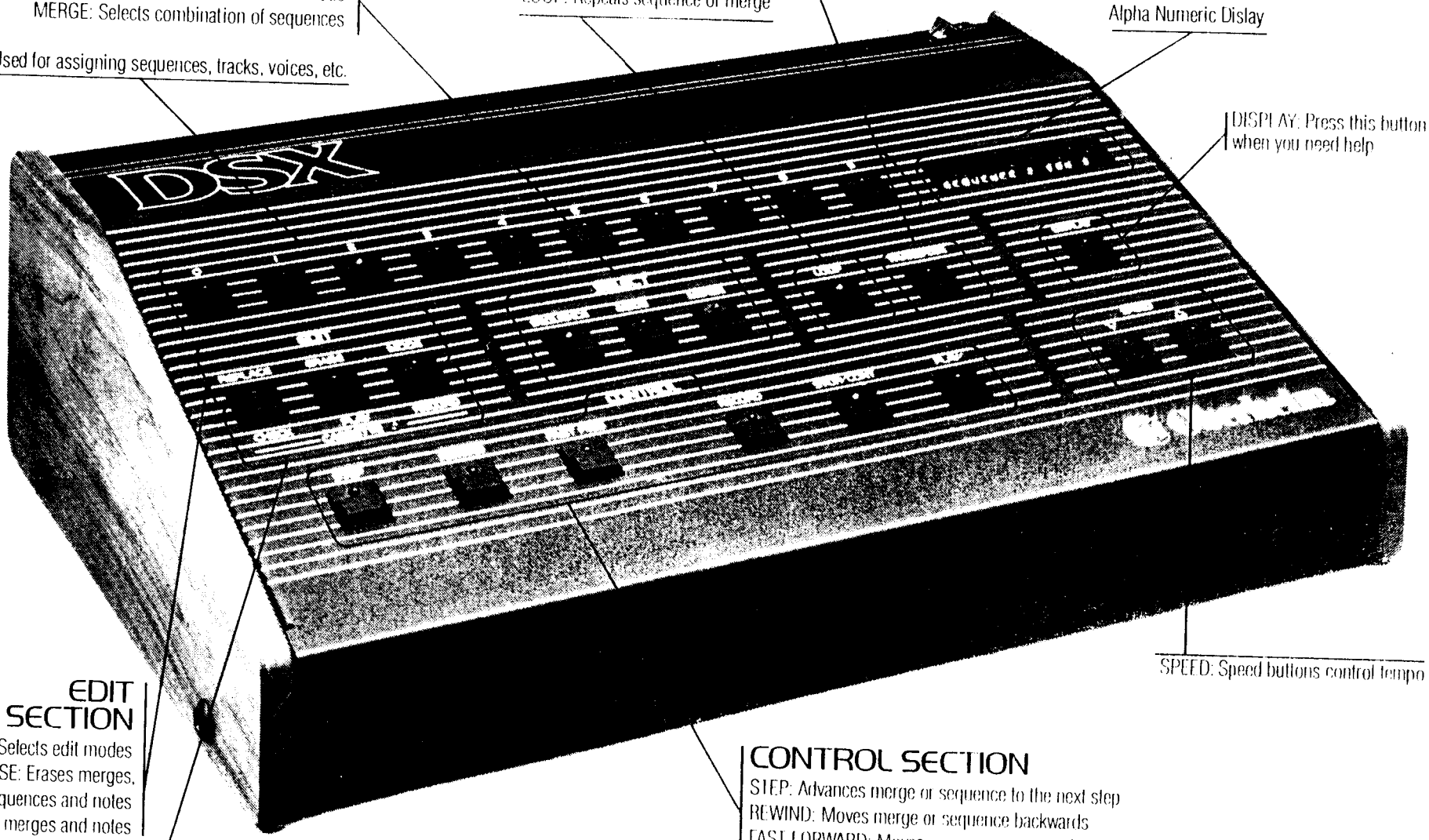
TRANSPOSE: Transposes sequences with the keyboard

LOOP: Repeats sequence or merge

Alpha Numeric Dislay

0 THRU 9: Used for assigning sequences, tracks, voices, etc.

DISPLAY: Press this button when you need help




SPEED: Speed buttons control tempo

## EDIT SECTION

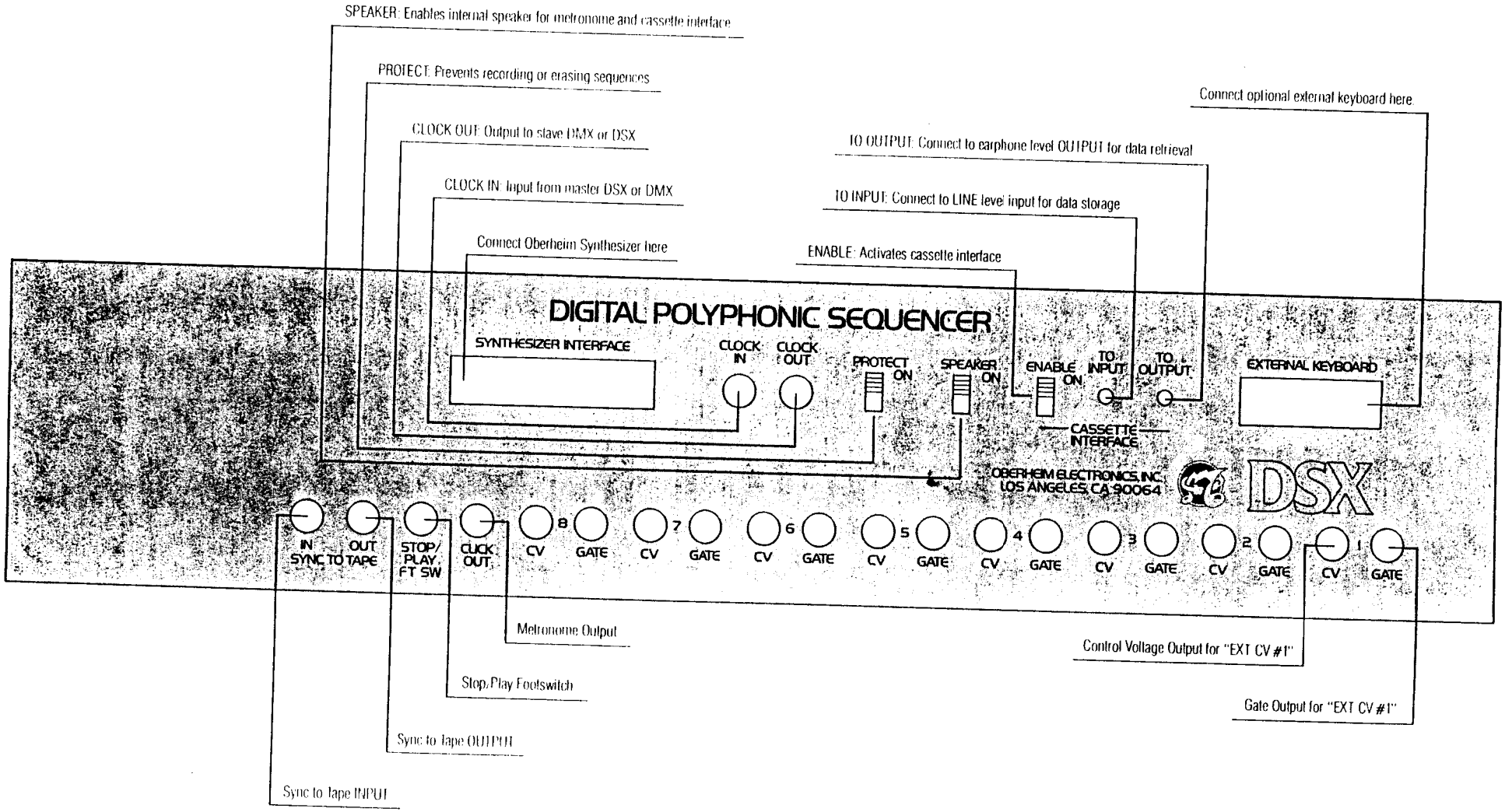
MODE: Selects edit modes
ERASE: Erases merges, tracks, sequences and notes
PLACE: Changes merges and notes

## CASSETTE INTERFACE

CHECK: Tests cassette for errors
PLAY: Loads data from cassette
RECORD: Dumps data onto cassette

## CONTROL SECTION

STEP: Advances merge or sequence to the next step
REWIND: Moves merge or sequence backwards
FAST FORWARD: Moves merge or sequence forwards
RECORD: Press with PLAY to record a sequence
STOP/CONTINUE: Stops a sequence. Press it again and it continues
PLAY: Plays a sequence from the beginning


SPEAKER: Enables internal speaker for metronome and cassette interface
PROTECT: Prevents recording or erasing sequences
CLOCK OUT: Output to slave DMX or DSX
CLOCK IN: Input from master DSX or DMX
Connect Oberheim Synthesizer here
Connect optional external keyboard here
TO OUTPUT: Connect to earphone level OUTPUT for data retrieval
TO INPUT: Connect to LINE level input for data storage
ENABLE: Activates cassette interface
DIGITAL POLYPHONIC SEQUENCER
SYNTHESIZER INTERFACE
CLOCK IN
CLOCK OUT
PROTECT ON
SPEAKER ON
ENABLE ON
TO INPUT
TO OUTPUT
EXTERNAL KEYBOARD
CASSETTE INTERFACE
OBERHEIM ELECTRONICS, INC.
LOS ANGELES, CA 90064
DSX
IN SYNC TO TAPE
OUT SYNC TO TAPE
STOP/ PLAY FT SW
CLICK OUT
CV
GATE
8
7
6
5
4
3
2
1
Metronome Output
Stop/Play Footswitch
Sync to Tape OUTPUT
Sync to Tape INPUT
Control Voltage Output for "EXT CV #1"
Gate Output for "EXT CV #1"

## POWER

The DSX comes from the factory set for use with 90-120 Volts, AC power. If the local power in your area is different, set the 110-220 switch inside the unit appropriately. This is done by removing the two screws on the front of the unit, and then lifting up the front panel. The power selection switch is located in the corner on the right side towards the rear of the unit, near the hinge.

## HOOKUP TO THE OBERHEIM OB-Xa, OB-SX, & OB-X

Your synthesizer as well as the DSX should both be turned off before being hooked up.

The OB-Xa, OB-SX, and OB-X (after Serial Number 803600) are equipped with a 37-pin COMPUTER INTERFACE connector. On the OB-Xa and OB-SX, the connector is located on the rear panel of the unit; on the OB-X the connector is located on the left end bell, adjacent to the VOLUME control.

Using the multi-pin cable supplied with the DSX, connect the SYNTHESIZER INTERFACE of the DSX to the COMPUTER INTERFACE on the synthesizer. This interface cable allows the computer in the DSX to "talk" to the computer in the OB-Xa, OB-SX, or OB-X. Turn on the DSX. The display will read "CONNECT SYNTH". Now turn on the synthesizer. The display should now read "* OBERHEIM DSX *". If the display still reads "CONNECT SYNTH", recheck your connections. The DSX will display the "* OBERHEIM DSX *" message whenever it is ready for your next command.

