OWNER'S MANUAL

OB-8

OBERHEIM ELECTRONICS, INC.

SECOND EDITION

OB-8
POLYPHONIC SYNTHESIZER

OWNERS MANUAL

by

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Covering units starting with serial number C32726

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S A F E T Y   I N S T R U C T I O N S

CAUTION:
To Prevent fire or shock hazard do not expose this appliance to rain or moisture.

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 persuant 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.

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L I S T   O F   T A B L E S
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1. INTRODUCTION

CONGRATULATIONS!!!

And welcome to the OB-8. You have just purchased a state-of-the-art electronic music device. The OB-8 is easy to use, yet contains many features that allow for very precise sound synthesis.

A refinement and evolution of Oberheim's OB-X and OB-Xa, the OB-8 contains more features and better performance, with fewer parts, which means more reliability.

The most important functions on the OB-8 are available simply by pressing the desired button or turning the proper knob; yet there are many other less used functions that can be accessed indirectly, allowing control over many functions without the need for more knobs and buttons.

The OB-8 interfaces with the Oberheim DSX Digital Polyphonic Sequencer, which adds greatly to the OB-8's capability by recording and playing notes as well as patch changes.

As with any piece of equipment, the more that you know about it, the better you will be able to use it. So read this instruction manual often, to familiarize yourself with the capability of this instrument.

And experiment! You won't discover all of the OB-8's capability unless you do.

Good luck!

2. S E T T I N G   U P

1) First, make sure the 115/230 Voltage switch on the rear panel is set for the local AC power;

2) Apply power and plug into your sound system;

3) Press "AUTO" to tune all of the oscillators;

4) Select a programmed sound by pressing a GROUP (A thru D, or any combination) and a PROGRAM (1 thru 8);

5) Set the MASTER VOLUME control to an appropriate level.

6) Play!

2.1. Master Volume
You can adjust the output volume of the OB-8 with the MASTER VOLUME control in the upper left hand corner. This control simultaneously controls both the stereo outputs and the mono output.

2.2. Master Tune
The MASTER TUNE control allows the instrument to be fine-tuned to other instruments. When this control is within the "dead-zone" near the top center, the instrument is tuned to standard A-440 pitch.

2.3. Auto Tuning
The AUTO button activates the Autotune program. This program tunes the initial frequency and volts/octave (tracking) of the oscillators one at a time, and the PROGRAM lights will flash one after the other, to indicate which voice is currently being tuned.

While the Autotune program is running, the outputs and all controls are disabled. The Autotune program also calibrates the pitch bend lever for zero bend and the vibrato lever for zero vibrato. It is important that the levers be left alone during Autotune, so that the Autotune program can set the zero points accurately.

If a particular voice cannot be tuned by the Auto-tune program, the PROGRAM light representing that voice will flash for two seconds, and the computer will automatically disable the out-of-tune voice.

2.4. Pan Pots
The OB-8 comes from the factory with Voices 1-4 panned all the way to the left and Voices 5-8 panned all the way to the right. Each of the voices can be panned anywhere in the stereo outputs by setting the pan pots located on the right side of the unit.

3. USING THE PROGRAMMER
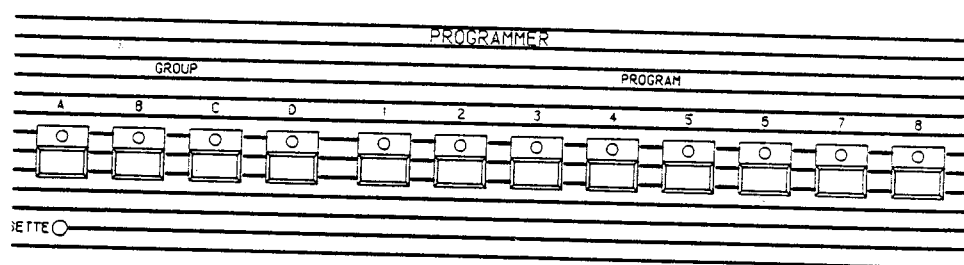
Fig. 3-1: Programmer Controls

There are two types of programs stored in the OB-8's memory:

> PATCH PROGRAMS that store sounds.
> SPLIT/DOUBLE PROGRAMS that store combinations of Patch
> Programs.

The OB-8 comes from the factory pre-programmed with 104 Patch
Programs, 12 Split Programs, and 12 Double Programs. These
include a great variety of sounds which will quickly acquaint you
with the capabilities of your instrument. The OB-8 Programmed
Patches book details these factory programs.

3.1. Recalling Patch Programs

The Patch Programs on the OB-8 are divided into 15 GROUPS of 8
PROGRAMS each. The 15 GROUPS are selected by pressing the four
GROUP buttons ("A", "B", "C", & "D") individually OR in any
combination ("AB", "AC", "BC", "ABC", "ABCD", etc.). The PROGRAM
within the selected GROUP is then selected by pressing one of the
eight PROGRAM buttons.

3.2. Modifying Patch Programs

Any sound recalled by the programmer can be modified (edited) by
changing the controls on the front panel.

The controls add to, or subtract from, the settings stored in the
computer program. For example, the release time of the LOUDNESS
ENVELOPE can be made longer than programmed simply by turning up
the RELEASE control on the LOUDNESS ENVELOPE. This feature allows
quick yet smooth modifications of existing programs. If it is
desired to further increase or decrease a control setting, and the
control is already at its maximum or minimum position, simply
rotate the control all the way in the opposite direction and then
make your desired setting.

Modifying the program does not change the program stored in the
OB-8's memory, and the original, unmodified sound program can be
recalled by pressing the appropriate PROGRAM button again.

For more information, see the sections titled "SOUND PROGRAMMING
CONTROLS" and "PAGE 2 CONTROLS".

3.3. Creating New Sounds

The OB-8 can be used to create completely new sounds, rather than alter existing sounds as described above, by using the MANUAL MODE. In MANUAL, the sound of the instrument will reflect the actual physical settings of the controls.

NOTE: The MANUAL MODE cannot be used while in SPLIT or DOUBLE modes, and the 2ND PAGE of controls have no effect (except for VOICE ENABLES -- see "PAGE 2")

3.4. Writing Programs

New, modified, or even existing programs can be written into the OB-8's memory. This is done with the following procedure:

1) Press and hold WRITE until the WRITE light comes on;
2) Select a GROUP (A thru D, or any combination)
3) Select a PROGRAM (1 thru 8).

The write operation actually occurs when the PROGRAM switch is pressed, with the WRITE light on.

NOTE: Before any programs can be written, the MEMORY PROTECT SWITCH on the rear panel must be OFF.

3.5. Moving Programs

It is possible to move a program from one program memory location to another. To do this, simply select the program you wish to move, and then write into the desired new program location, as described above.

4. SPLITS AND DOUBLES

The OB-8's normal configuration is that of a single 8 voice synthesizer. In Split or Double modes however, the OB-8 is divided into two separately programmable 4 voice synthesizers, called Lower and Upper. Any of the 120 Patch Programs can be recalled for the Lower or Upper synthesizers, or a combination "Split Program" or "Double Program" can be recalled.

4.1. Split And Double Functions

The KEYBOARD SECTION controls operate individually and in combination with each other to produce eleven different functions with just four buttons:
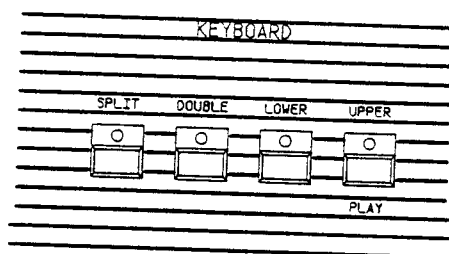
Fig. 4-1: Keyboard Controls

FUNCTION:	PRESS:	DESCRIPTION:
Enter Split Mode	SPLIT	When this button is pressed, the OB-8 enters the SPLIT mode. Pressing it again without any keys held down causes the OB-8 to exit the SPLIT mode.
Enter Double Mode	DOUBLE	When this switch is pressed the OB-8 enters the DOUBLE mode. Pressing the switch again causes the OB-8 to exit the DOUBLE mode.
Change Split Point	SPLIT (hold down) KEY (on the keyboard)	The key depressed is now the lowest note of the UPPER keyboard. This new SPLIT LOCATION will be remembered until a new split is entered, or a split is recalled from memory.
Display Lower Program	LOWER	The Lower Program can be edited or changed without affecting the Upper Program.
Display Upper Program	UPPER	The Upper Program can be edited or changed without affecting the Lower Program.
		NOTE: The MANUAL mode cannot be used when in SPLIT or DOUBLE.

FUNCTION:	PRESS:	DESCRIPTION:
Change Lower Transposition	SPLIT or DOUBLE (hold) LOWER (hold) KEY (on the keyboard)	The Lower Voices are referenced to the lowest "C" on the keyboard (C0). Transpositions may be made to any key. Pressing the "G" above the lowest "C" will transpose the Lower Voices up a fifth. Transpositions may be made in SPLIT or DOUBLE.
Change Upper Transposition	SPLIT or DOUBLE (hold) UPPER (hold) KEY (on the keyboard)	The Upper Voices are referenced to middle "C" on the keyboard (C2). Transpositions may be made to any key. Pressing the "C" below middle "C" will transpose the Upper voices down an octave.
Recalling Split Programs	SPLIT (hold) GROUP (A-D) or PROGRAM (1-8)	There are twelve SPLIT PROGRAMS which can be programmed and recalled. (see "SPLIT AND DOUBLE PROGRAMS", below).
Recalling Double Programs	DOUBLE (hold) GROUP (A-D) or PROGRAM (1-8)	There are twelve DOUBLE PROGRAMS which can be programmed and recalled. (see "SPLIT AND DOUBLE PROGRAMS", below).
Resetting Split Point & Transpositions	SPLIT or DOUBLE (hold) MANUAL	The SPLIT Location and Transpositions are reset to "normal" (Split Location at middle C, no transpositions). Balance and Lower Voices Detune are also reset.
Change Lower Voices Tuning	LOWER (hold) (turn:) OSC 2 DETUNE	The Lower voices can be detuned sharp or flat from the Upper voices. The LED above the OSC 2 DETUNE control will turn on when the Lower voices are detuned (only while holding the LOWER button).

Table 4-1: Keyboard Control Functions

All settings, including Patch Programs, Split Point, Transpositions, Balance, and Lower Voices Detune are remembered until the settings are changed, either by hand or by a Split or Double Program. When you exit the Split or Double modes, the OB-8 retains all of these settings; so that when you re-enter Split or Double, all of the settings will be recalled as they were when you were last in SPLIT or DOUBLE, even if the synthesizer was turned off.

4.2. Modifying Splits And Doubles
    In Split and Double there are two patches recalled: One for Lower, and one for Upper. Either patch can be modified or changed by displaying the desired patch (with the LOWER or UPPER button) and then changing the controls on the front panel.

4.2.1. Setting The Split Point
        Press and hold the SPLIT button, and while holding the SPLIT
        button, press any key on the keyboard. This key becomes the
        bottom note of the Upper synthesizer. The keyboard can be split
        anywhere, and is remembered until changed.

4.2.2. Setting Lower And Upper Transpositions
        Either half of the synthesizer can be transposed by any amount.

        The Lower half can only transpose up. To transpose the Lower
        half, press and hold the current mode (either SPLIT or DOUBLE) and
        LOWER. While holding both LOWER and SPLIT or DOUBLE press a key
        on the keyboard. The interval between this key and the lowest
        note on the keyboard (CO) becomes the transposition for the Lower
        synthesizer.

        The Upper half can transpose up or down. To transpose the Upper
        half, press and hold the current mode (either SPLIT or DOUBLE) and
        UPPER. While holding both UPPER and SPLIT or DOUBLE press a key
        on the keyboard. The interval between this key and Middle C (C3)
        becomes the transposition for the Upper synthesizer.

4.2.3. Setting The Balance Between Lower And Upper
        The control labelled PROGRAM VOL/BAL adjusts the balance between
        the Upper and Lower voices.

        The Programmed Volume of each patch program is ignored when in
        SPLIT or DOUBLE.

4.2.4. Detuning The Lower Voices
        The Lower voices can be detuned up or down from the Upper voices
        by pressing the LOWER button, and while holding it, turning the
        control labelled OSC 2 DETUNE. The LED above the control will
        turn on when the Lower Voices are detuned from the Upper voices.

4.2.5. Split And Double Reset
        All of the functions unique to Split and Double (Transpositions,
        Split Point, Lower Voices Detune, Balance) can be reset by
        pressing and hold the current mode (SPLIT or DOUBLE) and while
        holding SPLIT or DOUBLE, pressing MANUAL. These functions will be
        reset to the following values:

FUNCTION:	RESET TO:
Split Location	Middle C (C3)
Lower Transposition	Low C (CO)—no transposition
Upper Transposition	Middle C (C3)—no transposition
Balance	12 O'Clock—equal balance
Lower Voices Detune	12 O'Clock—no detune

Table 4-2: Split and Double Reset Values

4.3.   Split And Double Programs

The OB-8 is capable of storing 12 Split Programs, each of which will remember the following:

> Lower Patch Program Number
> Upper Patch Program Number
> Split Location
> Lower Transposition
> Upper Transposition
> Balance
> Lower Voices Detune

These settings are stored using the SPLIT button and any one of the 4 GROUP buttons or 8 PROGRAM buttons.

The OB-8 is also capable of storing 12 Double Programs. These settings are stored using the DOUBLE button and any one of the 4 GROUP buttons or 8 PROGRAM buttons.

The storage of Split and Double Programs are independent of the Patch Programs.

Split and Double Programs remember Patch Program Numbers (e.g.,"AB1") and not the Patch itself. If a Split Programs utilizes Patch Program "A1" and "A1" is changed, the Split sound will change as well.
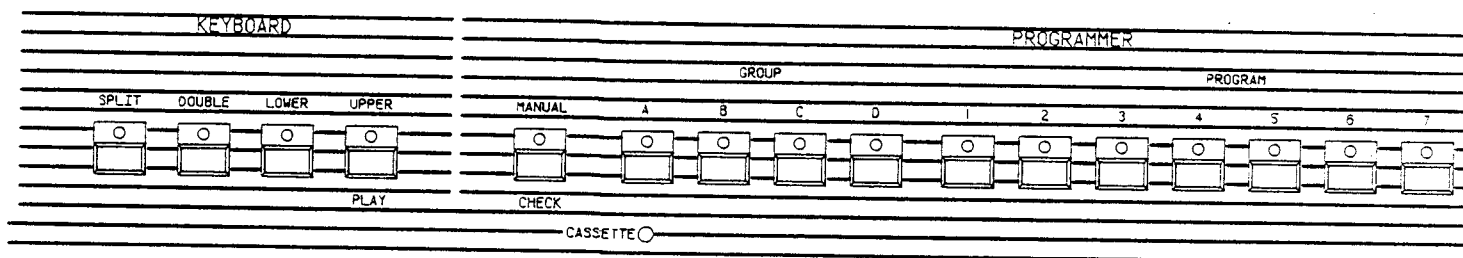
Fig. 4-2: Split and Double Program Controls

4.4.   Recalling Split And Double Programs

To recall a Split Program, hold SPLIT, and while holding SPLIT, press a GROUP or PROGRAM button. Make sure to release the SPLIT button last. The Lower Patch Program recalled as part of the Split Program is displayed on the GROUP and PROGRAM buttons.

