Written and Designed by FREFF
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BE CAREFUL !

DON'TS:

-- DON'T attach anything to the XLR connector on your
Voyetra's front panel except your VPK-5 keyboard. (The
connector supplies the keyboard's power, so attaching
microphones or other devices with XLR plugs to the
connector may damage your Voyetra and void your warranty.

-- DON'T block the cooling vents or spill anything into them.

-- DON'T put your Voyetra near heat sources like power
amplifiers, radiators, stoves, and such. If you've
rack-mounted it, allow at least 1 3/4" clearance at the
top for ventilation; if you have an earlier Voyetra
(pre-Version Three) without a built-in fan, the use of a
rack fan is recommended in high-heat environments.

-- DON'T open up your Voyetra; that will void your warranty.
If you need adjustments or modifications, get them done
at an authorized service outlet.

-- DON'T press the STORE button on your Voyetra's front panel
unless you mean to. (To know when that is, read the part of
this manual called "The Front Panel". In the meantime, don't
panic if you press STORE by accident. It's an annoyance, but
not a disaster.)

DO'S:

-- DO read your warranty (appendix #6) and promptly send in
your warranty registration card.

-- DO make backup cassettes of your sounds (see "Tape
Storage and Loading".)

-- DO study this manual thoroughly. It'll teach you what you
need to know...and then go make magnificent music.

USING THIS MANUAL

"GET READY..."

Hi. Some of you are old hands at using synthesizers, and some of you have never owned one before in your lives. This teaching manual is designed for both your needs.

As you go through the manual you'll be given a complete grounding in the Voyetra and what it can do, through a series of illustrated explanations and learning exercises. At the end of the course you'll be ready to take your new instrument as far as your imagination can go. (Heavy stress on that: no instrument, no matter how wonderful, can make up for a lack of imagination. So be creative!)

Read it carefully, study the diagrams, do as many of the suggested exercises as you can, and refer to the appendixes when you need to. Appendix #2, "Basics of Synthesis," will be especially helpful to you if the Voyetra Eight is your first synthesizer.

We also suggest that you keep some kind of workbook, preferably one with several sections, to use for taking notes. It will make the exercises go easier and faster, and help you remember ideas you'll want to test later on.

September 1983

SETTING UP

"Get set..."

Inside your shipping boxes you'll find a Voyetra 8 module
                                        a VPK-5 keyboard
                                        a power cable
                                        an XLR cable
                                        a Program cassette
                                        this manual.

The very first thing you should do is fill out the warranty
card included with this manual, and send it back to OEI.

After you've done that, it's time to make music. Clear enough
table or rack space for the Voyetra and keyboard and make them
both easy to reach. We recommend centering the module above the
keyboard, while you're learning, like this:

REST THE VOYETRA'S FRONT LEGS ON THE KEYBOARD. REST ITS REAR LEGS ON A PHONE BOOK, OR ANYTHING ELSE THAT WILL KEEP IT LEVEL.
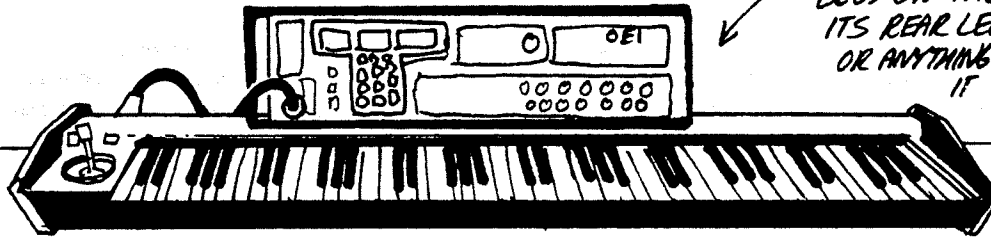
You can also place the module to one side or the other,
depending on whether you are left or right-handed. If you do it
that way, remember to angle the module to make it easier to see
and work with.

ALWAYS LEAVE SUFFICIENT SPACE FOR A WORKING NOTEBOOK.
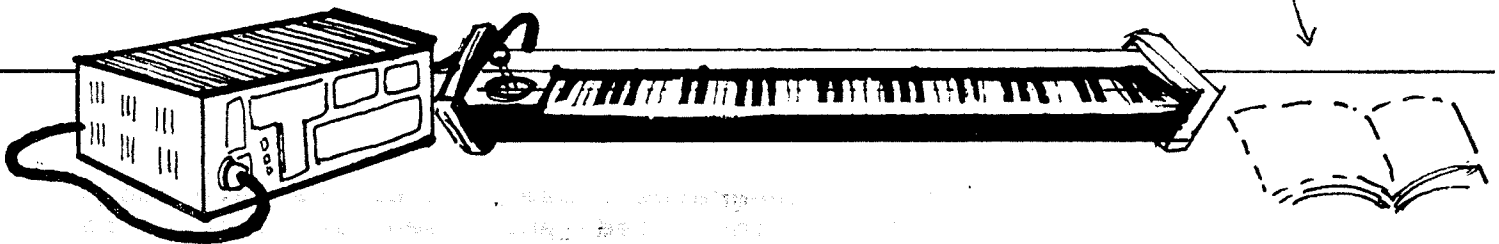
Then connect the XLR cable from the left rear of the keyboard
to the left front of the module, and connect the power cable from
the back of the module to any nearby electrical outlet. When you
turn on the unit's power various red lights will blink on and
numbers will appear in the digital readouts.