If the DSX is connected to the synthesizer while the synthesizer is on, or if the synthesizer is turned on before the DSX, random data can be transmitted to the synthesizer. While this cannot cause any damage, the synthesizer may play a few random notes or not make any sound. To correct this situation press AUTO-TUNE and the output will turn on after tuning.

You may notice that the lights on your synthesizer flicker slightly when the DSX is connected. This is a function of the two microprocessors talking to each other and is normal.

The COMPUTER INTERFACE can be added to OB-X's that do not have one. Contact the factory or your nearest service center for details.

## WHAT THE DSX DOES

In the same way that your the Oberheim X-series synthesizer remembers the sounds that you program into it, the DSX remembers the notes that you play on the keyboard. The DSX does not record sound, but only keeps track of which keys you played when. When you playback your recording on the DSX, the DSX performs those notes on the synthesizer the same as if you were playing the keyboard. This means that the DSX can never play more voices than there are in your synthesizer. If you are using the DSX with an OB-Xa, there can be up to eight voices and up to two sounds playing at any one time (by using the eight External CVs to control eight other synthesizers, this can increased to sixteen voices playing at any one time).

## READING THE DISPLAY

The alpha-numeric display of the DSX is designed to help you use the DSX faster and more easily. The display will tell you what the DSX is doing, and ask you what you would like it to do. Also, since many of the controls have multiple functions, the display will make it easier to understand those functions.

If at any time you need help with the operation of the DSX, press the the button marked DISPLAY, and more helpful information will appear on the display.

## PRESSING THE BUTTONS

To speed operation, the buttons show your decisions only as long as you press them down. When they are let go, the DSX advances to the next part of the current operation. So, when learning how to use DSX, get in the habit of pressing and holding buttons to better understand what you are doing. Once you have mastered the DSX, you will appreciate the added speed this approach gives you.

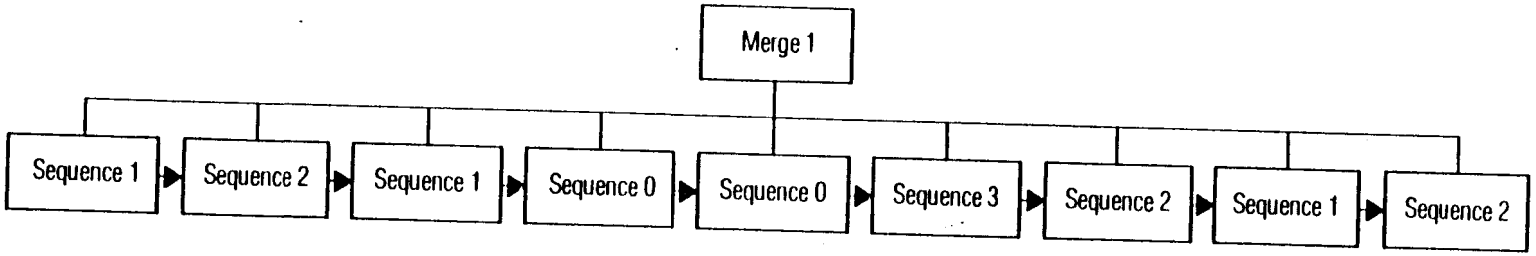
## WHAT'S IN A SEQUENCE

The DSX contains 10 SEQUENCES. Each SEQUENCE contains 10 TRACKS. There are 8 VOICES ("VOICES" in this manual refers only to the voices in an OB-Xa, OB-SX, or OB-X) as well as 8 EXTERNAL CVs, to make a total of 16 notes that may be recorded on 9 of the 10 TRACKS. TRACK 0 is reserved for recording patches, splits, and doubles; as well as other data relating to the sequence such as tempo and end point.

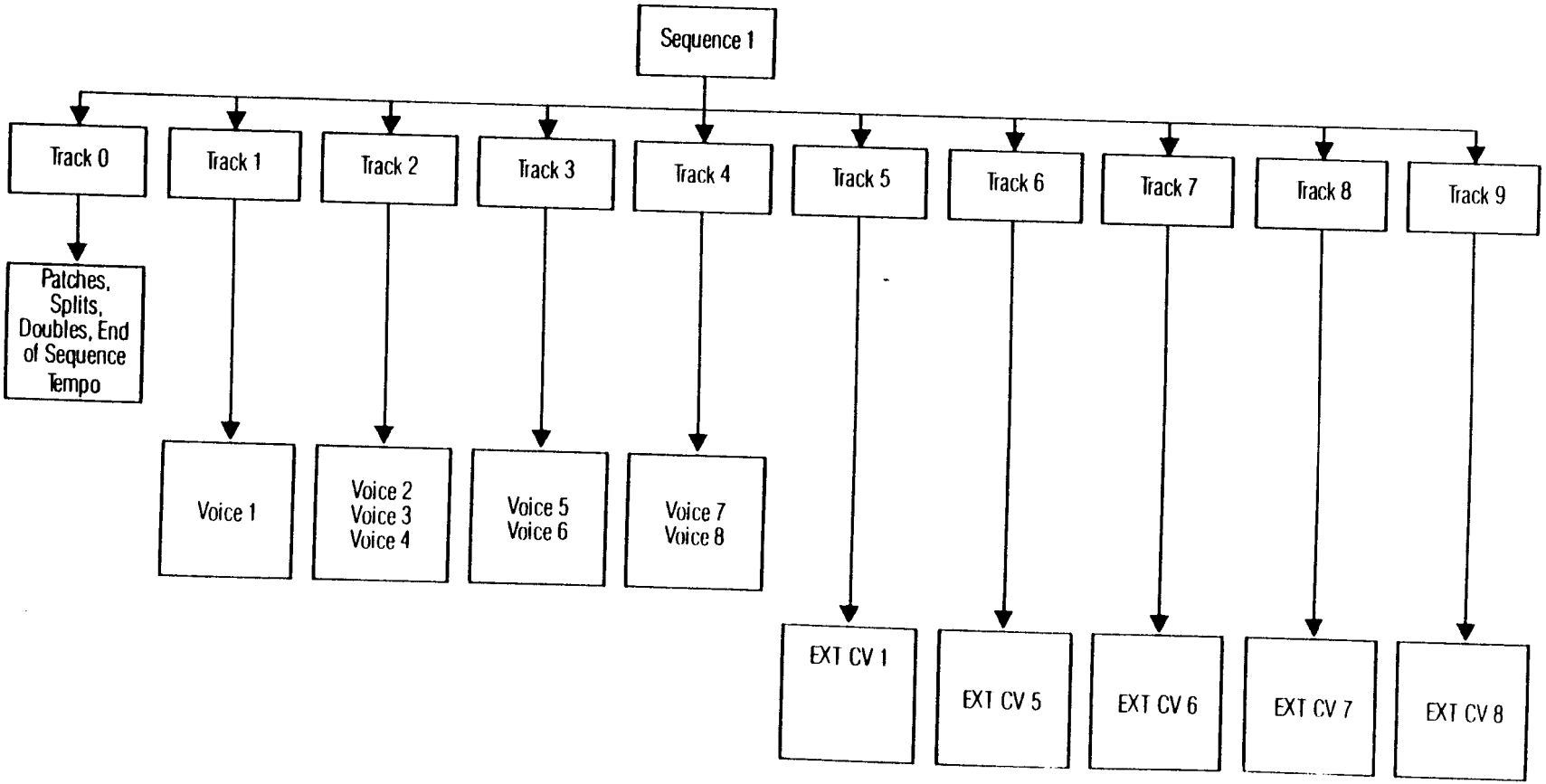
Any number of VOICES may be assigned to each track, but only one CV may be assigned to each track and the CV cannot be recorded on the same track as other VOICES. However, a track recorded with any number of VOICES may be reassigned to be played by the corresponding CVs and vice versa (see Recording With External CVs and Gates).

# The Make Up of a DSX COMPOSITION

A Merge: (one of ten) Contains a list of sequences, e.g.:




Each Sequence: (one of ten) is Made Up of 10 Tracks:




Track 0 Stores Information about the Sequence

Tracks 1-9 Store Notes either "VOICES" or "EXT CVs", eg:

A VOICE or CV may be assigned to more than one track, but some notes may not be heard if several tracks are "competing" for the same voice. The DSX will not rob a voice already playing in order to play a new note.

Once you've got your SEQUENCES recorded, you can combine them into a MERGE. If you consider a MERGE to be a complete composition, each SEQUENCE would be a section within that composition. More about MERGES later. For now let's start recording a SEQUENCE.

## RECORDING ON THE DSX

### SETTING RECORD ASSIGNMENTS

The DSX is designed to "default", or automatically choose certain record assignments if you don't. This makes it easy to operate the DSX, and still provides for extreme flexiblity when you want it. Setting the record assignments allows you to choose, for example, how many voices you would like to record at one time. You can record one part first, then overdub a second and a third etc., and keep each of the parts on a separate track, even though they are being played by a single synthesizer!

Pressing the SEQUENCE button accesses the loop of prompts which are used to set record assignments. These prompts are:

"SELECT SEQUENCE"
Choose a sequence to record or play back.

"SELECT RECRD TRK"
Select a track of the sequence to record on.

"SELECT VOICES"
Choose the voices (1 thru 8) you wish to record with.

"SELECT PLAY TRKS"
Choose which tracks you wish to play back.

These Prompts will repeat one after the other by pressing the SEQUENCE button, so if you miss something, you can repeat the loop until you find the assignment you wish to change.

The DSX makes record assignments by default until you change them. These default choices are:

SEQUENCE: 0
RECORD TRACK: NO CHOICE
VOICES: ALL VOICES IN YOUR SYNTHESIZER
PLAY TRACKS: ALL

The following example shows how to change the Record Assignments:

Example 1: Set record assignments to record four VOICES on TRACK 1 of SEQUENCE 1

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Access record assignments | SEQUENCE | SELECT SEQUENCE |
| | (the sequence currently assigned will light, the sequences that are completely empty will flash) | |
| Assign sequence 1 to be recorded | 1 | SELECT RECRD TRK |
| | (the track currently assigned will light, the tracks that are empty will flash) | |
| Assign track 1 to be recorded on | 1 | SELECT VOICES |
| Turn off voices not to be recorded | 5, 6, 7, 8, SEQUENCE | SELECT PLAY TRKS |
| | (the ones that are lit are the ones that are on) | |
| Select tracks to be monitored | SEQUENCE | * OBERHEIM DSX * |
| | (the ones that are lit are the ones that are on) | |

Once these record assignments are set, there is no need to change them while you are recording and playing the assigned voices, tracks, and sequence. If you wish to change any of them, press SEQUENCE several times until you access the particular assignment that you to change. Pressing STOP at any time will pop you out of the record assignments loop and return you to "* OBERHEIM DSX *".

It is necessary to press SEQUENCE after choosing voices to be recorded or tracks to be played. This is done because it is possible to choose more than one, unlike a sequence or a record track.

When selecting a sequence or track, the buttons (0-9) that flash represent sequences or tracks that are empty. The buttons that are dark represent ones that are not completely empty. You may select any sequence or track, whether the buttons are lit or not.

