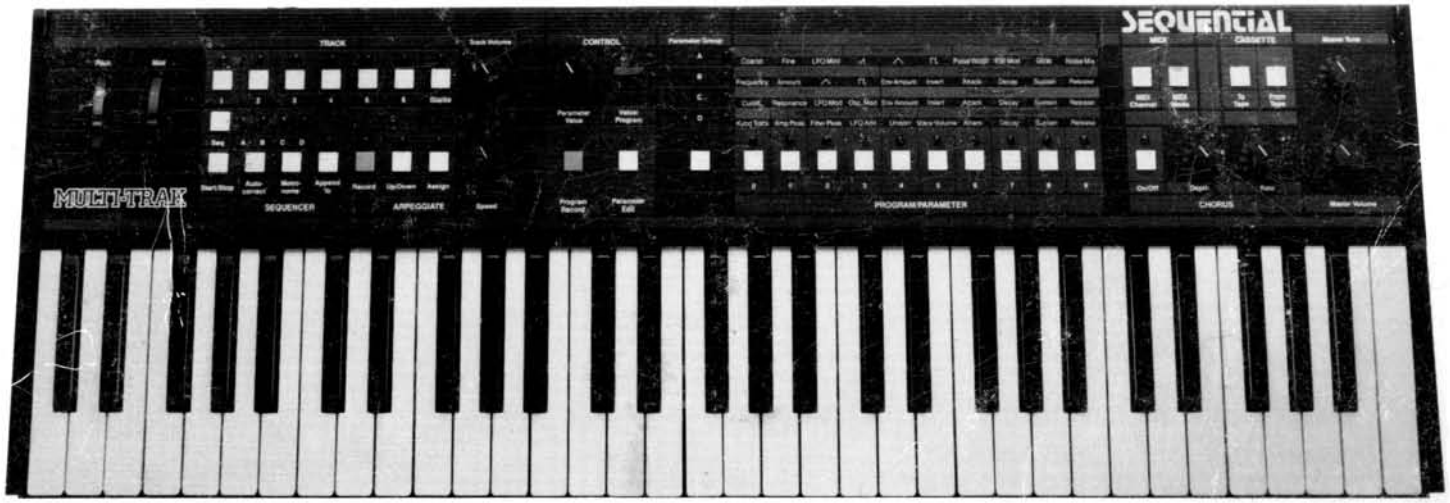

MULTI-TRAK

OPERATION MANUAL

SEQUENTIAL

Manual No: CM615B

MULTI-TRAK

SYNTHESIZER/SEQUENCER

OPERATION MANUAL

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MULTI-TRAK
MODEL 615

OPERATION MANUAL

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Preface

The velocity-sensitive, multi-timbral MULTI-TRAK combines the superior expressiveness of velocity touch sensitivity with the compositional flexibility of multi-timbral sound, as pioneered by Sequential with the Six-Trak and MAX synthesizers. Other features of the MULTI-TRAK include a built-in multi-track sequencer, a chorus effect for richer sounds, a split keyboard, individual audio outputs for each voice, a cassette interface for program and sequence storage, and, of course, MIDI (Musical Instrument Digital Interface).

The block diagram (page vii) shows the main sub-sections: keyboard, sequencer, sound memory, voices, and MIDI. Using this as a basis for discussion, we trace backwards from the audio output, to see how the sub-sections work together. There are two types of audio outputs, the **Mix** outputs and the **Track** outputs. The **Mix** outputs, **A** and **B**, provide a pseudo-stereo effect from the chorus. Stereo headphones can be plugged into either **Mix** output. The **Track** outputs are useful in studio situations, where each voice can be run through its own channel of the main mixer board. If a **Track** output is used, its voice is removed from the MULTI-TRAK's **Mix** outputs.

These audio outputs come from the six independent synthesizer voices. In contrast to homophonic synthesizers, which program each voice with the same sound, each of the MULTI-TRAK's voices can have a different sound (multi-timbre). Each voice has a multi-waveform oscillator (or noise) as the principal sound source. The oscillator drives a resonant low-pass filter which contours the timbre, and an amplifier which contours the dynamics. There are three attack-decay-sustain-release (ADSR) envelope generators: one for oscillator frequency, one for filter cutoff frequency, and one for amplifier gain. (The polarity of the first two can be inverted.) A triangle- or square-wave low frequency oscillator (LFO) can modulate oscillator frequency, pulse width, or filter frequency. The amount of LFO modulation can be controlled with the **Mod** wheel. A second modulation route runs from the oscillator triangle output to the filter frequency, for frequency modulation (FM). Frequency glide ("portamento") and voice volume are programmable. A **Pitch** wheel is provided for bending notes. Non-programmable master volume and tuning controls are provided. The TUNE switch has been eliminated by fully-automatic oscillator tuning, although a manual tune command is still available.

A voice has two types of inputs. First are the sound parameters from the sound memory. These operate on the synthesizer voices to define the track's timbre--in other words, the instrumental sound. The synthesizer program memory stores 100 sound programs, each consisting of 40 voice parameters. 100 instrumental sounds and effects are factory-programmed, but the player can modify (edit) these as desired. Light-emitting diodes (LEDs) clearly indicate the selected program, and if the program is being edited, they also display the parameter value and indicate which parameter is being edited. You use a single knob to change all parameter values. Programs can be copied. And the non-volatile memory is retained when power is off, thanks to a long-life backup battery. To permanently back-up programs and sequences, provision is made for storing them on audio cassette.

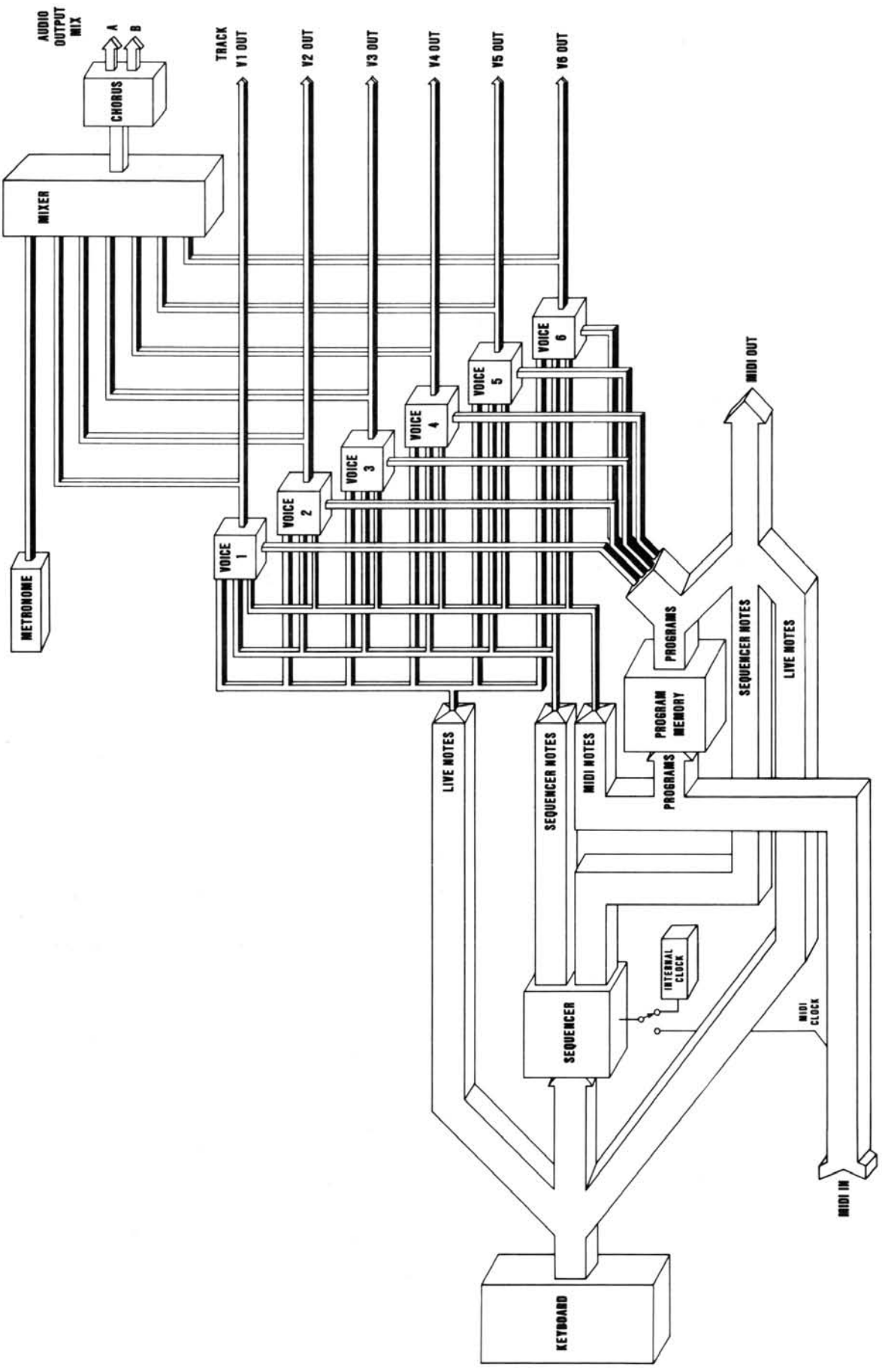
The second type of input to a voice are notes. Notes tell the voice when to play and what pitch to play. A voice can be played by notes coming from three sources: the keyboard, the sequencer, and MIDI. The MULTI-TRAK has a five-octave keyboard which you can use to overdub tracks, to play one or more voices live along with recorded sequences, or to play six voices live with either one sound (polyphonic or unison), or multiple timbres (in Stack or Split modes). The velocity with which a key is played can affect the loudness or brightness of the note, or the amount of LFO modulation applied. Other keyboard modes include voice stacking (for fatter sounds), a programmable split point, and a flexible arpeggiator.

When playing the MULTI-TRAK keyboard "live," each key played has the same sound (homophonic mode), except in Split mode, where the keyboard can be divided into two parts, each with its own timbre. When playing live, more complex multi-timbres are not possible because the MULTI-TRAK cannot know which keystrokes you intend for which timbres.

But the sequencer can record whatever you play on the keyboard as a separate track using its own voice. So each track can be overdubbed with a different sound. The sequencer allows overdubbing and editing without re-recording, splicing, or accumulating noise and distortion by "mixing-down" and "bouncing" audio tape tracks.

The 1600-note memory can be allocated to four sequences. Sequencer functions include overdubbing, programmable playback speed, programmable track volume, track erase, warning of memory-full, built-in metronome and autocorrect, an append function (which adds sequences together), and sync-to-tape.

Thirdly, the voices can play notes coming in from MIDI, which may be from another synthesizer or an external sequencer.



MULTI-TRAK BLOCK DIAGRAM

The MULTI-TRAK can send live notes, recorded notes, or sounds out to MIDI. For example, Sequential's Model 242 MIDI Interface Cartridge for the Commodore 64, and associated 900- series software, offers increased sequencer storage (up to 4000 notes), program and sequence storage on cassette or disc, and song transposition, as well as forthcoming music display and editing functions.

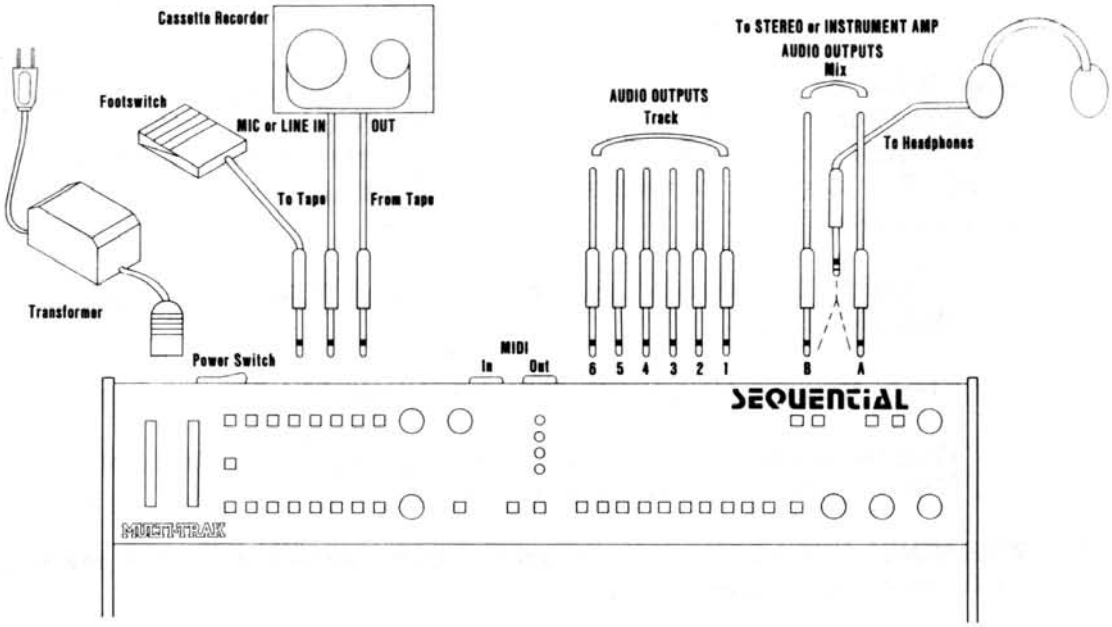
Finally, if you use a MIDI rhythm unit (such as the Sequential Model 400 Drumtraks), it sends a MIDI clock to the MULTI-TRAK sequencer, which synchronizes the MULTI-TRAK song to the drum song (or pattern).

Note: For more information on MIDI applications and use with Sequential's Drumtraks, please see the MULTI-TRAK MIDIGUIDE.

In order to get the most from the wealth of features found in your new MULTI-TRAK, we hope you will study this manual and the MIDIGUIDE thoroughly, and keep the reference card on hand while performing. You will find the MULTI-TRAK to be a most versatile music tool, both in itself and with its powers of MIDI expandability.

WARNING! Switch power off to all equipment in use before connecting or disconnecting anything.

SET-UP DIAGRAM



1. CONNECT **AUDIO OUTPUTS.**

CAUTION! If you are using an external amplifier, switch the amplifier power off.

CAUTION! Ordinary home stereo speakers and amplifiers may be damaged by the high transients produced by synthesizers. It is best to use sound equipment specifically designed for musical instrument amplification.

The MULTI-TRAK has stereo **Mix A** and **B** outputs which can be connected to the left and right auxiliary or tape monitor inputs of a stereo amplifier, to produce stereo-enhanced effects when the MULTI-TRAK's built-in chorus is in use.

Or, either the **Mix A** or the **Mix B** output can drive a monaural musical instrument amplifier or stereo headphones (either output will drive both sides of a stereo headset).

For studio use, the MULTI-TRAK has **Track** outputs for each voice. When these outputs are used, the corresponding voice(s) disappear from the **Mix** outputs. The **Track** outputs are not affected by the **Master Volume.**

2. IF USED, CONNECT FOOTSWITCH FOR REMOTE CONTROL.

3. FOR MIDI CONNECTIONS AND OPERATION, SEE THE MULTI-TRAK MIDIGUIDE.

4. CONNECT POWER TRANSFORMER.

WARNING! Leave enough room around the transformer for cooling air. Do not close it up in a box.