A caution: if for some reason you are using your own XLR cable between the keyboard and module instead of the one supplied by OEI, make certain it is less than 15 feet long. Otherwise, signal loss might cause you trouble. (Cables longer than 15 feet will *not* hurt your Voyetra; they just aren't likely to work as well. Much depends on the cable's quality--some we tested were effective even up to 30 feet. But we can't guarantee anything past 15.)
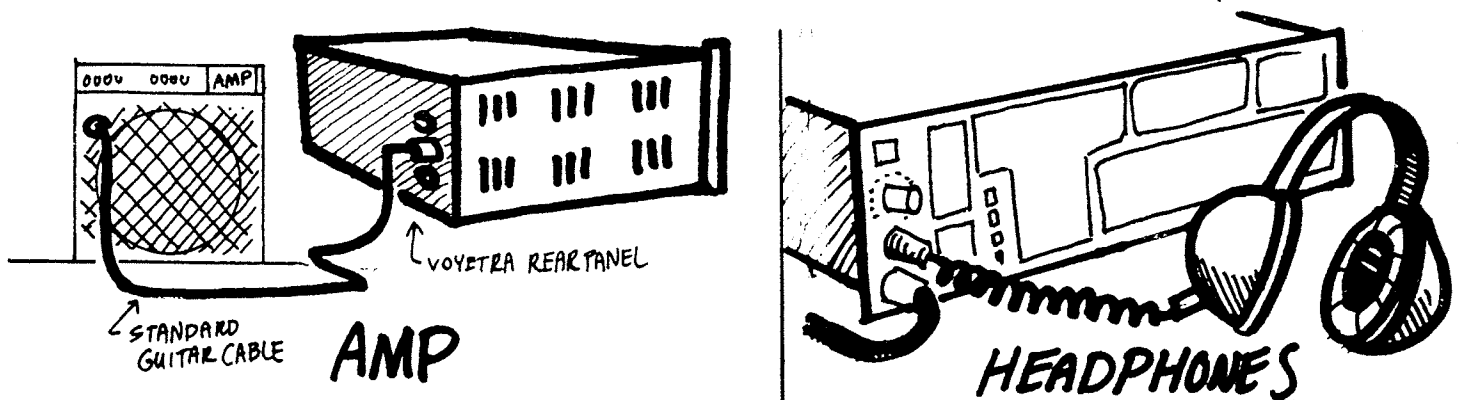
HOOKING UP THE AUDIO:
what you need to know right now

You've got two choices--an external amplifier or headphones.

↳ VOYETRA REAR PANEL

↳ STANDARD GUITAR CABLE   **AMP**

HEADPHONES

Hooking up to an **AMPLIFIER** is easy. Set the MASTER VOLUME control on the module's front panel to five and the volume on the amplifier to zero. Then find the AUDIO section on the rear panel and run a standard guitar-type connector cable from the MONO OUT jack to the amp of your choice. Once you've made this connection, play the keyboard and gradually turn up the amp's volume. Until you are familiar with the instrument's Programs, we recommend keeping the volume down; some of them are much louder than others. (*Amplifier drawback*: unless you have an amp especially designed for synths, or are plugging into a PA system, the sound you get won't be the full Voyetra sound. Most amps are designed for guitars, and aren't up to the frequency range demands of electronic keyboards.)

HEADPHONES are convenient, put you right in the middle of the sound (they'll also give you nearly all of it, if they're good ones) and won't disturb your neighbors at three in the morning. To use them, set the HEADPHONE MONITOR trimmer to zero and plug your phones into the jack immediately below. Then turn the volume up slowly while playing the keyboard. *Until you are familiar with the volumes of the Programs, be careful!* Accidentally blasting out your phones--or worse, your eardrums--is bad news. (*Headphone drawbacks*: first, the headphone signal is mono, not stereo. Second, for technical reasons, headphone output is NOT affected by the two volume trimmers in the Program Parameter Trimmer sction. This means

that when you are working with two different Programs at once--
as you will when we get into the keyboard modes called SPLIT and
LAYER--you won't be able to hear adjustments in their relative
volumes through the headphones. To hear those you must use an
external amplifier.)

For the best of both worlds, you might want to use a practice
amp that also has a headphone jack, or one of several battery-powered
headphone amplifiers.   Or you could connect
your Voyetra to your home stereo by running a cable from the Voyetra's
output to the stereo's Auxillary input. Both of these will give you
good sound and the capacity to hear individual Program volume
changes. But remember--always turn on your amplifier, whatever it
may be, *after* turning on your Voyetra, to avoid damaging your
amplifier or speakers.

TUNING:
what you need to know right now
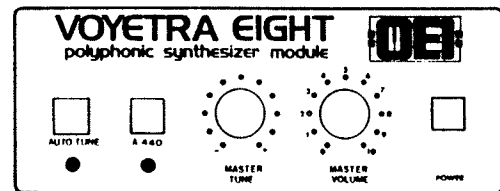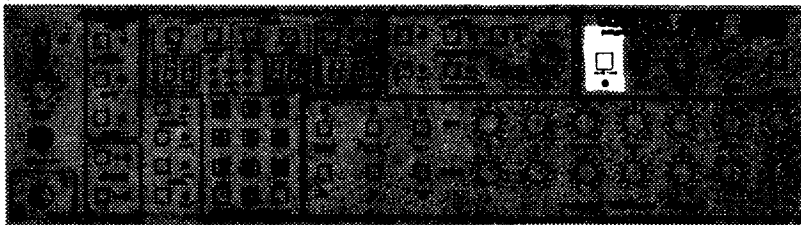
Let the unit warm up for five to ten minutes before you tune
it. That's important! Electronic gear (of any kind) takes a while
to reach a stable operating temperature, so it's a waste of your
time to try and tune the Voyetra before its sound-generating
oscillators stabilize.

Tuning--after warmup--is simple. Just press the white button
marked AUTO TUNE. The digital readout will give you a countdown
of the tuning process. After all sixteen oscillators have been
tuned, the readout will return to normal and you can play. (The
first time you do this, immediately after warmup, it's a good idea
to go through the tuning procedure twice to really lock it in.)

(If you saw a letter flash onto the readout during tuning, it
means that the internal computer couldn't tune that oscillator.
There are several possible reasons for this, but the most common
is insufficient warmup time. The cure is to let the unit sit a bit
longer and then press AUTO TUNE until no letters appear during the
countdown. For more details on what these letters mean, see the
section on tuning in "The Front Panel," later in this manual.)

OVERVIEW

"...go!"

Now that your Voyetra is connected, plugged in, turned on,
warmed up, and tuned, you should make some music. Go ahead. Play
as long as you feel like. Enjoy yourself. Then come back to this
manual when you're ready to dig in.

The way to begin is to press either the FORWARD or REVERSE
buttons at the bottom of the PROGRAMMER numerical keypad (or their
equivalents on your VPK-5 keyboard, above the joystick), and then
play some more. Do this several times, keeping track of what
happens on the front panel.

Seemed confusing, didn't it? All kinds of lights changed, all
the numbers changed, and certainly the sound changed...but actually
it isn't confusing, when you know what's going on. In fact, it's
rather simple.