The DSX allows you to choose which tracks you wish play back. You may turn off individual tracks if you do not wish to play them. This feature for example, allows you to record several "takes" of a given part and then choose between them afterwards, as with a multitrack tape recorder. Track 0 is used to store patches, tempo, end of sequence. More on Track 0 below.

Press RECORD and PLAY. When everything is set, the DSX will give you four beats free and then start recording.

However, when all of the record assignments have not been set, the DSX will "prompt" you to set them (see SETTING RECORD ASSIGNMENTS, above).

Example 2: Recording (after record assignments are set)

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Start recording | RECORD then PLAY | COUNT DOWN--4<br>COUNT DOWN--3<br>COUNT DOWN--2<br>COUNT DOWN--1 |

(when recording, the DSX will count four metronome beats before it actually starts recording.)

| | | |
|---|---|---|
| Play the keyboard | | NOTE NUMBER 0001<br>(starts counting) |
| Stop recording | STOP | * OBERHEIM DSX * |

When in the RECORD READY mode (Record light flashing), you may see how many notes are left in memory by pressing DISPLAY.

The four free beats before the DSX starts recording are eliminated by using the PLAY/STOP FOOTSWITCH instead of the PLAY button. You must still press RECORD first. See INTERFACING THE DSX.

## PLAYING A SEQUENCE

After you have recorded a sequence, you may play back what you have recorded by pressing PLAY. The Sequence currently playing will light on the 0-9 buttons.

If you have made a mistake, or would like to record over again, press RECORD and PLAY once more. Your first recording will be erased, and again, the DSX will count four beats before starting to record.

The sequence will play until all of the notes on all of the tracks playing have finished. The sequence can be stopped at a specific point by recording on Track 0 (see RECORDING PATCHES AND TEMPO ON TRACK 0).

While playing a sequence, you may choose to play a new sequence by pressing the desired sequence button (0-9). When the initial sequence has finished playing, the new one will start. You may turn individual tracks on and off while playing a sequence as well. See "CHANGING SEQUENCES".

Overdubbing is the process of recording more parts in synchronization with parts already played. With the DSX, overdubbing is basically the same as normal recording. Set the record assignments to record on a different track, and then you are ready.

Example 3: Overdub VOICES 5 thru 8 on TRACK 2 of SEQUENCE 1:

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Access record assignments | SEQUENCE | SELECT SEQUENCE |
| Assign sequence 1 to be recorded | 1 (or SEQUENCE) | SELECT RECRD TRK |
| Assign track 2 to be recorded on | 2 | SELECT VOICES |
| Turn off voices not to be recorded | 1, 2, 3, 4, SEQUENCE | SELECT PLAY TRKS |
| Select tracks to be monitored | SEQUENCE | * OBERHEIM DSX * |

Remember that a VOICE or CV may be assigned to more than one track, but some notes may be not be heard if several tracks are "competing" for the same voice.

## TEMPO

The DSX will record and play at tempos between 25 and 250 quarter note beats per minute. To set the tempo, simply press either of the SPEED buttons. While holding the button, the tempo will appear on the display in beats per minute, and the METRONOME will click accordingly. To examine the tempo without changing it, press both buttons. The tempo may be set in any mode of operation but it will only be stored when recording on Track 0. The tempo may be changed during record and play but the display will continue to show the elapsed note numbers and not display the tempo.

## RECORDING ON TRACK 0

Track 0 is reserved for recording patches, splits and doubles, tempo, and the end of sequence. Track 0 may be recorded at the same time as another track, or it may be recorded separately. When you start recording, it will see the program as displayed on the front panel. If you start recording in SPLIT or DOUBLE, the DSX will only see the program (Upper or Lower) that is being being displayed. The DSX will not see whether you are in Split or Double. However, while in RECORD, the DSX will remember all of the PROGRAMMER and KEYBOARD buttons that are pressed. If you enter the Split mode, it will remember that you depressed the SPLIT button; if you change the Split point, it will remember that; if you select a Double Program i.e., DOUBLE 6, it will remember that you pressed DOUBLE and 6 at the same time. The DSX does not know what DOUBLE and 6 means--it only knows that you pressed them. It is the OB-Xa that interprets DOUBLE and 6 and recalls the Double Program.

Example 4: Record tempo=120, programs A5 and SPLIT 4, and end of sequence on track 0:

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Access record assignments | SEQUENCE | SELECT SEQUENCE |
| Assign sequence 1 to be recorded | 1 (or SEQUENCE) | SELECT RECRD TRK |
| Select Track 0 to be recorded | 0 (turn off any other track that may be lit) then SEQUENCE | SELECT PLAY TRKS |
| Select tracks to be monitored | SEQUENCE | * OBERHEIM DSX * |
| Select Patch Program A5 | (on synthesizer) A,5 | * OBERHEIM DSX * |
| Set Tempo to 120 Beats/Min. | SPEED buttons until Display reads: | 120 BEATS/MIN |
| Start recording | RECORD then PLAY | COUNT DOWN--4,3,2,1 NOTE NUMBER XXXX |
| Select Program Split 5 | (on synthesizer) SPLIT, 5 | NOTE NUMBER XXXX |
| Set End of Sequence | STOP (at the proper moment) | * OBERHEIM DSX * |

When recording track 0, the DSX will store what tempo you finish recording at, and it will remember precisely where you press STOP to end the sequence. If you press STOP before all of the notes on the other tracks have been played, the DSX will not erase them, but you will not hear them when playing back the sequence with Track 0 on.

To record Track 0 at the same time as another track, press 0 and then the additional record track when setting Record Assignments. Only Track 0 may be switched on and off.

You may Overdub additional program changes on Track 0 without erasing the ones already recorded. Just Record over again. The DSX will update the Tempo and the End of Sequence as well. To completely erase Track 0 however, it is necessary to use the ERASE mode. See EDIT MODES.

You may want to record the end of sequence in a quantized mode in order to have the sequence loop in exactly the right place. See RECORDING MODES.

The DSX has five Edit Modes. Four of these modes are used for erasing, and the fifth mode is used to change a track assignment after the track has been recorded. The Edit Modes are accessed by pressing the EDIT MODE button. This button accesses a loop just as the SELECT SEQUENCE button does. The display will ask you to select the desired edit mode. These modes are:

1: Erase a Track
2: Erase a Sequence
3: Erase a Merge
4: Erase Everything
5: Copy Voice to CV

(pressing DISPLAY will light up the different modes)

Once you select an edit mode, the DSX will guide you through the appropriate editing process.

ERASING

When recording a track, the DSX will erase what was previously recorded on that track (except patch changes on track 0). However, you can ERASE any track, an entire sequence, merge, or everything in memory, respectively, with the first four edit modes.

Example 5: Erase SEQUENCE 3:

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Access Edit Mode | EDIT MODE | SELECT EDIT MODE |
| Select Erase Sequence | 2 | ERASE A SEQUENCE |
| | (let go) | SELECT SEQ ERASE |
| Erase Sequence 3 | 3 | SEQUENCE 3 ERASE |
| | (let go) | * OBERHEIM DSX * |

Example 6: Erase everything:

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Access Edit Mode | EDIT MODE | SELECT EDIT MODE |
| Select Erase Everything | 4 | ERASE EVERYTHING |
| | (let go) | HIT ERA TO CLEAR |
| Erase Everything | ERASE | NO SEQ IN MEMORY |
| | (let go) | * OBERHEIM DSX * |

COPYING

Tracks originally recorded with Voices can be copied to be played by the External CVs and vice versa. If a track assigned to Voices 5 through 8 is copied, it will then be played by External CVs 5 through 8. This fifth edit mode enables External CVs to be used polyphonically. (see "RECORDING WITH EXTERNAL CVS AND GATES").

Example 7: Copy Track 6 to be played by External CVs

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Access Edit Mode | EDIT MODE | SELECT EDIT MODE |
| Select Copy Mode | 5<br>(let go) | COPY VOICE TO CV<br>SELECT A TRACK |
| Select Track 6 | 6<br>(let go) | TRK 6 NOW C-VS<br>* OBERHEIM DSX * |

If this operation is repeated, Track 6 will switch back to Voices.

The DSX will normally record everything that you play just as you play it. However, you can set the DSX to QUANTIZE or "correct" your playing to any of several different note values between a 1/2 note and a 1/32 note. Recording a track while in one of the Quantize modes will make the rhythms metrically exact. If you record sixteenth notes while Quantized to quarter notes, your recording will playback as groups of quarter notes. The easiest way to use the Quantize modes is to select the rhythmic value equal to the shortest note you want to play.

Pressing SELECT MODE accesses the recording mode loop. The display shows the recording mode currently selected. The nine recording modes are:

0: Real Time Mode (records as played)
1: Quantize to 1/2 note
2: Quantize to 1/4 note
3: Quantize to 1/6 note (1/4 note triplet)
4: Quantize to 1/8 note
5: Quantize to 1/12 note (1/8 note triplet)
6: Quantize to 1/16 note
7: Quantize to 1/24 note (1/16 note triplet)
8: Quantize to 1/32 note
(Pressing DISPLAY will light up the different modes)

Select a recording mode or press MODE to continue in the loop to the metronome. As with any of the loops in the DSX, pressing STOP will pop you back to "* OBERHEIM DSX *".

## METRONOME

The metronome is provided to make recording easier. It has no effect upon recordings. The metronome normally clicks in eighth notes. It can be changed to click between a 1/2 note and a 1/32 note. After setting the recording mode, the SELECT MODE loop asks you to set the metronome value. Your choices are the same as the quanitizng values:

1: 1/2 note click
2: 1/4 note click
3: 1/6 note click (1/4 note triplet)
4: 1/8 note click
5: 1/12 note click (1/8 note triplet)
6: 1/16 note click
7: 1/24 note click (1/16 note triplet)
8: 1/32 note click
(Pressing DISPLAY will light up the different modes)

The METRONOME is heard through a speaker inside the DSX, or by using the CLICK OUT on the rear panel, through any other sound system. The SPEAKER switch, also on the rear panel, will turn the speaker off if you do not wish to hear it. The METRONOME will click only when in RECORD, or when the SPEED buttons are pressed (see TEMPO).

There is much more a sequence can do than just record and playback. The DSX enables sequences to repeat, change pitch, and change length. Parts can be added or subtracted from a sequence by turning tracks on and off, and another sequence can be selected, all while playing. These features give the live performer immediate and wide ranging compositional control. And that's what real-time is all about!

## LOOPING SEQUENCES

Pressing the LOOP button will cause the DSX to repeat a sequence over and over until STOP is pressed, or LOOP is turned off.

## TRANSPOSING SEQUENCES

After pressing the TRANSPOSE button, the sequence being played back will transpose up from the lowest note on the keyboard; in other words, playing C1 will transpose the entire sequence up an octave, playing Eb0 will transpose the entire sequence up a minor third. The transposing note will not be heard.

The synthesizer will only play notes within the range of the keyboard and transpose individual notes into an octave that is within the keyboard. Also, the transpose only affects notes that start playing after the transposition is made. Notes that are already playing while the transposition is made will not be affected.