To recall a Double Program, the procedure is the same: hold DOUBLE, and while holding DOUBLE, press a GROUP or PROGRAM button.

4.5. Modifying Split And Double Programs

In Split and Double there are two patches recalled: one for Lower, and one for Upper. To display the Lower patch, press LOWER; to display the Upper patch, press UPPER. Either patch can be modified by displaying the desired patch and then changing the controls on the front panel.

NOTE:The MANUAL mode cannot be used while in SPLIT or DOUBLE.

In addition, all of the Split and Double parameters (Split Point, Balance, etc.) that are recalled as part of a Split or Double Program can be modified as described above.

4.6. Writing Split And Double Programs

To write a Split Program:

1)   Press & hold the WRITE button until the WRITE light comes on;
2)   Hold SPLIT & press a GROUP or PROGRAM button.

Whatever Patches, Transpositions, Split Point, Balance, and Lower Voices Detune being used at that time are now stored into the selected Split Program. The selected Split Program will not light, instead the Lower Patch Program will be displayed.

To write a Double Program follow the same procedure except Press and hold DOUBLE instead of SPLIT.

NOTE: Edited Patch Programs will not be remembered, only the Patch Program as previously stored.

5. PERFORMANCE CONTROLS

These controls are used while playing the OB-8. The settings of these controls are not stored with a program, but remain in the OB-8's memory until changed.

5.1. Modulation Panel
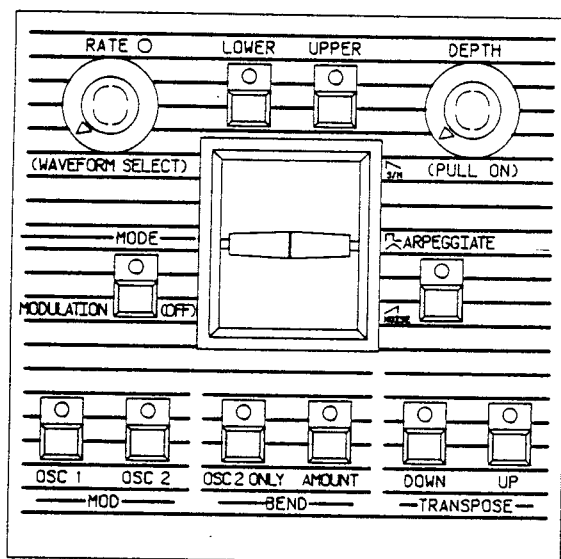
Fig. 5-1: Modulation Panel / Modulation & Pitch Bend Controls

TRANSPOSE
DOWN & UP
:   These switches allow you to transpose the entire keyboard up or down one octave from the normal range. When neither of the two buttons are on, the keyboard is in the normal range. Pressing the DOWN button transposes the keyboard one octave below normal. Pressing the UP button transposes the keyboard one octave above normal.

MODE
:   The MODULATION/PITCH BEND and the ARPEGGIATOR share the same controls on the Modulation Panel. With the MODE switch off, the MODULATION and PITCH BEND controls of the Modulation Panel are displayed. With the MODE switch on, the ARPEGGIATOR controls are displayed.

The MODULATION/PITCH BEND and the ARPEGGIATOR both operate at all times. The MODE button simply changes the functions of the buttons.

5.2. Modulation

MODULATION
LEVER

This lever controls the amount of modulation from the LFO to the assigned Oscillators. Pulling this control towards the front of the unit will add modulation. If the DEPTH control is on, this lever will add more modulation to the amount set by the DEPTH control.

Reversing
The Lever

It is possible to reverse the direction of the modulation lever. To do so, hold down the LOWER and OSC 2 ONLY buttons above and below the pitch bend lever while you turn the power on. To return the pitch bend to normal operation, repeat the procedure. When it leaves the factory the OB-8 is set for the regular direction (the right one!).

RATE

This controls the rate of the LFO. The rate can be adjusted from about .06 Hz to 50 Hz.

Waveform
Selection

The various waveforms of the LFO are shown in the following table:

DESIRED WAVEFORM	RATE KNOB SHOULD BE:	WHILE	BEND LEVER IS:
TRIANGLE	Pushed Down		Straight
SQUARE	Pulled Up		Straight
UP SAWTOOTH	Pulled Up		UP (towards the front of the unit)
DOWN SAWTOOTH	Pulled Up		DOWN (towards the rear of the unit)
NOISE	Pushed Down		UP (towards the front of the unit)
SAMPLE/HOLD	Pushed Down		DOWN (towards the rear of the unit)

Table 5-1: Performance LFO Modulation Waveforms

DEPTH

This control allows you to control the depth of the LFO without using the MODULATION LEVER. Turning the knob determines the modulation depth, and pulling up on the knob puts this control into effect.

The amount of depth set by this control is added to the depth controlled by the MODULATION LEVER or the external MODULATION PEDAL.

OSC 1 & OSC 2 These switches determine the destination of the LFO.

5.3. Pitch Bend

PITCH BEND   This lever is used to bend the pitches of notes being played.
LEVER   Pulling it towards the front of the unit causes the pitch to
                 go up, and pushing it towards the rear causes the pitch to go
                 down. Its range is determined by the AMOUNT switch.

Reversing   It is possible to reverse the direction of the pitch bend
The Lever   lever. To do so, hold down the UPPER and AMOUNT buttons
                 above and below the pitch bend lever while you turn the power
                 on. To return the pitch bend to normal operation, repeat the
                 procedure. When it leaves the factory the OB-8 is set for
                 the regular direction (the right one!).

AMOUNT   This switch determines the range of the PITCH BEND LEVER.
                 When this switch is off, the PITCH BEND LEVER has a range of
                 up or down one whole step (e.g. "C" could move up to a "D" or
                 down to a "Bb").

Programming   When the AMOUNT switch is on, the PITCH BEND LEVER can be
Bend Amount   programmed to bend an amount between a quarter-tone and an
                 octave up or down. To program the amount of pitch bend,
                 press and hold the AMOUNT button, and while holding it, press
                 any key in the lowest octave of the keyboard. The interval
                 between the lowest C and the key pressed becomes the maximum
                 range of the bend lever. For example, holding the AMOUNT
                 button and pressing the lowest Eb on the keyboard (Eb0) will
                 program a maximum bend range of a minor third up or down.
                 The amount of pitch bend with the AMOUNT light on will remain
                 at this same programmed value until changed, even if the
                 power is turned off.

OSC 2 ONLY   When this switch is on, the PITCH BEND lever bends only
                 Oscillator 2 of each voice. When this switch is off, the
                 BEND LEVER bends both Oscillators.

                 Bending only Oscillator 2 has an interesting, timbral effect
                 on programs in which Oscillator 2 is in SYNC.

LOWER &   These buttons are used to assign all of the functions of the
UPPER   MODULATION and PITCH BEND controls, to either half of the
                 keyboard when in the SPLIT or DOUBLE mode. The LOWER and
                 UPPER switches have separate functions for the ARPEGGIATOR,
                 so that the arpeggiator and modulation can be assigned to
                 Upper or Lower independently.

                 The LOWER and UPPER switches will both come on when not in
                 the SPLIT or DOUBLE modes, and will revert to their previous
                 settings upon re-entering Split or Double.

VCF Track Of   The Pitch Bend lever will also bend the filter cutoff
Pitch Bend   frequency if KBD TRACK (in the filter section) is turned on.

5.4. Arpeggiator
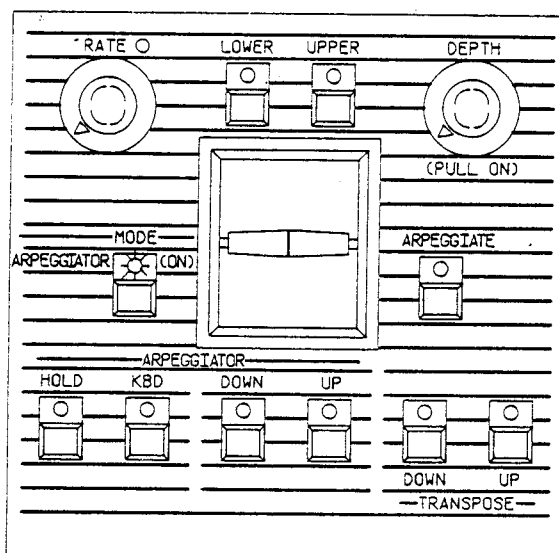
Fig. 5-2: Modulation Panel / Arpeggiator Controls

MODE

The ARPEGGIATOR shares the same controls on the Modulation Panel with the MODULATION and PITCH BEND. With the MODE switch on, the ARPEGGIATOR controls are displayed.

ARPEGGIATE

This button turns the arpeggiator on and off. The ARPEGGIATE button operates while either arpeggiator or modulation is displayed (whether the MODE switch is on or off).

KBD

When this button is on, notes played on the keyboard will arpeggiate.

HOLD

When this button is on, held notes or a held chord will arpeggiate. The operations for holding and transposing an arpeggio is the same as for holding and transposing a chord (see,"HOLD AND CHORD FUNCTIONS, BELOW).

Either the KBD or the HOLD button (or both) can be selected at one time.

UP & DOWN   These buttons work together to create four arpeggiator modes:

                 If the UP button is on, the notes will arpeggiate in the
                 order played.

                 If the DOWN button is on, the notes will arpeggiate in the
                 reverse order in which they were played.

                 If BOTH the UP and DOWN buttons are on, the notes will
                 arpeggiate first in order, and then in reverse order.

                 If NEITHER the UP nor the DOWN buttons are on, the notes will
                 arpeggiate in random order. The random sequence is weighted
                 so that the first note played will sound more often than the
                 others, and that a note will not sound twice in a row.

LOWER & UPPER   These buttons are used to assign the ARPEGGIATOR to either or
                 both halves of the keyboard when in SPLIT or DOUBLE. In
                 SPLIT, the arpeggiator will first arpeggiate the LOWER half
                 of the keyboard and then the UPPER half regardless of the
                 order in which the notes were played (except in reverse
                 "DOWN" mode in which case the UPPER half will play first).

                 Either the LOWER or the UPPER button (or both) can be
                 selected when in Split or Double. They will both come on
                 when not in the SPLIT or DOUBLE modes, and revert to their
                 previous settings upon re-entering SPLIT or DOUBLE.

5.4.1.   Transposing The Arpeggiator
         The OB-8's arpeggiator can transpose arpeggiating notes by up
         to five programmable intervals. The six buttons at the front
         of the MODULATION PANEL become the six transpose buttons
         (five plus no transposition) only while the MODE button is
         pressed. Thus, the Modulation Panel actually contains three
         pages of controls: Modulation (MODE button off), Arpgeggiator
         (MODE button on) and Arpeggiator Transpositions (MODE button
         held down).
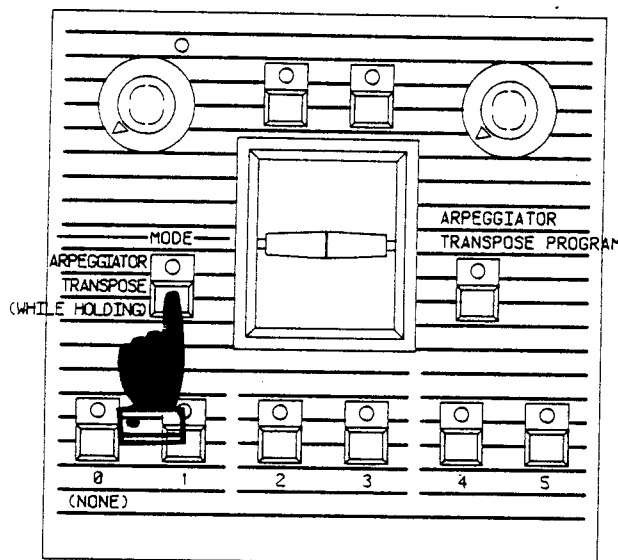
Fig. 5-3: **Modulation Panel / Arpeggiator Transposition Controls**

The left button (labelled HOLD and OSC 1) selects no
transposition. With no transposition, the notes will
arpeggiate as played (or held).

The other five buttons select the five transpositions. Each
transposition adds to the previous transpositions, i.e.
pressing the right-most button (labelled TRANSPOSE UP) will
arpeggiate the notes played (or held), and then transpose the
arpeggiation by the first interval, then by the second,
third, fourth, and finally the fifth, before starting over at
the bottom.

When shipped from the factory, the transpositions are
programmed to be successive octaves, but any of the
transposition can be programmed to be any interval. See
"PROGRAMMING ARPEGGIATOR TRANSPOSITIONS", below.

In the ARPEGGIATE UP mode, the notes played (or held) will
first arpeggiate as played, then by each transposition as
selected.

In ARPEGGIATOR DOWN mode, the arpeggiator action is the
reverse: the notes played (or held) will first arpeggiate in
reverse played order, transposed by the last interval
selected, then by the previous interval, etc., until reaching
the actual notes played.

In RANDOM mode (neither UP nor DOWN pressed), both the notes
played as well as the transpositions will be random.

5.4.2. Programming Arpeggiator Transpositions

Press and Hold BOTH the ARPEGGIATOR MODE button, and the
ARPEGGIATE button. While holding BOTH buttons, play five
keys on the keyboard, one at a time. These five keys become
transpositions 1, 2, 3, 4, and 5 in the order in which they
are played. The arpeggiator will now transpose played or
held notes by these intervals, after arpeggiating the notes
as played.

HINT: To avoid turning the Arpeggiator on or off while programming
          transpositions, press the MODE button before pressing the
          ARPEGGIATE button.

5.5. Hold and Chord Functions

Fig. 5-4: Hold and Chord Controls

HOLD   This button is used to produce a sustained note or chord.
                    To use, press the HOLD button and simultaneously play one or
                    more notes, and then release the HOLD button. The note or
                    notes played will now be sustained indefinitely. You can
                    play notes one at a time or all at once, while holding down
                    the HOLD button. To cancel the hold function, press HOLD a
                    second time, but be sure not to hold down any keys.

                    The HOLD button and the HOLD FOOTSWITCH operate the same and
                    can be used interchangeably.

                    HOLD may be used in Split and Double to sustain different
                    sounds at once, and with the Arpeggiator to arpeggiate a
                    sequence of notes without having to hold them down. (see
                    "ARPEGGIATOR")

CHORD
Chord Hold
The HOLD and CHORD buttons can be used together to play chords with one key. First, select the desired notes by using the HOLD function as described above. Then, press the CHORD switch. The held chord will cease sounding. By playing low C (C0) on the keyboard, the held chord will be reproduced as previously played. Playing notes above C0 will transpose the chord up by a corresponding interval. If the G above lowest C (G0) is played, the chord will sound transposed up a fifth; if the C two octaves above the lowest C (C2) is played, the chord will sound transposed up by two octaves. The actual note being played will not sound.

Transpose
Limit
The transposing effect can be limited to a part of the keyboard. Press the CHORD button, and while holding it press a key on the keyboard. This key becomes the Transpose Limit. A held chord will not be transposed above this key. Above the Transpose Limit, the remaining voices will play normally. The Transpose Limit remains stored in memory until changed.

NOTE:The Transpose Limit can only be changed while a chord is being held.

The chord will always be transposed by the lowest note on the keyboard below the Transpose Limit, even in split. However, individual notes can be played above the note transposing the chord as well as above the Transpose Limit. To exit the CHORD mode, simply press the HOLD switch.