There are only FOUR things to remember: Voices, Programs,
Steps, and Pages. (We'll always capitalize these, so you never
confuse a Voyetra Program with a television program, or a Voyetra
Voice with a singer's voice.)

Here's an analogy to help you understand just what these four
things are, and how they work together. Imagine for a moment that
your synth-sound is like a house. The Voyetra's Voices, Programs,
and Steps would be the foundation, first floor, and second floor
of the house, and its Pages would be the tools you built the house
with.

The following are simplified definitions. We'll go into more
detail later, as you need it. For now this is enough.

VOICES, PROGRAMS, and STEPS--

+--+
| |
| If you are a beginning synthesist, you may find some of the
| following text and diagrams tough to follow because you don't yet
| know all the terms being used. You'll find the definitions and
| explanations you need in appendixes #2 ("Basics of Synthesis") and
| #4 ("Glossary"). |
| |
+--+

A **VOICE** is the basic foundation of the Voyetra. It is
actually a monophonic synthesizer with two VCO's, two ADSRs,
a VCF, a VCA, a noise source, and inputs from two LFOs. Your
Voyetra has *eight* of these Voices (mono synths), and can
therefore play up to eight different notes at the same time,
depending on what keyboard mode you are in.

A VOICE CONTAINS ALL OF THE FOLLOWING—

LFO1 — VCO1
LFO2 — VCO2
NOISE → VCF → VCA → SOUND
ADSR1   ADSR2
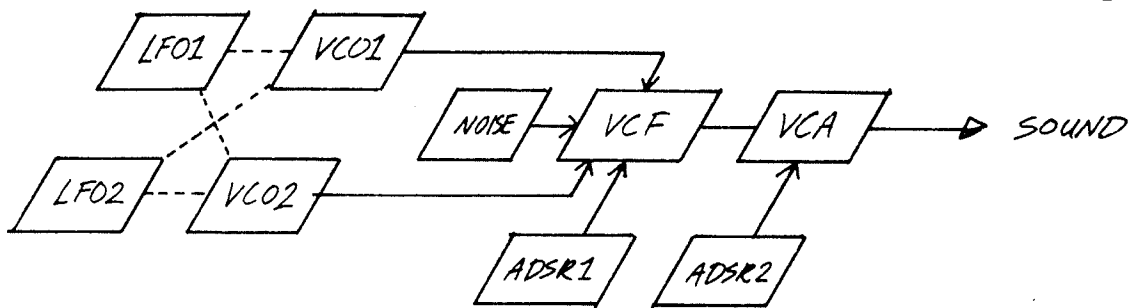
A PROGRAM is a *memorized* sound that you can call up whenever
you wish. It's very convenient. You design a sound you like,
complex or simple, assign whatever modulation controls you want,
and then the machine remembers all the relevant switch and trimmer
settings for you in a numbered Program. There's room for 100
Programs in the Voyetra's internal memory, and you can call them
up either randomly or sequentially (also, in two of the Voyetra's
three keyboard modes, you can have both PROGRAM LEFT and PROGRAM
RIGHT available on the keyboard at the same time.)

A PROGRAM CONTAINS ALL THE FOLLOWING —

ALL VOICE SETTINGS
MOD BANK A
MOD BANK B
MOD BANK C
MOD BANK D
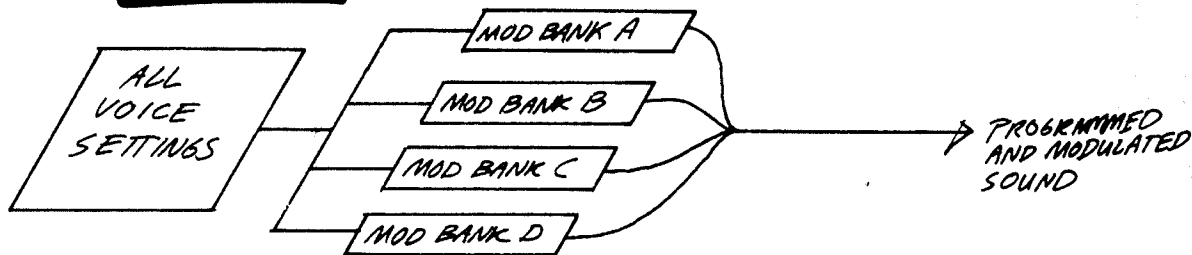→ PROGRAMMED AND MODULATED SOUND

A STEP is a "Programmed Program," so to speak. It memorizes
variations on Programs, up to 200 of them (two in each Step),
and allows you to call them up either randomly or sequentially.
As you work through this manual you'll discover that the Step is
amazingly powerful. Used to its fullest, the Step makes it
possible to store 300 different sounds in onboard memory, more
than any other polyphonic synthesizer. And that's only one of its
benefits; there are lots more (like making live performance
easier).

A STEP CONTAINS ALL OF THE FOLLOWING—

PROGRAM LEFT — RIGHT TRIMMER CHANGES — ARPEGGIATOR AND OTHER STEP FEATURES
PROGRAM RIGHT — LEFT TRIMMER CHANGES — ARPEGGIATOR AND OTHER STEP FEATURES
→ performance and recording power
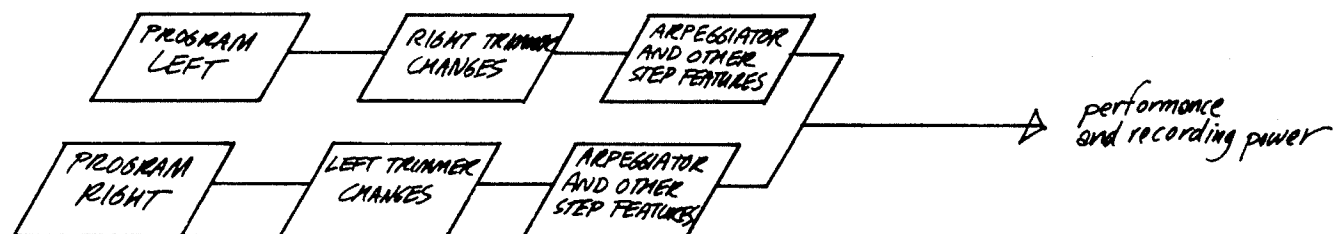
PAGES--

A casual glance at the Voyetra's front panel might make you think it didn't have many functions, but you'd be wrong. By taking advantage of the power of its internal computer, we've managed to pack more synthesizer into a smaller, more functional space than ever before--in fact, if every feature of the Voyetra had a separate control, the front panel would be over seventeen feet long!
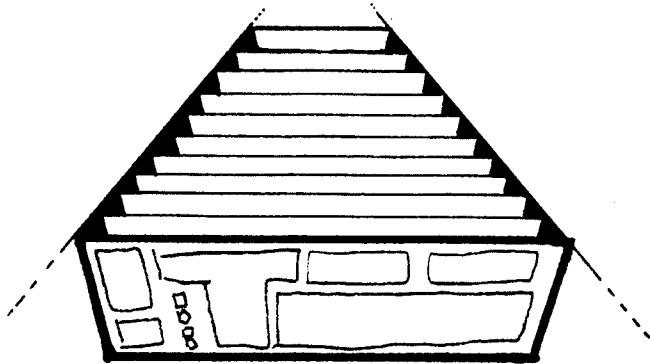
Try fitting *that* in a rack mount.