It is possible to limit the maximum transposition of a sequence. Press and hold the TRANSPOSE button and while holding TRANSPOSE, press a key on the keyboard. That key becomes the highest note that will transpose the sequence. Any key pressed between the the bottom note on the keyboard and this transpose limit will transpose the sequence and not play the synthesizer; any key pressed above the transpose limit will play and not transpose. The transpose limit can only be set while the DSX is in STOP, although the TRANSPOSE button can be turned on and off in any mode and will remember the transpose limit until changed or the DSX is reset (by either the DSX or the synthesizer being switched into Cassette Mode, disconnected, or turned off).

While playing a sequence, you may choose to play another sequence by pressing the desired sequence button (0-9). When the initial sequence is finished, the DSX will play the new sequence. If PLAY is pressed after selecting a new sequence, the new sequence will begin playing immediately.

You may select play tracks while in PLAY as well. While playing a sequence, pressing SELECT SEQUENCE will call up "SELECT PLAY TRKS" (as explained in SETTING RECORD ASSIGNMENTS). Pressing the desired track button (0-9) will instantly change the tracks currently playing. The tracks will only turn on or off at the beginning or end of a note, so as not to cause abrupt musical changes.

The DSX will turn on all of the tracks when changing sequences unless the play tracks are being displayed (display reads "SELECT PLAY TRKS") at the moment when the first sequence ends and the second sequence begins. If the play tracks ARE displayed at the moment of the sequence change, then the play tracks will remain the same for the new sequence.

The ability to choose whether or not all of the play tracks will turn on between sequences is useful when changing sequences in real time. By recording the same part on the same track in each of the different sequences (i.e., "Bass" on Track 1), you can change between several sequences without having to change tracks to play the same parts. Of course, the changes between sequences and tracks can be stored as a MERGE.

## SEQUENCE LENGTH

One of most important features of the DSX is the ability to set the length of a sequence three different ways.

1) Normally, the sequence will stop (or repeat, if LOOP is pressed) when all of the tracks that are playing have finished.

2) If "SELECT PLAY TRKS" is displayed, the sequence will not loop until all of the tracks, playing or not, have finished. In this mode you can turn tracks on and off (or ALL off) and the sequence length will not change.

3) If track 0 is recorded, turning on Track 0 sets the end point to the end of Track 0, regardless of the length of other tracks.

Keep in mind that a track doesn't end until STOP or PLAY was pressed during the original recording of that track, to allow for rests at the end of a track. For this reason, it is good to get in the habit, when recording, of pressing STOP or PLAY (or stepping on the footswitch) at the exact point you wish the sequence to end.

One prominent feature of music is that it is organized into sections that repeat and alternate with each other. A MERGE allows you to record each section of a piece as a separate sequence and then combine sequences into a complete composition, saving a lot of memory space, not to mention time and effort.

A merge then, is a combination of sequences. The merge does not remember the notes in a sequence, only the order of sequences you wish to play. There is no limit (except the absolute limits of memory space) to the number of sequences within a merge, nor to the number of times a sequence can repeat within a merge. A Merge can also LOOP and TRANSPOSE.

## PLAYING A MERGE

To enter the merge mode, press MERGE. The DSX will select merge 0 or the merge that was previously selected.

Example 8: Play merge 1

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Access Merge mode | MERGE (0 button lights) | * OBERHEIM DSX * |
| Select Merge 1 | 1 (1 button lights) | * OBERHEIM DSX * |
| Play Merge 1 | PLAY | PART 1, SEQ. 1 |

As the merge 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 merge is given an ascending PART number that reflects its order in the merge.

You will stay in the merge mode until you press MERGE again. The MERGE button will remain lit whenever you are in the merge mode.

Recording a merge is different than recording a sequence, because you are not playing any notes, just making a list of sequences. Actually you don't "record" a merge, you "edit" a merge.

To edit a merge press MERGE, then EDIT MODE. Once you entered MERGE EDIT, it will ask you to select the sequences that will make up the merge; the merge list.

Example 9: Recording merge 1

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Access Merge Mode | MERGE (1 button lights) | * OBERHEIM DSX * |
| Access Edit Mode | EDIT MODE | MERGE 1 EMPTY |
| | (If the Display reads "PART 1,SEQ.." instead of "MERGE 1 EMPTY", the merge is not empty and should be erased before recording; see ERASING) | |
| Start Merge with Sequence 1 | 1 | PART 1,SEQ 1 |
| Continue with Sequence 2 | 2 | PART 2,SEQ 2 |
| Continue with Sequence 1 | 1 | PART 3,SEQ 1 |
| Continue with Sequence 0 | 0 | PART 4,SEQ 0 |
| Repeat Sequence 0 | 0 | PART 5,SEQ 0 |
| Continue with Sequence 3 | 3 | PART 6,SEQ 3 |
| Finish | EDIT (light goes out) | * OBERHEIM DSX * |

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

If any of the sequences in a merge are empty, they will be skipped over when the merge is played.

You may revise the listing in a merge by repeating the steps in example 9. If there are already sequences contained in the merge the display will display the sequence contained in the first part. You may move through the merge list by using STEP, FAST FWD, or REWIND to get to the part of the merge that you wish to revise. You have three edit commands:

INSERT

By simply choosing a sequence with the buttons 0 thru 9, the DSX will insert the chosen sequence after the sequence just previously displayed and before the one following in the Merge List.

ERASE

By pressing ERASE, the DSX will remove the displayed sequence from the merge list.

REPLACE

By pressing REPLACE, you have signalled that you wish to replace the sequence being displayed with another one. The display will now read "SELCT REPLACEMNT", prompting you to select the replacement sequence by pressing the desired sequence button (0 thru 9).

Example 10: Re-editing merge 1

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Access Merge Mode | MERGE | * OBERHEIM DSX * |
| Access Edit Mode | EDIT MODE | PART 1,SEQ 1 |
| Step to next Sequence | STEP | PART 2,SEQ 2 |
| Step to next Sequence | STEP | PART 3,SEQ 1 |
| Replace Sequence 1 with Sequence 5 | REPLACE | SELCT REPLACMNT |
| | 5 | PART 3,SEQ 5 |
| Step to next Sequence | STEP | PART 4,SEQ 0 |
| Step to next Sequence | STEP | PART 5,SEQ 0 |
| Delete Sequence 0 | ERASE | PART 5,SEQ 3 (You just removed sequence 0 so all of the other sequences get moved up accordingly.) |
| Insert Sequence 6 | 6 | PART 6,SEQ 6 |
| Rewind back | REWIND (hold down) | PART 5,SEQ 3 |
| (continues rewinding) | | PART 4,SEQ 0 |
| (continues rewinding) | | PART 3,SEQ 5 |
| Stop Rewinding | (let go) | PART 3,SEQ 5 |
| Insert Sequence 1 | 1 | PART 4,SEQ 1 |
| Step to Next Sequence | STEP | PART 5,SEQ 0 (Remember, you just inserted Sequence 1, so all the Sequences after get moved back accordingly.) |
| Finish Editing | EDIT MODE | * OBERHIEM DSX * |

## TRANSPOSING SEQUENCES WITHIN A MERGE

It is possible to transpose individual sequences within a merge. While editing a merge, if you press a key on the keyboard while selecting a sequence, the DSX will store that transposition with that sequence in the merge list. The transpositions work the same way as when transposing a sequence, in that the sequence will transpose up from the lowest note on the keyboard.

Example 11: Transposing a sequence within a merge (Re-editing Merge 1)

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Select Edit Mode | EDIT MODE | PART 1,SEQ 1 |
| Insert Sequence 2, and Transpose up a Fourth | Press and hold "2", press "F0" on the kbd | PART 2,SEQ 2 |
| Step to next part | STEP | PART 3,SEQ 2 |
| Replace Sequence 2 with Sequence 5 transposed up a Ninth | REPLACE<br>Press and hold "5", press "D1" on the kbd | SELECT REPLACMNT<br>PART 3,SEQ 5 |
| Finish editing | EDIT MODE | SELECT MERGE 1 |

It is still possible to transpose the entire merge (including transposed sequences) during playback by pressing TRANSPOSE and playing the keyboard, the same as transposing individual sequences.

## PLAYING SELECTED TRACKS

When editing sequences in a merge, the DSX will normally play all of the tracks in the sequence. However, it is possible to specify which tracks are to be played in each sequence. This is a very powerful feature--a sequence can be played several times with different parts being played each time, saving memory space and eliminating the need to record repeating lines over and over.

Selecting which tracks are to be played in a merge is similar to selecting play tracks in a sequence. When editing a merge, the play tracks of the sequence shown in the display may be examined by pressing SEQUENCE. The numbered buttons will light up, representing which tracks are to be played. Pressing the numbered buttons will change the tracks to be played. Pressing SEQUENCE once more will store those tracks with the sequence, in that part of the merge.

Example 12: Selecting play tracks within a merge (Re-editing Merge 1)

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Select Edit Mode | EDIT MODE | PART 1,SEQ 1 |
| Access Play Track Selection | SEQUENCE | SELECT PLAY TRKS |
| Play Tracks 0,1,2 of Sequence 1 (Part 1) | 3,4,5,6,7,8,9 (turn off all tracks not to be played) | SELECT PLAY TRKS |
| Exit Play Track Selection | SEQUENCE | PART 1,SEQ 1 |
| Insert Sequence 1 (for Part 2) | 1 | PART 2,SEQ 1 |
| Access Play Track Selection | SEQUENCE | SELECT PLAY TRKS |
| Play Tracks 0,1,2,5,6 of Sequence 1 (Part 2) | 3,4,7,8,9 (turn off all tracks not to be played) | SELECT PLAY TRKS |
| Exit Play Track Selection | SEQUENCE | PART 2,SEQ 1 |
| Finish editing | EDIT MODE | SELECT MERGE 1 |

The Transpose feature as well as the Play Tracks feature may be used on any Sequence.

If Track 0 is not being played, the sequence will play only as long as the length of the tracks currently selected. The DSX will ignore the length of any tracks that are not on.

## CASSETTE INTERFACE

The DSX is equipped with a Cassette Interface which allows programs contained in the program memory to be stored externally on an audio cassette. All that is required to use the Cassette Interface feature is an audio cassette recorder with reasonable frequency response and a pair of mini-plug to mini-plug audio connecting cables. The cassette player must have an earphone or ext. speaker output.

### CONNECTIONS

Connect the Earphone or Speaker output of your cassette recorder (a Line output will not work) to the jack labeled "TO OUTPUT" on the rear of the DSX. Connect the "TO LINE INPUT" jack on the rear panel of the DSX to the Line or Aux input of your cassette recorder. See the Rear Panel Diagram at the front of the manual.

** NOTE **

To reduce hum, the "TO LINE INPUT" jack has no ground connection. For this reason, it is necessary to connect both the Input and the Output cables when recording data onto the cassette recorder.

### TRANSFERRING DATA

### TO RECORD PROGRAMS ONTO TAPE:

1) Connect the Cassette Recorder to the Cassette Interface Jacks on the rear panel of the DSX as described in the "CONNECTIONS" section, above.

2) Enable the Cassette Interface by throwing the switch on the rear panel.

3) Press the RECORD switch on the tape recorder. You should now hear a steady tone through the DSX's internal speaker (set the SPEAKER switch on the rear panel "ON").