Chord Latch
A held chord can be latched so it will remain gated on. Press and hold the CHORD button, and then press the HOLD button (be sure to release the HOLD button before releasing the CHORD button). A held chord will now stay on (be latched on). To turn off the chord latch, repeat the above procedure.

The arpeggiator will continually cycle through a latched chord, and will not restart when the transposition is changed.

The chord latch is off when the OB-8 is first turned on.

5.6. Foot Switches

The Foot Switch inputs are designed for use with the Model S-OBX Foot Switch. The S-OBX contains a momentary, normally open switch.

SUSTAIN
> Pressing the Sustain Switch causes the RELEASE on all Envelope Generators to be set to the amount programmed in each Patch (on PAGE 2). The PEDAL SUSTAIN time has the same range as the front panel RELEASE TIME of the envelope generators. In SPLIT or DOUBLE, the two patches will each die out according to their own programmed PEDAL SUSTAIN time.

PROGRAM
ADVANCE
> Pressing the Program Advance Switch advances the programmer to the next program. For example, if program A6 is presently selected and this switch is pressed, the Programmer moves on to program A7.
>
> As the footswitch is depressed, the programs cycle as follows:

GROUP NO.	A	B	C	D
1	*			
2		*		
3	*	*		
4			*	
5	*		*	
6		*	*	
7	*	*	*	
8				*
9	*			*
10		*		*
11	*	*		*
12			*	*
13	*		*	*
14		*	*	*
15	*	*	*	*

Table 5-2: Program Advance Order

HOLD
> The Hold switch functions exactly like the HOLD button on the front panel, and will cause the HOLD light to light when in use.

5.7. Foot Pedals

The Pedal inputs are designed for use with the Model P-OBX Foot Pedal. They are also designed to respond to Control Voltages, from the DSX Sequencer or other sources.

VOLUME   The Volume Pedal varies the volume of the OB-8 from zero to the MASTER VOLUME setting on the front panel.

The VOLUME jack also can be used as a Control Voltage output that will vary depending upon the setting of the MASTER VOLUME control on the front panel.

VIBRATO   The Vibrato Pedal functions like the Vibrato Lever on the MODULATION PANEL. It allows the user to add vibrato from the LFO in the MODULATION PANEL to whatever oscillators are assigned to it.

FILTER   This pedal controls the FILTER FREQUENCY of all voices. The range of the pedal is from a slightly lower frequency than when the pedal is not connected, to a significantly higher frequency.

6. SOUND PROGRAMMING CONTROLS

The controls described on the next few pages are used control the sound of the OB-8. It is the settings of these controls that is actually stored in the OB-8's program memory.

Any sound recalled by the programmer can be modified (edited) by changing these Sound Programming Controls. The controls add to, or subtract from, the settings stored in the computer program. For example, the release time of the LOUDNESS ENVELOPE can be made longer than programmed simply by turning up the RELEASE control on the LOUDNESS ENVELOPE. This feature allows quick yet smooth modifications of existing programs.

When selecting a program, the front panel settings do not affect the sound of the instrument. For instance, if a sound had originally been programmed with a FILTER FREQUENCY setting at 12 o'clock, but later the program is recalled with the FILTER FREQUENCY control set at 9 o'clock, the program sound will be the same as if the FILTER FREQUENCY control was set at 12 o'clock. If it is desired to further increase or decrease a control setting, and the control is already at its maximum or minimum position, simply rotate the control all the way in the opposite direction and then make your desired setting.
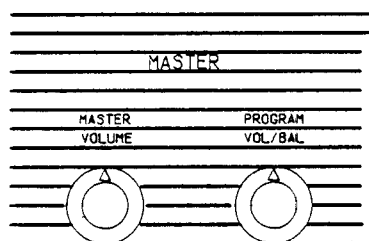
Fig. 6-1: Volume Controls

PROGRAM   This control sets the volume of each patch program.
VOL/BAL
                 NOTE:In SPLIT or DOUBLE, the PROGRAM VOLUME of each patch is
                 disregarded in favor of the PROGRAM BALANCE of the Split or
                 Double Program.

6.1. Oscillators
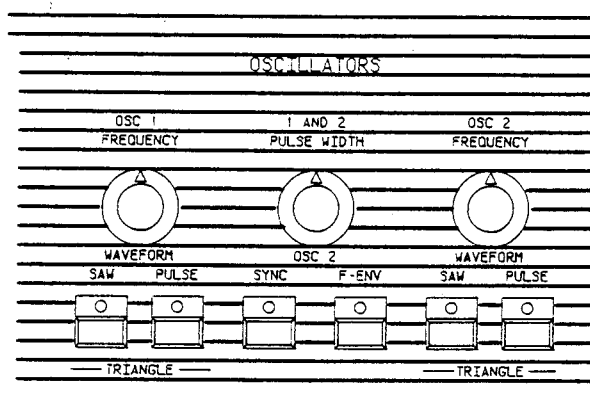
Fig. 6-2: Oscillator Controls

1 FREQUENCY   This control determines the initial frequency of Oscillator
               1. It operates in half steps within a four octave range.

WAVEFORM   These switches choose the waveform of Oscillator 1.
(SAW/PULSE)

               If the SAW switch is on, a sawtooth wave is selected. A
               Sawtooth wave contains all of the harmonic overtones.

               If the PULSE switch is on, a pulse wave is selected.
               Compared to a sawtooth wave, a pulse wave is missing some of
               the harmonics (the harmonic spectrum of the pulse wave is
               controlled by the PULSE WIDTH control), and the sound is
               thinner as a result.

               If BOTH the SAW and the PULSE switches are on, then both
               sawtooth and pulse waves are selected. This combination
               creates and extremely fat sound. The PULSE WIDTH control and
               the PULSE WIDTH MODULATION from the LFO will still affect the
               pulse wave in this mode.

               If NEITHER switch is on, a triangle wave is selected. The
               triangle wave has the harmonics of the sawtooth wave, only
               they are much softer in volume relative to the fundamental,
               and the resulting sound is closer to the pure tone of a sine
               wave.

PULSE WIDTH   This control sets the initial pulse width of both
                  oscillators. When it is set fully counter-clockwise a square
                  wave (50 % duty cycle) is selected. Turning this control
                  clockwise makes the sound progressively thinner and more
                  nasal.

Individual   The PULSE WIDTH control is also used to set the pulse width
Pulse Widths   of each oscillator independently. Press the PULSE button of
                  the desired OSCILLATOR, and while holding the PULSE button,
                  turn the PULSE WIDTH control. Turning the PULSE WIDTH
                  control all the way clockwise or counter-clockwise will reset
                  the individual pulse width setting of the oscillators.

SYNC   Pressing this switch causes Oscillator 2 to lock onto a
                  harmonic of Oscillator 1. Since Oscillator 2 is syncing to
                  Oscillator 1, changing the frequency of Oscillator 2 will
                  cause a timbral change rather than a pitch change.

F-ENV   This switch allows the FILTER ENVELOPE to modulate the
                  frequency of OSC 2. The amount is controlled by the
                  MODULATION control in the FILTER section. With this control
                  at its maximum setting, and the FILTER ENVELOPE SUSTAIN level
                  at maximum, OSC 2 will increase in pitch one octave.

2 FREQUENCY   This control determines the initial frequency of Oscillator
                  2. It operates in half steps within a four octave range.

WAVEFORM   These switches choose the waveform of Oscillator 2.
(SAW/PULSE)

                  If the SAW switch is on, a sawtooth wave is selected. A
                  Sawtooth wave contains all of the harmonic overtones.

                  If the PULSE switch is on, a pulse wave is selected.
                  Compared to a sawtooth wave, a pulse wave is missing some of
                  the harmonics (the harmonic spectrum of the pulse wave is
                  controlled by the PULSE WIDTH control), and the sound is not
                  as "fat" as a result.

                  If BOTH the SAW and the PULSE switches are on, then both
                  sawtooth and pulse waves are selected. This combination
                  creates and extremely fat sound. The PULSE WIDTH control and
                  the PULSE WIDTH MODULATION from the LFO will still affect the
                  pulse wave in this mode.

                  If NEITHER switch is on, a triangle wave is selected. The
                  triangle wave has the harmonics of the sawtooth wave, only
                  they are much softer in volume relative to the fundamental,
                  and the resulting sound is closer to the pure tone of a sine
                  wave.

6.2.   Filter

The Voltage Controlled Low Pass Filter (VCF) are used to control the brightness of the sound, filtering out the higher frequencies (the "buzz") in a very controllable manner. The Filter is arguably the most important component in a synthesizer, because it is the primary control of the timbre, or tone color of the sound. Because of this, the filter on each voice of the OB-8 can be set to two modes: 2-Pole and a 4-Pole. In the OB-8, the Filter Section also selects the sound sources (Oscillators and Noise) that are used in the patch.

Fig. 6-3: Filter Controls

FREQUENCY   This control sets the initial cut-off frequency of the
                   Filter.

RESONANCE   This control determines the amount of resonance ("Q" or
                   "emphasis") of the Filter. The RESONANCE emphasizes the cut-
                   off frequency of the Filter. As the RESONANCE is increased,
                   the overall volume of the sound will increase in the 2-POLE
                   mode and decrease in the 4-POLE mode.

MODULATION   This control determines the amount of Filter Envelope which
                   modulates the Filter. Modulation of the Filter by the
                   Envelope is a critical element in the synthesis of brass
                   sounds as well as creating percussion in organ sounds, to
                   name just a few uses. The MODULATION control also determines
                   how much Filter Envelope will modulate OSC 2 when the F-ENV
                   switch is on. The LFO can also modulate the Filter. See
                   "MODULATION SECTION"

OSC 1   When this switch is on, Oscillator 1 is routed into the
ON   Filter.

OSC 2   When either of these switches are on, Oscillator 2 is routed
HALF/FULL   into the Filter. The FULL switch selects the full output of
                   the oscillator and the HALF switch selects a signal level
                   approximately 5 db below full output.

NOISE   When this switch is on the Noise Generator is routed into the
ON   Filter.

4-POLE   Turning this switch on selects the 4-POLE filter mode. When
                this switch is off the 2-POLE filter mode is selected. The
                effect of this switch is to change the sharpness of the
                filtering effect. The 4-POLE mode has a 24db/octave slope
                (sharper), which results in a more full sound. The 2-POLE
                mode has a 12db/octave slope (more gradual), which results in
                a brighter sound.

KBD   This switch adds the control voltage from the keyboard to
TRACK   control the Filter Frequency. When on, the Filter in each
                voice will track the keyboard, and "open up" as higher notes
                are played. The TRANSPOSE and MASTER TUNE controls will also
                control the Filter when TRACK is switched on.

                When KBD TRACK is on, the pitch bend lever also controls the
                Filter Frequency. In SPLIT or DOUBLE the filter will only
                track the bend lever if it is assigned to it with the UPPER
                and LOWER buttons in the bend box.

6.3. Envelopes

     The Envelope Generators control the timing of the sound. It is the
Envelopes that make a long sound long, and a short sound short. For
example, the difference between a cresting ocean wave, and an explosion.
There are two envelopes on each voice of the OB-8; one that controls the
Filter (VCF) for timbral control, and one that controls the Amplifier (VCA)
for volume control.
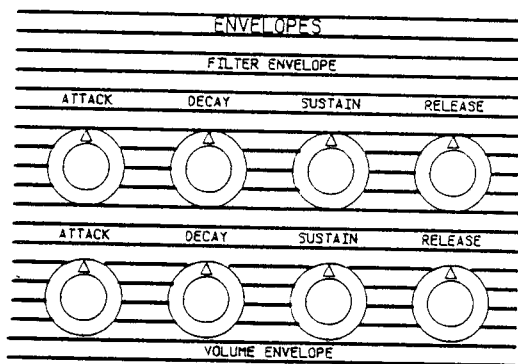
Fig. 6-4: Envelope Generator Controls

6.3.1. Filter Envelope

ATTACK
The Attack section of the envelope operates as soon as a key is pressed on the keyboard. This control sets the time the Filter takes to get to its maximum effect, as determined by the MODULATION control in the FILTER SECTION. The shortest time is selected by setting the ATTACK control fully counter-clockwise.

DECAY
The Decay section of the envelope comes into operation as soon as the envelope has reached its maximum level (as soon as the Attack is completed). This control sets the time the Filter takes to reach the sustain level, as set by the SUSTAIN control, while a key on the keyboard is being held down.

SUSTAIN
This control sets the level the Filter Envelope goes to following its initial decay, as set by the DECAY control. The Envelope will stay at the Sustain Level as long as the key on the keyboard is held down.

RELEASE
Once the key is released, the Envelope moves to the Release section, and completes its cycle. The RELEASE control sets the time the Filter takes to go from the Sustain level, to the off level. If the SUSTAIN control is set to minimum, the Release section will have no effect on the sound if the key is pressed and held down. If the key is pressed and immediately let go (in less time than the combined Attack and Decay time), then the Release Section will still have an effect.

Envelope
Reset
The Release of Envelope can be cut short by pressing the WRITE button.

Modulating
OSC 2
With The
Filter
Envelope
When the F-ENV switch is on, the Filter Envelope modulates OSC 2 as well as the FILTER. The pitch of OSC 2 will directly correspond to the shape of this Envelope. The ATTACK determines how fast OSC 2's pitch will rise, the DECAY determines how fast OSC 2 will decrease in pitch to the level set by the SUSTAIN control, and the RELEASE determines how fast OSC 2 will decrease in pitch after a note has been released. The MODULATION control in the Filter Section will control the range of the effect of the Filter Envelope on both the Filter as well as Oscillator 2.

6.3.2. Volume Envelope

ATTACK
The Attack section of the envelope operates as soon as a key is pressed on the keyboard. This control sets the **time** the sound takes to get to its maximum volume. The shortest time is selected by setting the ATTACK control fully counter-clockwise.

DECAY
The Decay section of the envelope comes into operation as soon as the envelope has reached its maximum level (as soon as the Attack is completed). This control sets the **time** that the VCA (that controls volume) takes to reach the sustain level, as set by the SUSTAIN control, while a key on the keyboard is being held down.

SUSTAIN
This control sets the **level** the Volume Envelope goes to following its initial decay, as set by the DECAY control. The Envelope will stay at the Sustain Level as long as the key on the keyboard is held down.

RELEASE
Once the key is released, the Envelope moves to the Release section, and completes its cycle. The RELEASE control sets the **time** the sound takes to go from the Sustain level, to the minimum level. If the SUSTAIN control is set to minimum, the Release section will have no effect on the sound if the key is pressed and held down. If the key is pressed and immediately let go (in less time than the combined Attack and Decay time), then the Release Section will still have an effect.

Envelope
Reset
The Release of Envelope can be cut short by pressing the WRITE button.

6.4.   Control Section

```
┌─────────────┐
│ ═══════════ │
│ ═══════════ │
│  CONTROL    │
│ ═══════════ │
│ ═══════════ │
│ PORTAMENTO  │
│ ═══════════ │
│    ╱△╲      │
│   (  ○  )   │
│ ═══════════ │
│  UNISON     │
│ ═══════════ │
│   ┌─○─┐     │
│   └───┘     │
│ ═══════════ │
│ ═══════════ │
│     ○       │
│ OSC 2 DETUNE│
│ ═══════════ │
│    ╱△╲      │
│   (  ○  )   │
│ ═══════════ │
│ ═══════════ │
└─────────────┘
```
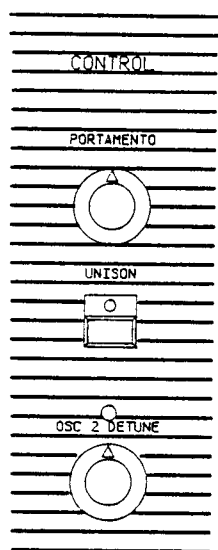
Fig. 6-5: Control Section Controls

PORTAMENTO   This control determines the rate of portamento or "glide" of
                 each voice as that voice's pitch is changed. Note that the
                 portamento of the OB-8 is polyphonic, so each voice will
                 glide from note to note independently of all other notes.
                 Portamento also functions in UNISON mode. There are several
                 Portamento Modes. For more information, see "PORTAMENTO
                 MODES".