To do it, we used **PAGES**. There are eleven Pages, ten of which are always "hidden" at any given time.

JUST IMAGINE THAT BEHIND YOUR VOYETRA'S FRONT PANEL THERE ARE TEN OTHER CONTROL PANELS.

Try this experiment. Press the blue A-440 button and hold it down. Now press the white STEP ENABLE button above the STEP digital readout. All the numbers in the readouts should vanish and be replaced with dashes and numbers. Let go of both buttons.

Congratulations! You've just successfully gone from the *Normal Page* to the *Alternate Page*, and a lot of the switches on the front panel have changed functions. The AUTO TUNE button, for example, isn't a tuning switch any more (even though it still says so beneath it). Instead it now turns the arpeggiator clock keyboard retriggering on and off.

If you think this is a confusing thing, you're right. At first it is. But like learning to drive with a stick shift, or to ride a bicycle, after a little practice it'll be a breeze.

Press the STEP ENABLE button once more to return to the Normal Page (AUTO TUNE is now a tuning switch again) and do the following exercises. They'll teach you how to move around the Programs, Steps, and Pages, and give you a chance to explore all the preset sounds.

Ready? Set? Notebook and pen out?

--go!

EXERCISES

(We suggest you do each exercise until you feel confident that you
have learned it, and then go on.)

EXERCISE # 1: MOVING FROM STEPS TO PROGRAMS AND BACK

← PAY ATTENTION TO
THE PERIODS!
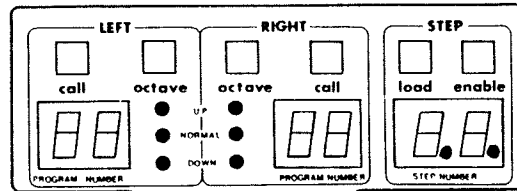
     Right now there should be periods next to the numbers in the
STEP readout. Locate the red CALL button in the RIGHT readout
section, and press it. Then press STEP ENABLE. Then press
the red CALL button in the LEFT readout section. Alternate back
and forth between these three buttons a few times, and watch what
happens to the periods.

     These periods are your way of knowing just what you'll be
changing with the PROGRAMMER keypad and the FORWARD and REVERSE
switches. If the periods are in the STEP readout and you press
FORWARD, you will advance to the next *Step* in memory. But
if they were in the RIGHT or LEFT readouts, and you pressed
FORWARD, you would advance to the next *Program* in memory. We
will be doing this next.

EXERCISE #2: CALLING UP PROGRAMS
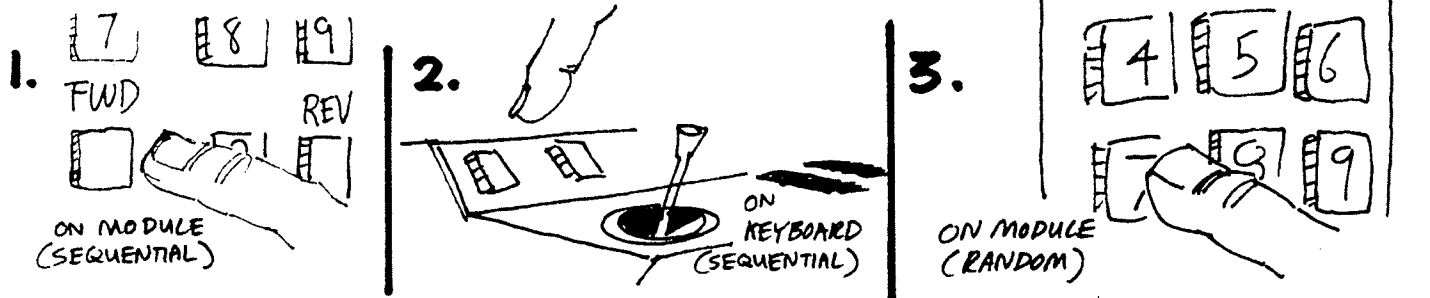
     There are three basic ways to call up Programs.

     You can call them up sequentially (in numerical order, like
00, 01, 02, 03, etc.) with the FORWARD and REVERSE switches in
the PROGRAMMER section of the Voyetra's front panel. You can also
call them up sequentially by using the buttons just above the
keyboard's joystick. (The two keyboard buttons are arranged like
the two front panel buttons; left is FORWARD, right is REVERSE.)
Press the red CALL RIGHT button, and then try those four switches
and watch what occurs. Play the keyboard a little as you do this,
just to prove to yourself that the Programs are, indeed, changing.
(For a little more fun, try it in both WHOLE 8 and LAYER keyboard
modes. When you press WHOLE 8 you will only hear PROGRAM RIGHT as

it changes. When you press LAYER you will hear a changing PROGRAM RIGHT against an unchanging PROGRAM LEFT. This is an easy way to audition new sound combinations.)

Those are the two ways to call up Programs sequentially. If you'd rather skip around, you can use the number keypad to call them up randomly. All you have to do is press the two numbers that identify the Program you want. Try these: 22, 29, 87, 01, 99, 08, 63. See how the readouts changed? Hear how the sounds changed?

Sequential and random access can be combined. Try it; press the number of your choice, and use FORWARD and REVERSE to change Programs one by one from there.

(There's an extra way to change Programs sequentially, and that's with an optional FORWARD/REVERSE footswitch. If you have one, plug it in and try it out.)