4) Press the CASSETTE RECORD switch on the DSX (it shares a button with the EDIT MODE switch). After the RECORD switch is pressed, five seconds of the steady "leader" tone will be sent out followed by the actual memory information. During this time, the display will read "RECORDING DATA". After all of the memory information has been tranfered, the display will read "DATA COMPLETED".

5) Check the Cassette Data to make sure it has been recorded correctly. See "TO CHECK TAPES", Page 25.

TO PLAY PROGRAMS FROM TAPE INTO THE DSX:

1) Connect the Cassette Recorder to the Cassette Interface Jacks on the rear panel of the DSX as described in the "CONNECTIONS" section, above.

2) Enable the Cassette Interface by throwing the switch on the rear panel.

3) Press the CASSETTE PLAY switch on the DSX (it shares a button with the ERASE switch). The display will read "START DATA TAPE".

4) Press the PLAY switch on the tape recorder. You will now be able to monitor the tape through the speaker inside the DSX.

5) As soon as the "leader" tone is recognized by the DSX, the display will change to read "PLAYING DATA". When the information transfer has been completed, the display will read "DATA COMPLETED".

6) If an error is detected, the display will read "ERROR IN DATA".

*** NOTES ***

If the MEMORY PROTECT SWITCH on the rear panel of the DSX is switched ON, the display will read "MEM. PROTECTED" and the data will not be transferred.

Some cassette recorders invert the phase of the signal in the process of recording and playing back. If your cassette recorder NEVER plays data properly, the inverted phase may be the problem. The software version 2.22 enables inverted data to be read properly by the DSX Cassette Interface. To set the DSX to read inverted data, press the STEP button after pressing PLAY but before starting the data tape (while the display reads, "START DATA TAPE"). The STEP light will stay on, indicating that the DSX is expecting inverted data.

TO CHECK TAPES:

The CHECK function of the Cassette Interface enables verification of the data on a tape without actually transferring the data into the DSX's memory. A tape should always be checked after recording.

1) Connect the Cassette Recorder to the Cassette Interface Jacks on the rear panel of the DSX as described in the "CONNECTIONS" section, above.

2) Enable the Cassette Interface by throwing the switch on the rear panel.

3) Press the CASSETTE CHECK switch on the DSX (it shares a button with the REPLACE switch). The display will read "START DATA TAPE".

4) Press the PLAY switch on the tape recorder. You will now be able to monitor the tape through the speaker inside the DSX.

5) As soon as the "leader" tone is recognized by the DSX, the display will change to read "CHECKING DATA". When the information transfer has been completed, the display will read "DATA COMPLETED".

6) If an error is detected, the display will read "ERROR IN DATA".

** NOTES **

Once the leader tone has started and the display reads "PLAYING DATA" or "CHECKING DATA", the cassette interface must complete its cycle.

Some cassette recorders invert the phase of the signal in the process of recording and playing back. If your cassette recorder NEVER checks data properly, the inverted phase may be the problem. The software version 2.22 enables inverted data to be read properly by the DSX Cassette Interface. To set the DSX to read inverted data, press the STEP button after pressing CHECK but before starting the data tape (while the display reads, "START DATA TAPE"). The STEP light will stay on, indicating that the DSX is expecting inverted data.

## POSSIBLE CAUSES OF TAPE TRANSFER ERRORS

If errors are found during the play or check process, the display will read "ERROR IN DATA". If this happens, one of the following reasons might be responsible:

A) The playback volume is too high or too low. Some trial and error may be required. Generally the best level is as high as possible before distortion occurs (approximately 3/4 of the way up). If the playback volume is very low if the tape recorder is connected incorrectly, the DSX will not acknowledge the data at all, and the display will continue to read "START DATA TAPE".

B) The leader tone is too short. At least three seconds of the "leader" tone must come between pressing PLAY and the rough sound of the memory information.

C) The tone control may be set improperly. It is important that the tone control(s) be set so that neither the high nor the low frequencies are attenuated.

D) Some cassette recorders invert the phase of the signal in the process of recording and playing back. If your cassette recorder NEVER checks or plays data properly, the inverted phase may be the problem. The software version 2.22 enables inverted data to be read properly by the DSX Cassette Interface. To set the DSX to read inverted data, press the STEP button after pressing PLAY or CHECK but before starting the data tape (while the display reads, "START DATA TAPE"). The STEP light will stay on, indicating that the DSX is expecting inverted data.

E) The playback head azimuth of the tape recorder may be out of alignment. This will only affect recordings made on other tape recorders.

F) The Batteries in the cassette machine are too weak.

G) There is a bad spot on the tape.

H) Sometimes tape errors are caused by poor recordings. Set the recording level manually if possible, and use a LINE or AUX input if available.

The Cassette Interface is designed to work with portable cassette recorders having an "Earphone", "Speaker", or "Monitor" output. The Interface is not designed to work with tape recorders having only a line level output.

The DSX contains a rechargeable battery that maintains power to the memory even when the DSX is unplugged. This way you can turn off the power and not lose your sequences, much like the battery backup in the OB-Xa Polyphonic Synthesizer. However, the memory in the DSX is much larger, and as a result a rechargeable Nickel-Cadmium battery is used.

With normal use the battery will rarely be drained completely, since the battery is able to maintain power to the memory for several weeks, when fully charged. However, if the battery does become completely discharged, leave the DSX plugged in and turned on for 14 hours to fully recharge the battery.

As a safeguard, you may wish to record important sequences onto cassette, using the Cassette Interface.

## STOP/PLAY FOOTSWITCH

The STOP/PLAY FOOTSWITCH is designed to be used with a "momentary on switch like the S-OBX, available from your dealer. Use of the footswitch enables several other convenient methods of recording and playback.

### PLAY/STOP

Pressing the Footswitch from STOP places the DSX into PLAY. Pressing the switch again stops the sequence. This function is a bit different than the STOP/CONTINUE button on the front panel which continues to play the sequence from where it stopped. The Footswitch always starts the sequence or merge from the beginning.

### INSTANT RECORDING

If the DSX is in the RECORD READY mode (RECORD light flashing), pressing the STOP/PLAY FOOTSWITCH will cause the DSX to immediately start recording, without counting down the 4 free beats.

### RECORD TO PLAY

If the DSX is in RECORD, pressing the Footswitch will stop recording and jump immediately into PLAY and playback what was just recorded.

## HOOKUP TO OTHER SYNTHESIZERS USING THE CVs AND GATES OUT

The eight independent CONTROL VOLTAGE (CV) and GATE outputs on the rear panel allow the DSX to control other synthesizers. They may be used individually with monophonic synthesizers such as the Oberheim OB-1, and/or in combination to control polyphonic synthesizers such as the Oberheim Eight-Voice and Four-Voice. The eight CV and GATE outputs are played from the OB-Xa (OB-SX, OB-X) keyboard.

Connect the desired CV OUT on the DSX to the CV IN or other appropriate input on your synthesizer, such as the input to the Voltage Controlled Oscillator (VCO). Connect the adjacent GATE OUT on the DSX to the GATE IN or other appropriate input on your synthesizer, such as the trigger input on the envelope generator.

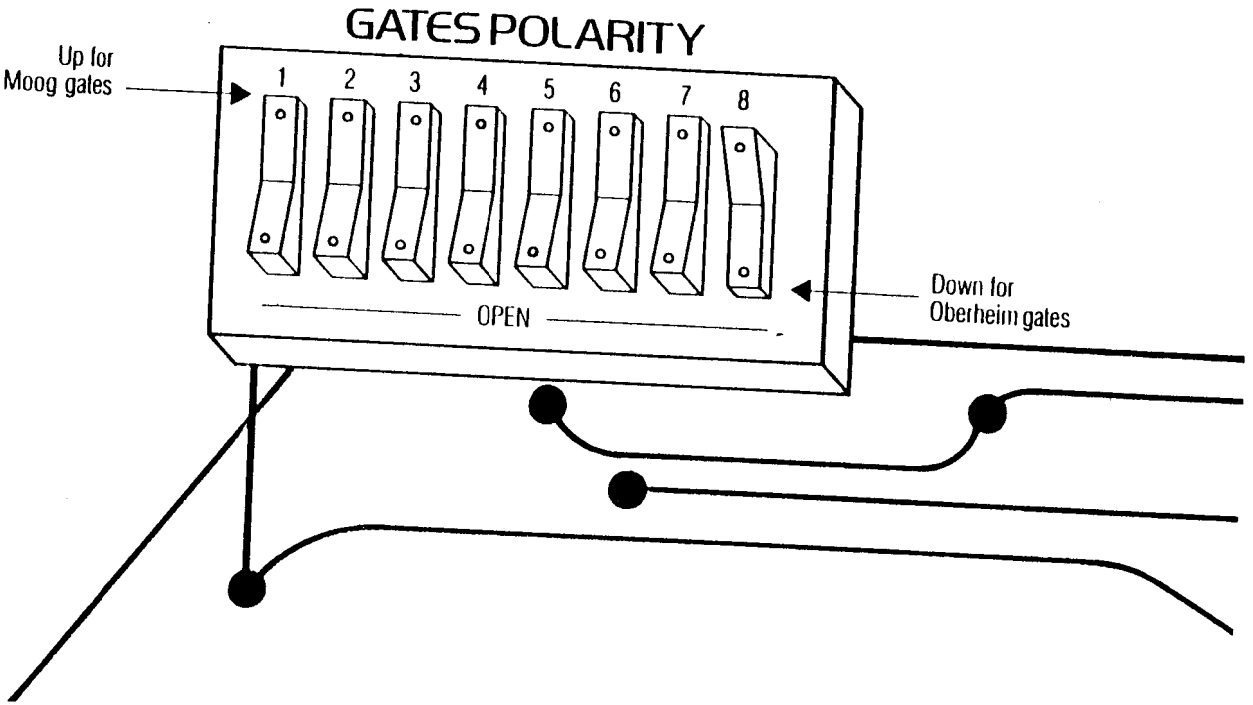
The GATEs OUT come from the factory set to be compatible with Oberheim, and other synthesizers that utilize a gate pulse that goes HIGH (+10 volts) when gated. Moog synthesizers use a gate pulse that goes LOW (0 volts) when gated (S-Trig). To use any of the GATEs OUT with Moog synthesizers, it is necessary to change the polarity of the gate. This is easily done. Remove the two phillips head screws at the front of the sequencer, and lift up the front panel. At the top left hand side of the switch board (the top board), is an eight position "DIP" switch, about the size of an integrated circuit, labelled, "GATES POLARITY". The small rocker switches should be pushed DOWN for Oberheim gates, and UP for Moog gates. Each switch affects only the corresponding GATE on the rear panel, and does not affect the data coming from the SYNTHESIZER INTERFACE, so you can use several different synthesizers with the DSX, and interface them all properly.

## RECORDING WITH EXTERNAL CVs AND GATES

Recording with an External CV is similar to recording with one of the voices through the computer interface. The main thing is that you cannot record on more than one of the external CVs at a time and you cannot mix voices and ext CVs on one Track. External CVs can be made to play polyphonically by copying a track recorded on Voices to be played by External CVs (see EDIT MODES).

When setting record assignments, you must select NO voices to be recorded on before the DSX will ask you which CVs you wish to record with.