WARNING! Be sure you are using the correct transformer for your location. For the USA and Japan, use only Sequential Model E-170 (110 volts). For Europe, use only Sequential Model E-175 (220 volts). Transformers not supplied by Sequential could damage your MULTI-TRAK.

Connect the transformer cable to the **POWER** jack on the MULTI-TRAK.

Check that the MULTI-TRAK **POWER** switch is **Off.**

Plug the transformer into a power outlet of the correct voltage. (The transformer requires no grounding.)

WARNING! The transformer should be disconnected from the power outlet when not in use.

5. SWITCH POWER ON.

Switch the MULTI-TRAK **POWER** switch to **On.**

Switch amplifier power on (if used).

(Later, when you are done playing, to prevent a "pop" switch off amplifier power first, then switch off the MULTI-TRAK.)

6. OBSERVE THE **Value/Program** DISPLAY. IT SHOULD READ '00.'

When you apply power, 00 appears in the **Value/Program** display. This indicates that the MULTI-TRAK is ready to play, and that program number 00 is selected. If the factory programs are in place, program 00 is an organ sound.

One of the **Seq** LEDs is also lit. This means that the multi-track sequencer is ready. **CHORUS On/Off** may also be lit.

If the display, instead of showing 00, counts slowly from 1 to 6, this means the non-volatile memory has lost information. The MULTI-TRAK is tuning, and will be ready to play when 00 appears. However, sequences or programs may have been damaged. If this happens more than once, consult an authorized Sequential service center.

7. CHECK THAT THE **Pitch** WHEEL IS CENTERED IN ITS DETENT POSITION, AND THE **Mod** WHEEL IS FULLY DOWN.

8. CHECK THAT **Master Tune** IS CENTERED. IF NECESSARY, ADJUST TO TUNE THE MULTI-TRAK TO ANOTHER INSTRUMENT.

CAUTION! To protect speakers (and ears!), first lower **Master Volume** all the way, then, while playing, gradually raise it to the desired level.

Note: For best signal-to-noise ratio when using external amplifiers, raise MULTI-TRAK **Master Volume** and lower the amplifier level.

1. PLAY THE KEYBOARD.

When you play the keyboard, the MULTI-TRAK should now produce an organ sound, which is factory program number 00. At this point all six track voices play the same sound. This is called homophonic (same-sounding) mode.

As you play the keys, the **Track** LEDs show which voices are active. These indicate voice assignment. While you play, the computer continuously assigns the voices to the most recently-played keys. You can play a maximum of six keys at once. If you play more than six keys at the same time, then the computer assigns the voices to only the latest six keys.

For example, play and hold C, E ,G ,A ,C, and E. Listen carefully while also pressing G. Notice that the first C disappears when you play the G. In other words, the MULTI-TRAK normally operates on a "last-note priority" system: each new note played is assigned to the earliest-used voice. If you strike the same key repeatedly, the computer re-assigns the same voice (unless six or more keys are held).

2. TO SELECT PROGRAMS: ENTER TWO DIGITS USING THE **PROGRAM/PARAMETER** SWITCHES.

The MULTI-TRAK is "ready-to-play," with 100 factory-programmed sounds in memory. These present a wide range of instruments and effects.

If **Parameter Edit** is on, switch it off. The **Value/Program** display now shows a program number.

When **Parameter Edit** is off, pressing any two **PROGRAM/PARAMETER** switches selects a new program.

The new program takes effect when the second digit is entered.

If the sequencer and arpeggiator are off, pressing the footswitch selects the next higher program number within the current group of ten programs. (It wraps around from, for instance, 28, 29, to 20.)

The factory programs are described in Section 10 of this manual. Try playing them, and see how they sound.

3. SELECT PROGRAMS WITH VELOCITY, SUCH AS #43. LISTEN TO THE VARIATION IN SOUND DEPENDING ON HOW HARD YOU PLAY THE KEYS.

When you hit a key with more force, the note will be louder, brighter, or have a stronger vibrato, than the same key played with less force. This is due to the velocity response of the MULTI-TRAK. This feature is very useful for giving more expression to your music.

In programs where velocity is set very high, it may take some practice to acheive a consistent sound. Alternatively, you can reduce the sensitivity (see Sections 6 and 7).

4. USE THE WHEELS TO ADD EXPRESSION TO YOUR PLAYING.

The **Pitch** wheel is normally left in its center-detent position, from which it is possible to "bend" oscillator pitch up or down by about a third.

Check that the **Mod** wheel is down (minimum modulation). The **Mod** wheel sets the modulation level. When not in use, the wheel is left "down" and no modulation occurs. When the wheel is advanced fully "up," modulation is maximum. As you try various programs, try advancing the **Mod** wheel.

Note: To prevent mysterious tuning and modulation effects, it is good to develop a habit of always checking the wheel positions before playing.

5. SELECT A **CHORUS** PROGRAM, SUCH AS #33, OR SWITCH **CHORUS On** WITH ANY PROGRAM. VARY THE CHORUS EFFECT WITH THE **Depth** AND **Rate** KNOBS.

On some factory programs, you may notice that the **CHORUS On/Off** LED is lit. While playing these programs, experiment with the **CHORUS Depth** and **Rate** controls. As these are increased, the sound becomes richer, and if the **Mix A** and **Mix B** outputs are connected to a stereo system, a lively stereo effect is heard. Since, like **Master Tune** and **Master Volume**, the **CHORUS Depth** and **Rate** controls are not programmed, they do not change when the program is changed, but always produce the effect indicated by their front panel settings (providing the **CHORUS On/Off** switch is on).

6. SELECT A UNISON PROGRAM, SUCH AS #80. NOTICE THAT YOU CAN ONLY PLAY ONE NOTE AT A TIME.

If the Unison parameter is on in the current program, all six voices are assigned to the lowest key played.

The keyboard remains in multiple-trigger mode, that is, with each new keystroke, the envelopes retrigger. However, if two or more keys are being held and the lowest one is released, the pitch changes to the lowest key still held, but without retriggering.

7. SELECT A PROGRAM WITH A LONG GLIDE RATE, SUCH AS #85. COMPARE IT WITH #80. NOTICE THAT ALTHOUGH BOTH ARE UNISON PROGRAMS, #85 TAKES A LONG TIME TO SLIDE BETWEEN KEYS.

GLIDE determines how long it takes to slide between notes. When programmed to 0, there is no effect: the oscillator steps instantly between specific pitches. As GLIDE is advanced, it takes longer for the oscillator pitch to change. This introduces "portamento" between the notes, which can be subtle or quite extreme.

Glide operates whether Unison is on (monophonic) or off (polyphonic). Polyphonic glide is unpredictable but can be a good effect. For an example of polyphonic glide, try program #98.

8. AUTOMATIC TUNING: THE MULTITRAK TUNES ITSELF AFTER 30 SECONDS OF NOT PLAYING.

As the MULTI-TRAK warms up, temperature change causes the oscillators to drift. To correct for this, the MULTI-TRAK tunes itself when it is not being played. After the MULTI-TRAK has been "standing by" for 30 seconds, it tunes one oscillator. Thirty seconds later, it tunes the next oscillator, and so on. If you need to play it while it is tuning, go ahead: playing interrupts tuning. It may be necessary to slightly readjust **Master Tune** after automatic tuning takes place.

9. MANUAL TUNING: IF YOU DO NOT WANT TO WAIT FOR AUTOMATIC TUNING TO TUNE THE SIX OSCILLATORS:

Hold **Program Record.**
Press **PROGRAM/PARAMETER 6.**

While tuning is in progress, the display counts from 1 to 6, indicating which voice is tuning. When tuning is concluded, the MULTI-TRAK returns to exactly the state it was in before the tuning. (Even unrecorded Edit Mode changes are retained.) It may be necessary to slightly readjust **Master Tune.**

3-1 INTRODUCTION

The sequencer is the heart of the MULTI-TRAK, recording the synthesizer tracks which result in complete orchestrations. The sequencer records each voice on its own track, so each track can have a different sound (multi-timbre). The sequencer capacity of 1600 total notes is alloted to four sequences, Sequence A through Sequence D. You can program the track playback mixture for each sequence.

Typically, you create multi-track sequences one track at a time. The first track recorded is referred to as the "basic" track. It determines the total length of that sequence. The basic track will therefore usually be a rhythm or bass track (but can be whatever you want).

Note: As mentioned, each voice is recorded on its own track. This means, for example, that if one track is being overdubbed, only one note should be played at a time. If more than one note is played, only the last one is recorded. To record two or more voices for either the basic track or overdubbed tracks, two or more tracks need to be switched into record mode.

There are three basic sequencer modes: RECORD BASIC TRACK, OVERDUB, and PLAYBACK. RECORD BASIC TRACK and OVERDUB are both considered RECORD modes. The difference is that when entering RECORD BASIC TRACK mode, the previous sequence is erased and Track 1 is set up for recording (if desired, other tracks may also be switched into record). In OVERDUB mode, the previous tracks are not erased, new tracks can be recorded, and notes can be added to or erased from previously recorded tracks.

Other features of the sequencer include:

- When the sequencer is stopped, complete tracks can be erased;
- In RECORD modes, a built-in metronome is provided and recorded notes are automatically synchronized with it using autocorrect;
- An append function merges sequences to form longer ones;
- Sequences can be stored on tape or dumped via MIDI;
- The sequencer can be synchronized to a standard clock or MIDI clock from a drum machine (such as Sequential's Drumtraks) or other source, or to a sync pulse on tape; and,
- A footswitch can be used for convenient sequencer control.

3-2 SEQUENCE PLAYBACK

Before trying to record sequences, familiarize yourself with the playback functions explained in this section.

When the MULTI-TRAK left the factory, four demonstration sequences were loaded in memory. You can play these sequences to show that the MULTI-TRAK is properly connected and operating correctly, and we will use them for examples in the instructions below.

NOTE: All references to the **Record** switch in this section refer to the **SEQUENCER Record** switch, unless otherwise indicated.

1. TO START PLAYBACK: SELECT DESIRED SEQUENCE THEN PRESS **Start.**

   a. The arpeggiator and stack mode must be off, and the sequencer must be stopped (no **Track** LEDs lit).

   b. Select desired sequence, A-D, if not already lit, by repeatedly pressing **Seq.** Each time you press **Seq,** the selection advances.

   c. Press **Start.** The selected sequence starts playing back. If the sequence is empty, no sound is heard and the **Track** LEDs do not light.

2. TO STOP PLAYBACK: PRESS **Stop.**

   Sequences always repeat continuously until stopped. Each repetition is called a "loop." During playback, **Track** LEDs light for those tracks which are recorded in the sequence.

3. DURING SEQUENCE PLAYBACK, IF ANY TRACKS ARE NOT LIT, YOU CAN PLAY THE KEYBOARD "LIVE," USING THE PROGRAM WHICH IS CURRENTLY SELECTED.

   a. Select desired program.

   b. Play no more keys at once than the number of available voices (non-lit sequencer tracks).

   c. Use the wheels. They only affect live playing, not the sequence.

4. TO DISPLAY A TRACK'S CURRENT PROGRAM NUMBER: PRESS THE DESIRED **Track** SWITCH.

   If you have just switched on the MULTI-TRAK, for example, the program selection is 00. Sequences, though, often have different sound selections for each track.

While a sequence is playing, try pressing the six **Track** switches. As long as **Track** is held down, that track's program number appears in the **Value/Program** display.

If a track has not been recorded, when you press its switch, the display shows horizontal bars (--).

5. TO ADJUST PLAYBACK SPEED: USE THE **Speed** KNOB.

a. The initial playback speed of the sequence is always the last speed at which it played.

b. Adjust **Speed** as desired.

c. Note: do not turn **Speed** all the way counterclockwise, as this will stop the sequencer by selecting MIDI or external clock input. (For more information on MIDI clock see the MIDIGUIDE, and for external clock, see page 3-12.)

6. PLAYBACK CAN BE PAUSED AND CONTINUED USING THE OPTIONAL FOOTSWITCH.

a. Plug in the footswitch (the jack is on the rear panel).

b. Start playback normally, by selecting a sequence, then pressing **Start**.

c. Pause the sequence by pressing the footswitch.

d. The **Track** LEDs for tracks used by the sequence remain lit, indicating standby.

e. To continue playback, press the footswitch. The sequence again loops until the footswitch (or **Stop**) is pressed.

7. CHAINED PLAYBACK: WHILE A SEQUENCE IS PLAYING, SELECT ANOTHER SEQUENCE WITH **Seq**.

The LED of the new sequence blinks, while the current one remains steady.

At the end of the current sequence, its LED goes out, the new sequence starts playing, and its LED lights steadily. The speed of the new sequence is determined by the speed of the first sequence.

If the new sequence is empty, the sequencer stops.

Note: This feature can be used to make a sequence stop precisely at the end of the current loop (rather than having to stop "manually.")

8. TO ADJUST A TRACK VOLUME: HOLD DESIRED **Track** SWITCH WHILE ADJUSTING **Track Volume** KNOB.

a. Start playback.

b. Hold one of the lit **Track** switches.

c. Adjust **Track Volume** as desired. A volume value of 0-15 is displayed. (It is possible to mute the track entirely.)

d. Release **Track** switch.

e. The track always plays at the volume to which it was last adjusted.

During playback you can adjust the "mixture" of the track volumes. For example, start Sequence A. Hold **Track 6** (which is lit) and turn down **Track Volume**. The volume of the lead line drops until you can not hear the track and it is said to be "muted." Now stop Sequence A and start it again. **Track 6** is lit, but you do not hear the lead line. Keep this in mind as a reminder to check the track volume when a track appears to be off. Now raise the volume of **Track 6** by holding its switch and turning up **Track Volume**.

(Each sequence has independent volumes. In other words, if Sequence A volumes are adjusted, Sequence B is not affected.)

Adjust the volume of the other tracks in the demonstration sequences. You can emphasize or deemphasize any of the tracks, to make many variations of one sequence.

9. TO CHANGE A TRACK'S PROGRAM: HOLD **Track**(s), AND SELECT NEW PROGRAM:

a. The sequence must be either running or paused (stopped in PLAYBACK with the footswitch).

b. Press and hold the **Track** switch(es) for the track (or tracks) you want to change.

c. Enter the two digits for the desired program (even if the program number is already displayed). While holding the **Track** switch, you can try several program selections.

d. Release the **Track** switch. The track now has the new program.

Experiment with changing the track's programs in the four demonstration sequences. Verify the changes (by simply pressing the **Track** switches).

10. TO ERASE A TRACK FROM A SEQUENCE: HOLD **Record** AND PRESS THE **Track** SWITCH.

a. Select sequence.

b. The sequence must be stopped.

c. Press and hold the **Record** switch. It blinks, and "Er" appears in the **Value/Program** display.

d. Press the switch for the track you want to erase.

e. To erase another track, repeat from step b.

Note: Before continuing, be sure you have saved the factory sequences on cassette if you want to keep them. See Section 8.