NOTE: For your convenience, the FORWARD and REVERSE buttons on the keyboard have an auto repeat function. Hold down either button and, after about a half second, the Voyetra will start advancing automatically at the rate of several Programs or Steps per second. This feature is *only* on the keyboard FORWARD and REVERSE buttons, and does *not* apply to those on the Voyetra module or the optional footswitch.

EXERCISE #3: RIGHT VS. LEFT
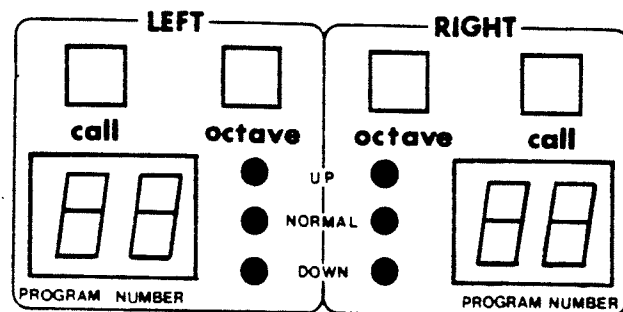
All of what you learned in the previous exercise applies to PROGRAM LEFT as well as PROGRAM RIGHT. But there is one major difference that you should know about.

We'll explain it in a minute. First we want you to hear it.

Set PROGRAM RIGHT to 00 by pressing CALL RIGHT, and then 0 and 0 on the PROGRAMMER keypad. Then make certain that the light next to WHOLE 8 VOICE in the KEYBOARD MODE section is on (if it isn't on, press the WHOLE 8 button) and that the lights in the UNISON section are off. Play something on the keyboard and you will hear Program 00.

Now, while still playing, press CALL LEFT and start tapping FORWARD or REVERSE.

The numbers in the LEFT readout will keep changing. Your sound won't. This is *not* a malfunction.

Carrying the test further, press UNISON RIGHT on and off while still playing, and then do the same with UNISON LEFT. (See how UNISON LEFT wouldn't turn on?) Then locate the RIGHT and LEFT Fc trimmers in the PROGRAM PARAMETER TRIMMER section, and turn both of them all the way clockwise and counterclockwise. Which modified the sound?

This reveals a general principle of the Voyetra's structure that we'll elaborate on in the next section, but which you should know about now: unless the instrument is in SPLIT or LAYER keyboard modes, no control marked LEFT has an audible effect. RIGHT dominates. Which explains why you still heard 00, the Program in the RIGHT readout, even though the little periods were in the LEFT readout.

This allows you to select what Program you want on tap for PROGRAM LEFT, in the SPLIT or LAYER modes, without requiring that you enter those modes first. This way, you can set PROGRAM LEFT however you would like, but not have it audible until you *want* it to be heard.

EXERCISE #4: CALLING UP STEPS

This is Exercise #2 all over again, because calling up Steps is the same as calling up Programs, except for two things. First, you begin the process by hitting STEP ENABLE instead of CALL LEFT or CALL RIGHT (remember Exercise #1!). Second, when you change from one Step to another the numbers in *all* the readouts change.

You don't have to do all of Exercise #2 over if you understood it the first time. Just test out the sequential and random access techniques it describes, and think "Step" every time it says "Program."

SPECIAL EXERCISE #5!

We hope that got your attention, because this one is VERY important. It will save you a lot of confusion later on, and help you get the most out of your Voyetra.

It's like this: when you are working with Steps, you just can't take the numbers in the LEFT and RIGHT readouts at face value. Take a look at the following hypothetical set of readouts--

It seems fairly clear. Here in Step 99 the Voyetra is in SPLIT mode, with Program 60 on both the left and right side of the keyboard. So both sides of the keyboard will sound the same, right? And if you pressed CALL RIGHT to call up a Program, and then pressed 60, that would sound the same, too. Right?

Well...maybe. And then again, maybe not.

Here's why. A Step, if you remember our definition from earlier in this section, is made of *variations* on Programs. So the 60 in PROGRAM LEFT that is part of Step 99 could be a radical variation on the original 60, and the 60 in PROGRAM RIGHT could be a second, totally different variation. That gives you three completely unique sounds...all numbered 60 in the readouts.

The reason for this will be explained later in the part of this manual called "Steps and Beyond." What's important for you to remember now is that when you call up a Step, the sounds represented by the numbers in the LEFT and RIGHT readouts aren't necessarily the same as the sounds of the original Programs bearing those numbers. The following exercise is designed to drive this point home, because in it you will re-create the example above: three totally different sounds, all Program-numbered 60.

Start by pressing CALL RIGHT and then using the keypad to bring up Program 60. Play it. Get used to its sound, so you'll recognize it when you call it back later.

Then press the SPLIT mode button, and use CALL LEFT and the keypad to put Program 60 on the left side of the keyboard.

Now start twiddling with the Program Parameter Trimmers, both left and right. Pretty soon those two sides of the keyboard are going to sound quite different from each other, and also from the Program 60 that was their original source...which is precisely the point. *If* you were to use the STEP LOAD function right now to save these sounds, you'd have three different sounds all numbered 60: one on the left side, one on the right, and the original unaltered Program.

See? Or—more precisely—hear?

(To end this exercise, use the CALL buttons and keypad to return the *original* Program 60 to both sides of the keyboard, by pressing CALL LEFT, 6, 0, and then CALL RIGHT, 6, 0.)

EXERCISE #6: MOVING AMONG PAGES

NOTE: Do NOT enter the Velocity Taper Page unless you intend

> to set a new user-velocity taper. Entering this
> page AUTOMATICALLY erases the user-velocity taper that
> came preset from the factory (it does *not* harm the
> basic velocity preset, however).

There are eleven Pages.

--the NORMAL PAGE (which is what you get when you turn the
                   Voyetra on).

--the ALTERNATE PAGE,
   the POLY-SEQUENCER PAGE,
   the VELOCITY TAPER PAGE,
   and the SET PAGE (all of which you can only reach from the
                      Normal Page by pressing A-440 and some
                      other button at the same time; and from
                      all of which you can return only to the
                      Normal Page).

--EDIT PAGE 1,
   EDIT PAGE 2,
   and MODULATION BANKS A, B, C and D (these six Edit Pages
                      are reached by pressing the grey EDIT
                      button just below the LEFT readout; you
                      can then cycle forwards and backwards
                      through them by tapping FORWARD or
                      REVERSE on either the module, the
                      keyboard, or your optional footswitch).