## Dip Switch


GATES POLARITY
Up for
Moog gates
1
2
3
4
5
6
7
8
OPEN
Down for
Oberheim gates

Example 13: Record EXT CV 1 on Track 3 of Sequence 1:

| OPERATION: | PRESS: | DISPLAY READS: |
|---|---|---|
| Access record assignments | SEQUENCE | SELECT SEQUENCE |
| Assign sequence 1 to be recorded | 1 | SELECT RECRD TRK |
| Assign track 3 to be recorded on | 3 | SELECT VOICES |
| Choose voices to be recorded | (turn all lights off), then press SEQUENCE | SELECT EXT C-VS |
| (selecting NO voices to be recorded allows you to select an external control voltage) | | |
| Choose external CVs to be recorded | 1 | SELECT PLAY TRKS |
| Select tracks to be monitored | SEQUENCE | * OBERHEIM DSX * |
| Start recording | RECORD then PLAY | COUNT DOWN--4,3,2,1 |
| Play the keyboard | | NOTE NUMBER 0001 |
| Stop recording | STOP | * OBERHEIM DSX * |

While recording, the lowest note that is played will go to the assigned CV and NOT to the corresponding voice. Therefore, to hear what you are recording, it is necessary to monitor the external synthesizer.

Whenever the DSX is not in the PLAY, RECORD, or CASSETTE modes, the CVs and GATES will output whatever the Voices inside the synthesizer are playing. In other words, if C3 is played on the keyboard, and the OB-Xa's internal voice assignment system assigns it to Voice 1, that same note will also be assigned to CV 1 and GATE 1. If eight external voices are connected to the External CV outputs, then the eight external voices can be played simulaneously with the eight voices inside the synthesizer. This mode can be turned on and off by pressing and holding TRANSPOSE and then pressing DISPLAY. The display will read either "CV OUTPUTS ON" or "CV OUTPUTS OFF" depending on its previous state. This function does not affect recording or play back of tracks that have been assigned to the External CV outputs.

## ADDITIONAL USES FOR THE EXTERNAL CVs AND GATE

The eight CVs and GATEs OUT provide many possibilities for voltage control, in addition to those described above.

The CV Outputs of the DSX can be connected to the synthesizer's FOOT PEDAL inputs to control the Filter Frequency on the OB-Xa and OB-SX, as well as the Volume on the OB-X. Similarly, the GATE Outputs of the DSX can control the FOOT SWITCH inputs, Sustain, Hold, and Program Advance.

The Oberheim DMX Digital Drum Machine has CV and GATE inputs that can be connected to the CVs and GATEs OUT of the DSX. This allows you to play the drum sounds of the DMX from the keyboard connected to the DSX. For more information, consult the DMX Owner's Manual.

The CV and GATE Outputs can be used to control a modular synthesizer as well. For example, the CV OUT of the DSX would normally be connected to the CV IN of a Voltage Controlled Oscillator (VCO), and the GATE OUT of the DSX to the GATE IN of an Envelope Generator. By controlling a Voltage Controlled Amplifier (VCA) with the Envelope Generator, and connecting the output of the VCO to the SIGNAL INPUT of the VCA, a simple "voice" is created that will sound whenever a key is depressed.

Most synthesizer patches are quite a bit more complicated then the one just described, with several voltage controlled devices utilized. It is certainly possible to employ several of the CVs and GATEs OUT to control a single patch. One possibility would be to use a Voltage Controlled Filter (VCF), and control its frequency from a second CV output.

With proper interfacing, many other devices can be controlled by the CV and GATE outputs, such as automated mixing consoles, video synthesizers, lights, lasers, slide projectors, movie projectors, etc. The DSX CVs OUT have a range of 0 to +10 Volts, arranged so that one octave on the keyboard equals 1 Volt of control voltage.

The GATES OUT in the normal polarity (Oberheim gate) output +10 Volts when gated and 0 Volts when not gated. With the GATE POLARITY reversed (for Moog gates), the Gate Voltage is 0 Volts when gated and +10 Volts when not gated.

## SYNCHRONIZING TO THE DMX DRUM MACHINE AND OTHER DSX

The DSX and DMX have been designed to operate in sync with each other. When the DSX runs in tandem with a DMX or another DSX, one unit must be the master and the other the slave.

HOOKUP

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.

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 DSX and DMX have the same TEMPO programming. Recordings may be made separately and synchronized later.

To Record, press RECORD and PLAY as before. The only difference here is that recording on the slave will not start until the master is started. When utilizing the remote start feature of the DSX, only the RECORD button need be pressed.

The slave DSX will recognize incoming clock pulses and automatically enter the PLAY mode whenever clock pulses start. If the DSX does not see any pulses for 125 milliseconds (1/8 second), it will automatically STOP. These features allow the DSX to be remotely started and stopped by the external clock pulse.

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

The remote start and stop functions can be defeated by using a cable with stereo phone plugs at each end.

** NOTE **

The clock in the DSX requires 96 pulses per quarter note in order to achieve its high resolution, therefore a click track or a clock from an analog sequencer will most likely not be fast enough to drive the DSX properly.

The DSX has been designed to sync to tape as well. Sync to Tape is achieved by recording a sync tone from the SYNC OUT jack on the Rea Panel on to a track of a tape recorder, and then playing it back in the SYNC IN jack.

RECORDING THE SYNC TONE

The DSX will output the sync tone only while in RECORD or PLAY. In STOP or other modes, the output will be a leader tone like the cassette interface. Make sure the tempo that is set on the DSX is the proper tempo, because the tempo will be governed by the sync ton when playing back. As a result, the DSX will respond to changes in the tape speed within a range of about 20% up or down.

Start recording the leader tone on your tape recorder. To reduce crosstalk between the tone and other tracks, you may wish to record the tone at a reduced level. Press PLAY on the DSX 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. When the DSX finishes playing, the leader tone will return.

PLAYING BACK THE SYNC TONE

Press PLAY on the DSX, and then start the tape recorder. The DSX will wait to start playing until the chattering sound starts. The DSX will continue to play until the chattering sound stops.

RECORDING WHILE SYNCHRONIZED TO TAPE

Recording onto the DSX while syncing to tape is much the same as normal recording. Set Record Assignments, press RECORD and PLAY on the DSX, then start the tape recorder. The DSX will wait to record until the sync tone on the tape starts. There will not be a four click countdown as there is normally and the DSX will not record beyond where the sync tone stops.

HINT:

If you are going to be recording on the DSX while synchronized to tape, you might consider recording sync longer than you need just to be safe. The DSX will stop at the end of a sequence or merge even if the sync tone continues.

## A WORD ABOUT SEQUENCERS AND MICROPROCESSORS

A sequencer "remembers" a series of sequential events. After the events have been stored in memory, the sequencer sends them to the output, one at a time. A sequencer does not remember pitch, but only information that can be used by a Voltage Controlled Oscillator (VCO) to oscillate at a desired pitch.

Analog sequencers, like the Oberheim Mini-Sequencer, use a series of potentiometers to "store" the sequence of voltages. A digital sequencer, like the Oberheim DS-2, converts the voltages coming from the keyboard into a series of numbers, and then stores the numbers. When playing back, the digital sequencer converts the numbers back into voltages.

The design of the Oberheim X-series of synthesizers incorporates a microprocessor to take over many of the functions previously handled by direct voltage control. For example, in previous synthesizer designs, the output of the keyboard was a voltage that increased by exactly 1 Volt Per Octave. In the X-series the output of the keyboard is not a voltage, but a number from 0 to 60, representing the 61 keys on the keyboard. The microprocessor stores the number in the Random Access Memory (RAM). After the microprocessor has looked at all of the keys, it takes the numbers from memory and assigns them to the eight voices, then converts them to voltages for the VCOs.

The DSX employs a second microprocessor that "talks" to the one inside the synthesizer. After the synthesizer has stored the numbers from the keyboard in memory, the microprocessor in the DSX takes the numbers from the synthesizer's memory and stores them in its own memory. This is how the DSX remembers which notes you have played. To play back, the DSX takes the numbers from its memory and puts them back in the synthesizer's memory. The synthesizer goes about its own business, looks into its memory to see if any notes were played, and finding the numbers the DSX has placed there, assigns them to the voices and then converts them to voltages for the VCOs.

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

ADDRESS

An ADDRESS is a location where a particular piece of information (DATA) is stored.

COMPUTER INTERFACE

A connection for communication (ie., input and output) between a computer and an external piece of equipment, in this case another computer. The computer in the DSX and the one in the synthesizer "talk" to each other via the COMPUTER INTERFACE.

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 DSX. If you do not specify which sequence to play, for example, the DSX will DEFAULT and specify that sequence 0 is to be played.

EPROM

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

GATE

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

MERGE

A combination of sequences.

MICROPROCESSOR

The MICROPROCESSOR is the "brain" of the computer. 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.

PARALLEL INTERFACE

A connection within a computer system that uses many lines (wires) at once to transfer information. (See schematic diagram for a complete description of those lines) A PARALLEL INTERFACE has the potential to transfer information more quickly than a Serial Interface, which uses essentially one line to transfer information.

PART

In the DSX the term PART refers to a segment of a Merge. Each Sequence recorded in a Merge adds another PART to the Merge. There is no set limit to the number of PARTS that a Merge may contain, however each PART must be one of the ten Sequences.

PROMPT

A statement which appears on the display when the DSX needs information from you; for example, which sequence to play, which track to record on, etc.

QUANTIZE

A process of rounding off, in the case of the DSX the rhythms that are played, to the closest specified increment. In the DSX, your recordings can be QUANTIZED to the nearest Quarter note, Eighth note, or other smaller subdivisions down to a Thirty-Second note.

RANDOM ACCESS MEMORY (RAM)

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 DSX, that includes notes, patches, sequences, etc.

REAL TIME

That which is perceived as instantaneous. The DSX continually performs many individual operations, each of which takes time to complete. Yet the DSX appears to operate in real time.

SEQUENCE

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

SOFTWARE

The computer program or instructions that the computer follows to do its assigned task. In the DSX and X-series synthesizers, the SOFTWARE is stored in EPROMS located on the circuit boards.

INTERFACABLE SYNTHESIZERS: Oberheim OB-Xa, OB-SX, OB-X via the computer interface; any synthesizer with 1 Volt/Octave Control Voltage Input and Gate Inputs (Oberheim or Moog) via the External CV and Gate Outputs (requires Oberheim External Keyboard if not used with an Oberheim X-Series Synthesizer)

NUMBER OF NOTES: UP TO 6000 (assignable to any sequence)

NUMBER OF MERGES (COMBINATIONS OF SEQUENCES): 10
MAXIMUM NUMBER OF SEQUENCES IN A MERGE: practically unlimited

NUMBER OF VOICES CONTROLLABLE BY THE DSX: 16
8 via the computer interface
8 via the External CV and Gate Outputs

TEMPO RANGE: 25-250 Beats per Minute

MINIMUM NOTE LENGTH: 2.5 Ms.
MAXIMUM NOTE LENGTH: 27 Min.
MAXIMUM SEQUENCE LENGTH: 112.5 Days

RECORDING MODES:
Real Time: (1/384 note resolution)
Quantize: between 1/2 Note and 1/32 Note

POWER: 95-130, 200-260 Volts AC, 50-60Hz, 12 Watts

DIMENSIONS: 18"(45.7cm, wide, 11.8"(30cm) deep, 5"(12.7cm) high

WEIGHT: 10 lbs. (4.5kg,

DSX Revision 3.01 Software
Operation Guide
4/1/84

Since its release in October 1982, the Oberheim DSX Digital Polyphonic Sequencer has established itself as the premier music programming peripheral. As the cornerstone of the Oberheim Music System, the DSX has changed the way music is recorded and performed around the world.