UNISON   When switched on, causes all voices to be sounded by one key
                 depression. In UNISON, the OB-8 keyboard operates with low
                 note rule, which means that the lowest note played on the
                 keyboard will always have priority. When in SPLIT, the
                 UNISON mode is independent for the two halves of the
                 keyboard, so if the upper half is in UNISON, then only the
                 lowest note of the upper half of the keyboard will affect it.

OSC 2 DETUNE   This control allows Oscillator 2 to be tuned either flat or
                 sharp relative to Oscillator 1. Turning the control to the
                 left makes Oscillator 2 go flat and to the right makes it go
                 sharp. The LED above the OSC 2 DETUNE control turns on when
                 the Oscillator 2 is detuned from Oscillator 1.

6.5. Modulation

```
┌─────────────────────────────────────────────────┐
│                   MODULATION                      │
│                                                   │
│      LFO          MODULATION       MODULATION     │
│      RATE          DEPTH 1          DEPTH 2       │
│                                                   │
│      (  )           (  )             (  )         │
│                                                   │
│    WAVEFORM        OSC 1 FRQ        OSC 1 PWM     │
│      [ O ]          [ O ]            [ O ]        │
│                                                   │
│                    OSC 2 FRQ        OSC 2 PWM     │
│      [ O ]          [ O ]            [ O ]        │
│                                                   │
│   SAMPLED    TRIG                                 │
│   VIB LFO          FILTER FRQ      VOLUME MOD     │
│    S/H  [ O ]       [ O ]            [ O ]        │
│                                                   │
└─────────────────────────────────────────────────┘
```
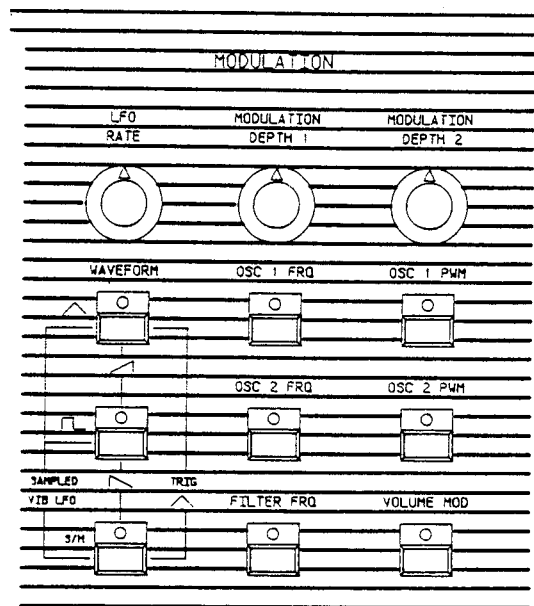
THE LOW FREQUENCY OSCILLATORS (LFOS) are used for modulation at low frequencies --that is, frequencies near or below the range of hearing. If you were to listen to an LFO directly, you would not hear anything; however by controlling the frequency or pulse width of an oscillator or filter, the effect of an LFO becomes apparent.

The OB-8 contains three LFOs: two are controlled from the Modulation Section on the front panel and are discussed here; the third is controlled from the Modulation Panel to the left of the keyboard (see "PERFORMACE CONTROLS").

6.5.1. Modulation Source

RATE   This control determines the SPEED of modulation. The range
                  is from approximately 1/15 oscillation per second to 50
                  oscillations per second.

WAVEFORM   The WAVEFORM switches select the modulation source according
                  to the following table:

Sine   1

Square   2

Sample/Hold   3

Up Sawtooth   1,2

Down Sawtooth   2,3
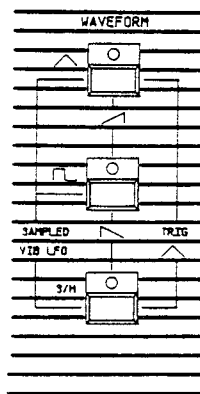
Trig LFO   1,3   In this mode, the LFO resets each
                               time a key is pressed (There are
                               several options for this mode that
                               are available on PAGE 2--see "PAGE 2
                               CONTROLS").

Sampled Vibrato
LFO   1,2,3   This mode is something like
                               SAMPLE/HOLD, except that while
                               SAMPLE/HOLD samples noise, this
                               mode samples the LFO in the
                               Modulation Panel, which can be set
                               to several different waveforms and
                               speeds itself (see "PERFORMANCE
                               CONTROLS").

6.5.2.   Modulation Destinations

MODULATION 1

DEPTH 1

This control determines the AMOUNT of modulation sent to the destination switches below.

OSC 1 FRQ

Pressing this switch routes frequency modulation to Oscillator 1. Small amounts of frequency modulation are frequently used to create vibrato effects; larger amounts can be used for special effects.

OSC 2 FRQ

Pressing this switch routes frequency modulation to Oscillator 2.

FILTER FRQ

Pressing this switch routes frequency modulation to the Filter. Modulating the frequency of the filter creates a "wah-wah" effect.

MODULATION 2

DEPTH 2

This control determines the AMOUNT of modulation sent to the destination switches below.

OSC 1 PWM

Pressing this switch routes modulation to the pulse width of Oscillator 1. Pulse width modulation does not alter the pitch of the oscillators but rather the shape of the pulse wave, causing a change in the timbre of the sound not unlike the effect of a rotating speaker on an organ.

OSC 2 PWM

Pressing this switch routes modulation to the pulse width of Oscillator 2.

VOLUME MOD

Pressing this switch routes modulation to control the volume of the Voltage Controlled Amplifier (VCA). This volume modulation (also known as amplitude modulation) creates the effect of tremolo, among other things.

7. P A G E   2   C O N T R O L S

Many of the OB-8's features are controlled by a "second page" of controls; in other words, the knobs and buttons on the front panel have two functions: for example, the control labeled LOUDNESS ENVELOPE RELEASE becomes the SUSTAIN PEDAL RELEASE control when in PAGE 2.

All of the Page 2 controls (with the exception of the VOICE ENABLES) are stored with a patch program. The continuous edit features of the controls on Page 1 apply to the controls on page 2 as well.

When in SPLIT or DOUBLE, the LOWER and UPPER buttons select display of PAGE 2 for the LOWER patch or UPPER patch, just as they do for page 1.

NOTE: In MANUAL mode, the Page 2 functions do not operate except for the VOICE ENABLES.

7.1. Accessing Page 2

To access the second page of functions, press the CHORD/PAGE 2 button twice within 1.5 seconds. The CHORD/PAGE 2 button will light, and voila, you will be looking at the second page of controls.

To return to page 1, press the CHORD/PAGE 2 button once more.

NOTE: any "held notes" will be changed into a held chord whenever the CHORD/PAGE 2 button is pressed.

7.2. Additional LFO Controls
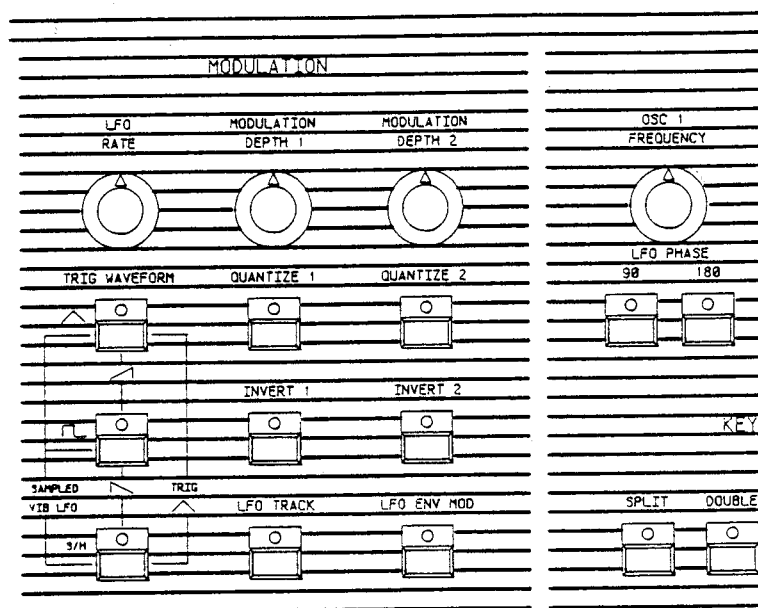
Fig. 7-1: Page 2 Modulation Controls

QUANTIZE 1   These switches quantize the sweep of the LFO into half steps.
QUANTIZE 2   QUANTIZE 1 affects OSC 1 FRQ, OSC 2 FRQ, and FILTER FRQ, and
                  QUANTIZE 2 affects OSC 1 PW, OSC 2 PW, and VOL MOD.

LFO PHASE   These switches change the phase of the LFO. With both
90° switches off, the LFOs of all voices are in phase. The
180° buttons offset the LFO phase of Voices 5-8 by 90° or 180°
                  relative to Voices 1-4.

                  The LFO PHASE control has no effect when LFO TRACK or LFO ENV
                  MOD are on or when using a TRIG WAVEFORM.
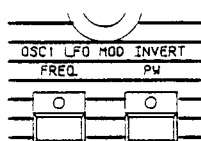
Fig. 7-2: Page 2 LFO Phase Controls

LFO INVERT   With this mode on, the LFO modulation of VCO 1's frequency is
VCO 1   out of phase by 180 degrees (phase opposition) with respect
FREQUENCY   to the LFO frequency modulation on VCO 2 and the VCF.

LFO INVERT   With this mode on, the LFO modulation of VCO 1's pulse width
VCO 1   is out of phase by 180 degrees (phase opposition) with
PULSE WIDTH   respect to the LFO pulse width modulation on VCO 2 and VOLUME
                  MOD.

TRIG WAVEFORM   Any of the waveforms of the front panel LFO can be selected
                 as the Triggered LFO Waveform by selecting KBD TRIG as the
                 waveform on page 1 and then selecting the desired waveform on
                 page 2. For example, if KBD TRIG is selected on page 1 and
                 UP SAWTOOTH is selected on page 2, the result will be an UP
                 SAWTOOTH that is reset every time a new key is pressed.
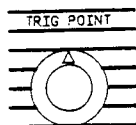
Fig. 7-3: Page 2 Trig Point Control

TRIG POINT   The TRIG waveform can be set to retrigger at any point in its
                 cycle by turning the TRIG POINT control on page 2.

7.3. LFO Envelopes

     Besides the FILTER ENVELOPE and VOLUME ENVELOPE, there are two simple
envelope generators for the LFO, one for DEPTH 1 (OSC 1 FRQ, OSC 2 FRQ, and
FILTER FRQ) and another for DEPTH 2 (OSC 1 PW, OSC 2 PW, and VOL MOD). The
LFO envelope generators enable changes in modulation depth as a note plays,
just as the FILTER ENVELOPE and VOLUME ENVELOPE enable changes in the filter
and volume levels as note plays.
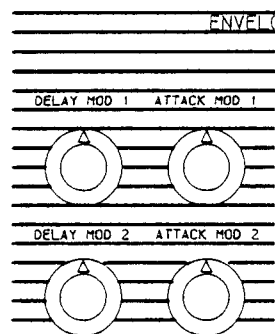
Fig. 7-4: Page 2 LFO Envelope Controls

DELAY MOD 1   These controls set the time delay of the LFO's envelope
DELAY MOD 2   generators. The delay ranges from a minimum of zero to a
                 maximum of 3.5 seconds. The delay is reset each time a new
                 note is played. MOD 1 affects OSC 1 FRQ, OSC 2 FRQ, and
                 FILTER FRQ, and MOD 2 affects OSC 1 PW, OSC 2 PW, and VOL
                 MOD.

ATTACK MOD 1   These controls set the attack time of the LFO's envelope
ATTACK MOD 2   generators. The attack time ranges from a minimum of zero to
                 a maximum of 3.5 seconds. The attack time is reset each time
                 a new note is played. MOD 1 affects OSC 1 FRQ, OSC 2 FRQ,
                 and FILTER FRQ, and MOD 2 affects OSC 1 PW, OSC 2 PW, and VOL
                 MOD.
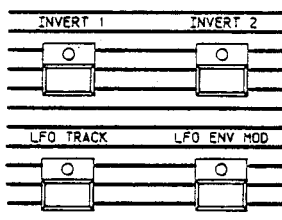
Fig. 7-5: Page 2 LFO Envelope Invert Controls

INVERT 1   These switches invert the LFO envelope generators. INVERT 1
INVERT 2   affects OSC 1 FRQ, OSC 2 FRQ, and FILTER FRQ, and INVERT 2
                affects OSC 1 PW, OSC 2 PW, and VOL MOD.

                With INVERT off, the LFO will start each note at zero
                modulation and increase to the depth set by the appropriate
                DEPTH control in the time set by the DELAY and ATTACK
                controls.

                With INVERT on, the LFO will start each note at the
                modulation depth set by the DEPTH control and decrease to
                zero modulation in the time set by the DELAY and ATTACK
                controls.

LFO TRACK   This adds 1/4 of the keyboard to the rate of the LFO. The
                LFO speed will double every four octaves on the keyboard
                (e.g.-C0 to C4).

LFO ENV MOD   This switch acts something like the F-ENV switch on page 1.
                Pressing this switch enables the LFO 2 envelope to control
                the rate of the LFO. The LFO 2 DEPTH controls the amount of
                modulation. DELAY 2, ATTACK 2, and INVERT 2 will all affect
                the rate of the LFO when this switch is on.

7.4.   Portamento Modes

Fig. 7-6: Page 2 Portamento Mode Controls

MATCH   When the MATCH switch is on, all voices will portamento at
                 exactly the same rate. When the MATCH switch is off, the
                 voices will portamento at slightly different rates.

QUANTIZE   This switch quantizes the sliding portamento into semitone
                 steps.

LEGATO   THIS MODE CAN BE TURNED ON ONLY WHILE IN UNISON MODE. When
                 legato portamento is on, notes will slide only when played
                 legato, e.g. without releasing the key while going from one
                 note to another. When notes are played detached, no
                 portamento will occur. This feature enables portamento to be
                 used expressively while soloing. Legato Portamento can be
                 used in conjunction with any of the other portamento modes,
                 but only in unison. Turning off UNISON will automatically
                 turn this mode off.

EQUAL TIME   This switch makes the glide time between notes independent of
                 the interval between the notes, e.g. it will take the same
                 time to glide from C0 to C£0 as it would from C0 to C6. The
                 range of the glide time is smaller than with the regular
                 portamento mode. Note that BEND PORTAMENTO and EQUAL TIME
                 PORTAMENTO cannot be on at the same time.