     Study the diagram below for a moment, and then do this
exercise--practice moving from Page to Page.

     Go from Normal to Alternate and back, several times. Then
from Normal to Poly-Sequencer, or Normal to Set (DO NOT go into
the Velocity Taper page, as we warned you in the boxed note
above). Lastly, go from Normal to the Edit Pages and practice
cycling around the six of them.

     As you do these things, *watch the readouts*. Each Page uses
them differently. In no time at all you'll know what page you are
in with only a glance.

     One last thing. Try playing the keyboard while moving from
Page to Page. You'll find that the Voyetra is always playable,
no matter what Page you are in. This is simply a matter of
convenience. As you use the Pages to create and modulate your
sounds, it gives you instant feedback on how you're doing.

THE ELEVEN VOYETRA PAGES:

POLY-SEQUENCER PAGE
TO ENTER: A-440 AND ARPEGGIATOR RIGHT

TO EXIT: ARPEGGIATOR RIGHT

VELOCITY TAPER PAGE
TO ENTER: A-440 AND AUDIO MUTE

TO EXIT: AUDIO MUTE

* DO NOT ENTER BY ACCIDENT: ENTERING THIS PAGE AUTOMATICALL CHANGES THE USER-VELOC TAPER SET AT THE FACTORY

SUB-DIVISION OF SEQUENCER PAGE

SONG PAGE
ENTER AND EXIT BY PRESSING "SPLIT"

SET PAGE
TO ENTER: A-440 AND RANDOM
TO EXIT: RANDOM

ALTERNATE PAGE
TO ENTER: A-440 AND STEP ENABLE
TO EXIT: STEP ENABLE

NORMAL PAGE
THIS PAGE COMES ON WITH VOYETRA POWER.

EDIT PAGE 1 (VCO)
TO ENTER AND EXIT: PRESS EDIT.

YOU CAN RETURN TO THE NORMAL PAGE FROM ANY OF THESE 6 EDITING PAGES BY PRESSING THE EDIT BUTTON.

EDIT PAGE 2 (VCF/ADSR)

MOD BANK D

MOD BANK A

CIRCLE OF EDITING PAGES

((PRESS FORWARD OR REVERSE TO CYCLE AMONG THESE PAGES))

MOD BANK C

MOD BANK B

EXERCISE #7: THE SOUNDS THEMSELVES

  This is the really fun part, but you'll probably want to do
it a little at a time.

  Start this exercise by opening up your working notebook and
writing down the word "PROGRAMS," followed by the numbers 00-99.
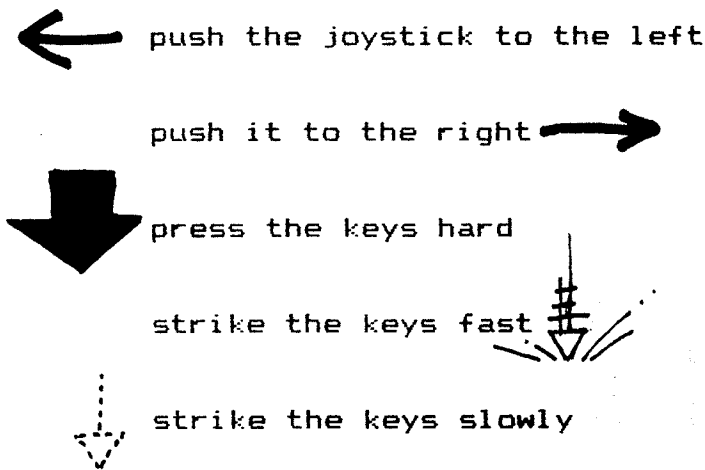Skip at least one line between each number. Then write "STEPS,"
and 00-99 again.

  Now you get to play all you want. Begin with Program 00
and work your way through to Program 99, learning what the
Programs sound like, and writing down whether or not they change
(and if so, how) when you do the following:

    ← push the joystick to the left

    push it to the right →

    ↓ press the keys hard

    strike the keys fast

    strike the keys slowly

  Remember to play over the whole length of the keyboard with
every sound, and if you find a neat effect while trying the list
above, play that low and high, too (some of the differences will
be dramatic).

  When you've gone through all the Programs, do the same with
the Steps (and if you're really roaring, the Program variations
within each Step).

  Here's a sample of the kind of notes you might take:

STEPS

32 —

*PROGRAM LEFT IS 36, PROGRAM RIGHT IS 55.
BRASSY SOUND. LONG DECAY. JOYSTICK LEFT DOES
NOTHING, JOYSTICK RIGHT BENDS PITCH OF ONE
VCO UP. KEYBOARD PRESSURE MAKES IT GO
"WAH."*
    (etc. this example is hypothetical.)

  You don't *have* to do all of this before going ahead to the
rest of the manual, but it can help. Later on, say, you'll have a
much easier time understanding the section on the Mod Banks if

you can readily find and listen to Programs that actually use them. And if there's a sound that especially intrigues you--a "how did they do that?" sound--make sure you mark it down. That way, after you've finished the manual, you can go back to the sound, trace it through its settings on the various Pages, and find out for yourself.

Those are the exercises. If you've done them carefully and paid attention, you have the basic skills and understanding you'll need to take full advantage of your Voyetra's features.