For example, select demonstration Sequence A and erase Track 6. You now have an unrecorded track to use for live playing. While holding **Record**, be sure to press the correct **Track** switch, or you may accidentally erase a part you wanted to keep.

(When you erase the last track of a sequence, the speed is not erased.)

3-3 SEQUENCE RECORD

Having covered the playback functions, we now turn to recording and overdubbing.

Before recording, estimate the memory space you'll need to record.

1. THE MULTI-TRAK STORES A MAXIMUM OF 1600 NOTES. WHEN CAPACITY IS REACHED, RECORD MODE SWITCHES OFF AUTOMATICALLY AND HORIZONTAL BARS (--) FLASH IN THE **Value/Program** DISPLAY.

a. To stop the LEDs from blinking, press **Stop.**

b. You can create more space by erasing undesired tracks in any sequence, or by erasing another sequence entirely. (1600 notes is the total for all four sequences.)

c. You may erase the tracks you were recording when you ran out of memory, and record them over, or you can place the sequencer in OVERDUB and take up where they stopped.

2. SELECT THE PROGRAM DESIRED FOR YOUR BASIC TRACK OR TRACKS.

Rehearse a bit using this program.

3. TO RECORD A NEW SEQUENCE AND ERASE CURRENT SEQUENCE: HOLD **Record**, AND PRESS **Start.**

a. Select the sequence you want to erase and record.

b. The sequence must be stopped.

c. Hold **Record.** "Er" blinks in the **Value/Program** display.

d. Press **Start.** The **Record** LED blinks, **Track 1** LED blinks, and the metronome begins to click.

e. If you are not ready to start recording now, hit **Stop.** The sequence is now erased, and RECORD BASIC TRACK can be started again by first pressing **Record,** then **Start.**

4. TO TURN OFF THE METRONOME, PRESS **Metronome.**

The metronome appears automatically when you start recording. If you don't want to use it, turn it off. It can be turned on and off whenever you are in RECORD mode, but doesn't work in PLAYBACK.

5. IF DESIRED, ADJUST THE **Speed** CONTROL.

Now that the metronome is running, adjust its speed to your liking. Each click equals one quarter note, which equals 24 external or MIDI clocks, the same standard which most drumboxes observe. If your keyboard playing skills are slower than your ideas, you may want to record your tracks slowly, speeding them up with the **Speed** knob on playback.

6. TO RECORD BASIC TRACK: START PLAYING. AT THE END, PRESS **Record.**

The basic track or tracks are the first recorded in a sequence. They determine the sequence length. Therefore you usually use the basic tracks for the rhythmic or bass foundations of a sequence, but of course you can record anything you want.

a. One track can only play one note at a time. If you need more than one voice for the basic track, switch on additional **Track** switches (2, 3, etc.).

b. Play the notes for the basic track(s). Recording starts automatically with the first note you play.

c. Just before the desired ending, either:

1. Press **Record.** The sequence plays back, looping, in OVERDUB mode. The track or tracks recorded remain in record until switched off.

or,

2. Press **Stop.** The tracks do not play back. (If desired, press **Start** to start playback.)

NOTE: The ending of the sequence is autocorrected to the following quarter note (except in "HI-RES" autocorrect mode). If you record the ending too early (before the quarter note before the desired ending), you will have to re-record the basic track(s). If you record it too late, it is possible to correct the mistake by truncating the sequence to the correct length. (See page 3-9.)

7. TO OVERDUB TRACKS (SEQUENCER ALREADY IN OVERDUB):

If you have recorded the ending of the basic track using the **Record** switch, the sequencer is now looping in overdub. The basic tracks are still in Record mode (**Record** and **Track**(s) blinking), so anything you play is recorded.

a. Switch off the track or tracks already recorded. Notice the **Track** LEDs stop blinking and light steadily, indicating the change from RECORD to PLAYBACK.

b. While waiting for the beginning to come around again, listen to the sequence. You can play along to practice before recording the next track. Although the sequencer is in OVERDUB mode (**Record** blinking), it can record nothing, since no **Tracks** are blinking.

c. Adjust playback speed, if desired.

d. Select the program desired for this overdub. (You can try various programs by playing live on the keyboard.)

e. Switch on desired overdub tracks. After selection, the **Track** LEDs blink. Anything played now is recorded.

f. When recording is done, go back to step "a", and repeat until all desired tracks have been recorded. The entire sequence can be built up, track by track, without the sequence ever stopping.

8. TO OVERDUB TRACKS (SEQUENCER STOPPED):

a. Before starting overdub, listen to the sequence in playback.

b. Adjust playback speed to desired rate.

c. If desired, adjust volumes of track(s) which are playing back.

d. Select the program desired for this overdub. (You can try various programs by playing live on the keyboard.)

e. **Stop** sequence.

f. Switch **Record** on. The LED lights.

g. Switch on desired overdub tracks. After selection, the **Track** LEDs blink.

h. Press **Start.** Previously recorded tracks now start playing back, and their **Track** LEDs light steadily. The sequence plays and loops continuously. Anything played on the keyboard is recorded in the tracks which have blinking LEDs. If your new track has notes at or near the beginning of the sequence, it is best to let the sequence play through once, then start playing at the beginning of the next loop.

i. Note that it is possible to overdub notes on a track which you have already recorded. (For more practical information on overdubbing, see the example which follows.)

j. From this point on, follow the procedures in step 7 (previous page), since the sequencer is now in OVERDUB.

9. FOR EASIER CONTROL, USE THE OPTIONAL FOOTSWITCH.

There are three ways to use the footswitch when recording:

a. When recording the basic track of a sequence, the actual recording of the sequence may be started with the footswitch (before the first note is played). This produces a rest at the beginning of the sequence.

b. When recording the basic track of a sequence, the footswitch may be used to end the sequence. In this case it duplicates the function of the **Record** switch, so the sequence end is recorded and the basic track(s) start looping in OVERDUB.

c. In OVERDUB mode, the footswitch stops the sequence, just like the **Start/Stop** switch does.

10. TO TRUNCATE A SEQUENCE, IN OVERDUB, HOLD **Record** AND PRESS **Stop.**

a. Sequencer must be in OVERDUB mode (**Record** blinking).

b. As the desired ending approaches, hold **Record.** It blinks rapidly, and "Er" blinks in the display.

c. Within one quarter note before the desired ending, press **Stop.**

d. The ending will be autocorrected to the next quarter note (except in "Hi-Res" Autocorrect mode).

This feature is useful for correcting an ending that was improperly recorded, or for deleting a sequence that was mistakenly appended.

11. TO ERASE INDIVIDUAL NOTES FROM THE SEQUENCE, WHILE IN OVERDUB, HOLD **Record** AND EITHER THE **Track** OR THE KEY YOU DESIRE TO ERASE.

a. Enter overdub mode as described in previous instruction (**Record** blinking), switching into RECORD those tracks which have notes you want to erase (they blink).

b. While the sequence is playing in OVERDUB, hold **Record. Record** blinks rapidly and "Er" blinks in the display.

c. While holding **Record,** either:

1. Hold one **Track** switch. While held, all notes occuring in this track are erased.

-or-

2. Hold a key. While held, all occurances of this note are erased from all recording (blinking) tracks.

12. TO APPEND ONE SEQUENCE TO ANOTHER: SELECT THE SEQUENCE YOU WANT AT THE END, PRESS **Append To**, SELECT THE SEQUENCE YOU WANT TO APPEND IT TO, THEN PRESS **Record.**

a. The sequence must be stopped.

b. Select the sequence to be appended.

c. Press **Append To.** It blinks.

d. Select the sequence you want to append it to. (It is possible to append a sequence to itself. For that, don't do anything--it's already selected.)

e. Press **Record.** That's it.

f. (If you need to abort the procedure while **Append To** is blinking, press **Append To** again.)

13. SET AUTO CORRECT RESOLUTION: HOLD **Autocorrect** AND ADJUST THE **Parameter Value** KNOB.

Autocorrect is a feature of the MULTI-TRAK which adjusts the timing of notes that you record, so that they coincide with the metronome beat. This is done automatically, when the sequence is recorded. What it does is move notes so they're played exactly on the nearest beat--the nearest eighth note, for example, if autocorrect is set to "8". If, while recording, you tend to anticipate, or play a little ahead of the beat, the sequencer delays the notes, playing them "right on". If your playing is a little behind, it will correct that as well.

Auto correction is useful for rhythmically 'tightening up' a sequence, especially if you plan to later synchronize it to a drum box, or if your keyboard technique leaves something to be desired. To some people, autocorrected sequences sound too crisp, too machine-like. Therefore the feature can be defeated, or adjusted for the amount of correction desired. But autocorrect not only corrects the notes, but the ending of the sequence as well. And this is of great use to everybody, because even a very slight error in timing on the ending accumulates into a gross error after the sequence has looped a number of times--an error which is especially noticeable when the sequencer is synchronized to a drumbox. For this reason, use of autocorrect is recommended when a drumbox is used or your sequences loop repeatedly, unless your playing and use of the footswitch (or **Record** switch) is exceptionally precise.

Autocorrect resolution may be adjusted during recording. For instance, you may want to record the basic track at the coarsest (Eighth note) resolution, and change to finer and finer resolutions as you overdub tracks with faster notes.

While the sequencer is stopped, press **Autocorrect** and turn the **Parameter Value** knob through its range. You will see five different numbers in the display. Here is the translation:

INDICATION	MEANING
8	EIGHTH NOTE correction. The notes are moved to the nearest eighth note. Since the metronome clicks every quarter note, autocorrected notes play either on the clicks of the metronome, or exactly halfway between them.
16	SIXTEENTH NOTE correction. Autocorrected notes play either on the clicks, or at one of three points between them (one quarter, one half, or three quarters).
8.	(Note decimal point). EIGHTH NOTE TRIPLET correction. Autocorrected notes play on the clicks or at one of two points between them (one third or two thirds).
16.	(Note decimal point.) SIXTEENTH NOTE TRIPLET correction. Notes play on the click or at one of five points between them (one sixth, one third, one half, two thirds, or five sixths).
96	"HI-RES" (high resolution) correction. This is essentially "autocorrect off." Notes are recorded exactly as you play them. In this mode, the ending is not autocorrected.

Note: Sequence endings are always autocorrected to the next quarter note, unless **Autocorrect** resolution is set to "HI-RES".

Try recording with each of these different settings. When playing them back, notice that unless the resolution corresponds to the rhythms used, what you played comes out askew. If it does correspond, however, the recorded version should sound more precise than the original.

14. USE AN EXTERNAL CLOCK PULSE TO SYNCHRONIZE THE MULTI-TRAK WITH A DRUM MACHINE:

a. Connect the drum box's clock output to **From Tape.** (The MULTI-TRAK expects 24 pulses-per-quarter note.)

b. To record a sequence in time with a drum pattern:

1. Turn the sequencer **Speed** knob all the way to the left (counterclockwise). This tells the sequencer to use the clock coming in from the drum box **(From Tape).**

2. Place sequencer in RECORD BASIC TRACK mode.

3. Start the drum box. The sequencer's metronome and autocorrect now work as usual. As the drum box pattern loops, start playing at the beginning of a loop. At the end, press **Record** or **Stop** to record the end of the sequence loop. The end is autocorrected as usual.

4. If it is desired to start the sequence with a rest, press the footswitch at the beginning of the drum box loop.

c. Alternatively, you can connect **To Tape** to the drum box's clock input. (The MULTI-TRAK puts out 24 pulses-per-quarter note.)

15. USE SYNC-TO-TAPE TO SYNCHRONIZE WITH A TAPE RECORDER:

a. Connect **To Tape** to the recorder's line input.

b. Connect the recorder's line output to **From Tape.**

c. To set up the record level for the sync track, start the sequence. The level should be set between 0 and +3 VU. Stop the sequence.

d. Place the tape recorder in record and play the sequence, while recording the sync track.

e. When done recording, switch the MULTI-TRAK to external clock (turn the **Speed** knob all the way counterclockwise).

f. Now, play the first sequence and record it on tape while the sync track plays back, synchronizing the sequencer. Start the sequencer slightly before the beginning of the sync track. It waits for the first clock pulse from tape, then synchronizes exactly.

g. Other sequences can now be laid down on other tracks, using the sync track.

g. To record a new sequence while listening to tracks already on tape, use the drum box procedure (14. c. 2-5), substituting the sync track for the drumbox. (The recorder's playback and record heads must be in line--i.e., "sel-sync.")

h. To start a new sequence at the beginning of a taped sequence (without letting it play through an extra loop), use the following procedure:

1. Set up RECORD BASIC TRACK, external clock, as before.

2. Start tape. Before the taped sequence and sync track actually start, hold the starting key or keys (or footswitch, if the new sequence is to start with a rest) until the taped sequence begins. Then continue playing as usual.

3-4 SEQUENCE EXAMPLE

This section shows how to multi-track record a complete sequence, "MAXimum Blues," a song originally written to demonstrate another Sequential instrument, the "MAX".

Before attempting to record the sequence, you may want to practice the parts (see page 3-16).

NOTE: For instructions on synchronous MIDI operation with the Drumtraks, see the MULTI-TRAK MIDIGUIDE.

1. DECIDE THE BASIC ARRANGEMENT AND PROGRAMS.

As you know from reading the playback instructions, you can change a track's program at any time. Yet it is best to record using the desired program, because of the interaction between the characteristics of the program and the exact way that you play it.

We choose the following programs:

Track 1	42	Res-bass I
Track 2	07	Heavy Leslie
Track 3	07	Heavy Leslie
Track 4	07	Heavy Leslie
Track 5	65	Pleiades
Track 6	17	Brass II

2. ESTIMATE THE NUMBER OF NOTES.

You do not need an exact count, just enough information to know that what you have in mind won't exceed 1600 notes. Looking at track 1 of the score, we find four notes per bar, for a total of 48. Tracks 2, 3, and 4 each have fifteen notes, making a total of 93 (48+45). Track 5 has 30. This makes 123 total notes--well under the limit.

3. SET AUTOCORRECT TO "EIGHTH NOTE" CORRECTION.

Press and hold **Autocorrect** while turning **Parameter Value** until display shows "8" (without a decimal point).

4. ERASE SEQUENCE AND START RECORDING.

We are going to use sequence A. With no **Track** LEDs lit, select Sequence A. Press and hold **Record** and press **Start. Record** blinks, **Track 1** blinks, and the metronome begins clicking.

5. SET **Speed** TO ABOUT 90 QUARTER NOTES PER MINUTE OR WHATEVER SPEED YOU CAN PLAY COMFORTABLY.

Of course a main benefit of using the sequencer is that you can record at a much slower, error-free speed, then raise the speed for playback (without any pitch-change as there is with audio tape).

6. SELECT PROGRAM 42, USING THE **PROGRAM/PARAMETER** SWITCHES.

This bass program is used for recording the basic track on track 1.

7. PLAY THE BASS LINE WITH THE METRONOME.

Because this program is very low, you should play it on the keyboard one octave higher than written. Recording starts with the first note you play. Concentrate on placing the notes directly on each beat. When you get to measure 10, prepare to press the **Record** switch or footswitch.

Especially when laying down a bass line such as this track it is important to play at a steady rate. If the timing of this part is too far off, Autocorrect may move notes as far as a full eighth note, depending on the Autocorrect setting.