EXPONENTIAL   This mode is essentially identical to the equal time
                 portamento but the "shape" of the glide is exponential
                 instead of linear. This means that the pitch will glide
                 slower and slower as it gets closer to the destination note.
                 This kind of portamento was used on the Oberheim Modular 2,4
                 & 8 voice synthesizers. Note that EXPONENTIAL PORTAMENTO
                 cannot be on at the same time as either EQUAL TIME or BEND
                 PORTAMENTO.
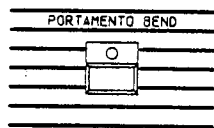
Fig. 7-7: Page 2 Portamento Bend Control

PORTAMENTO   This switch causes all notes to glissando from a programable
BEND   interval above or below the note being played. The rate of
                  the gliss is controlled by the PORTAMENTO control on either
                  page.

Programming   Press and hold the PORTAMENTO BEND control, and play a note
Portamento   on the keyboard. The C two octaves from the bottom of the
Bend   keyboard (C2) equals zero bend, and each key away from C2 (up
                  or down) equals a quarter-tone, e.g. pressing D3 will set
                  notes to gliss from a perfect fifth above.

Chord and   Held Chords being transposed will not portamento if the
Arpeggiator   PORTAMENTO BEND is on. Notes being Arpeggiated operate in
Portamento   the opposite manner: they will portamento only if the
                  PORTAMENTO BEND is on. So, when using portamento with Held
                  Chords that are being transposed and Arpeggiated, you have a
                  choice: With the PORTAMENTO BEND on, each arpeggiated note
                  will portamento; with the PORTAMENTO BEND off, only the chord
                  transpositions will portamento.

Fig. 7-8: Voice Detune Control

7.5. Voice Detune
                  This control detunes the voices from each other. Some of the
                  voices are tuned flat, some sharp, and some remain the same.
                  The voices are detuned when the led above the control is on.
                  Zero detune is achieved by turning the VOICE DETUNE control
                  completely counter-clockwise.
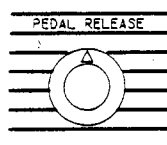
Fig. 7-9: Page 2 Sustain Pedal Release Control

7.6.   Sustain Pedal Release Time
This control sets the release time of the FILTER and VOLUME
ENVELOPES when the SUSTAIN FOOTSWITCH is depressed. The
PEDAL SUSTAIN can be set to any amount of time from zero to
20 seconds.

7.7.   Page 2 Reset
All of the controls on Page 2 can be reset to minimum or off.
To reset Page 2, follow this procedure:

1)   press the CHORD/PAGE 2 button twice, and hold the button
the second time.

2)   While holding the CHORD/PAGE 2 button, press the PAGE 2
RESET button (labelled "F-ENV") on the front panel.
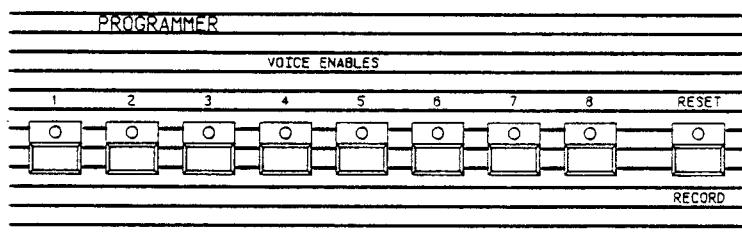
Fig. 7-10: Page 2 Voice Enable Switches

7.8.   Voice Enable Switches
The individual voices can be enabled or disabled from the
front panel using the PROGRAM 1-8 buttons on page 2. A voice
is enabled when the corresponding PROGRAM light is on.

8. CASSETTE INTERFACE

The OB-8 is equipped with a Cassette Interface which enables 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.

NOTE: The cassette player must have an earphone or ext. speaker output
           (a LINE OUT will not work).

NOTE: The OB-8 Cassette Interface is not compatible with other Oberheim
           synthesizers.

8.1. Tape Recorder Hookup

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 OB-8. Connect the "TO LINE INPUT" jack on the rear panel of the OB-8 to the Line or Aux input of your cassette recorder. If the recorder does not have one, connect the "TO MIC INPUT" jack on the rear panel to the Mic input of your cassette recorder.

NOTE: To reduce hum, the "TO LINE INPUT" and "TO MIC INPUT" jacks have
           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.

8.2. Cassette Interface Controls

CASSETTE   This switch on the rear panel enables the cassette interface.
ENABLE   When the Cassette Interface is enabled, the CASSETTE LIGHT on
               the front panel lights up and all normal functions on the
               instrument are disabled.

RECORD   RECORD shares a switch with the WRITE button. Pressing
               RECORD allows you to record your programs onto tape.

PLAY   PLAY shares a switch with the UPPER button. Pressing PLAY
               allows you to play your programs from the tape into the OB-8.

CHECK   CHECK shares a switch with the MANUAL button. Pressing CHECK
               allows you to check your program recordings without writing
               them into the OB-8.

HOLD   This button cancels any Cassette operation at any time.

8.3. Recording Programs Onto Tape

1) Enable the Cassette Interface with the switch on the rear panel.

2) Press the RECORD switch on the tape recorder. You should now hear a steady tone through the main outputs of the OB-8. The MASTER VOLUME control will adjust the volume of the tone heard in the OB-8's outputs, but will not affect the level of the Cassette Interface Output.

3) Press the RECORD switch on the OB-8. After the RECORD switch is pressed, ten seconds of the steady "leader" tone will be sent out followed by sixteen seconds of the actual memory information. During these twenty-six seconds, the light on the RECORD switch will be on. The GROUP lights (A, B, C, D) come on in sequential order ("A", "B", "AB", "C", "AC", etc.) indicating that information transfer is taking place.

The RECORD function can be cancelled by pressing the HOLD button.

8.4. Playing Programs From Tape Into The OB-8

1) Enable the Cassette Interface with the switch on the rear panel.

2) Press PLAY on the tape recorder. You will be able to monitor the tape through the main outputs of the OB-8. The MASTER VOLUME will control the volume for monitoring the tape.

3) As soon as the "leader" tone is heard, press the PLAY switch on the OB-8. At least three seconds of the "leader" tone must come between pressing PLAY and the rough sound of the memory information. The light on the PLAY switch will be lit from the time the switch is pressed until the first of the memory information is recognized. At that point, the GROUP lights (A, B, C, D) come on in sequential order ("A", "B", "AB", "C", "AC", "ABC", etc.) indicating which group is being transferred. The Splits and Doubles are transferred last.

If the MEMORY PROTECT switch on the Rear Panel of the OB-8 is set to PROTECT, the PLAY light will not operate.

4) If an error is detected, the PLAY light will flash.

The PLAY function can be cancelled by pressing the HOLD button.

NOTE: If a cassette of patches from an OB-8 with A7 or previous software is loaded into an OB-8 with A8 software, it is possible that some of the new features of the A8 software (portamento and LFO invert functions) will be turned on in some of the programs. To eliminate them, simply edit them out of each patch and re-write it into memory. For more information, see the SOFTWARE REVISIONS section of this manual.

8.5. Checking Tapes

The CHECK function of the Cassette Interface enables verification of
the data on a tape without actually transferring the data into the OB-8's
memory. A TAPE SHOULD ALWAYS BE CHECKED AFTER RECORDING.

1) Enable the Cassette Interface with the switch on the rear
    panel.

2) Press PLAY on the tape recorder. You will be able to monitor
    the tape through the main outputs of the OB-8.

3) As soon as the "leader" tone is heard, press the CHECK switch
    on the OB-8. As with the PLAY switch, at least three seconds
    of "leader" tone must follow pressing the switch and precede
    the rough sound of the memory information. The CHECK light
    will be on during the reception of the leader tone and the
    GROUP lights will sequence, just as during the PLAY
    operation, however no actual information transfer into memory
    takes place.

4) A CHECK error is indicated if the CHECK light flashes at the
    end of the operation.

The CHECK function can be cancelled by pressing the HOLD button.

8.6. Possible Causes of Tape Transfer Errors

A) There is a dropout on the tape.

B) 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 distorion occurs (approximately 3/4 of the
    way up). If the playback volume is too low, the OB-8 will
    not acknowledge the data at all.

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) The Batteries in the cassette machine are too weak.

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 output. Our experience is that monophonic recorders
work more reliably that stereo units. One cassette recorder that
we have found to work well with the cassette interface on all of
Oberheim's products is the Superscope C-200LP.

8.7. Loading Selected Patches From Tape Into the OB-8

Up to eight individual patch Programs can be played from tape into the OB-8. Follow this procedure:

1)   Enable the Cassette Interface with the CASSETTE ENABLE switch on the rear panel.

2)   Select the location of the desired Patch Program to be loaded from the tape by pressing the GROUP and PROGRAM buttons. This "source" location will remain lit on the GROUP and PROGRAM buttons.

3)   Select the destination of this Patch Program by again pressing the GROUP and then the PROGRAM buttons. While the PROGRAM button is pressed, the "destination" location will be displayed; after the PROGRAM button is released, the GROUP and PROGRAM lights will go dark, indicating that the source and destination has been stored.

4)   Up to eight individual Patch Programs can be selected to be played into the OB-8 at one time by repeating this procedure.

5)   After programming the selected Patch Sources and Destinations, start the tape recorder and press PLAY as soon as the "leader" tone starts. The entire tape will play, and the GROUP lights will sequence, but only the selected patches will actually be loaded into the OB-8's memory.

The Patch selections can be cancelled by pressing the HOLD button.

9. C O M P U T E R   I N T E R F A C E

The OB-8's Computer can be interfaced to other components such as computers or the Oberheim DSX Digital Polyphonic Sequencer via the Computer Interface connector on the rear panel.

The Computer Interface is a parallel interface that among other features allows Direct Memory Access by other peripherals. For more information about the interface, consult the DSX Service Manual.

9.1. Using The OB-8 With The DSX
            The Oberheim DSX Digital Polyphonic Sequencer can be used to play notes and change patches on the OB-8. The DSX features 10 Sequences, each of which contains 10 Tracks which can be individually recorded and played.

The OB-8 connects to the DSX with the multi-pin connector supplied with the DSX.

For more information, consult the DSX Owner's Manual.

10.   S O F T W A R E   R E V I S I O N S

Since its release in January 1983, the software in the OB-8 has been upgraded through several software revisions. These revisions have added new features and improved performance to existing features.

All OB-8s can be updated with new software by any authorized Oberheim Service Center.

10.1. Displaying The Software Revision

The latest computer software (as of August 1983) is labeled A8. For a quick check to see which software is in your OB-8, enter PAGE 2 by pressing the CHORD/PAGE 2 button twice, and hold it down on the second push. While holding, press the SYNC button. While holding both of these buttons down, the software version will be displayed in the Programmer Section. If you currently have version A8 software, the GROUP A and the PROGRAM 8 lights will light up.

NOTE: If a cassette of patches from an OB-8 with previous software is loaded into an OB-8 with A8 software, it is possible that some of the new features will be turned on in some of the programs. To eliminate them, simply edit them out of each patch and re-write it into memory.

11.   S O F T W A R E   C A L I B R A T I O N S

The OB-8 has a number of calibrations that are stored in its computer memory. Most of these are envelope time calibrations that are set at the factory so that the envelope generators in the OB-8 will be matched from voice to voice and between the upper and lower voices. These calibrations are **unique** to each OB-8 and are stored on tape automatically each time you save your programs. This feature is on all OB-8s having software version A6 or above. Under normal operation of the OB-8, these calibrations should never be altered, but the following provisions for setting them can be very useful if the unusual situation arises in which the OB-8 is not functioning properly.

11.1. Tape Storage of Calibrations

The calibrations of your particular OB-8 stored in computer memory are recorded on tape automatically each time you save your programs. If for some reason your OB-8 gets out of calibration (due to memory drop), the calibrations on tape can be loaded back into the OB-8 in much the same manner as patch programs are loaded into the OB-8 from tape:

1)   Enable the Cassette Interface with the switch on the rear panel.

2)   Press PLAY on the tape recorder. You will be able to monitor the tape through the main outputs of the OB-8. The MASTER VOLUME will control the volume for monitoring the tape.

3)   Hold down all six buttons in the FILTER section (OSC 1 ON, OSC 2 HALF, OSC 2 FULL, NOISE, 4 POLE, and TRACK).

4)   As soon as the "leader" tone is heard, press the PLAY switch on the OB-8. At least three seconds of the "leader" tone must come between pressing PLAY and the rough sound of the memory information. The light on the PLAY switch will be lit from the time the switch is pressed until the first of the memory information is recognized. At that point, the GROUP lights (A, B, C, D) come on in sequential order.

     If the MEMORY PROTECT switch on the Rear Panel of the OB-8 is set to PROTECT, the PLAY light will not operate.

4)   If an error is detected, the PLAY light will flash.

     The PLAY function can be cancelled by pressing the HOLD button.

The calibrations should only be loaded in if the OB-8 has lost its programs, or the envelope generators do not seem to be operating properly. It is important that these calibrations are loaded in only from a tape made from the same OB-8, otherwise the wrong calibrations will be loaded in.

Checking a data tape will also check the calibrations on that tape (See CASSETTE INTERFACE).

11.2. Master Reset

If for some reason (memory drop, for example), the OB-8 seems to be functioning improperly (i.e. four voices out of tune with the other four, envelope generators are unmatched, transpose won't work), it is possible to reset the computer inside the OB-8.

To reset the OB-8's computer, press all 8 PROGRAM buttons and the SPLIT button at the **same time** (use your elbow), WHILE MEMORY PROTECT IS OFF. The reason this a difficult procedure is so that it cannot be done accidentally, since all the envelope calibrations will be reset to zero.

When this reset is done, the envelopes should be matched closely enough for normal operation, but to match them more accurately, the calibrations must be loaded in from tape.

NOTE: These functions have been provided as a last resort when there seems to be no other way to correct a problem of envelope matching or transpositions not functioning. Since the consequences of these operations are not user repairable, contact your authorized service center or Oberheim Customer Service to determine whether or not these actions should be taken to solve a particular problem.

11.3. Reset of All Performance Controls

If this same reset procedure is done with **ONLY WITH MEMORY PROTECT ON**, all of the OB-8 functions EXCEPT the envelope calibrations will be reset. This can be useful when it is desired to reset the arpeggiator transpositions, bend amount, bend direction, split transpositions, etc. without affecting any of the calibrations.