To start learning about *those*, just turn the page and read on.
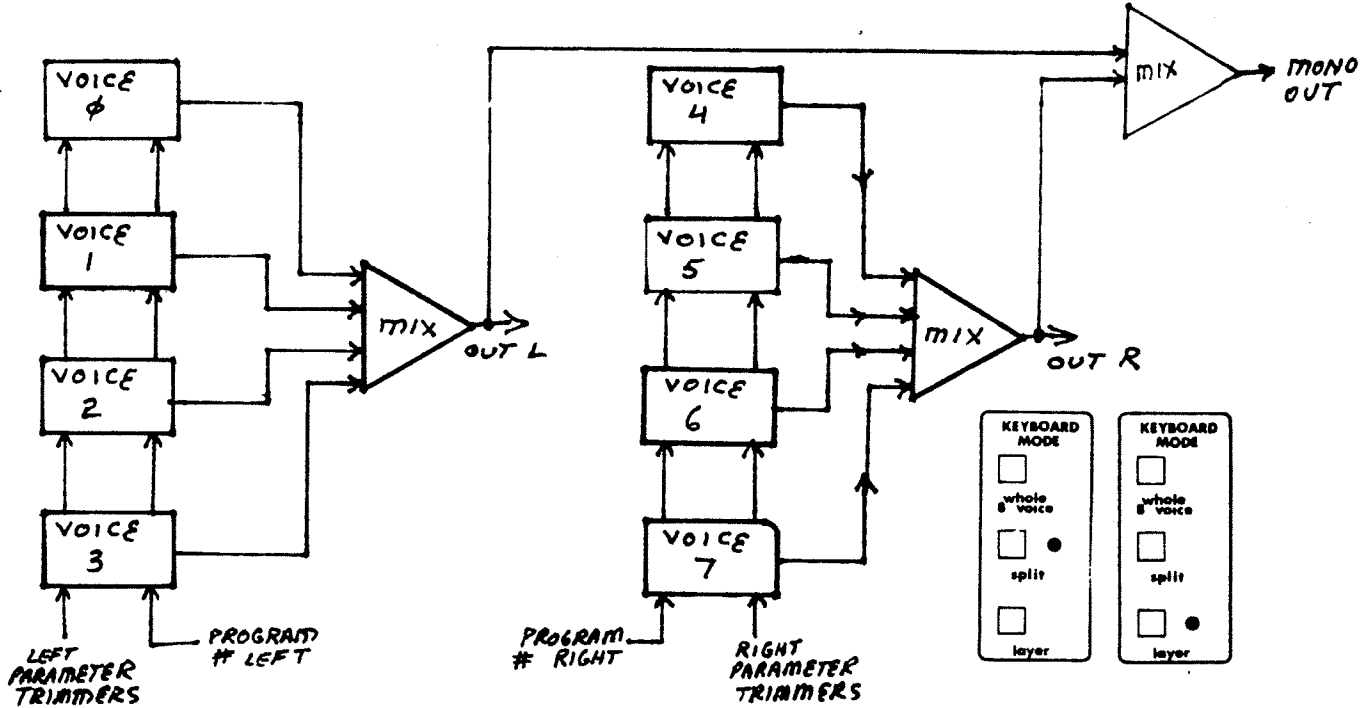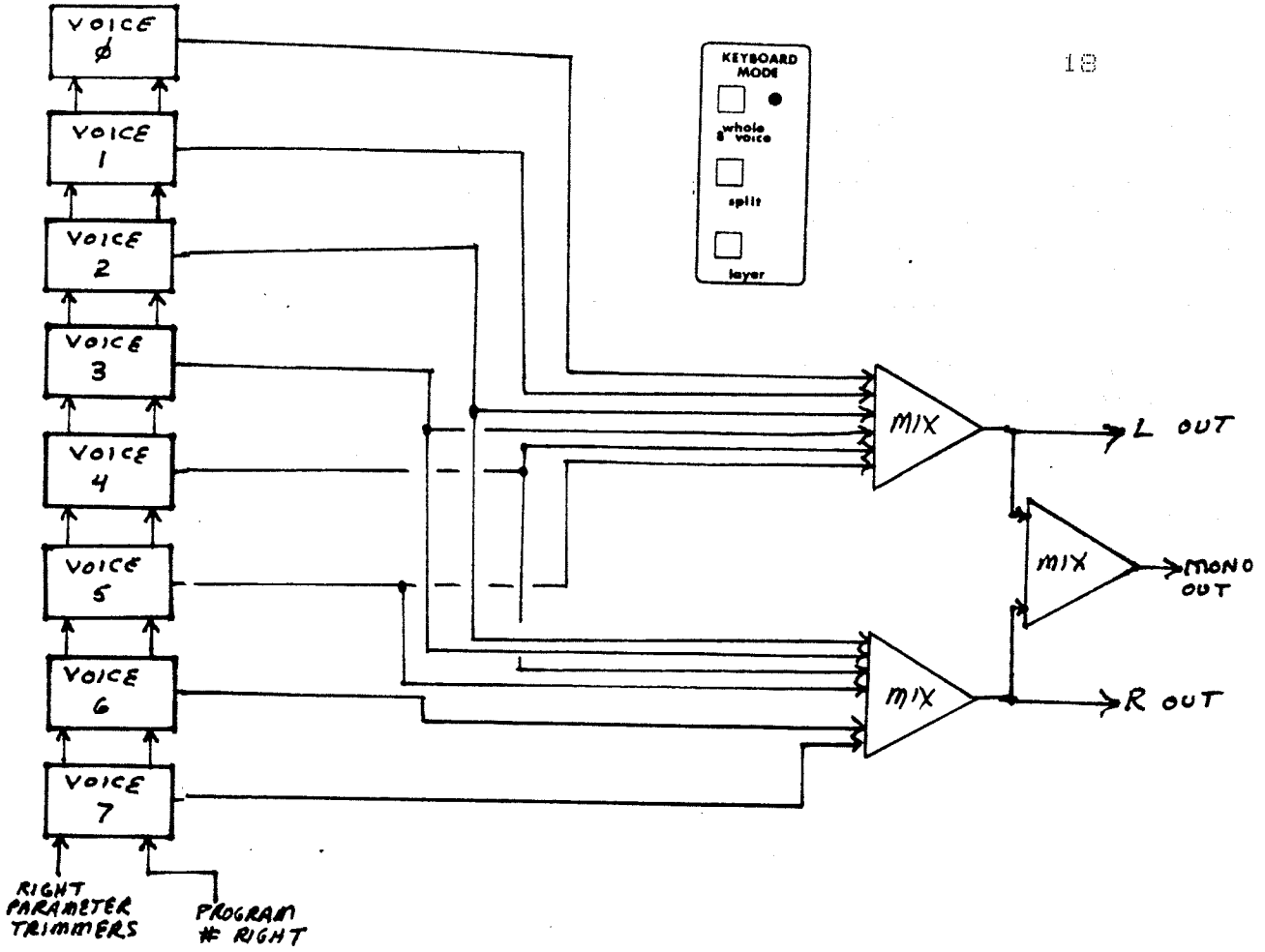
In the whole 8 mode, the left and right outputs have
all eight voices panned.
The split/layer modes have four
voices on the left output and four on the right output so
that they may be equalized and amplified separately. The
mono output is the sum of the left and right outputs in all

THE FRONT PANEL (NORMAL PAGE)

NOTE: DECIMAL POINTS TELL YOU
WHICH READOUT WILL BE
AFFECTED BY THE KEYPAD!