8. PRESS **Record** (or footswitch) JUST BEFORE WHAT WILL BE THE FIRST BEAT OF THE NEXT LOOP. THE BASS LINE PLAYS BACK.

Listen to the playback. Remember that the sequencer is now in OVERDUB for Track 1. Any notes you play are added into the track. Take this opportunity to add in any note you omitted or played too late.

9. SWITCH **Track 1** OFF.

Although the sequencer is still in OVERDUB, switching track 1 off eliminates the danger of adding unwanted notes while listening. Now you can play along and rehearse for the next track.

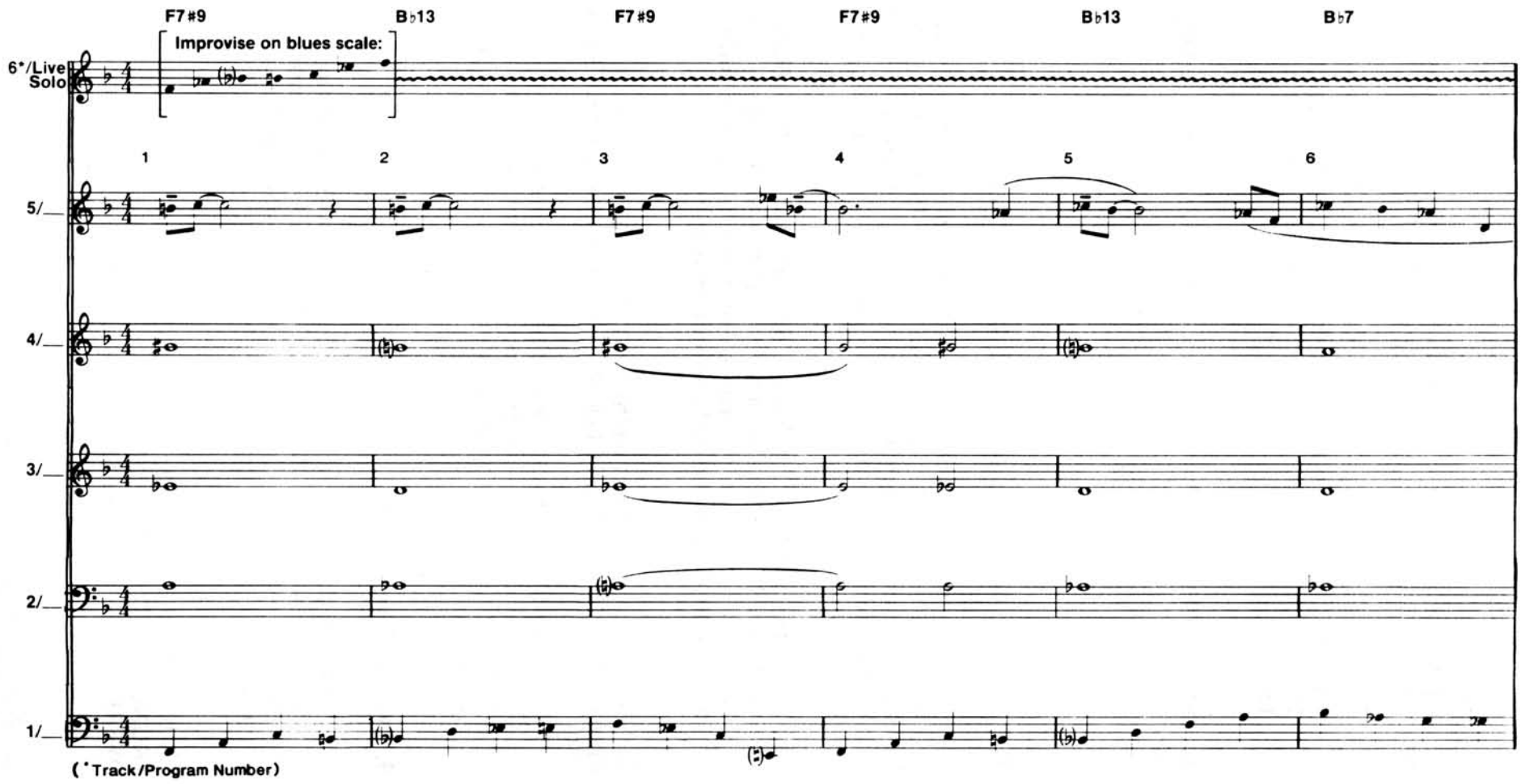
10. IF THE BASIC TRACK IS NOT CORRECT, CORRECT IT USING TRUNCATE (TO CORRECT LOOP LENGTH), ERASE A NOTE AND OVERDUB, OR JUST ERASE THE TRACK AND RE-RECORD.

11. IF THE BASIC TRACK IS CORRECT, SELECT PROGRAM NUMBER 07 (FOR OVERDUBBING TRACK 2).

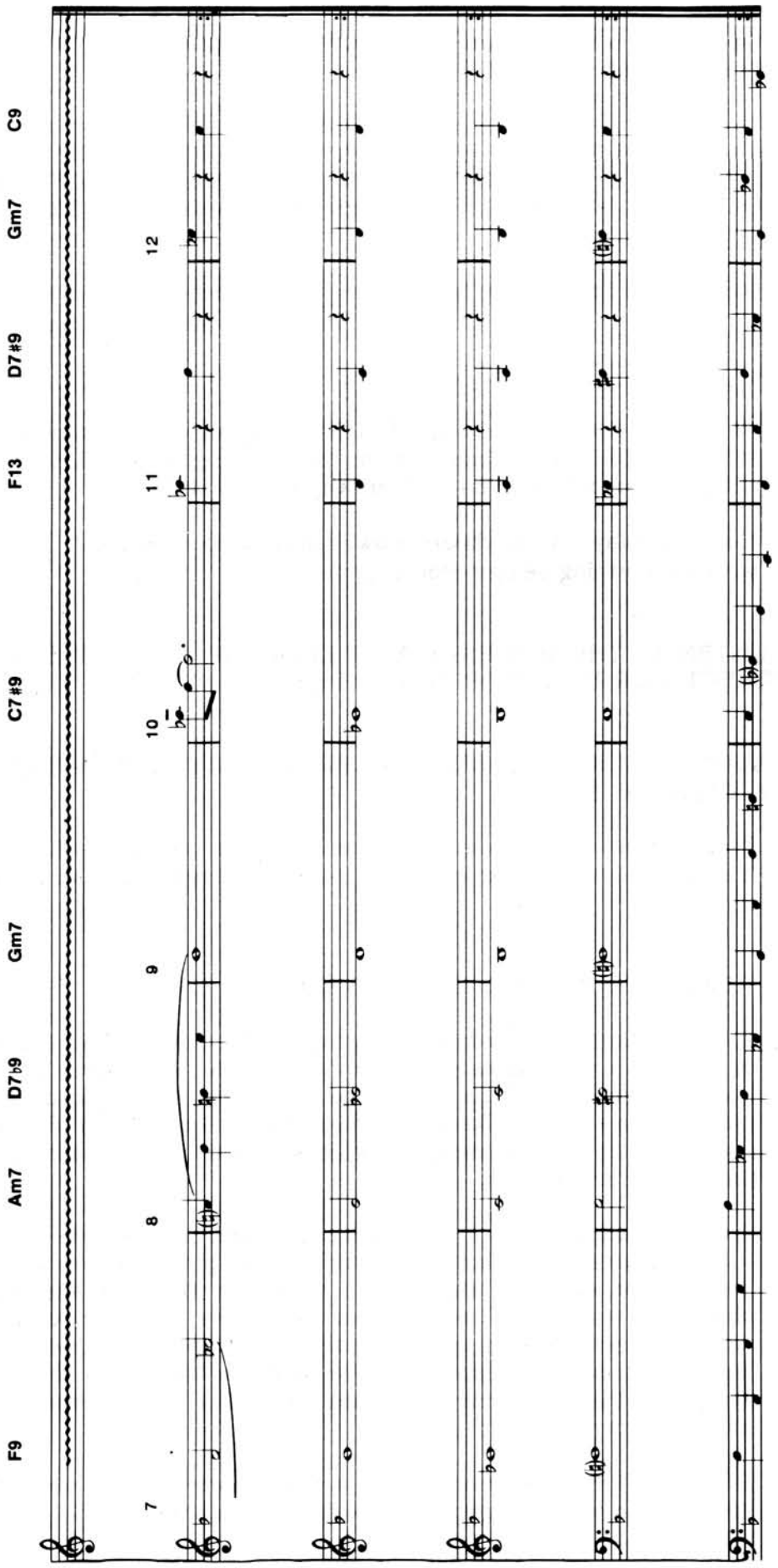
MAXIMUM BLUES

By Stanley Jungleib

Blues — Any Tempo



(*Track/Program Number)


F9
Am7
D7b9
Gm7
C7#9
F13
D7#9
Gm7
C9
7
8
9
10
11
12

12. SWITCH **Track 2** ON. IT BLINKS.

13. WAIT WHILE THE SEQUENCE PLAYS THROUGH TO THE END, AND BE READY TO PLAY WHEN THE BEGINNING OF THE SEQUENCE COMES AROUND AGAIN. PLAY THROUGH TO THE END.

Record and **Track** LEDs blink during this procedure.

14. AT THE END (OF THE BASIC TRACK), PRESS **Track 2.**

This takes the track out of RECORD. Although the sequencer is still in OVERDUB (as indicated by the blinking **Record** LED), no notes are recorded if you accidentally hit the keyboard.

You can play the keyboard now, using voices (tracks) 3 - 6, without anything being recorded.

15. LISTEN TO THE SEQUENCE AS IT LOOPS. IF TRACK 2 IS NOT CORRECT, CORRECT IT OR ERASE IT AND RE-RECORD.

16. WHEN TRACK 2 HAS BEEN RECORDED, LOWER ITS VOLUME TO A VALUE OF 8.

This makes it easier to hear the bass line when overdubbing tracks 3 and 4. After adjusting, press **Track 2** again to take it out of record.

17. PREPARE TO RECORD TRACKS 3 AND 4.

The advantage of recording more than one track at a time is that by playing simultaneously you can add rhythmic nuances which may be more difficult to create one track at a time. Chords, for example, are more likely to sound like chords when they're played all at once--instead of building them up one note at a time on different loops.

Note that since tracks 1 and 2 were recorded on different loops, you know exactly which notes each track plays. If you erase track 2, for example, this has no effect on the bass line. But when two tracks are recorded at the same time, they may exchange parts, depending on exactly how you play the keyboard. The disadvantage to recording more than one track at a time is, therefore, that it is more difficult to find a single error in a track and correct it.

If this point is unclear now, with a little more practice you will learn how to best apply your own keyboard technique.

18. THE PROGRAM SELECTION IS STILL 07.

If you wish to change the program, do so.

19. SWITCH **Tracks 3** AND **4** ON.

They blink because they are ready to record. Tracks 1 and 2 are lit because they have already been recorded.

20. WAIT UNTIL THE END OF A LOOP, THEN PLAY PARTS 3 AND 4 THROUGH TO THE END.

21. SWITCH OFF **Tracks 3** AND **4**, AND LISTEN.

22. FOR BETTER BALANCE, ADJUST VOLUMES OF TRACKS 3 AND 4 DOWN TO ABOUT 8.

23. SELECT PROGRAM NUMBER 65, FOR TRACK 5.

25. RECORD THE MELODY FOR TRACK 5.

Use velocity, playing with more force the notes you want to bring out.

26. AFTER RECORDING, SWITCH OFF TRACK 5, AND ADJUST THE VOLUMES OF ALL TRACKS FOR THE BEST BALANCE.

You can turn Track 5 all the way down, to give you a version of the sequence without the melody.

27. WITH THE SEQUENCE PLAYING, SELECT PROGRAM 17 (OR ANYTHING ELSE YOU WANT TO TRY), AND PLAY ALONG LIVE WITH THE SEQUENCE.

You can record track 6, too. Possibilities for this track might include percussion, an alternate bass line, an alternate melody, adding more harmonic density, or doubling the melody with a "Hi-Res" Autocorrect version.

28. FOR PRACTICE, TRY THE FOLLOWING:

Change the programs for any track.
Try recording tracks 2, 3, and 4 all at once--inserting rhythm and syncopation instead of the held chords.
Record your own harmonies and melodies over the bass line.

4-1 INTRODUCTION

The arpeggiator is a very useful keyboard memory feature with two basic modes: **Up/Down** and **Assign.** In either mode you can "latch" the arpeggiator, so it continues to play even when you remove your hands from the keyboard. After latching, the arpeggiated notes can be transposed.

The arpeggiator uses voice 6 only. For either **Up/Down** or **Assign** modes, the arpeggiator will recognize a maximum of sixteen held keys.

Note: **SEQUENCER, Stacks,** and **Parameter Edit** must all be off before using the arpeggiator.

4-2 Up/Down

With **Up/Down** on, the MULTI-TRAK sequences between any held keys according to their position, from low to high and back down. For example, if you were holding the notes C, E, G, and B, all in the same octave, the sequence would be: C E G B G E C E G...

1. TO ARPEGGIATE: SWITCH **Up/Down** ON, HOLD KEYS.

   The arpeggiator will play, using voice 6.

   Adjust **Speed** as desired.

   If only one key is held, the note re-triggers at the rate set by the **Speed** knob.

   The **Pitch** and **Mod** wheels do not affect the arpeggiated voice, but do affect voices 1-5.

2. TO LATCH, PRESS THE FOOTSWITCH OR **SEQUENCER Record** WHILE YOU HOLD DOWN KEYS.

   You can then remove your hand(s) and the notes will continue to arpeggiate.

   While the arpeggiator is latched, you can play along with up to five more keys, which will not be arpeggiated or latched. The wheels will operate on these live voices, and another program can be selected for them. (This can be a unison program.)

3. TO TRANSPOSE, WHILE LATCHED, HOLD **Record** OR THE FOOTSWITCH AND PRESS A KEY.

The distance of the key you hit from C2 (the C under the **Program Record** switch) determines the interval of transposition. For instance, if you play E2 (the E above C2), the arpeggiated notes transpose up a major third.

4. TO STOP, SWITCH **Up/Down** OFF.

4-3 Assign

Assign sequences between keys according to the order they are played. For example, C G E B C G E B. This allows you to create intense riffs, without necessarily having to play them.

1. TO ARPEGGIATE: SWITCH **Assign** ON, PRESS KEYS IN THE ORDER YOU WISH THEM TO ARPEGGIATE, AND HOLD THEM.

Assign operation, including latching, is the same as **Up/Down**, except you press keys in the order you want them to be played.

2. TO LATCH, PRESS THE FOOTSWITCH OR **SEQUENCER Record** WHILE YOU HOLD DOWN KEYS.

3. TO TRANSPOSE, WHILE LATCHED, HOLD **Record** OR THE FOOTSWITCH AND PRESS A KEY.

4. TO STOP, SWITCH **Assign** OFF.

In the MULTI-TRAK a stack consists of up to six different timbres (programs) assigned to each note played on the keyboard. Intervals can be stacked, usually by simply adjusting the OSCILLATOR COARSE FREQUENCY parameter for the various programs. This enables the creation of very complex sounds by playing up to six programs at once. Stack mode can be played polyphonically, with two or three notes playable at a time, depending on how many tracks are used for the stack.