A. SPECIFICATIONS

SYNTHESIZER COMPONENTS: 8 Voices; 3 Low Frequency Oscillators ,Arpeggiator,
     Polyphonic Portamento, Pink Noise Source

VOICE COMPONENTS:
    2 Voltage Controlled Oscillators
    1 Voltage Controlled Filter (2-Pole or 4-Pole low pass type,
      selectable)
    2 Envelope Generators
    1 Voltage Controlled Amplifier

LFO COMPONENTS:
    1 Voltage Controlled Low Frequency Oscillator with Triangle, Square, Up
      and Down Sawtooth waveforms
    1 Sample/Hold Generator
          Front Panel LFO's only:
          2 Envelope Generators
          90° and 180° Phase switch
          Quantizing
          Keyboard Track
          Programmable Trigger point

NUMBER OF PROGRAMS: 120 Patch Programs, 12 Split Programs, 12 Double
     Programs

KEYBOARD: 5 Octaves (C to C)

KEYBOARD MODES: FULL, SPLIT (splits OB-8 into two independent
     synthesizers), and DOUBLE (plays both independent synthesizers
     simultaneously); programmable split point and transpositions anywhere
     on the keyboard (in SPLIT or DOUBLE)

INPUTS/OUTPUTS: Stereo and Mono signal outputs (Output Level: 1 Volt peak
          to peak, 75K Ohms Impedance)

          Cassette Interface inputs and outputs
          Arpeggiator Clock Input

          Computer Interface (Parallel Interface)

FOOT CONTROLS: Footswitches: Sustain, Hold, Program Advance
               Foot Pedals: Volume, Filter, Vibrato

POWER: 90-130 or 180-240 Volts AC, 50-60 Hz, 46 Watts

DIMENSIONS: 40"(101.6cm) wide, 20"(50.8cm) deep, 6"(15.24cm) high

WEIGHT: 38 lbs. 17 (kg)

OB-8

PAGE 1 FUNCTIONS

MASTER

MASTER VOLUME
PROGRAM VOL/BAL
AUTO
HOLD
CHORD/ PAGE 2

CONTROL

PORTAMENTO
UNISON

MODULATION

LFO RATE
MODULATION DEPTH 1
MODULATION DEPTH 2
WAVEFORM
SAMPLED V/B LFO
S/H
OSC 1 FRQ
OSC 2 FRQ
FILTER FRQ
OSC 1 PWM
OSC 2 PWM
VOLUME MOD
FRQ

MASTER TUNE
OSC 2 DETUNE

OSCILLATORS

OSC 1 FREQUENCY
1 AND 2 PULSE WIDTH
OSC 2 FREQUENCY
WAVEFORM
SAW PULSE TRIANGLE
SYNC
F-ENV
WAVEFORM
SAW PULSE TRIANGLE

FILTER

FREQUENCY
RESONANCE
MODULATN
OSC 1 ON
OSC 2 HALF FULL
4 POLE
NOISE ON
ACK

ENVELOPES

FILTER ENVELOPE
ATTACK DECAY SUSTAIN RELEASE
ATTACK DECAY SUSTAIN RELEASE
VOLUME ENVELOPE

KEYBOARD

SPLIT
DOUBLE
LOWER
UPPER
MANUAL
PLAY

PROGRAMMER

GROUP
A B C D
PROGRAM
1 2 3 4 5 6 7 8
WRITE
CHECK
CASSETTE
RECORD

OB-8

PAGE 2 FUNCTIONS

MASTER

MASTER VOLUME

PROGRAM VOL/BAL

AUTO   HOLD   CHORD/ PAGE 1

CHORD LATCH

MASTER TUNE

VOICE DETUNE

CONTROL

PORTAMENTO

PORTAMENTO BEND

MODULATION

LFO RATE

MODULATION DEPTH 1

MODULATION DEPTH 2

TRIG WAVEFORM   QUANTIZE 1   QUANTIZE 2

SAMPLED   INVERT 1   INVERT 2

VCO LFO   LFO TRACK   LFO ENV MOD

S/H   TRIG

OSCILLATORS

OSC 1 FREQUENCY   OSC 2 PULSE WIDTH   OSC 2 FREQUENCY

LFO PHASE   90   180   OSC1 LFO MOD   FREQ1   PW   INVERT   MATCH QUANTIZE   PORTAMENTO QUANTIZE

LEGATO   PORTAMENTO EQUAL TIME   EXPO

SOFTWARE PAGE 2
REV. NO.   RESET
(WHILE HOLDING LIT CHORD BUTTON)

KEYBOARD

SPLIT   DOUBLE   LOWER   UPPER

FILTER

FREQUENCY   RESONANCE   MODULATION

ENVELOPES

DELAY MOD 1   ATTACK MOD 1   TRIG POINT

DELAY MOD 2   ATTACK MOD 2   PEDAL RELEASE

PROGRAMMER

VOICE ENABLES

1   2   3   4   5   6   7   8

RESET

CASSETTE

OB-8 FACTORY PATCHES

GROUP \ PROGRAM	1	2	3	4	5	6	7	8
A	BRASS ENSEMBLE	ST. GENEVIEVE	STRING ENSEMBLE	VIBES	ACCELERATING ROTARY ORGAN	WHISTLE	REPEAT	BOUNCING BALL
B	DEM BONES	CLAVINET	HIGH STRINGS	DIGITAL PIANO	CATHEDRAL ORGAN	CHORUS	PULSE SWEEP	CALLIOPE
AB	FRENCH HORNS	BASS 1	BRIGHT STRINGS	ELECTRIC PIANO	ROTARY ORGAN	BAGPIPES	QUANTIZED LFO	RUSH REZZ
C	TRUMPET	MAGIC CLAVINET	SLOW STRINGS	RESONANCE SWEEP	COMBO ORGAN	DOUBLE REED	FARR'S FUNK	FM
AC	TRUMPET ENSEMBLE	BASS 2	FOUR POLE STRINGS	REED PIANO	CIRCUS ORGAN	SAX	HARP	DISTORTION SOLO
BC	TROPICAL HORNS	RUBBER CLAVINET	STRINGS 2	KLINK PIANO	HYMN ORGAN	RECORDER	LONG CHIMES	PERCUSSIVE SOLO
ABC	COMP HORNS	BELLS	FOUR POLE STRINGS 2	SOFT PIANO	BIRDS	VOCAL WOW	MARIMBAS	ROCK UNISON
D	DELAYED OCTAVE	TRIG PULSE WIDTH	POLYPHONIC PORTAMENTO	STEEL DRUMS	SQUARE MOD	COMP SYNTH	UNISON PORTAMENTO	DELAY MOD
AD	SWELL HORNS	SITAR	FIDDLE	SAW PIANO	PULSE WIDTH REZZ	TRIANGLE COMP	JAZZ SOLO	EARTHQUAKE
BD	S/H PORT REZZ	CONGA	STRINGS 3	FUNKY KEYS	FADING DETUNE	TREMOLO REZZ	BOX O' PUPS	STEREO SPIN
ABD	DECELERATE	CARILLON	SOLO STRINGS	DETUNED LONG PIANO	FILTER DRONE	3 WAY	HARMONIC PERCUSSION	CHOPPER
CD	TUNED PORTAMENTO	ALIEN CRAFT	STRINGS 4	PULSE WIDTH MOD	WHIPPETS	METAL SOLO	CLAVE	JET
ACD	WATER WIGGLE	STRIPPER SAX	ROSIN STRINGS	FLANGED PIANO	SAW MOD	IMPACT	THUNDER	START ENGINES
BCD								
ABCD								
SPLITS	ORGAN / POLY PORT	DEM BONES / STRINGS	STEEL DRUMS / CONGA	ROCK UNISON / ORGAN				
DOUBLES	OCTAVE CLAVINET	DOUBLE STRINGS	BELLS IN FOURTHS	STRINGS IN HEAVEN				
SPLITS/ DOUBLES	STRINGS / BRASS \ A	FARR'S FUNK / REPEAT \ B	ORGAN / BASS \ C	ST. GENE / PIANO \ D SPLIT	PIANO/STRING IN FIFTHS \ A DOUBLE	PERCUSSIVE ORGAN \ B	OCTAVE ORGAN \ C	STRINGS & BRASS \ D

NEW PAGE 2 FEATURES

The latest version of the Oberheim OB-8 has eight exciting
new features not listed in the current Owner's Manual. All
of these features are retrofitable to any previously
manufactured OB-8 at your local Oberheim Service Center.

The new computer software is labeled A8. For a quick check
to see which software is in your OB-8, enter PAGE 2 by
pressing the CHORD/PAGE 2 button twice, and hold it down on
the second push. While holding, press the SYNC button.
While holding both of these buttons down, the software
version will be displayed in the Programmer Section. If you
currently have version A8 software, the GROUP A and the
PROGRAM 8 lights will light up.

NOTE: If a cassette of patches from an OB-8 with old
software is loaded into an OB-8 with A8 software, it is
possible that some of the new features will be turned on in
some of the programs. To eliminate them, simply edit them
out of each patch and re-write it into memory.

The software version A8 contains the following new features:

1)-- LEGATO PORTAMENTO
2)-- EQUAL TIME LINEAR PORTAMENTO
3)-- EXPONENTIAL PORTAMENTO
4)-- INVERT LFO FREQUENCY MODULATION ON VCO 1
5)-- INVERT LFO PULSE WIDTH MODULATION ON VCO 1
6)-- VCF TRACKING OF THE BEND LEVER
7)-- REVERSABLE BEND LEVER
8)-- REVERSABLE MODULATION LEVER

1)   LEGATO PORTAMENTO

This mode is turned on from PAGE 2 with the OSC 1 FULL switch
and is stored in the patch. THIS MODE CAN BE TURNED ON ONLY
WHILE IN UNISON MODE. Turning off UNISON will automatically
turn this mode off. When legato portamento is on, the
portamento (any kind) will be active only when the keyboard
is played legato, e.g. without releasing the key while going
from one note to another.

2)   EQUAL TIME LINEAR PORTAMENTO

This mode is turned on from PAGE 2 with the OSC 2 HALF switch
and is stored in the patch. BEND PORTAMENTO (the UNISON
button on PAGE 2) AND EQUAL TIME PORTAMENTO CANNOT BE ON AT
THE SAME TIME. When this mode is active, the glide time
between any note is independant of the interval between the
notes, e.g. it will take the same time to glide from CO to C1

as it would from C0 to C6. The glide time is controlled by
the portamento rate knob. The range of the glide time is
smaller than with the regular portamento mode.

3) EXPONENTIAL PORTAMENTO

This mode is turned on from PAGE 2 with the OSC 2 FULL switch
and is stored in the patch. BEND PORTAMENTO AND EXPONENTIAL
PORTAMENTO CANNOT BE ON AT THE SAME TIME. EQUAL TIME LINEAR
PORTAMENTO AND EXPONENTIAL PORTAMENTO CANNOT BE ON AT THE
SAME TIME. This mode is essentially identical to the equal
time portamento but the "shape" of the glide is exponential
instead of linear. This means that the pitch will glide
slower and slower as it gets closer to the destination note.
This kind of portamento was used on the Oberheim Modular 2,4
& 8 voice synthesizers.

4)   INVERT LFO FREQUENCY MODULATION ON VCO 1

This mode is turned on from PAGE 2 with the SYNC switch and
is stored in the patch. With this mode on, the LFO
modulation of VCO 1's frequency is out of phase by 180 .
degrees (phase opposition) with respect to the LFO frequency
modulation on VCO 2 and the VCF.

5)   INVERT LFO PULSE WIDTH MODULATION ON VCO 1

This mode is turned on from PAGE 2 with the F-ENV switch and
is stored in the patch. With this mode on, the LFO
modulation of VCO 1's pulse width is out of phase by 180
degrees (phase opposition) with respect to the LFO pulse
width modulation on VCO 2 and the VOLUME MOD.

6)   VCF TRACKED BY THE PITCH BEND LEVER

When VCF TRACK is on, the pitch bend lever controls the VCF
frequency. In SPLIT or DOUBLE the VCF will only track the
bend lever if it is assigned to it with the UPPER and LOWER
buttons in the bend box.

7)   REVERSABLE PITCH BEND LEVER

It is now possible to reverse the direction of the pitch bend
lever. To do so, hold down the UPPER and AMOUNT buttons
above and below the pitch bend lever while you turn the power
on. To return the pitch bend to normal operation, repeat the
procedure. This setting is not stored with the patch but
will remain in its current mode even when the power is turned
off. When it leaves the factory the OB-8 is set for the
regular direction (the right one!).

2

8)   REVERSABLE MODULATION LEVER

Same as for the pitch lever but you must use LOWER and OSC 2
ONLY (above and below the modulation lever) while you turn on
the power.

As with any piece of equipment, the more you know about it,
the better you will be able to use it. So experiment! You
won't discover all of the capabilities of your new PAGE 2
controllers unless you do.

ADDITIONAL OB-8 SOFTWARE INFORMATION

There are also a few features of the OB-8 that have existed
in earlier software versions, but have not been explained in
the owner's manual. The following features are on all OB-8s
having software version A6 or above. Under normal operation
of the OB-8, these features would never be used, but they can
be very useful if the unusual situation arises in which the
OB-8 is not functioning properly.

1)   TAPE STORAGE OF CALIBRATIONS

The OB-8 has a number of calibrations that are stored in its
computer memory. Most of these are envelope time
calibrations that are set at the factory so that the envelope
generators in the OB-8 will be matched from voice to voice
and between the upper and lower voices. These calibrations
are unique to each OB-8 and are stored on tape automatically
each time you save your programs. If for some reason your
OB-8 gets out of calibration (due to memory drop), the
calibrations on tape can be loaded back into the OB-8 by
holding down all six buttons in the FILTER section (OSC 1 ON,
OSC 2 HALF, OSC 2 FULL, NOISE, 4 POLE, and TRACK), then
pressing PLAY and then playing in the tape (MEMORY PROTECT
must be off in order to play in a cassette). The
calibrations should only be loaded in if the OB-8 has lost
its programs, or the envelope generators do not seem to be
operating properly. It is important that these calibrations
are loaded in only from a tape made from the same OB-8,
otherwise the wrong calibrations will be loaded in.

2) MASTER RESET

If for some reason (memory drop, for example), the OB-8 seems
to be functioning improperly (i.e. four voices out of tune
with the other four, envelope generators are unmatched,
transpose won't work), it is possible to reset the computer
inside the OB-8 by pressing all 8 PROGRAM buttons and the

SPLIT button at the same time (use your elbow), WHILE MEMORY
PROTECT IS OFF. The reason we made this a difficult
procedure is so that it cannot be done accidentally, since
all the envelope calibrations will be reset to zero. To then
reload the envelope calibrations, follow the procedure listed
above. When this reset is done, the envelopes should be
matched closely enough for normal operation, but to match
them more accurately, the calibrations must be loaded in from
tape. If the reset is done with memory protect on, all of
the OB-8 functions EXCEPT the envelope calibrations will be
reset. This can be useful when it is desired to reset the
arpeggiator transpositions, bend amount, bend direction,
split transpositions, etc. without affecting any of the
calibrations.

NOTE: These functions have been provided as a last resort
when there seems to be no other way to correct a problem of
envelope matching or transpositions not functioning. Since
the consequences of these operations are not user
repairable, contact your authorized service center or
Oberheim Customer Service to determine whether or not these
actions should be taken to solve a particular problem.

USING THE OB-8 MIDI INTERFACE

MIDI

MIDI is an acronym for Musical Instrument Digital Interface. It is a serial computer interface which enables synthesizers and computers to communicate. MIDI was designed to be a universal computer interface through which synthesizers and computers could communicate regardless of manufacturer. Any synthesizer or computer having a MIDI interface will connect to an OB-8.

MIDI CONNECTORS

MIDI CONNECTORS are located on the rear panel of the OB-8 or, on the left end bell of an OB-8 with a MIDI retrofit. The MIDI IN connector receives MIDI information. The MIDI OUT connector transmits MIDI information from the synthesizer. Keyboard information, patch changes, and bend lever/modulation lever changes generated on an OB-8 will be sent to the MIDI OUT connector. The MIDI THRU connector is used to pass MIDI information which was generated by another synthesizer/computer. Information played on an OB-8 is not available at it's own MIDI THRU connector.

BASIC CONNECTION

The simplest application is to connect 2 OB-8's together. The Master OB-8 will be referred to as Synthesizer A and will, for the following demonstrations, be the controller. The second OB-8 will be referred to as Synthesizer B or the Slave, and will be controlled by the Master OB-8. We will use this configuration to explain MIDI operation and associated controls.

NOTE: WHEN CONNECTING COMPUTER BASED PRODUCTS TOGETHER, MAKE SURE POWER IS OFF ON BOTH UNITS.