After many months of programming and testing, new computer software for the DSX is available. The DSX software revision 3.01 adds many new features and improves the operation and reliability of any DSX.

This document assumes that the reader is already familiar with the DSX. Consequently, only changes in the DSX operation are discussed here. For more information about the DSX, read the DSX Owner's Manual.

## NEW FEATURES:

### 1. PUNCH IN

Any track (except track 0) can now be edited by punching in and out and playing new notes, much like a tape recorder but with a few twists. This works as following:

1) While in PLAY, if RECORD is pressed, the currently selected track will begin erasing what was there and recording whatever new notes are played (like punching in on a tape recorder).

2) Once in RECORD, if RECORD is pressed again, the selected track is punched out and the sequencer continues to play. Any notes remaining on the track after punching out remain intact (like punching out on a tape recorder).

3) Once in RECORD, if STOP is pressed, or if the sequencer is stopped by external clock or sync pulses, the selected track is punched out and the sequencer stops. Any notes remaining on the track after punching out remain intact.

4) Once in RECORD, if PLAY is pressed, the selected track is punched out. Any remaining notes are erased and a new end time is recorded for the selected track. This is useful for making a track end sooner than was previously recorded.

5) If FAST PLAYTRACKS is on (see SELECT OPTIONS, below), punching in will cause the current track to immediately start erasing notes, and notes that were sustaining will be cut short (just like a multitrack tape recorder). If FAST PLAYTRACKS is off, the current track will erase new notes, but notes already playing at the punch in point will continue to sustain until the notes reach their release time. This allows for punch ins to overlap because new notes can be recorded while the existing notes continue.

6) If a sequence is in LOOP, and a track is punched in and out before the end of the sequence, the sequence will loop as normal and will play the new notes that were punched in. If the track has not been punched out by the end of the sequence, the track will remain in record and the sequence will not loop until finished recording. This allows for extending the end time of a track if desired.

7) If Track 0 is being played back while recording, the track will automatically punch out at the end of track 0, and if LOOP is on, the track will start playing back. This is quite useful because the track can be punched in and out repeatedly without stopping.

THINGS TO KEEP IN MIND WHEN USING PUNCH IN:

1) If no track has been selected, the RECORD switch is ignored.

2) Only the track currently selected will be recorded over when punching in.

3) Only one punch in is allowed each time a sequence plays or loops.

4) If memory protect is on, punch in is ignored.

5) If memory runs out after punching in, the display will read NO MEMORY LEFT! and it will punch out at that point. All remaining notes will remain intact. It is necessary to have enough memory for the current track AND the new notes you plan to play.

6) If a sequence is looped after punching out, and alot of notes were recorded, the DSX may hesitate slightly before looping the sequence. This is normal due to the large amount of memory management required after punching in. This delay will not occur when playing the sequence back again. If the DSX is being clocked from a DMX, the DSX will immediately catch back up and play in time with the DMX after the slight delay.

## 2. SELECT OPTIONS

A new "page" has been added to the SELECT MODE button and is called SELECT OPTIONS. It is accessed by pressing the MODE button three times. These options allow you to turn on or off many of the new features of the DSX. These options remain in memory when power is turned off. There are 12 option functions addressed from the 0-9 buttons, the SPEED buttons, and the EDIT MODE switch. The current status of each switch is shown on the switch LEDs, or when DISPLAY is pressed. The options are:

(0) CV OUTPUTS ON/OFF

This switch turns on or off the CV and GATE outputs while the DSX is in STOP mode. When the CVs are on, the eight CV outputs will output exactly what the eight voices of the OB-8 are playing. When the CVs are off, they will do nothing while in STOP mode. This switch will not affect any CVs that are playing from a sequence. In older software revisions, This feature used to be selected with the TRANSPOSE and DISPLAY buttons.

(1) COUNT DOWN ON/OFF

This switch turns on or off the four beat count down before recording. When it is off, record is entered right away without a count off. When it is on, the DSX will count four metronome clicks before recording. This feature also enables a countdown while clocked to an external source, such as a DMX.

(2) CLIK IN PLAY ON/OFF

This switch turns the metronome on or off while in PLAY mode. The metronome is always on while in RECORD mode, but will be on in PLAY only if this switch is on.

(3) EXT CLOCK IN ON/OFF

This switch enables or disables the EXTERNAL CLOCK input of the DSX. When the switch is on, the DSX will only play if a clock signal is present at the clock input. When it is off, the DSX will play from its internal clock, regardless of whether or not anything is plugged into the external clock jack. When something is first plugged into the external clock jack, the external clock mode is automatically enabled, and the count down is automatically turned off. When the external clock is unplugged, the external clock mode is automatically disabled, and the count down is turned back on. This is so that these functions stay consistant with previous software versions, and to simplify the operation of the sequencer.

(4) SYNC-TO-TAPE ON/OFF

This switch enables or disables the SYNC TO TAPE function. The EXTERNAL CLOCK and the SYNC TO TAPE cannot be on at the same time, and the EXTERNAL CLOCK takes priority. Like the external clock, when a jack is first plugged into the SYNC TO TAPE input, the SYNC TO TAPE is turned on and the count down is turned off. When the jack is unplugged, the SYNC TO TAPE is turned off and the count down is turned on.

(5) FAST TRK SEL ON/OFF

When FAST TRACK SELECT is off, the DSX functions the same as its previous software versions, e.g. when a playtrack is turned off while playing, any notes that were sustaining will continue to sustain until they reach their release time. When FAST TRACK SELECT is on, a playtrack will cut off immediately when turned off. This feature can be used in conjuction with PUNCH IN to alter sustain times for individual notes and to allow overlapping punch ins (see "PUNCH IN", above).

(6) FAST TRNSPOS ON/OFF

When FAST TRANSPOSE is off, the DSX functions the same as its previous software versions, e.g. when a transpose key is selected while playing, only new notes will be transposed, and sustaining notes will remain in the old key. When FAST TRANSPOSE is on, all notes will transpose immediately when a new transposition is selected.

(7) PRGM CHANGES ON/OFF

When PROGRAM CHANGES is on, The DSX will function the same as its previous software versions, e.g. when a program change has been recorded onto track 0, it will be played back. When PROGRAM CHANGES is off, program changes will still be recorded into track 0, but they will <u>not</u> be played back. The end time and the programmed tempo of track 0 will still be played back.

(8) REMOTE START ON/OFF

When REMOTE START is on and external clock or sync to tape is on, the DSX will jump into play automatically if an external clock or sync pulse is present, and stop automatically if the clock or sync pulse stops. When REMOTE START is off, the DSX will only play or stop when the front panel switches are pressed. When sync to tape is used with this feature, synchronizing the DSX to a sync tone is greatly simplified, although it is possible for noise on the tape track to cause false triggers when no sync tone is present. Once the sync leader tone has been detected, the DSX will remain in STOP until the timing pulses start.

(9) PUNCH FOOTSW ON/OFF

This option enables punching in and out with the footswitch. When PUNCH FOOTSWITCH is off, the footswitch operates in its original manner, e.g. press once to play, once to stop. When PUNCH FOOTSWITCH is on, pressing the footswitch in STOP mode puts you in PLAY, pressing it while in PLAY punches into RECORD and pressing it while in RECORD punches out to PLAY. A record track must be selected in order to punch in or out. The footswitch can be used to punch in while clocked by an external source. See PUNCH IN, above.

(SPEEDS) SYNC OFFSET

It is possible to make the DSX play ahead of the timing source (internal clock, external clock, or sync to tape). Pressing both SPEED buttons while in SELECT OPTIONS mode displays "x/384 NOTE AHEAD". The DSX can be set to play from 0 to 9/384th notes early. 1/384th note is the speed of the Oberheim System timing clock, frequently described as 96 pulses per quarter note. At a tempo of 125 Beats per Minute, one clock pulse equals 5 milliseconds; at 25 BPM a clock pulse is 25ms.; at 250 BPM a clock pulse is 2.5ms. This is an "advanced" feature, and is best used by "feel" so that the timing of a sequence sounds right. For example, if a brass sound is used on the synthesizer and it has a fairly slow attack, it may be desired to put the DSX "ahead" of the beat so that the attack of each note can start BEFORE the beat.

In RECORD, the sync offset is ignored so that recordings are made properly. Also, there is no offset on the CLOCK OUT and SYNC OUTputs of the DSX.

(EDIT MODE) CVS TO OB-8 MIDI

Pressing the EDIT MODE button while in Select Options mode allows you to select CVs to be "echoed" to the OB-8's MIDI OUTput. The display reads "CVS TO OB-8 MIDI". Any combination of individual CVs can be selected to be echoed to the OB-8 MIDI, by pressing the 1-8 buttons. This allows you to control additional MIDI synthesizers from the DSX through the OB-8 MIDI output. Any CVs that are selected will be sent out of the OB-8 MIDI OUT, and none of the notes being played by the OB-8 will be sent to the MIDI OUT. Now, any tracks assigned to CVs will be played by the synthesizer hooked to the OB-8 MIDI OUT.

All CV notes will still appear at the appropriate CV and GATE OUTputs of the DSX. If NO CVs are selected to be echoed, the MIDI OUT will echo the VOICES being played by the OB-8.

If OMNI MODE on the OB-8 is ON, the selected CVs will appear on the selected MIDI channel of OB-8's MIDI OUT. If OMNI MODE is OFF, then the CVs will appear on one of two MIDI channels depending upon the Split Point of the OB-8. All CVs playing above the OB-8's Split Point will appear on the selected MIDI channel. All CVs playing below the the Split Point will appear on the selected MIDI channel plus 1.

In this way, the DSX can control many synthesizers independently: The OB-8 can play two independent parts in Split Mode, a second OB-8 connected to the first OB-8's MIDI OUT can play the selected CVs that occur above the Split Point, a third OB-8 can be connected to play the CVs below the Split Point, in addition to monophonic synthesizers connected to the CV and GATE outputs of the DSX.

EXAMPLE OF USING TWO OB-8s CONTROLLED FROM ONE DSX:

Connect the Master OB-8 (synth A) to the DSX. Connect the MIDI OUT of synth A to the MIDI IN of the Slave OB-8 (synth B). Any notes played on synth A will be played on synth B (if not, go to "CVS TO OB-8 MIDI" as described above and turn all 8 CVs OFF). Place both synths in OMNI ON (switch C lit on PAGE 2). Select a record track, assign it to VOICES 1-8, and record something on synth A while listening to synth B. After recording, reassign this track to CVs 1-8. Go to option "CVS TO OB-8 MIDI" and turn on 1-8. Press PLAY. The track that was recorded should now only play on synth B. Select a new track and assign it to VOICES 1-8. Record on synth A. Play back both tracks. The first will be played only by synth B, and the second track will only be played by synth A.