Additionally, the stacks can be used to store split-points for the MULTI-TRAK's keyboard. Any number of tracks (up to five) can be assigned to the left side of the keyboard, with the remainder assigned to the right. And each side of the split can be programmed to either play polyphonically or as a monophonic stack.

Ten different stack/split presets can be stored in the MULTI-TRAK's memory.

1. TO PLAY A STACK OR SPLIT:

a. Switch off **SEQUENCER, ARPEGGIATE,** or **Parameter Edit.**

b. Switch **Stacks** on. One of the **PROGRAM/PARAMETER** LEDs light, indicating the current preset number (0-9). If the current preset is a stack, the number is also shown in the **Value/Program** display. If it is a split, "SP" appears in the display.

c. To change to a different preset, press one of the **PROGRAM/PARAMETER** switches.

d. Play the keyboard.

When a stack is selected and a key is played, the number of **Track** LEDs lit indicates the number of tracks used for that stack. If only 2 tracks are used, the MULTI-TRAK is three-voice polyphonic--that is, up to three notes can be played at once (since each note uses two voices, and 2x3=6, the maximum available). Likewise, if three tracks are used for a stack, two notes can be played at once. And if four or more are used, the MULTI-TRAK is monophonic (one note only).

2. TO CREATE OR MODIFY A STACK OR SPLIT: SELECT THE STACK AS ABOVE, THEN:

a. To select whether stack or split, or change the split point, either:

1. To program a stack, hold **Track 1** and press any key.

-or-

2. To program a split, first decide how many voices are to be on each side of the split, and where on the keyboard the split is to be. Hold the **Track** switch corresponding to the first voice for the right side, and press the key which will be the first one on the right side.

For example, let's say you want to assign two voices to the left side and four to the right side of the keyboard, with the split-point at C2. The left side, then, would get tracks 1 and 2, so track 3 would be the first for the right side. Press and hold **Track 3**, and press C2. C2 is now the first key on the right side of the split.

For a split side to be polyphonic requires that all tracks on that side be set to the same (non-unison) program, and they must all be set to the same volume. If any are different (or if a unison program is chosen), the side will behave as a monophonic stack. Use the following procedure to select programs:

b. To display the program assigned to a track:
Press the desired **Track** switch.
If the track is not deleted, the program is displayed.
If it has been deleted, horizontal bars (--) appear in the display.

c. To change the program for a track:
Press and hold desired **Track** switch.
Select desired program.
Repeat as required to assign programs to desired tracks.
If the track has been deleted, changing the program produces no effect until the track has been added to the stack (see below).

d. To adjust track volume:
Hold desired **Track** switch.
Adjust **Track Volume** as desired.
Note: All tracks on a polyphonic side must be manually set to the same volume.

e. To delete a track from the stack:
Adjust the track's **Track Volume** to 0.
Note: No tracks should be deleted from a polyphonic split side.

f. To add a track to the stack:
Raise the track's **Track Volume** above 0.
Change program if desired.

6-1 INTRODUCTION

Basic operation with the factory programs has already been covered. You can use the MULTI-TRAK solely with the factory programs. However, as good as they are, the musician is bound to feel that some are more useful than others in specific musical contexts. This is why you want to be able to create your own custom programs.

There are several aspects to programming custom sounds: knowing the MULTI-TRAK's modes of operation and accompanying switch functions, knowing what the synthesizer parameters do in a functional sense, and knowing how to use the parameters for musical purposes.

The modes and switch functions are explained in this section. The parameters are explained in the next section. The use--the art--is your part. To exploit the MULTI-TRAK's sonic possibilities fully, learn as much about it as you can by studying the parameters (see Section 7) and the factory programs (see Section 10). Seeing exactly how these programs are constructed makes it easier for you to begin to create your own programs. At first, practice synthesizing by editing the factory programs. For many, this is the best way to learn exactly how the parameters on the MULTI-TRAK operate. Then try creating programs "from scratch" (see page 6-4).

Be advised that in the excitement of creation, new and interesting programs tend to escape if not documented. Program parameter forms are provided for this purpose following the factory program listings.

It is also a good idea to save programs on cassette. This gives you more freedom to experiment with the programs in the MULTI-TRAK, as well as protecting against accidental loss of programs--whether due to technical malfunction or just hitting the wrong button at the wrong time.

6-2 EDITING A PROGRAM

1. IF THEY ARE ON, SWITCH THE SEQUENCER, ARPEGGIATOR, OR STACK MODE OFF.

If any of these are on, the **Parameter Edit** switch will not light.

2. SWITCH **Parameter Edit** ON.

The current parameter value is displayed in the **Value/Program** display.

The current parameter is indicated by a parameter matrix above the **PROGRAM/PARAMETER** switches. The parameters in the matrix are organized into four rows (labelled **A, B, C,** and **D**), and ten columns (**0-9**). The current parameter is at the intersection of the LEDs lit when **Parameter Edit** is on. For instance, if the **D Parameter Group** and the **0 PROGRAM/PARAMETER** LEDs are lit, KYBD TRACK is the current parameter.

3. SELECT THE PARAMETER TO BE EDITED BY FIRST PRESSING THE **Parameter Group** SWITCH REPEATEDLY UNTIL THE CORRECT ROW IS SELECTED, THEN SELECT THE COLUMN USING A **PROGRAM/PARAMETER** SWITCH.

Actually this can be done in either order, and if the new parameter you are selecting happens to be in the same row or column as the last one, only one switch needs to be pressed.

4. TO EDIT THE PARAMETER VALUE, TURN THE **Parameter Value** KNOB.

The changing value is shown in the display. The parameters don't all have the same range (see Section 7).

6-3 RESTORING A PROGRAM

TO CANCEL ALL EDITS AND RESTORE THE ORIGINAL PROGRAM: SWITCH **Parameter Edit** OFF, THEN RE-ENTER THE PROGRAM DIGITS.

6-4 AN EDITING EXAMPLE

Select Factory Program 94. Now, for example, suppose you want to change oscillator waveforms from sawtooth to pulse, change the LFO-modulation rate, and you prefer a brighter tone in the program:

A. Switching Waveforms

1. SWITCH **Parameter Edit** ON.

2. SELECT **'A'** AND **'3'** FOR THE SAWTOOTH PARAMETER.

Observe the **Value/Program** display. If the sawtooth is currently on, the value is 1.

3. TO SWITCH OFF THE SAWTOOTH, TURN THE **Parameter Value** KNOB COUNTERCLOCKWISE.

The displayed value changes to 0, indicating the sawtooth is off.

4. PRESS **'5'** FOR PULSE PARAMETER. (**'A'** IS ALREADY SELECTED.)

If the pulse is off, the current value is 0.

5. TO SWITCH ON THE PULSE, TURN THE **Parameter Value** KNOB CLOCKWISE.

The displayed value is changed to 1, indicating the pulse is on.

B. Editing Modulation Rate

1. SELECT **'B'** AND **'0'** FOR LFO FREQUENCY.

Observe the **Value/Program** display. A number from 00 to 15 is displayed. This is the current programmed value.

2. WHILE OBSERVING THE DISPLAY, TURN THE **Parameter Value** KNOB ACROSS ITS FULL RANGE.

3. WHILE PLAYING, ADJUST THE **Parameter Value** KNOB FOR DESIRED MODULATION RATE.

C. Editing Brightness

1. SELECT **'C'** FOR FILTER CUTOFF PARAMETER. (**'0'** IS ALREADY SELECTED.)

2. ADJUST **Parameter Value** KNOB FOR DESIRED BRIGHTNESS.

(Note that only the CUTOFF parameter has a value range from 0 to 127, and that the "1" representing hundreds is represented by a decimal point.)

6-5 RECORDING A PROGRAM

TO RECORD AN EDITED PROGRAM OR COPY AN EXISTING ONE, SWITCH **Program Record** ON, AND ENTER THE PROGRAM NUMBER WITH THE **PROGRAM/PARAMETER** SWITCHES.

a. Switch **Program Record** on. (Do not hold it, or you may accidentally activate "hidden functions.")

b. Select the first digit of the program number being recorded, using the **PROGRAM/PARAMETER** switches.

(If the original program is to be saved, use the number of an unneeded program. If the original program is to be replaced by the edited version, use that number.)

c. If you made a mistake in selecting the first digit, you can exit record mode at this point by merely switching **Program Record** off. The program memory will not be affected.

d. Press the second digit, and the program is recorded in that location.

Note: be sure to hit the correct **PROGRAM/PARAMETER** digit or you may erase a program you wanted to keep.

e. When the second digit is entered, the **Program Record** LED goes off.

6-6 USING THE BASIC PATCH

When creating programs it is often convenient to begin with a basic sound instead of editing an existing program. Rather than having to manually check and edit all of a program's parameters, a function is available which clears all parameters to 0, except for the minimum needed to produce a basic sound. To switch to this basic patch:

Hold **Program Record** and press **PROGRAM/PARAMETER 8.**

This will set all parameters to 0, except:

SAWTOOTH	1 (on)
CUTOFF	127
FILTER KEYBOARD	2 (full)
AMP SUSTAIN	15
VOICE VOLUME	15

The keyboard will now play with a basic sound.

If desired, you can record the basic patch as a program.

7-1 INTRODUCTION

This section describes the MULTI-TRAK's programmable voice parameters.

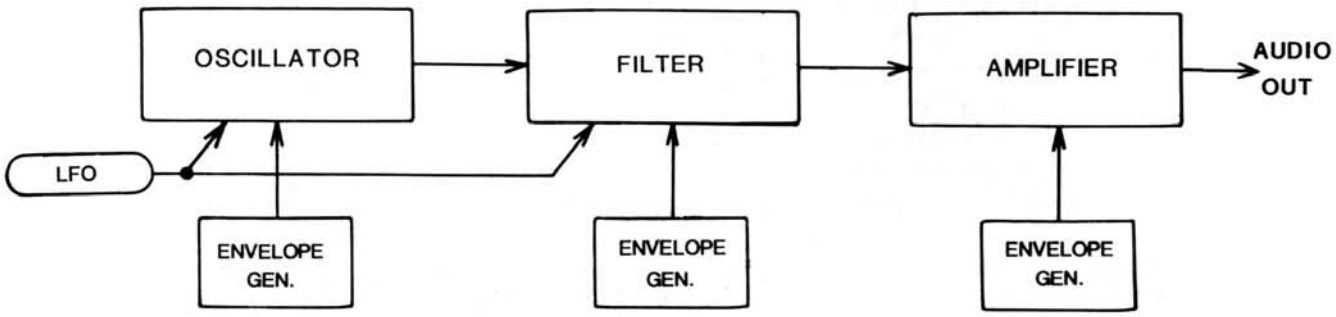


Figure 7-1
MULTI-TRAK GENERAL VOICE DIAGRAM

The MULTI-TRAK actually contains six synthesizers, termed "voices." Figure 7-1 diagrams one of these voices at a very general level. The MULTI-TRAK fits into the tradition of voltage-controlled analog synthesizers. To understand these instruments it has proven useful to identify three basic functions: controllers, audio sources, and modifiers (filters and amplifiers). Each voice contains several of each function, which are represented on the block diagram, Figure 7-2.

Basically, controllers provide the control voltages (CVs) which determine the pitch of the audio sources, or the filtering or attenuation effects of the modifiers. Controllers can be mechanical devices such as keyboards and wheels. For example, as the CV from the keyboard to the oscillator (audio source) is increased, the oscillator frequency increases. Or controllers can be electronic, such as the LFO or the three envelope generators. For example, as a rapidly-decreasing CV from an envelope generator sweeps down the the filter cutoff frequency, it imparts a "pluck" to the voice. Other controllers include The **Master Tune** knob and **Pitch** wheel, which in effect provide two CVs which control all of the oscillators.

There are three audio sources: the oscillator, the noise source, and the filter, if it is adjusted for self-resonance.

The mixer, filter (when not in self-resonance), and amplifier are modifiers.

A more detailed examination of the voice parameters follows.

7-2 OSCILLATOR FREQUENCY

The oscillator is an audio-frequency source always under control of COARSE and FINE FREQUENCY, the keyboard, **Pitch** wheel, and **Master Tune.** Oscillator frequency can be modulated by the LFO and by the envelope generator.

COARSE FREQUENCY

Value Range: 00-48

00= lowest octave
12= one octave up
24= two octaves (middle C)
36= three octaves
48= four octaves

Adjusts oscillator pitch in semitones, over a four-octave range. To this is added the five-octave keyboard, for a total range of nine octaves.

Note that to keep programs in tune, this parameter should normally be adjusted to the octaves (00, 12, 24...).

Exact oscillator pitch should be fine-tuned with **Master Tune,** with FINE at a value of 0.

FINE FREQUENCY

Value Range: 00-31

0= no offset
31= almost one semitone above

Normally this parameter is set to 0, while oscillator pitch is adjusted with **Master Tune.** This parameter adjusts oscillator frequency by up to just less than a semitone. This allows detuning of the oscillator, usually for use only in SEQUENCER or STACK modes.

FREQUENCY LFO MOD

Value Range: 00/01

00= Off
01= On

This enables LFO modulation to the oscillator frequency, according to the level set by LFO AMOUNT, VELOCITY LFO AMOUNT, and the **Mod** wheel. This produces a vibrato or trill, depending on whether LFO TRIANGLE or LFO SQUARE is on.