Using a cable with 5 pin male DIN connectors on each end, connect MIDI OUT on the master OB-8 to MIDI IN on the Slave OB-8. Turn power on and press auto tune. Notes played on the Master OB-8 will also be played by the Slave OB-8.
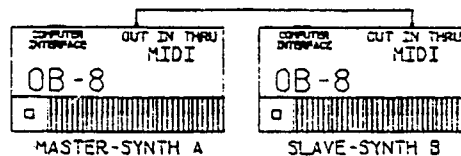
(Figure 1.)

MIDI SWITCHES AND FUNCTIONS
        All MIDI SWITCHES are located in the PAGE 2 feature of the OB-8.
        Enter PAGE 2 by rapidly pressing the PAGE 2 switch twice. The Led
        for the PAGE 2 switch will light signifying that you are in PAGE
        2. Most of the MIDI related switches are located in the programmer
        section.

(Figure 2.)

PROGRAM ENABLE / DISABLE — SWITCH "A" (Page 2)
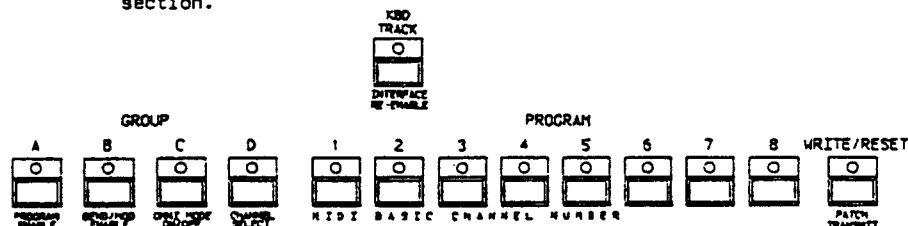   This switch enables and disables two patch related functions: patch
        select, and patch data transfer. When the OB-8 is powered up these
        functions are disabled.

        SELECTING PATCHES — In PAGE 2 on both OB-8's, press the A switch.
        The A Led will light, indicating the ability to transmit/receive
        program information.   Selecting a patch program in PAGE 1 on the
        Master OB-8 will select the same patch program on the Slave OB-8.
        (EXCLUDING SPLITS & DOUBLES).

        PATCH TRANSMIT — "WRITE/RESET" SWITCH (Page 2)
        The program enable switch also allows you to transfer patches
        from the Master OB-8 to the Slave OB-8.   (NOTE: Memory Protect
        must be off on the Slave OB-8.) In PAGE 1 on the Master OB-8,
        select patch D-1. Now, enter Page 2 and press the WRITE button on
        the Master OB-8. After a short delay, the WRITE Led will light,
        indicating that the program Patch D-1 has been transferred from
        the memory of the Master OB-8 to memory location D-1 in the Slave
        OB-8. To play this patch on the Slave OB-8, you must return to
        PAGE 1 and re-select Patch D-1, or select a different patch on the
        Master OB-8 then select D-1. Now both OB-8's will play Patch D-1.

PITCH BEND AND MODULATION LEVER ENABLE / DISABLE — "B" SWITCH (Page 2)
        When the OB-8 is powered on, the pitch bend and modulation levers
        are not sent or received over MIDI (disabled). They must be enabled
        on both units each time power is turned on.

        In PAGE 2 on both OB-8's, press the B switch.   The B Led will
        light, indicating the ability to transmit and receive pitch
        bend/modulation information.   When the Slave OB-8 receives pitch
        bend/modulation information, it uses that information based on the
        settings on it's own Performance/Modulation Panel. In other
        words, if the slave machine is set to bend a semi-tone, it will
        bend at that interval regardless of the bend setting of the master
        machine.

OMNI MODE ON / OFF — "C" SWITCH (Page 2)
         The power up or default condition is OMNI MODE on, C Led lit.

         When OMNI MODE is on, the OB-8 receives on ALL MIDI channels and
         transmits all data on Basic Channel N only.
         When OMNI MODE is off, the OB-8 receives on MIDI Basic Channel N
         only. When OMNI MODE is off in the transmitting OB-8, it will
         transmit on two MIDI channels. Notes above the split-point are sent
         on Basic Channel N. Notes below split-point are sent on the Basic
         Channel plus one. Example: When power is turned on the Basic
         Channel is always channel 1. After OMNI MODE is turned OFF, the
         upper half of keyboard is sent on channel 1, and the lower is sent
         on channel 2. If the Basic Channel is changed to channel 5, the
         upper will be channel 5 and the lower will be channel 6.
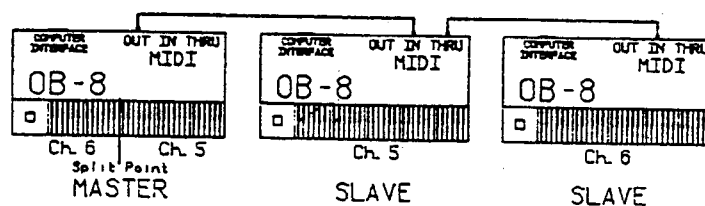
(Figure 3.)

MIDI BASIC CHANNEL SELECT / DISPLAY — "D" SWITCH (Page 2)
         The power up or default MIDI Basic Channel is channel 1. To change
         the Basic Channel, PRESS & HOLD the D switch. The D Led the 1 led
         will light, indicating that the Basic Channel is channel 1. If you
         select 5, the 5 led will light, indicating that the Basic Channel is
         now channel 5.

    NOTE: Do not attempt to change MIDI channels while notes are playing.
         This may cause a note to get "stuck" ON. If this happens, try the
         DSX RE-ENABLE / TURN OFF MIDI NOTES switch (see next section) or
         switch in & out of cassette mode or power OFF/ON to reset.

DSX RE-ENABLE / TURN OFF MIDI NOTES — "TRACK" SWITCH (Page 2)
         The hardware design of the OB-8 does not allow MIDI IN and the DSX
         COMPUTER INTERFACE to be used at the same time without possible
         MIDI errors. The OB-8 receives information from the DSX sequencer
         thru the 40 pin connector on the rear panel of the OB-8. Any time
         MIDI IN information is detected by the OB-8, the DSX interface is
         DISABLED and the DSX RE-ENABLE Led will light. While the DSX RE-
         ENABLE Led is on, the DSX cannot play the OB-8. Pressing the DSX
         RE-ENABLE switch causes the Led to go out and re-enables the
         parallel interface.

    NOTE: The Yamaha synthesizers have a MIDI option called "active sense".
         They are ALWAYS transmitting MIDI data even if no notes are being
         played. Connecting a DX-7 to MIDI IN on an OB-8 will not allow
         you to use the DSX. The OB-8 will continually detect MIDI
         information and will keep the parallel interface disabled.

OTHER CONNECTION CONFIGURATIONS

   MASTER <=> SLAVE
        BY adding another MIDI cable, it is possible to use either OB-8 to
        control the other. Connect MIDI OUT on the Slave to MIDI IN on
        the Master. Now either OB-8 can be the Master or the Slave.
        Information received at the MIDI IN connectors is NOT available at
        the MIDI OUT connector of the same synthesizer. This prevents an
        endless loop situation from occurring which would be the MIDI
        version of acoustical feedback.
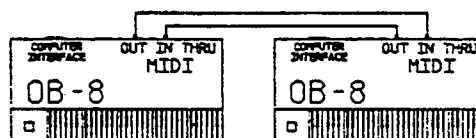
(Figure 4.)

   SIMPLE CHAIN
        It is possible to connect synthesizers together in a configuration
        known as a CHAIN. This allows one synthesizer to control many
        synthesizers. Connect them as follows:

            SYNTH A MIDI OUT   to   SYNTH B MIDI IN
            SYNTH B MIDI THRU   to   SYNTH C MIDI IN
            SYNTH C MIDI THRU   to   SYNTH D MIDI IN
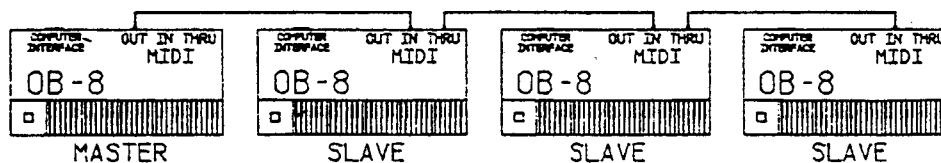
(Figure 5.)

        If synthesizers B, C and D are in OMNI mode or are all on the same
        MIDI channel as synthesizer A, synthesizer A will control all
        synthesizers.

USING MIDI WITH THE DSX
   The sequencing power of the DSX can be used with ANY synthesizer
   having a MIDI interface. With a DSX sequencer playing the Master
   OB-8, any synthesizer connected to the MIDI OUT connector of the
   Master OB-8 will DOUBLE the notes played by the OB-8.   Also, you
   can use the OB-8 to merely pass the DSX information to the MIDI
   OUT connector causing any synthesizer with MIDI IN to   be
   controlled by the DSX.
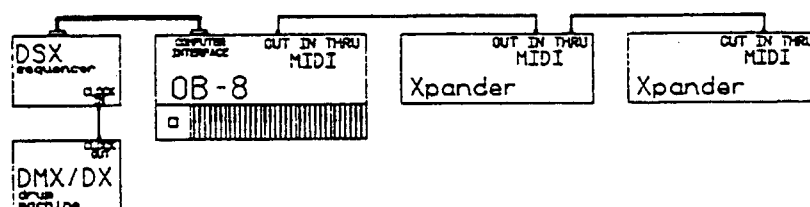
(Figure 6.)

   Oberheim Electronics is excited about the future of MIDI and plans
   to include MIDI on future products. With MIDI on your OB-8 you
   now have a very special connection to future musical developments.

OB-8 MIDI IMPLEMENTATION

TRANSMITTED DATA - CHANNEL VOICE MESSAGES

Status	Data Bytes	Description
1000 xxxx	Okkk kkkk Ovvv vvvv	Note off. (See notes no. 1-2.) Ovvv vvvv=note off velocity: always OOH.
1001 xxxx	Okkk kkkk Ovvv vvvv	Note on. (see notes no. 1-2.) Ovvv vvvv=40H
1011 xxxx	Occc cccc Ovvv vvvv	Control Change. (if enabled). Occc cccc=Control number (01=mod lever). Ovvv vvvv = control value.(range 0-1EH).
1100 xxxx	Onnn nnnn	Program select. (if enabled). Onnn nnnn =0 through 77H.
1110 xxxx	Ovvv vvvv Ovvv vvvv	Pitch Bend change LSB (see note 3). Pitch Bend change MSB

TRANSMITTED DATA - SYSTEM MESSAGES

Status	Data Bytes	Description
1111 0000	10H Oddd dddd 01H Occc cccc data F7H	System Exclusive . Oberheim I.D. no. Device number . OB-8 = 01H Command Byte 1 : Program data dump follows. Command Byte 2 : Program number. Program data. (see note 4) End of System Exclusive Status Byte.

RECOGNIZED RECEIVE DATA - CHANNEL VOICE MESSAGES

Status	Data Bytes	Description
1000 xxxx	Okkk kkkk Ovvv vvvv	Note off. (See notes no. 1-2.) Ovvv vvvv=note off velocity: ignored
1001 xxxx	Okkk kkkk Ovvv vvvv	Note on. (see notes no. 1-2.) Ovvv vvvv=0: Note Off. Ovvv vvvv not=0, velocity ignored.
1011 xxxx	Occc cccc Ovvv vvvv	Control Change. (if enabled). Occc cccc=Control number (01=mod lever). Ovvv vvvv = control value.(0-1EH)
1100 xxxx	Onnn nnnn	Program select. (if enabled). Onnn nnnn =0 through 77H
1110 xxxx	Ovvv vvvv Ovvv vvvv	Pitch Bend change LSB (see note 3). Pitch Bend change MSB

RECOGNIZED RECEIVE DATA - SYSTEM MESSAGES

```
1111 0000    10H              System Exclusive . Oberheim I.D. no.
             Oddd dddd        Device number : OB-8 = 01H
             01H              Command Byte 1 : Program data dump follows.
             Occc cccc        Command Byte 2 Program Number
             data             data (see note 4 for data format)
             F7H              End of System Exclusive Status Byte.

1111 0000    10H              System Exclusive . Oberheim I.D. no.
             Oddd dddd        Device number . OB-8 = 01H
             00H              Command Byte 1 Program data dump Request.
             Occc cccc        Command Byte 2 Program Number
             F7H              End of System Exclusive Status Byte.

1111 0110    -               System Common Message : Tune Request
```

NOTES:
1. xxxx : Basic Channel number minus 1. i.e. 0000 is CH.1. and 0001 is CH.2.
        range : CH.1-8.

2. kkk kkkk = note number. Range 24H-60H

3. Sensitivity of the pitch bender is selected in the receiver. Center
position (no pitch change) is 2000H, which is transmitted ExH-00H-40H.
Maximum transmitted value is 7F40H. (The 6'lsb's are not looked at by the
OB-8).

4. OBERHEIM OB-8 PROGRAM BIT MAP :

   Sent as 4 bit nibbles, right justified, LS nibble sent first.

	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0 :	VCF REL		(6 BITS)			:	LFO WAVE	
						:	2	1 :
BYTE 1 :	VCA REL		(6 BITS)			:	:UNISON :	
						:	0 :	:
BYTE 2 :	VCF DCY		(6 BITS)			:FILTER	: OSC 2 :	
						: FM	: FM :	
BYTE 3 :	VCA DCY		(6 BITS)			:OSC 2 WAVEFORM :		
						: 1	: 0 :	
BYTE 4 :	VCF ATK		(6 BITS)			:OSC 1 WAVEFORM :		
						: 1	: 0 :	
BYTE 5 :	VCA ATK		(6 BITS)			: OSC 2	: OSC 1 :	
						: PWM	: PWM :	

```
BYTE  6 :        VCF SUS      (6 BITS)        : NOISE :4 POLE :
        :                                     :      :       :
BYTE  7 :        VCA SUS      (6 BITS)        : OSC 2 : OSC 2 :
        :                                     :  ON  :  HALF :
BYTE  8 :        VCF MOD      (6 BITS)        : OSC 1 : TRACK :
        :                                     :  ON  :       :
BYTE  9 :        VCF RES      (6 BITS)        :  PW1  : VCO1  :
        :                                     : 180 ' : 180 ' :
BYTE 10 :        VCO 1 PW     (6 BITS)        :  VCA  : F-ENV :
        :                                     :  MOD  :       :
BYTE 11 :        LFO FREQ     (6 BITS)        : SYNC  : OSC 1 :
        :                                     :       :  FM   :
BYTE 12 :        FM AMNT      (6 BITS)        :       :       :
        :                                     :  5    :  4    :
                                                   VOLUME    —
BYTE 13 :        PWM AMNT     (6 BITS)        :       :       :
        :                                     :  3    :  2    :
BYTE 14 :        PORT AMT     (6 BITS)        :       :       :
        :                                     :  1    :  0    :
BYTE 15 :        VCO2 DETUNE  (6 BITS)        :  VCO 2 PW     :
        :                                     :  5    :  4    :
BYTE 16 :        VCF FREQ     (6 BITS)        :       :       :
        :                                     :  3    :  2    :
BYTE 17 :        VCO2 FREQ    (6 BITS)        :       :       :
        :                                     :  1    :  0    :
BYTE 18 :        VCO1 FREQ    (6 BITS)        : SPARE : LEGATO:
        :                                     :       : PORT. :
BYTE 19 :        RETRIG POINT (6 BITS)        :RETRIG LFO WAVE:
        :                                     :  2    :  1    :
BYTE 20 :        PEDAL SUSTAIN(6 BITS)        :       : PORT  :
        :                                     :  0    : BEND  :
BYTE 21 :        FM  VIB RAISE(6 BITS)        : LFO   :FM DLY :
        :                                     : TRACK :INVERT.:
BYTE 22 :        PWM VIB RAISE(6 BITS)        : PORT  : PORT  :
        :                                     : QUANT : MATCH :
BYTE 23 :        FM  VIB DELAY(6 BITS)        : 180 ' : 90 '  :
        :                                     :       :       :
```

BYTE 24 :	PWM VIB DELAY(6 BITS)	:PWM DLY: PWM :
:		:INVERT.: QUANT :
BYTE 25 :	VOICE DETUNE (6 BITS)	: EXPO : CONST.:
:		: PORT. : PORT. :
BYTE 26 :	BEND AMOUNT (6 BITS)	:LFORATE: FM :
:		: DELAY : QUANT :

MODE

   The OB-8 defaults to OMNI ON upon power up. If the OB-8 is a receiver, it will receive on all channels. If the OB-8 is the transmitter, it will transmit on one channel. (selectable)
   The OB-8 may also be operated in OMNI OFF mode. If the OB-8 is a receiver, it will now receive ONLY on the selected Basic Channel. If the OB-8 is used as transmitter, it will now transmit the upper half of the keyboard on the Basic Channel, and the lower half will be transmitted on the Basic Channel + 1. Pitch bend, progam select, etc. will be transmitted on both channels. The Channel Split Point is the same as the regular Split Point. (default is middle C.) THIS MODE IS INDEPENDENT OF SPLIT MODE.
   The OB-8 is always in POLY MODE.