Note that this function will only work on DSXs connected to OB-8s with the MIDI option installed and revision B4 or above OB-8 software. For more information, see the OB-8 MIDI interface addendum.

3. COPYING TRACKS

Any track can now be copied to any other track by using EDIT MODE 5. While in STOP and MERGE is off, press the EDIT MODE button. Now press the 5 button (this used to be "COPY VOICES TO CVS"). The display will read "COPY A TRACK" while 5 is being held, and then "COPY FROM TRK *" when 5 is released. Select a track (0-9) from the currently selected sequence. When the numbered switch is pressed, the "*" will be replaced by the track number selected. When the switch is released, the display will read "TO SEQ *". Select the destination sequence and the "*" will be replaced by the sequence number. When the sequence number has been released, the display will read "TO SEQ n TRACK *", n being the selected sequence. Select a destination track and the "*" will be replaced by the track number, and the track will be copied. The old destination track will no longer exist, since the new track was copied over it.

STOP or EDIT can be pressed at any time in order to abort the copy. If track 0 has been selected to be copied, it can only be copied to another track 0. If track 1-9 has been selected to be copied, it can be copied to any track but track 0. If there is not enough room in memory to copy a track, the display will read 'NO MEMORY LEFT!'.

TRANSPOSING COPIES

If a key on the OB-8 is pressed while holding the destination track number (the last number pressed), the track will be transposed up by the interval from the bottom of the keyboard to the key being held when it is copied. It is possible to copy a track to itself in order to transpose it. This transposition is now permanent for the copied track. This is useful for copying bass lines to be played in octaves, etc.

## 4. APPENDING TRACKS

Any track can be appended (connected) to any other track by using EDIT MODE 6. The display will read "APPEND A TRACK" until the 6 is released, afterwhich the operation is identical to copying tracks. The display will read "APPEND FROM TRK*". Select a track using the 0-9 buttons and the "*" will be replaced by the track number. When the number is released, the display will read "TO SEQ *". Select the destination sequence using the 0-9 buttons and the "*" will be replaced by the sequence number. Release the number, and the display will read "TO SEQ n TRK *". Select the destination track using the 0-9 buttons: the "*" will be replaced by the track number, and the append will be executed.

If the destination track is empty, the track will be appended starting at the beginning of the sequence (this is the same as copying). If the source track is empty, nothing will happen. If track 0 is selected to be appended, it can only be appended to another track 0, and if tracks 1-9 are selected to be appended, they can only be appended to tracks 1-9.

A track can be appended to itself to make it twice as long.

TRANSPOSING APPENDS

If a key on the OB-8 is pressed while holding the destination track number, the appended part of the track will be transposed up by the interval from the bottom of the keyboard while being appended.

## 5. COPYING SEQUENCES

Any sequence can be copied to another sequence by using EDIT MODE 7. The display will read "COPY A SEQUENCE" while the 7 is being held down, and then "COPY SEQ n TO *" when it is released. The 'n' will display the current sequnce number. Select the destination sequence: the "*" will be replaced by the destination sequence number, and the copy will be executed. Any data in the destination sequence will be erased, since the new sequence is copied over it. Because of the large amount of memory being processed, the execution may take several seconds.

TRANSPOSING COPIED SEQUENCES

If a key on the OB-8 is pressed before releasing the sequence number, the sequence will be transposed by that key. It is possible to copy a sequence to itself in order to transpose it.

RUNNING OUT OF MEMORY WHILE COPYING A SEQUENCE

If there is not enough room in memory to copy any tracks of a sequence, the display will read "OUT OF MEMORY!" and will not alter anything. If there is room to copy some of the sequence's tracks, the display will read "COPY THRU TRK *", the "*" being the last track of the sequence that was copied. All of the remaining tracks will still contain their previous data.

## 6. COPYING MERGES

Any merge can be copied to another merge by using EDIT MODE 8. The display will read "COPY A MERGE" while the 8 is being held down, and then "COPY MERGE n TO *" when it is released. The "n" will display the current merge number. Select the destination merge and the "*" will be replaced by the destination merge number. If there is not enough room in memory to copy the merge, the display will read "OUT OF MEMORY!" and will not alter anything.

## 7. REASSIGNING VOICES OR CVS

The voice assignments for a track can now be changed AFTER a track has been recorded. The procedure is the same as selecting voices before: After selecting the desired sequence and record track, "SELECT VOICES" or "SELECT EXT CVS" as desired. The difference is that now the voice assignments can be changed at any time and the track will play on the newly assigned voices or CVs.

Any number of CVs can be assigned to a track but recording can only take place on one CV. If a track assigned to more than 1 CV is recorded on, it will only record to the lowest numbered CV monophonically. The recommended method for recording polyphonically to CVs is to record the track assigned to VOICES and then change the voice assignments to the desired CVs.

It is possible to reassign a track with fewer voices than it was recorded with. If there are more notes to be played than voices assigned, the extra notes will not be heard.

## 8. PLAY MODE FROM "SELECT PLAY TRACKS"

PLAY can now be entered from the SELECT PLAYTRACKS mode by pressing the PLAY button. The DSX will stay in select playtracks while playing. NOTE: The DSX will only Auto-Start from STOP.

## 9. PLAYING SUCCESSIVE MERGES

A new merge can now be selected while playing a merge. If the 0-9 buttons are pressed while a merge is playing, the newly selected merge will play after the current merge is through. If a new merge is selected and PLAY is pressed before the old merge is finished, the new merge will begin right away. This operation is identical to changing sequences while playing.

## 10. DISPLAYING PLAY TRACKS WHILE PLAYING A MERGE

Play tracks can now be displayed while playing a merge. If the SEQUENCE button is pressed while playing a merge, the current playtracks will come up on the 0-9 leds, just as when playing a sequence. If the merge has been programmed to turn on or off certain playtracks at different parts of the merge, the lights will show which tracks are on or off at any given time. The current tracks being played can be altered by pressing the 0-9 buttons. Any changes will not affect the programming of the merge, and when the next part of the merge is played, the playtracks for the new part will be recalled and displayed. The length of each sequence in a merge is determined by the length of the tracks that are currently on, so that if all recorded tracks in a part of a merge are turned off, the merge will immediately advance to the next part.

## 11. LOADING INDIVIDUAL SEQUENCES AND MERGES FROM TAPE

Individual sequences and merges can now be loaded into the DSX from cassette tape. Enter CASSETTE MODE. To load in a single sequence, press the sequence number before pressing cassette PLAY. Press PLAY and play in the cassette all the way through. The sequence selected will be loaded into memory, and all other sequences and merges will remain untouched. Any old data in the selected sequence location will be erased even if the new data loads improperly. If there is not enough room in memory, the DSX will load in as many tracks as possible and then display "OUT OF MEMORY!".

To load in an individual merge, follow the same procedure as above, but press the MERGE button and then the merge number before pressing PLAY. Remember that a merge does not contain any notes, but only of list of sequences to be played. Therefore, all sequences used in a merge must be loaded into memory in order to make the merge play properly.

NOTE: Selective loading of sequences and merges can only be made from Revision 3.01 cassettes. To convert an old tape to 3.01, load the old tape into memory, and then re-save it again. The tape will have the same data, but it will now be a Rev 3.01 cassette.

## 12. IMPROVED RECOVERY OF BAD CASSETTE TAPES

The new cassette format includes an ID for each track, which enables loading individual sequences and merges, and also allows cassettes with bad sections to be loaded in, so that any good tracks can be recovered. After a bad cassette has been loaded in, the display will read "ERROR IN DATA" but most of the data in memory will be valid. Whichever tracks had the errors on the cassette will no longer exist, but all others will be intact.

LOADING OLDER REVISION CASSETTES

The Revision 3.01 DSX software will read tapes made on any DSX, but older (before revision 3.01) DSXs cannot read the new cassettes. Older DSXs must be updated to revision 3.01 before the new tapes can be loaded in.

## 13. POWER ON STATUS

The DSX will now turn on in whatever state it was in when power was turned off. Whatever sequence, merge, or track had been selected, whatever quantize, metronome, or tempo setting when power was turned off, all of these settings will remain the same when power is turned back on.

## 14. OPERATING THE DSX WITHOUT A SYNTHESIZER

The DSX can now be operated without being connected to the OB-8. The message "CONNECT SYNTH" no longer exists. Instead, the message "* OBERHEIM DSX *" will read "! OBERHEIM DSX !" when the synth is disconnected. All functions will operate as normal, although recording notes is naturally impossible without a synthesizer being connected to the computer interface. This feature is useful if it is desired to play just the CV and GATEs without having to connect the OB-8.

## CHANGES OF OPERATION:

1. CV OUTPUTS ON/OFF used to be switched when pressing DISPLAY while holding TRANSPOSE. This is now switched on the new "SELECT OPTIONS" page (see "NEW FEATURES").

2. The AUTO START feature of the External Clock used to be turned on or off by using a stereo or mono clock cable. This is now switched on and off from the new "SELECT OPTIONS" page (see "NEW FEATURES"). This feature is used to make the DSX jump into play when the DMX or DX is started, and has now been expanded to allow automatic starting from a Sync-to-Tape tone as well.

3. The 5 scrolling help display messages have been eliminated to make room for new features. Pressing DISPLAY while in stop now always shows the number of notes left in memory. Previously, the available notes could only be displayed when in "record ready" (RECORD led flashing). The 5 messages that are gone were accessed when DISPLAY was pressed while in STOP, MERGE, MERGE EDIT, SELECT SEQUENCE, and SELECT RECORD TRACK. Multiple choice functions such as selecting the Quantize or Click value will still display the possible choices by pressing DISPLAY.

4. The DSX will now only recall the tempo of a sequence in a merge if playtrack 0 for that sequence is turned on. This has no effect when clocking externally.

5. Edit mode 5 (COPY VOICE TO CVS) no longer exists. The CV assignments (SELECT EXT CVS) now allow multiple CVs to be selected at one time. Since voice assignments can now be changed after a track has been recorded (see below), copying a voice track to CVs can be accomplished by reassigning the voices to CVs with the SEQUENCE button.

6. The DSX will no longer automatically turn on all playtracks when a new sequence has been selected while in play. The playtracks will remain in their previously selected state.

7. If a track is recorded in real time while being clocked from the DMX, and the DMX is in song mode so the end of the song sets the end of the track, the DSX will end exactly on the beat. Previously, the DSX would be behind by one clock pulse if this method was used.

8. The SPEED buttons will no longer change the tempo at one constant speed while in stop. They will change the tempo up or down once each 1.2 seconds until it has changed the tempo four times, after which the tempo will change seven times a second. This makes it much easier to get from one tempo to another.

9. The DSX will no longer skip playing a note whose start time was before the end time of the previous note assigned to the same voice. This problem would usually occur when recording a monophonic track to a CV using a quantized mode. While recording in quantize mode, if a note is played late it is automatically moved forward to make it in time. If this note's start time is now before the previous note's release time, the previous note's release time will be changed to be one clock before the new note's start time. Now, the new note will not be silenced by the previous note.