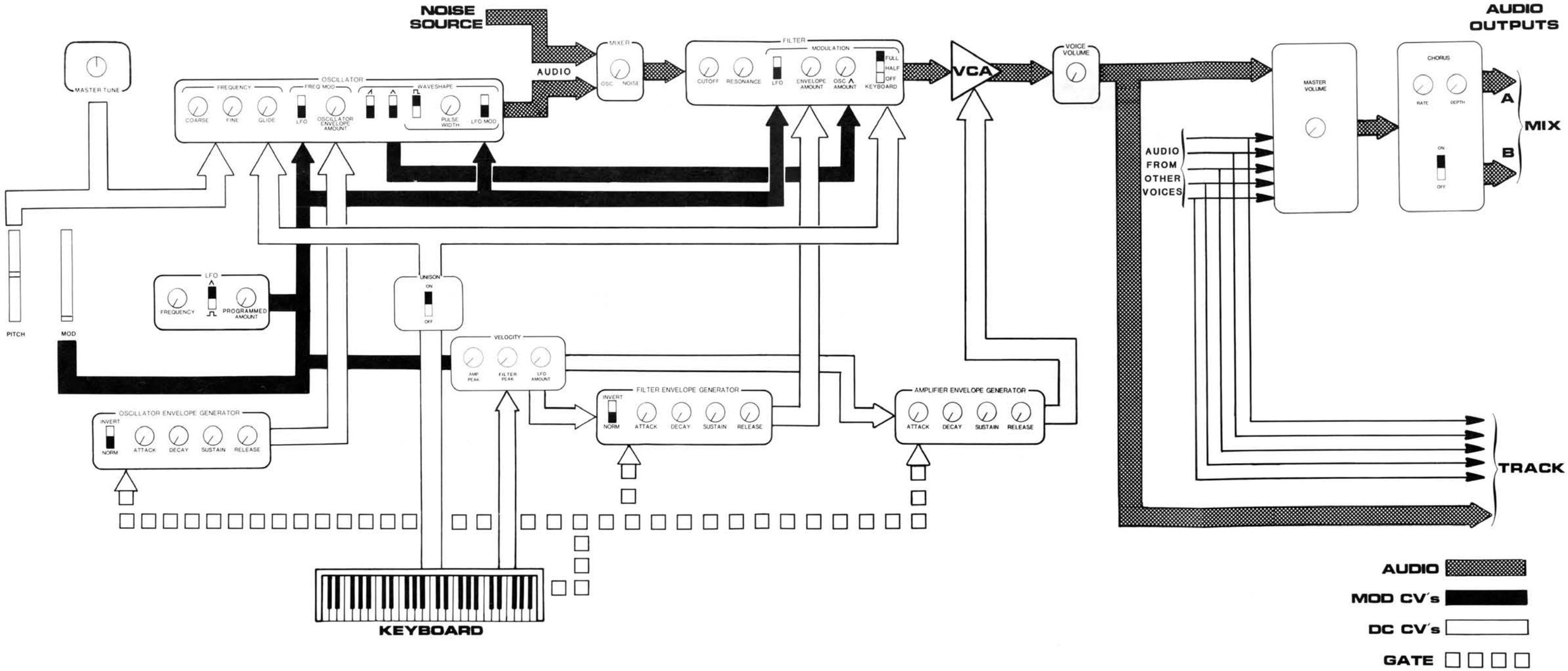


Figure 7-2
MULTI-TRAK VOICE BLOCK DIAGRAM

7-3 OSCILLATOR WAVESHAPE

If no waveshape parameter is on, the oscillator has no audio output. If two or three waveshapes are on, they are mixed at full level and supplied as the oscillator's output to the MIXER.

SAWTOOTH
Value Range: 00/01
00= Off
01= On

Enables full-level waveshape containing all harmonics. This basic shape is often described as "brassy."

TRIANGLE
Value Range: 00/01
00= Off
01= On

Enables full-level triangle wave, containing little harmonic energy, thus having a dull tone.

PULSE
Value Range: 00/01
00= Off
01= On

Enables full-level waveshape whose harmonic content, thus timbre, depends on the value of PULSE WIDTH and LFO MODulation. If switching this on produces no sound, try adjusting PULSE WIDTH to a value between 2 and 60.

7-4 MODIFIERS

PULSE WIDTH
Value Range: 00-63
01= 1%
15= 25%
32= square wave
47= 75%
63= 99%

Adjusts the harmonic content of the pulse wave by varying its duty cycle from approximately 1 to 99%. At the extreme parameter values (00-02 and 60-63) the pulses may be barely audible. A 50% duty-cycle pulse (having only odd harmonics), also called a square wave, can be selected (approximately value 32).

This parameter is only effective if PULSE is on. This parameter has no effect on the sawtooth or triangle waves.

PW MOD
Value Range: 00/01
00= Off
01= On

Applies LFO modulation to oscillator pulse width.

GLIDE
Value Range: 00-15
0= no glide
15= maximum glide (five octaves in approximately fifteen seconds)

When set to 0, the keyboard CV, which controls the oscillator pitch, instantly steps between notes. As GLIDE is raised, the CV does not step between the notes, but begins to slide. This introduces "portamento" between notes. Usually used with UNISON on, because polyphonic (UNISON off) use is difficult to predict--but can produce interesting effects.

NOISE MIX
Value Range: 00-31
00= maximum oscillator level
15= even mixture
31= maximum noise level

Adjusts the ratio of the oscillator and noise source input to the filter.

7-5 LFO

"Modulation" refers to a periodic or consistent (as opposed to accidental) aural change which is interesting or musically useful. Modulation is created by electronic controllers when it is not possible to adjust a mechanical controller with the required speed or precision. Modulation systems thus free the hands for playing the keyboard.

Modulation involves a signal-generating source and a modulated destination. The MULTI-TRAK contains two modulation systems in each voice: LFO-MOD and FREQUENCY-MOD. FREQUENCY-MOD has one source, the oscillator, and one destination, the filter. For more information see FILTER OSC TRIANGLE MOD.

LFO-MOD has a low-frequency oscillator (LFO) as a source, but has three selectable destinations. The LFO frequency, basic output level, and waveshape, are adjusted by the next four parameters. To this modulation level is added any contribution of VELOCITY LFO AMOUNT and the **Mod** wheel. Total modulation is applied to three destinations by the switches: FREQUENCY LFO MOD, PULSE-WIDTH LFO MOD, and FILTER LFO MOD.

FREQUENCY
Value Range: 00-15

Adjusts LFO frequency from about ¼ to 20 Hz.

AMOUNT
Value Range: 00-31

Programs modulation depth. The **Mod** wheel is added to this amount.

TRIANGLE WAVE
Value Range: 00/01
00=Off
01=On

Selects a triangle wave for vibrato. If a square wave is selected, the triangle wave turns off automatically.

SQUARE WAVE
Value Range: 00/01
00=Off
01=On

Selects a square wave for trills. If a triangle wave is selected, the square wave turns off automatically.

7-6 OSCILLATOR ENVELOPE

Each voice contains three independent ADSR envelope generators: one controls oscillator frequency; one controls filter cutoff frequency; and one controls the amplifier gain. The following comments on the ADSR envelope generators are valid for all three.

An "envelope" changes value over time at a rate adjusted by the ATTACK, DECAY, and RELEASE parameters. As the envelopes are generated with each keystroke, they "contour" the voice intonation, timbre, and dynamics, animating the otherwise raw waveshapes which come from the mixer.

The contour pattern is initiated when a key is struck. This "triggers" the envelope generator(s) to proceed through their attack and decay periods. These periods can each range from zero to about 11 seconds. The envelope voltage rises to its full value, then falls (decays) to the level set by the sustain parameter, where it remains until the key is released. When the key is released, the gate goes off and the envelope voltage drops to zero at a rate set by the release parameter.

ENVELOPE AMOUNT
Value Range: 00-15

This parameter controls the depth of oscillator envelope modulation.

INVERT
Value Range: 00/01
00=Normal
01=Invert

This turns the oscillator envelope upside down. Normally, the envelope drives the oscillator sharp. When inverted, the oscillator is driven flat.

ATTACK
Value Range: 00-31
15= ½ second
31= 15 seconds

Adjusts the length of time for the envelope to go from zero level (when key is initially depressed) to maximum level.

DECAY
Value Range: 00-31
15= ½ second
31= 15 seconds

Adjusts the length of time for the envelope to go from maximum level to sustain level. If sustain is set at maximum then this parameter is irrelevant, because level is already maximum.

SUSTAIN
Value Range: 00-15

Adjusts the sustain level from zero to maximum. This is a level control, not a time control. Sustain time is the period between the end of the decay period and the beginning of the release period. (The length of time the key is held after attack and decay.)

RELEASE
Value Range: 00-31
15= ½ second
31= 15 seconds

Adjusts the length of time for the envelope to go from sustain level to zero. If the key is released before the attack or decay periods have elapsed, release controls the time taken for the envelope to drop to zero from whatever its level was when the key was released. If the attack and decay periods have elapsed and sustain is set to 0, then the release value is irrelevant, because the level is already minimum.

To hear the effect of this parameter, the Amplifier and Filter envelopes must be set for an equal or longer release time.

7-7 FILTER

CUTOFF
Value Range: 00-127
(The "hundreds" digit is displayed as a decimal point. For example, value 127 is displayed as "2.7".)

Adjusts cutoff frequency of the 24 dB/octave (4-pole) low-pass filter. This parameter is rather like a tone control. "Cutoff" is the frequency below which all elements of the mixer's output signal are let through. The higher-frequency components of the input signal (that is, all those above the cutoff frequency) are suppressed. The higher the parameter value, the higher the frequencies are which pass through the filter. Thus, the "brighter" the sound.

In addition to this parameter, overall cutoff frequency is the result of all the filter modulation parameters: the FILTER ENVELOPE parameters (as affected by velocity), LFO, KYBD TRACK, and OSCILLATOR TRIANGLE MOD.

RESONANCE
Value Range: 00-63
43= approximate oscillation point (may vary from voice to voice)

Adjusts the amount of filter resonance. As the value is increased from 0, the amount of resonance ("emphasis," "regeneration," or "Q") applied to those signal components at the cutoff frequency will increase. As resonance increases, frequencies lower than the cutoff will become decreasingly audible in comparison with those nearer the cutoff. As the parameter value is even further increased, the filter breaks into oscillation, acting like a sine-wave audio source whose pitch is determined by CUTOFF (and the various filter modulation sources).

LFO MOD
Value Range: 00/01
00= Off
01= On

This parameter switches LFO modulation to the filter, which normally produces a vibrato effect.

OSC MOD
Value Range: 00-63

This parameter controls FREQ-MOD. Increasing this parameter applies the oscillator triangle waveform as a control voltage to the filter cutoff frequency. This high-frequency modulation is used to create "ring" modulation and bell effects.

This parameter operates regardless of whether OSCILLATOR TRIANGLE WAVESHAPE is switched on.

7-8 FILTER ENVELOPE

The filter cutoff may be varied over time by the filter envelope generator. For more information on the following six parameters, see Section 7-6, OSCILLATOR FILTER ENVELOPE.

ENVELOPE AMOUNT
Value Range: 00-15
00= no envelope modulation

This parameter adjusts the depth of filter envelope modulation.

INVERT
Value Range: 00/01
00=Normal
01=Invert

When normal, the envelope will drive the filter cutoff positively. If inverted, the filter cutoff contour will be reversed.

ATTACK
Value Range: 00-31

DECAY
Value Range: 00-31

SUSTAIN
Value Range: 00-15

RELEASE
Value Range: 00-31

If filter release produces no effect, check that AMP ENVELOPE RELEASE is set to approximately the same value or longer.

KYBD TRACK
Value Range: 00-02
00= Off
01= Half
02= Full

When Full, the KYBD TRACK control voltage (CV) is applied to the filter's cutoff frequency just as it is normally applied to the oscillator. With the filter thus "tracking" the keyboard, cutoff frequency is maintained at a constant point relative to the notes being played. This results in a consistency of timbre over the whole keyboard range. When KYBD TRACK is off, notes played higher on the keyboard will have have a duller timbre. Obviously, the 1/2 value selects the midrange between these two effects.

If FILTER RESONANCE is set for self-oscillation, setting KYBD TRACK on Full will allow the filter to be played from the keyboard. However, since the filters in resonance are not precisely tuned, there will be considerable error from the normal keyboard scale. (Unless a complex effect is desired, FILTER ENVELOPE AMOUNT will in this case normally be set to 0, to maintain a steady frequency from voice to voice).

If the KYBD TRACK parameter is changed while holding keys down, the effect will not be heard until the key is restruck.

7-9 VELOCITY SENSITIVITY

To provide more expression for the musical performer, Sequential has provided velocity sensitivity in the MULTI-TRAK. Whenever a key is played, the force, or velocity with which it is played is scaled by the three velocity parameters, then applied to the respective destinations.

The velocity sensitivity, as adjusted by the two peak parameters (AMP PEAK and FILTER PEAK), can be varied from zero to the current value of the envelope amount parameter it is going to modulate. If velocity sensitivity is set to zero, then velocity is disabled. If set to maximum, then the softest keystroke will set that envelope amount parameter to zero, and the hardest will drive it to whatever value it would have had, had velocity been disabled (its current value). In other words, velocity is subtractive: Soft keystrokes subtract from the modulated parameter, while forceful ones leave it the same.

If the velocity parameter is set to some intermediate value, that value is the maximum that will be subtracted from the modulated parameter for the softest keystroke. Say, for instance, if AMP ENVELOPE VOICE VOLUME is set to 15, and VELOCITY AMP PEAK is set to 2, the softest keystroke will result in an overall VOICE VOLUME of 13, a medium one will produce 14, and a more forceful one, 15. A subtle change, yes, but if VELOCITY AMP PEAK is set to 15, the softest keystroke will turn the voice off completely, while the most forceful will turn it all the way on--making VOICE VOLUME much more sensitive to velocity.

AMP PEAK
Value Range: 00-15

Controls the sensitivity of velocity modulation of amplifier envelope amount.

FILTER PEAK
Value Range: 00-15

Controls the sensitivity of velocity modulation of filter envelope amount.

LFO AMOUNT
Value Range: 00-15

Controls the sensitivity of velocity modulation of LFO amount. This works slightly differently than the peak controls. Here, the **Mod** wheel and LFO AMOUNT (in the LFO section) set a base amount to which the velocity information is added. If this parameter is set to maximum, the LFO can be driven from the base amount (as low as zero) to full amplitude by velocity. If set to zero, velocity is off. Intermediate values limit the range of the velocity effect.

7-10 UNISON

UNISON
Value Range: 00/01
00= Off
01= On

When off, the keyboard plays polyphonically with six voices. When on, all voices are assigned to the last note played. The keyboard operates in multiple-trigger mode: every new keystroke triggers an attack/decay. (See "Unison" under Basic Operation).

7-11 AMPLIFIER ENVELOPE

The amplifier controls are VOICE VOLUME and the envelope generator attack, decay, sustain, and release parameters, which shape the envelope applied to the VCA. These parameters control the note dynamics. For more information on envelopes, see Section 7-6, OSCILLATOR ENVELOPE.

VOICE VOLUME
Value Range: 00-15
15= maximum signal-to-noise ratio

Programmable voice volume is a convenient way to balance the loudness of programs so you don't have to readjust **Master Volume** each time you switch programs. Use it after the program is basically created.

ATTACK
Value Range: 00-31

DECAY
Value Range: 00-31

SUSTAIN
Value Range: 00-15

Unless this parameter is turned up slightly, nothing will be heard after the attack and decay periods have elapsed.

RELEASE
Value Range: 00-31

7-12 CHORUS

CHORUS On/Off
Value Range: 00/01
00= Off
01= On

Turns the Chorus on or off. This is the only programmable parameter associated with the Chorus, as **Depth** and **Rate** are set by the actual front-panel knob settings.

8-1 INTRODUCTION

The MULTI-TRAK microcomputer transforms the instrument's sonic identity into digital data stored in semiconductor memory (RAM). The cassette interface enables this sonic data to be transfered to and from common audio cassettes, enabling you to build up an unlimited stock of programs and sequences. It then becomes easy to change the MULTI-TRAK's personality at any time, since reprogramming by tape takes only a few minutes. This means if a MULTI-TRAK is going to be at your destination, you can leave your MULTI-TRAK home and bring only the cassettes you need to personalize the instrument. However, the most important benefit of tape storage is program protection from accidental erasure, component failure, or instrument damage.

The 100 Factory Programs and four demonstration sequences are included on a cassette with each MULTI-TRAK. Inasmuch as the Factory Programs provide many points of departure for editing into custom sounds, we suggest making a backup copy of this cassette as soon as you learn how to use the interface.