FRONT PANEL SELECTABLE FUNCTIONS (ON PAGE TWO OF FRONT PANEL)

NOTE: Functions must be enabled on source AND destination machines to work.

Switch	Function
A	Enable/Disable program change and program dump. Power-On default: disabled.
B	Enable/Disable Pitch bend and modulation controls. Default: disabled.
C	OMNI ON/OFF. Toggle OMNI status. Power-On default is OMNI ON (led is lit.) (see MODE)
D	Channel display/select. Press and hold down D button to display or select the Basic Channel.
WRITE	Dump current STORED program to MIDI. NOTE: SWITCH "A", "PROGRAM ENABLE", MUST BE ENABLED FOR A DUMP TO OCCUR.
TRACK	Sequencer Re-Enable / Turn off MIDI Notes.

IMPORTANT: The OB-8 cannot RECEIVE MIDI info and be run by the DSX sequencer simultaneously (due to hardware design.) So, to prevent MIDI data errors, the sequencer is DISABLED upon receiving any data from MIDI IN. This condition is displayed by the TRACK led on page 2. When you no longer wish to use the OB-8 as a receiver, and you want to use the DSX, disconnect MIDI IN and press the TRACK button. The led will go out, the sequencer will work normally, and any notes turned on by MIDI will be turned off.

Power-On default: TRACK light off, Sequencer Enabled.

OB-8 Revision B5 Software
Operation Guide
8/15/84

This revision of OB-8 software (version B5) has been made to improve the operation of the OB-8 with the DSX, as well as to add some new MIDI features. For a complete explanation of the OB-8's existing features, please refer to the OB-8 Owner's Manual and the OB-8 Revision B3 Software Operation Guide. To verify the software version number of an OB-8, press the PAGE 2 button twice and hold it down the second time it is pressed (the PAGE 2 led should now be lit). While holding down the PAGE 2 button, press and hold the SYNC button. While holding both switches down, the PROGRAMMER leds will display the OB-8's software version number. If the B led in the GROUP section and the 5 led in the PROGRAM section are now lit, the software version is B5. This version has all of the features of version B3, as well as the following NEW FEATURES:

1. The Sustain Footswitch on the OB-8 has now been added to the MIDI interface. This means that when two OB-8s are connected together through MIDI, the Sustain Footswitch on th MASTER OB-8 (the one using MIDI OUT) will also control the Sustain on the SLAVE OB-8 (the one using MIDI IN). This feature can also be used by other synthesizers that transmit and recieve Sustain Footswitch information on MIDI.

2. When an OB-8 with MIDI is connected to a DSX Digital Sequencer, the MIDI output of the OB-8 will send out the notes played by the DSX through the MIDI output. This allows additional synthesizers with MIDI to play the same thing that the OB-8 is playing from the DSX. Now with version B5 (and a DSX with version 3.00 or above), it is possible to have the DSX control the OB-8 AND a synthesizer connected to the OB-8's MIDI OUT INDEPENDENTLY. By assigning the DSX's CV outputs to the OB-8 MIDI (see "DSX REVISION 3.00 INSTRUCTIONS"), the DSX will send whatever the DSX's CVs are playing to the OB-8's MIDI OUT without the OB-8 playing it. The notes that the OB-8 are playing will NOT be sent to the MIDI OUT, so that the two synthesizers can play completely independently. This also means that when this feature is used, and the DSX is not playing anything on the CVs, no notes will be sent to the OB-8's MIDI OUT regardless of what is being played on the OB-8.

3. The overall speed of operation on the OB-8 has been increased to allow the DSX to communicate with the OB-8 faster, resulting in increased accuracy of the timing of notes played by the DSX.

4. The range of vibrato lever has been changed for better compatability.

OB-8 MIDI IMPLEMENTATION VERSION B-5

TRANSMITTED DATA - CHANNEL VOICE MESSAGES

Status	Data Bytes	Description
1000 xxxx	Okkk kkkk Ovvv vvvv	Note off. (See notes no. 1-2.) Ovvv vvvv = note off velocity: always 40H.
1001 xxxx	Okkk kkkk Ovvv vvvv	Note on. (see notes no. 1-2.) Ovvv vvvv = 40H
1011 xxxx	Occc cccc Ovvv v000	Control Change. (if enabled). Occc cccc = Control number (01=mod lever). Ovvv v000 = control value.(range 0-78H. Lowest 3 bits are ignored).
1011 xxxx	Occc cccc Ovvv vvvv	Control Change. (if enabled). Occc cccc = Control number (40H = Sustain footswitch) Ovvv vvvv = control value.(0 = off. 7FH = on.)
1100 xxxx	Onnn nnnn	Program select. (if enabled). Onnn nnnn = 0 through 77H.
1110 xxxx	Ovvv vvvv Ovvv vvvv	Pitch Bend change LSB (see note 3). Pitch Bend change MSB

TRANSMITTED DATA - SYSTEM MESSAGES

1111 0000	10H Oddd dddd 01H Occc cccc data F7H	System Exclusive . Oberheim I.D. no. Device number . OB-8 = 01H Command Byte 1 : Program data dump follows.. Command Byte 2 : Program number. Program data. (see note 4) End of System Exclusive Status Byte.

RECOGNIZED RECEIVE DATA - CHANNEL VOICE MESSAGES

Status	Data Bytes	Description
1000 xxxx	Okkk(kkkk Ovvv vvvv	Note off. (See notes no. 1-2.) Ovvv vvvv = note off velocity: ignored
1001 xxxx	Okkk kkkk Ovvv vvvv	Note on. (see notes no. 1-2.) Ovvv vvvv = 0: Note Off. Ovvv vvvv not = 0, velocity ignored.
1011 xxxx	Occc cccc Ovvv v000	Control Change. (if enabled). Occc cccc = Control number (01=mod lever). Ovvv v000 = control value.(0-78H. Lower 3 bits are ignored.)
1100 xxxx	Onnn nnnn	Program select. (if enabled). Onnn nnnn = 0 through 77H
1110 xxxx	Ovvv vvvv Ovvv vvvv	Pitch Bend change LSB (see note 3). Pitch Bend change MSB

RECOGNIZED RECEIVE DATA - CHANNEL MODE MESSAGES

1011 xxxx	0111 1011 0000 0000	cccc cccc = 123 (7BH) : All notes off. vvvv vvvv = 0. The OB-8 turns off all notes that were turned on by MIDI.
1011 xxxx	0111 1100 0000 0000	cccc cccc = 124 (7CH) : OMNI mode off. vvvv vvvv = 0. The OB-8 turns OMNI mode off and turns off all notes that were turned on by MIDI.
1011 xxxx	0111 1101 0000 0000	cccc cccc = 125 (7DH) : OMNI mode on. vvvv vvvv = 0. The OB-8 turns OMNI mode on and turns off all notes that were turned on by MIDI.
1011 xxxx	0111 1110 0000 0000	cccc cccc = 126 (7EH) : MONO mode on. vvvv vvvv = 0. The OB-8 has no MONO mode. When this command is received the OB-8 switches to OMNI on / POLY mode and turns off all notes that were turned on by MIDI.
1011 xxxx	0111 1111 0000 0000	cccc cccc = 127 (7FH) : POLY mode on. vvvv vvvv = 0. The OB-8 is always in POLY so no mode change occurs. All notes are turned off that were turned on by MIDI.

RECOGNIZED RECEIVE DATA - SYSTEM MESSAGES

1111 0000   10H   System Exclusive . Oberheim I.D. no.
             0ddd dddd   Device number : OB-8 = 01H
             01H   Command Byte 1 : Program data dump follows.
             0ccc cccc   Command Byte 2 Program Number
             data   data (see note 4 for data format)
             F7H   End of System Exclusive Status Byte.

1111 0000   10H   System Exclusive . Oberheim I.D. no.
             0ddd dddd   Device number . OB-8 = 01H
             00H   Command Byte 1 Program data dump Request.
             0ccc cccc   Command Byte 2 Program Number
             F7H   End of System Exclusive Status Byte.

1111 0110   -   System Common Message : Tune Request

NOTES:

1. xxxx : Basic Channel number minus 1. i.e. 0000 is CH.1. and 0001 is CH.2.
          range : CH.1-8.

2. kkk kkkk = note number. Range 24H-60H

3. Sensitivity of the pitch bender is selected in the receiver. Center
position (no pitch change) is 2000H, which is transmitted ExH-00H-40H.
Maximum transmitted value is 7F40H. (The 6 lsb's are not looked at by the
OB-8).

4. OBERHEIM OB-8 PROGRAM BIT MAP :

    Sent as 4 bit nibbles, right justified, LS nibble sent first.

	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE 0 :	VCF REL		(6 BITS)				LFO WAVE	
							2	1
BYTE 1 :	VCA REL		(6 BITS)					UNISON
							0	
BYTE 2 :	VCF DCY		(6 BITS)				FILTER FM	OSC 2 FM
BYTE 3 :	VCA DCY		(6 BITS)				OSC 2 WAVEFORM 1	0
BYTE 4 :	VCF ATK		(6 BITS)				OSC 1 WAVEFORM 1	0
BYTE 5 :	VCA ATK		(6 BITS)				OSC 2 PWM	OSC 1 PWM
BYTE 6 :	VCF SUS		(6 BITS)				NOISE	4 POLE
BYTE 7 :	VCA SUS		(6 BITS)				OSC 2 ON	OSC 2 HALF
BYTE 8 :	VCF MOD		(6 BITS)				OSC 1 ON	TRACK
BYTE 9 :	VCF RES		(6 BITS)				PW1 180 '	VCO1 180 '
BYTE 10 :	VCO 1 PW		(6 BITS)				VCA MOD	F-ENV
BYTE 11 :	LFO FREQ		(6 BITS)				SYNC	OSC 1 FM

BYTE 12 :	FM AMNT (6 BITS)	:	: 5 : 4 :
:		:	VOLUME --
BYTE 13 :	PWM AMNT (6 BITS)	:	: : :
:		:	: 3 : 2 :
BYTE 14 :	PORT AMT (6 BITS)	:	: : :
:		:	: 1 : 0 :
BYTE 15 :	VCO2 DETUNE (6 BITS)	:	: VCO 2 PW :
:		:	: 5 : 4 :
BYTE 16 :	VCF FREQ (6 BITS)	:	: : :
:		:	: 3 : 2 :
BYTE 17 :	VCO2 FREQ (6 BITS)	:	: : :
:		:	: 1 : 0 :
BYTE 18 :	VCO1 FREQ (6 BITS)	:	: SPARE : LEGATO:
:		:	: : PORT. :
BYTE 19 :	RETRIG POINT (6 BITS)	:	:RETRIG LFO WAVE:
:		:	: 2 : 1 :
BYTE 20 :	PEDAL SUSTAIN(6 BITS)	:	: : PORT :
:		:	: 0 : BEND :
BYTE 21 :	FM VIB RAISE(6 BITS)	:	: LFO :FM DLY :
:		:	: TRACK :INVERT.:
BYTE 22 :	PWM VIB RAISE(6 BITS)	:	: PORT : PORT :
:		:	: QUANT : MATCH :
BYTE 23 :	FM VIB DELAY(6 BITS)	:	: 180 ': 90 ' :
:		:	: : :
BYTE 24 :	PWM VIB DELAY(6 BITS)	:	:PWM DLY: PWM :
:		:	:INVERT.: QUANT :
BYTE 25 :	VOICE DETUNE (6 BITS)	:	: EXPO : CONST.:
:		:	: PORT. : PORT. :
BYTE 26 :	BEND AMOUNT (6 BITS)	:	:LFORATE: FM :
:		:	: DELAY : QUANT :

MODES

        The OB-8 defaults to OMNI ON upon power up. If the OB-8 is a receiver,
it will receive on all channels. If the OB-8 is the transmitter, it will
transmit on one channel. (selectable)
        The OB-8 may also be operated in OMNI OFF mode. If the OB-8 is a
receiver, it will now receive ONLY on the selected Basic Channel. If the OB-
8 is used as transmitter, it will now transmit the upper half of the
keyboard on the Basic Channel, and the lower half will be transmitted on the
Basic Channel + 1. Pitch bend, progam select, etc. will be transmitted on
both channels. The Channel Split Point is the same as the regular Split
Point. (default is middle C.) THIS MODE IS INDEPENDENT OF SPLIT MODE.
        The OB-8 is always in POLY MODE.

FRONT PANEL SELECTABLE FUNCTIONS (ON PAGE TWO OF FRONT PANEL)

NOTE: Functions must be enabled on source AND destination machines to work.

Switch   Function
  A   Enable/Disable program change and program dump.
             Power-On default: disabled.

  B   Enable/Disable Pitch bend and modulation controls.
             Default: disabled.

  C   OMNI ON/OFF. Toggle OMNI status. Power-On default is OMNI ON
             (led is lit.) (see MODES)

  D   Channel display/select. Press and hold down D button to display
             or select the Basic Channel.

WRITE   Dump current STORED program to MIDI. NOTE: SWITCH "A", "PROGRAM
             ENABLE", MUST BE ENABLED FOR A DUMP TO OCCUR.

TRACK   Sequencer Re-Enable / Turn off MIDI Notes.

             IMPORTANT: The OB-8 cannot RECEIVE MIDI info and be run by the
             DSX sequencer simultaneously (due to hardware design.) So, to
             prevent MIDI data errors, the sequencer is DISABLED upon
             receiving any data from MIDI IN. This condition is displayed by
             the TRACK led on page 2. When you no longer wish to use the OB-
             8 as a receiver, and you want to use the DSX, disconnect MIDI IN
             and press the TRACK button. The led will go out, the sequencer
             will work normally, and any notes turned on by MIDI will be
             turned off.

             Power-On default: TRACK light off, Sequencer Enabled.