Operation of the cassette interface is extremely simple, as programs or sequences are saved or loaded in one operation.

8-2 RECORDER AND TAPE SELECTION

Virtually any portable cassette recorder will work satisfactorily with this interface. High-fidelity cassette decks will work, too. But since high-fidelity contributes little to the recording of digital data, an expensive component deck does not help.

In other words, you can try any recorder you may already own (including reel-to-reel) with the interface. But if you intend to acquire a portable for specific use with the MULTI-TRAK, here are some features to look for:

AC-supply, included or available--to help regulate tape speed.
MIC or LINE IN jack.
EAR or MONITOR jack.
Adjustable output level in play.
Built-in speaker--for monitoring voice announcements and locating files.
Built-in microphone--handy for voice-announcing files.
Tape counter--for indexing multiple files on the same cassette.

The interface verification system prevents accidental recording over a "dropout"--or any problem area--on the cassette tape. So, dropout-tested tape is not necessary. High-fidelity is not a consideration with regard to tape selection. But once recorded, the data's permanence will depend on the durability of the tape emulsion and the reliability of the cassette mechanism. So while it is true that even the most exotic audio tape formulations may not be 100% dropout tested, we recommend the use of high-fidelity cassettes because they generally have tough emulsions and solid mechanics. Besides being less likely to jam, "name" cassettes assembled with machine screws are preferred because they can be opened and repaired without destroying the cassette itself.

8-3 PRECAUTIONS

Assume that it is always possible for a computer error to occur. You don't have to always have 100 perfect programs or four perfect sequences before storing them. Backup your programs and sequences any time you have a program or sequence into which you've invested time which you don't want to spend in rework.

It is best to use two different backup cassettes, alternately saving to one, then the other. This protects you from mechanical failures of a cassette.

For protection from loss or damage, maintain a duplicate set of cassettes in a safe place.

Protect "permanent" programs and sequences from accidental erasure by removing the "write protect" tab on the back of the cassette.

Be careful with cassettes. Do not touch the tape itself (with your oily fingers). Don't leave them in direct sunlight or freeze them overnight in a car.

Make sure there is no tape sticking out of the cassette when inserting it into the recorder.

Use an AC-supply with portable recorders. Using (weak) batteries may cause tape speed variations outside of the interface's range.

Don't copy tapes between recorders. Instead load the master into and record the copy from the MULTI-TRAK.

Clean and demagnetize your recorder every 10 - 20 hours.

Protect cassettes from the (slight) possibility of magnetic transients by removing them from the recorder when switching its power on or off.

If using a stereo deck, record on both channels simultaneously to preserve monophonic compatibility. (Otherwise, playback noise from an unrecorded channel can interfere with data loading).

If two recorders have been used satisfactorily by themselves, and tapes exchanged between them produce errors, the two recorders probably have quite different tape speeds. The same error could occur on a single recorder operated at one time from batteries and another time from an AC-supply.

8-4 SAVING PROGRAMS OR SEQUENCES TO TAPE

1. Connect recorder to MULTI-TRAK as diagrammed on page 1-1.

2. Insert cassette into recorder and rewind to start of tape.

3. To save sequences, press **SEQUENCER Record**, or to save programs, **Program Record.**

4. If the correct record level has already been set, skip to step 8. Otherwise, to set the record level, press the **To Tape** switch. **Value/Program** displays "CS" for Cassette Save.

5. Check that the record level is at 0 VU during the twelve second "sync" tone that precedes the actual data.

> NOTE: Tape interface data recording is quite different from typical audio practice, where the tape is rarely allowed to saturate. Instead, data recording is done at saturation level. Recorders with VU meters should be at 0 dB or above. Recorders with single-LED peak detectors should be set so the LED stays lit. Recorders with automatic level control (ALC) can't be adjusted, but usually work fine.

6. After setting the record level, wait for the **Value/Program** display to change from "CS" to "CH", then press **Parameter Group.**

7. Press **SEQUENCER** or **Program Record.**

8. Place recorder into record mode and wait a moment for the tape leader to pass.

9. Press the **To Tape** switch. **Value/Program** displays "CS" for Cassette Save.

10. When, after about 50 seconds, (for programs--an unpredictable period for sequences) the **Value/Program** display shows "CH" (for check), stop the recorder.

11. Now the recording should be verified. If this is not desired, to return to normal operation press **Parameter Group.**

12. To verify, first rewind to start of tape.

13. Check playback level. For portable recorders, the rule-of-thumb for playback level into the **From Tape** jack is about 75% of full volume. The interface is difficult to overdrive (but it can happen).

14. Place recorder into play mode and wait for the sync tone.

15. As soon as a steady sync tone appears, press the **From Tape** switch. The **Value/Program** display continues to show a "CH." The timing of this operation is important, since the MULTI-TRAK needs 2 or 3 seconds of sync tone before the data begins, and the total sync tone is only about twelve seconds long. But pressing the **From Tape** switch too soon, while the sync tone is garbled or not present, can also cause problems.

16. If verification is positive, the MULTI-TRAK returns to normal operation (**Value/Program** displays the last-selected program). Turn off the tape recorder.

17. If instead, an "Er" (error) appears in the **Value/Program** display, a tape error has occurred. Try verification again, by repeating from step 9.

18. If verification fails a second time try re-recording a file, by repeating from step 4.

19. If the tape will still not verify, try different record and playback levels or try a new cassette.

20. If it is desired to return to normal operation at this point, press **Parameter Group**.

21. It is possible to store several program or sequence files on a cassette. Just be careful to leave plenty of time (1-2 minutes) between data recordings on the tape. You may wish to voice-announce each file, for example, "MULTI-TRAK file number 4, containing 100 string programs, follows in ten seconds."

8-5 LOADING PROGRAMS OR SEQUENCES FROM TAPE

1. Connect recorder to MULTI-TRAK as diagrammed on page 1-1.

2. Insert cassette into recorder and rewind to start of tape.

3. Check playback level. For portable recorders, the rule-of-thumb for playback level into the **From Tape** jack is about 75% of full volume. The interface is difficult to overdrive (but it can happen).

4. To load sequences, press **SEQUENCER Record**, or to load programs, **Program Record.**

5. Place recorder into play mode and wait a few seconds for the sync tone.

6. As soon as a steady sync tone appears, press the **From Tape** switch. The **Value/Program** display shows a "CL." The timing of this operation is important, since the MULTI-TRAK needs two or three seconds of sync tone before the data begins, and the total sync tone is only about twelve seconds long. But pressing the **From Tape** switch too soon, while the sync tone is garbled or not present, can also cause problems.

7. When tape loading is completed, the MULTI-TRAK returns to normal operation **(Value/Program** displays the last-selected program). Turn off the tape recorder.

8. If instead, an "Er" (error) appears in the **Value/Program** display, a tape error has occurred. Return to normal operation at this point by pressing **Parameter Group.** If desired, try loading again, by repeating from step 4.

Power
If the MULTI-TRAK is receiving power, it displays program numbers. If no LEDs are lit, either the MULTI-TRAK is not switched on, or power is not reaching the unit. Check the power source by plugging in other equipment. Examine the transformer cable for damage. There is no fuse to check.

Audio
If the **Value/Program** display lights but no sound is heard, check that **Master Volume** is turned up. Check that track volumes are not set too low. Test the synth by simply connecting stereo headphones directly to the output. Try other programs or the "Basic Patch" (page 6-4). Try substituting the audio output cable with one known to be good. Check your amplifier by trying a high-level audio input such as another synthesizer or tape deck.

Memory
If the display counts from 1 to 6 when power is switched on, there may be a memory problem. Check your sequences and a few programs to see if they are as recorded.

If this occurs repeatedly, you may want to consult an authorized Sequential Service Center.

Control
If the keyboard or controls "lock up," check that you are not making an operational error. If necessary, reset the computer by switching power off, then, after a few moments, back on. (If the sequencer controls are still working, stop the sequence before turning power off.)

Sequencer
If the sequencer does not work, check that the external (MIDI) clock has not accidentally been enabled (try turning **Speed** clockwise).

If sequences play back with erroneous note timing, check the **Autocorrect** setting.

If sequences have been lost and the sequencer is not functioning ("locked-up"), it can be reset. Be sure you are not making an operational error, because resetting will erase anything you have recorded in all four sequences.

To reset the sequencer:
Turn on **SEQUENCER Record.**
Hold **Seq** and press **Program Record.**

(For more control information, see the MIDIGUIDE.)

Two sets of programs are supplied on the MULTI-TRAK factory program tape. Although the sets contain the same programs, for the most part, they are in different order. Set "A," the set loaded in the MULTI-TRAK before it leaves the factory, has the sounds in a random order, to create the most interest while stepping through them. Set "B" has similar sounds in each bank of 10, arranged to be complementary to MAX sounds when a MAX is slaved to a MULTI-TRAK via MIDI. (See MIDIGUIDE.)

Beginning on page 10-4, the parameters for each program in Set A are given in detail.

00 - Filt Res. Low Sweep
01 - Brass I
02 - String III
03 - Square
04 - Clavtron
05 - Syn-Tom I
06 - Miridium
07 - Heavy Leslie
08 - Lead I
09 - Europa
10 - Sawtooth
11 - Organ--Velocity Leslie I
12 - String IV
13 - Res II
14 - Bass II
15 - Space Drum
16 - Glide/Res
17 - Brass III
18 - Lucky Man
19 - Lazar
20 - Triangle
21 - Kari
22 - High String I
23 - Res III
24 - Taur I
25 - African Log
26 - Electric Piano I
27 - Pop Brass
28 - Lead II
29 - Leeches
30 - Synthy
31 - Clav I
32 - Harpsichord
33 - E. Piano with Chorus
34 - Synthy Chorus
35 - Synth/Clav
36 - Electric Piano II
37 - Piano (Acoustic) High Half
38 - Piano (Acoustic) Low Half
39 - Fluty-Clav
40 - Organ--Flutes
41 - Brass IV
42 - Bass-Res I
43 - Res I
44 - Jaco Bass
45 - Syn Tom II
46 - Synth chords
47 - Bass with Release Tick
48 - Clari-uni
49 - Scratch
50 - Organ I
51 - Vox Humana
52 - Strings--Slow Swell
53 - Chloe
54 - Flute
55 - Agogo Bell
56 - Noise Burst I
57 - Mock Horn
58 - Heavy Bass
59 - Groan
60 - Organ--Bright
61 - Digi Horn
62 - Sci-Fi
63 - Echo
64 - Backwards Triangles
65 - Pleiades
66 - Organ III
67 - Artemeides
68 - Taur II
69 - Falling trill
70 - Organ II
71 - Cornet
72 - String V
73 - High synth
74 - String Bass
75 - 5^{th}'s Release
76 - Discovery
77 - Funk
78 - Backwards Bass
79 - Frankenstein
80 - Wak Lead
81 - Bach Trumpet
82 - String I
83 - Lead IV
84 - Lead III
85 - Unison--Long Glide
86 - Dropped Pitch Lead
87 - Low Brass
88 - String II
89 - Bass Drum
90 - Saran
91 - Brass II
92 - High String II
93 - Descending Bells
94 - Square Wave Trill
95 - Wind
96 - Almost Bomb
97 - 5^{th} of sawtooth
98 - Polychords
99 - Alien

FACTORY PROGRAMS-SET "B"

00 - Organ I
01 - Organ--Flutes
02 - Organ--Velocity Leslie I
03 - Organ--Velocity Leslie II
04 - Organ II
05 - Organ--Bright
06 - Organ 4' Stop
07 - Heavy Leslie
08 - Organ III
09 - Organ 8' Stop
10 - Brass I
11 - Brass II
12 - Pop Brass
13 - Cornet
14 - Bach Trumpet
15 - Mock Horn
16 - Digi Horn
17 - Brass III
18 - Brass IV
19 - Low Brass
20 - String I
21 - String II
22 - High String I
23 - String III
24 - String IV
25 - High String II
26 - String V
27 - Strings--Slow Swell
28 - High String II
29 - High String III
30 - Synthy
31 - Clav I
32 - Harpsichord
33 - E. Piano with Chorus
34 - Synthy Chorus
35 - Synth/Clav
36 - Electric Piano II
37 - Piano (Acoustic) High Half
38 - Piano (Acoustic) Low Half
39 - Fluty-Clav
40 - Taur I
41 - String Bass
42 - Bass-Res I
43 - Clavtron
44 - Jaco Bass
45 - Bass II
46 - Backwards Bass
47 - Bass with Release Tick
48 - Heavy Bass
49 - Taur II
50 - Syn-Tom I
51 - Bass Drum
52 - Syn Tom II
53 - Synth. Cowbell
54 - African Log
55 - Space Drum
56 - Noise Burst I
57 - Scratch
58 - Noise Burst II
59 - Agogo Bell
60 - Synth chords
61 - Sci-Fi
62 - Res I
63 - Echo
64 - Miridium
65 - Pleiades
66 - Res II
67 - High synth
68 - Artemeides
69 - Flute
70 - Chloe
71 - Kari
72 - 5th's Release
73 - Glide/Res
74 - Filt Res. Low Sweep
75 - Res III
76 - Electric Piano I
77 - Triangle
78 - Sawtooth
79 - Square
80 - Lead I
81 - Lead II
82 - Lead III
83 - Lead IV
84 - Clari-uni
85 - Unison--Long Glide
86 - Dropped Pitch Lead
87 - Wak Lead
88 - Lucky Man
89 - Backwards Triangles
90 - Saran
91 - Groan
92 - Wind
93 - Leeches
94 - Square Wave Trill
95 - Lazar
96 - Almost Bomb
97 - Discovery
98 - Polychords
99 - Alien

Program Number 00 Name FILT RES. LOW SWEEP Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	20	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
2	31	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
68	28			7			15	9	23

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	8	7			15			15	27

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 01 Name BRASS I Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1	1		1	12		1	

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
26				15		10	17	9	14

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	7	8			15		17	9	11

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 02 Name STRING III Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12			1		1	43	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
5	31	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
81				2		3	27	11	21

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	6				12	11	28	13	17

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 03 Name SQUARE Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	32			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
2.7								9	2

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10	10			15			15	13

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 04 Name CLAVTRON — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
		1			1	57			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
45	33			9			27		16

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1		13	8		15		26	9	2

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 05 Name SYN-TOM 1 — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1				32			18

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1		15			23		

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
26	56		22	10				2	15

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	7				15		17		15

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 06 Name MIRIDIUM — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24					1	43	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
1	31	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
76	38		51	6			18	13	29

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	9	13			13		29		27

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 07 Name HEAVY LESLIE — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	35	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11	13	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
71	28			2				3	

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2			15		15			14	1

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 08 Name LEAD I Chorus:

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24		1		1	1	21		2	

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
81	37			15			27	13	25

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	8	10	9	1	15		19	15	28

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 09 Name EUROPA Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1		1					

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
12		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
46	50	1					28		29

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10	14	8		15			15	25

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 10 Name SAWTOOTH Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12			1			32			

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
2.7									

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10	10			15			15	13

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 11 Name ORGAN-VELOCITY LESLIE I Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	29	1		

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
9		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
73	27			2				3	

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2			15		15			14	1

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 12 Name STRING IV — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24					1	33	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
5	31	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
94				2		6	27	11	20

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	3	2			12	13	28	13	19

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 13 Name RES II — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12			1			32			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
2.7	30			15	1		3	8	25

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	2	15			15			15	24

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 14 Name BASS II — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
			1	1	1	13	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
12		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
36	29			12		4	11	8	5

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	[illegible]	11		1	15		15	5	4

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 15 Name SPACE DRUM — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
48						32			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	63		63	14				7	13

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	8				15		23		21

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 16 Name GLIDE/RES — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24				1	1	51	1	4	

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
12		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
16	27	1		15			24	3	28

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10	8	15		15			15	27

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 17 Name BRASS III — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1	1			32			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
26				15		10	17	9	13

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	7	8			15		17	9	11

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 18 Name LUCKY MAN — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1		1		32		2	

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
75	29			15			27	9	23

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2		10	10	1	15		19	15	28

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 19 Name LAZAR — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
						32			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	39	1	36	15			24		26

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	4	4	10	1	15			15	31

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 20 Name TRIANGLE Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⌒	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12				1		32			

LFO				Oscillator Envelope					
Frequency	Amount	⌒	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
2.7									2

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10	10			15			15	16

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 21 Name KARI Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⌒	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1	1	1		36			

LFO				Oscillator Envelope					
Frequency	Amount	⌒	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
12	1	1		14			6		

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
90	2		15	7		8	17	6	21

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1		12	9		15	8	12	12	24

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 22 Name STRING HIGH I Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⌒	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24			1		1	28	1		

LFO				Oscillator Envelope					
Frequency	Amount	⌒	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
10	2	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
94				2		20	27	11	20

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	3	2			12	18	28	13	19

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 23 Name RES III Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⌒	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24		1		1	1	51		4	

LFO				Oscillator Envelope					
Frequency	Amount	⌒	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
45	30		56	15		13	26	3	27

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	8	10	10		15	7		15	29

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 24 Name TAUR I — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
			1		1	23	1		

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
	28	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
72	7			10			21	2	20

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	8	6		1	15			11	21

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 25 Name AFRICAN LOG — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
						32			

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
42	63		15	4					

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	12				15		13		12

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 26 Name ELECTRIC PIANO I — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	15			

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
56				8			26		12

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	6	4			15		25		10

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 27 Name POP BRASS — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24		1	1			32			

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1		3			8		

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
43			48	15		7	21	7	9

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	2	7			15		8	8	8

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 28 Name LEAD II Chorus:

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24		1	1		1	25			

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
92	18		63	8			27		12

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	4	9	10	1	15			15	12

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 29 Name LEECHES Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
48			1			32			

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1		13			31		25

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
2.7	63		51					9	21

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10	10			10			15	23

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 30 Name SYNTHY Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	23	1		

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
5	14	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
2.7								9	2

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	11	10	11		15			15	13

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 31 Name CLAV I Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	50	1		

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
4		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
38	12			11			21	8	5

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	6	7			15		14	15	2

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 32 Name HARPSICHORD — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	61			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
93	26		63	1	1			15	

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2					15		24		11

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 33 Name E. PIANO WITH CHORUS — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24		1	1		1	21	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
9		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
69	6		25	7			13	8	16

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	7	4			15		24		11

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 34 Name SYNTHY CHORUS — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	39	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
2	31	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
72	5		17	7			9	8	12

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	6	8			15		24		13

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 35 Name SYNTH/CLAV — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	50	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
4		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
24	22		44	11			21	8	1

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	8	3			15		14	15	1

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 36 Name ELECTRIC PIANO II Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1	1		1	21			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
12		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
50				7			24	8	17

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	8	1			15		24		12

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 37 Name PIANO (ACOUSTIC) HIGH HALF Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
45					1	5			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
66	16			7			23		19

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
	15				15		23		14

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 38 Name PIANO (ACOUSTIC) LOW HALF Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
					1	14			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
59				8			26		21

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	6	4			15		25		13

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 39 Name FLUTY-CLAV Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1	1	1	1	8			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
84				6			10		8

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	8	13			12		22	15	9

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 40 Name ORGAN - FLUTES Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24				1		36	1		

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
3	31	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
83	29			2				3	

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2			15		15			14	1

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 41 Name BRASS IV Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24		1	1			13			

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
16	7			15		9	16	9	11

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	6	6			15		17	9	10

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 42 Name BASS - RES I Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
			1	1	1	45	1		

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
1	23	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
50	17			12			11	7	2

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	5	7			15			15	7

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 43 Name RES I Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
36		1	1			32			2

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
50	31			11			16	8	26

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	7	8	7		14		11	15	27

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 44 Name JACO BASS Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
					1	58			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
2		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
48	16			7			18	9	18

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1		15			15		2	10	2

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 45 Name SYN TOM II Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
4				1		32			18

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1		15			18	15	15

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
31				12			16	10	15

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	9	3			15		13	7	16

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 46 Name SYNTH CHORDS Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
29		1	1		1	34	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
69	7			10		3	10	11	14

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10	10			15			15	12

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 47 Name BASS WITH RELEASE TICK Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
		1	1	1		23	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
0.8	15			8	1	14		15	

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	3	6		1	15			10	9

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 48 Name CLARI-UNI Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⌒	⊓	Pulse Width	PW Mod	Glide	Noise Mix
		1		1	1	32			

LFO				Oscillator Envelope					
Frequency	Amount	⌒	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	13		25	14		4	19	14	25

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	2	4	9	1	9	6	22	12	7
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 49 Name SCRATCH Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⌒	⊓	Pulse Width	PW Mod	Glide	Noise Mix
16		1				32			

LFO				Oscillator Envelope					
Frequency	Amount	⌒	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
90	61		34	2		7			

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	4	3			15	6	1		
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 50 Name ORGAN I Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⌒	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12			1		1	36	1		

LFO				Oscillator Envelope					
Frequency	Amount	⌒	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
3	31	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
70	29			2				3	

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	8		15		15			14	1
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 51 Name VOX HUMANA Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⌒	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24		1	1			3			

LFO				Oscillator Envelope					
Frequency	Amount	⌒	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
12	2	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
70	26	1							

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	8				15	12	21	9	13
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 52 Name STRINGS-SLOW SWELL Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	20	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
10	10	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
94				2		20	27	11	20

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	3	2			12	24	28	13	19

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 53 Name CHLOE Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	26	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
2	26	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
1.0	2		15	8	1	20	14		21

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1		4			15	8	12	12	24

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 54 Name FLUTE Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
36			1			32			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11	8	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
72	9	1	3	1		12	7		

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2		4			15	6	5	11	4

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 55 Name AGOGO BELL Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
40		1				32			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11			1	15			23		

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
60	56	1	17						

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10				15		9		13

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 56 Name NOISE BURST I — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
						32			31

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11	11		1						

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
61	10			15			14		21

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2		15		1	15		12		15

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 57 Name MOCK HORN — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24		1	1			13			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
37	15			9		6	17	12	8

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10	10			15		17	9	4

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 58 Name HEAVY BASS — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
			1	1	1	45	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
1	23	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
50	14			15			13	6	2

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
	5	7		1	12			15	7

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 59 Name GROAN — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
			1			32			31

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
0.3	60		51	12	1		31	9	27

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10	10		1	15			15	23

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 60 **Name** ORGAN-BRIGHT **Chorus:** ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24					1	21	1		

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
14	2	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
84	29		3	2				3	

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	2		8		13			14	1

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 61 **Name** DIGI HORN **Chorus:** OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
36		1	1		1	44			

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
95	14		31	6	1		7		

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	7		11		15		19		9

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 62 **Name** SCI-FI **Chorus:** ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24		1	1			32			

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11			1						

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
93	8			3			7	7	24

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10	10	9		15			15	22

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 63 **Name** ECHO **Chorus:** OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
36			1	1		32			

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
0.9				3	1	4			

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	10				15			15	12

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 64 Name BACKWARD TRIANGLES Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1		1	1	32			

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11	3	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
67	5			9	1		21		6

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2		10	8		13		5	15	15

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 65 Name PLEIADES Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12			1		1	23	1	1	

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
	28	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
67	7			7			20	2	20

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	8	10			15			11	21

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 66 Name ORGAN III Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24			1		1	35	1		

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11	18	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
83	32			3				3	

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	5				15			14	1

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 67 Name ARTEMEIDES Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	60	1	5	

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
7	6	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
41	20			12			23		28

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	9	6	8		15			15	26

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 68 Name TAUR II — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
			1		1	50	1	3	

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
1	31	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
77	8			9			23	2	24

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	8	4		1	11		7	15	24

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 69 Name FALLING TRILL — Chorus:

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
27						32			

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
15	2		1						

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
44	45	1	9	7		7	19		21

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2		11			13	7	21		18

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 70 Name ORGAN II — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12				1	1	21	1		

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
	25	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
77	29		3	3					

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	6		8		15			14	1

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 71 Name CORNET — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24		1	1			32			

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
69			50	11		8	19	6	5

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	2	10	3		15	1		11	9

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 72 Name STRING V Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⌒	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24					1	21	1		

LFO				Oscillator Envelope					
Frequency	Amount	⌒	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
10	13	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
0.3				2		20	27	11	20

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	3	1	9		12	9	28	14	19

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 73 Name HIGH SYNTH Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⌒	⊓	Pulse Width	PW Mod	Glide	Noise Mix
48		1		1		32		3	

LFO				Oscillator Envelope					
Frequency	Amount	⌒	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
50	14			11			16	8	26

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	7	8	7		13		11	15	27

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 74 Name STRING BASS Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⌒	⊓	Pulse Width	PW Mod	Glide	Noise Mix
				1	1	21	1		

LFO				Oscillator Envelope					
Frequency	Amount	⌒	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
2		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
48	36			4			22	9	19

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
	7	2			15	1	20		11

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 75 Name 5TH'S RELEASE Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⌒	⊓	Pulse Width	PW Mod	Glide	Noise Mix
19					1	50			

LFO				Oscillator Envelope					
Frequency	Amount	⌒	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
7		1		14	1			15	7

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
73	2		19	7		3	17	6	17

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	7	12			15		12	12	24

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 76 Name DISCOVERY — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
36				1		50			

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
12	3								

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
32	30	1	33	15		22	21	8	23

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	7	8			15		14	15	18

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 77 Name FUNK — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1	1		1	42			

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
51	33		51	9			27		16

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1		15	8		15		26	9	2

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 78 Name BACKWARDS BASS — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
			1		1	23	1		

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
	28	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
1.5	22		63	9	1		20	4	23

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	5			1	15			11	20

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 79 Name FRANKENSTEIN — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
		1							28

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
15		1		15			23		

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	53		39	15			3	15	18

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	5	8			15		21		15

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 80 Name WAK LEAD — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
36		1			1	54	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
10	3	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	41			13				15	23

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	6			1	13		3	15	

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 81 Name BACH TRUMPET — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
36		1	1			32			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
76	7			15		11	15	9	5

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	5	3	5		15	1		12	9

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 82 Name STRING I — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24			1		1	43	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
5	31	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
84				2		3	27	11	21

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	6				12	11	28	13	17

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 83 Name LEAD IV — Chorus:

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24		1	1		1	36		2	

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
12		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
93	16			3			7	7	2

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	7	8		1	15			12	7

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 84 Name LEAD III Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
36		1	1		1	32		1	

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
71	16			6				14	1

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	5	7		1	15			15	2

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 85 Name UNISON – LONG GLIDE Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
		1	1			32		12	

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
84	21			6				11	27

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	4	5	12	1	15			15	29

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 86 Name DROPPED PITCH LEAD Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
23		1	1			32			

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1		6			6	6	23

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
91	8			3			7	7	31

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	6	10	5	1	15			14	20

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 87 Name LOW BRASS Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	^	⊓	Pulse Width	PW Mod	Glide	Noise Mix
		1	1			13			

LFO				Oscillator Envelope					
Frequency	Amount	^	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	7			15		9	14	7	12

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	6	6			15		17	9	11

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 88 Name STRING II — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12					1	33	1		

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
5	25	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
94				2		6	27	11	18

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	5	2			12	10	28	13	16

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 89 Name BASS DRUM — Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
						32			7

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
40	63			9				5	2

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	4				15		9		7

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 90 Name SARAN — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1				32			11

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1		15			23		

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
60	56		63	10	1			15	

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10				15		21		15

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 91 Name BRASS II — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24		1	1			32			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
4	6			15		7	22	11	13

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	9				15	3	17	10	11

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 92 Name STRING HIGH II Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
36		1	1			16	1		

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
9	2	1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
85				3		6	27	11	21

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	3	2			12	14	28	13	21

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 93 Name DESENDING BELLS Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
24									

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
			1	15			28		31

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
22	50		43	15			28		31

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2		15			15			15	25

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 94 Name SQUARE WAVE TRILL Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
29		1	1			32			

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
10	15		1						

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
44	37			9		6	26	9	25

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	6	4			12		29	15	29

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 95 Name WIND Chorus: OFF

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
		1							31

LFO				Oscillator Envelope					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
50	17	1		14		29	27	8	28

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
1	5	8			15	20	21	15	31

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 96 Name ALMOST BOMB — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1				32			11

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11	31	1		15			23		

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
55	63		17	11			24	15	31

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10			1	15		21		31

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 97 Name 5TH OF SAWTOOTH — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
19			1			32			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
2.7									

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	10	10			15			15	13

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 98 Name POLYCHORDS — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
12		1	1			32		15	

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
2.7									

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
2	3				15			15	31

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number 99 Name ALIEN — Chorus: ON

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	↗	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
7						32			

LFO				Oscillator Envelope					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
11		1							

Filter				Filter Envelope					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
89	63		63						

	Velocity Sensitivity				Amplifier Envelope				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
				1	15	26		15	31

0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

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Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	/|	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	/|	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	/|	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	/|	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	◿	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	◿	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	◿	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	◿	⋀	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	⋀	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	/|	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	/|	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	/|	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	/|	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	⊿	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	⊿	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	⊿	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	⊿	∧	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	∧	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9

PROGRAM/PARAMETER

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	/|	/\	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	/\	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
0	1	2	3	4	5	6	7	8	9
PROGRAM/PARAMETER									

Program Number **Name** **Chorus:**

Osc. Frequency			Osc. Waveshape			Modifiers			
Coarse	Fine	LFO Mod	/|	/\	⊓	Pulse Width	PW Mod	Glide	Noise Mix
LFO				**Oscillator Envelope**					
Frequency	Amount	/\	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
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PROGRAM/PARAMETER									

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LFO				**Oscillator Envelope**					
Frequency	Amount	/\	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
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Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
Kybd Track	Amp Peak	Filter Peak	LFO Amt	Unison	Voice Volume	Attack	Decay	Sustain	Release
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Frequency	Amount	/\	⊓	Env Amount	Invert	Attack	Decay	Sustain	Release
Filter				**Filter Envelope**					
Cutoff	Resonance	LFO Mod	Osc. Mod	Env Amount	Invert	Attack	Decay	Sustain	Release
	Velocity Sensitivity				**Amplifier Envelope**				
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0	1	2	3	4	5	6	7	8	9
PROGRAM/PARAMETER									

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