KEYBOARD
PLAYING MODES
CAN BE CHANGED
USING THE
KEYBOARD MODE
SECTION

CALL LEFT
MAKES THE
KEYPAD CONTROL
THE PROGRAM
NUMBER LEFT

CALL RIGHT
IS THE SAME EXCEPT
FOR PROGRAM # RIGHT

STEP ENABLE
MAKES THE KEYPAD
CONTROL THE STEP #

THESE CONTROL THE
ARPEGGIATOR FUNCTIONS FOR
WHOLE & KEYBOARD MODE AND THE
RIGHT SIDE OF KEYBOARD IN
SPLIT MODE.

KEYBOARD MODE — whole & voice — split — layer — UNISON — L — R

LEFT — call — octave — RIGHT — octave — call — STEP — load — enable
PROGRAM NUMBER — UP — NORMAL — DOWN — STEP NUMBER

REMOTE — EDIT — START — TAPE — LOAD — DUMP

mode — UP — DOWN — RANDOM — speed — ARPEGGIATOR — LEFT — PAUSE — RIGHT — assignment — SLOW — FAST

VOYETRA EIGHT — polyphonic synthesizer module — V8

AUTO TUNE — A 440 — MASTER TUNE — MASTER VOLUME — POWER

1 2 3
4 5 6
7 8 9
FWD 0 REV
PROGRAMMER

RELEASE REPEAT — PITCH BEND REPEAT — HOLD — LEFT — RIGHT
A — B — LFO RATE — GLIDE — F — DETUNE — VOLUME
PROGRAM PARAMETER TRIMMERS

SAVE A
PROGRAM USING
THE STORE BUTTON

EDIT GETS YOU
INTO THE INTERNAL
EDITING PAGES

KEYPAD TO ACCESS
PROGRAMS AND
STEPS IN
MEMORY

PARAMETER TRIMMERS
ARE FOR QUICK CHANGES
TO MAJOR PROGRAM
PARAMETERS

VOLUME
CONTROLS FOR
BALANCING PROGRAM
LEFT AND RIGHT
IN SPLIT OR LAYER
KEYBOARD MODES
(WON'T AFFECT HEADPHONES)

A440 LETS YOU
GET INTO THE DIFFERENT
PAGES AS WELL AS LETTING
YOU DO OTHER "HIDDEN" THINGS.
SEE THE APPENDIX FOR A LIST
OF WHAT IT CAN DO.

The Normal Page is the centerpiece of the Voyetra. It's the
Page that comes up when you turn the power on. It's the one you
use to get from one Page to another (except among the Edit
Pages, which will be covered in the next section). And for most
performance situations it's the only Page you'll need, because all
of the "live performance" features are conveniently there.

In fact, the Normal Page *is* the front panel of the Voyetra,
which makes it the perfect place to start. As we go through the
following features, make sure you locate them on the front panel
of your machines.

AUDIO MUTE:
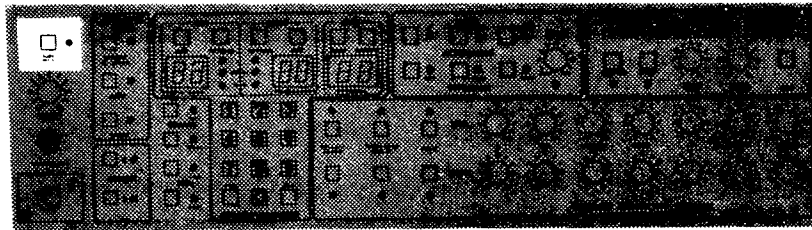
AUDIO MUTE is the blue switch in the upper left corner of the
front panel. When you press it, the external audio signal is
shut off. (It will only start up again when you press AUDIO MUTE
a second time, or turn the Voyetra off and on.) The level
setting doesn't change--it's just interrupted.

What this allows you to do, on stage or in the studio, is set
your output level once and then forget about it. If you need to
practice a part or adjust a sound, but don't want to be heard by
anyone, or to affect your output volume setting, you simply press
AUDIO MUTE and then listen to your Voyetra through a set of
headphones plugged into the HEADPHONE MONITOR.

HEADPHONE MONITOR:
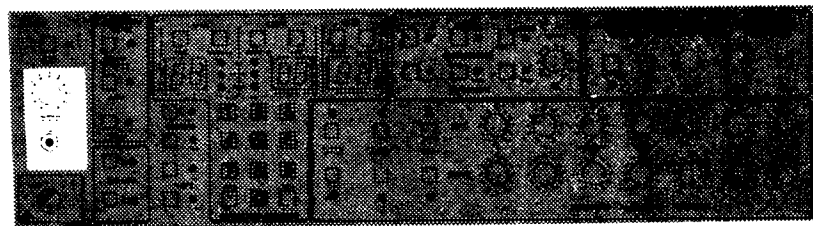
You plug your headphones into the stereo jack immediately
above the keyboard XLR plug, on the left side of the front panel.
Volume is set by the trimmer above the jack.

As we mentioned in "Setting Up," the headphone jack's output
is not affected by the LEFT and RIGHT VOLUME trimmers in the Program
Parameter Trimmer section, so you can't use HEADPHONE MONITOR to
adjust the relative volume of LEFT and RIGHT Programs when in
SPLIT or LAYER keyboard modes. (You *can* use earphones for this
by hooking them up elsewhere--see the boxed note in "Setting Up."
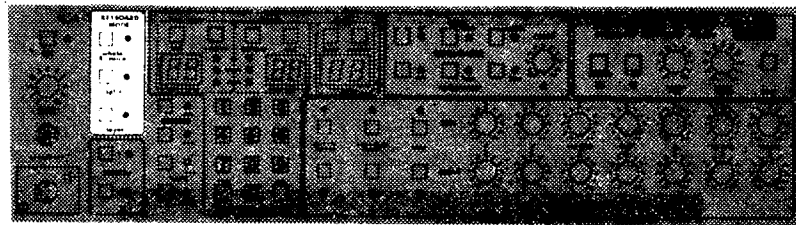

KEYBOARD MODES:

There are three keyboard modes, and some variations created
with the UNISON buttons.

Find the top left white-outlined section on the front panel,
the one marked "KEYBOARD MODE," and experiment with each of the
following:
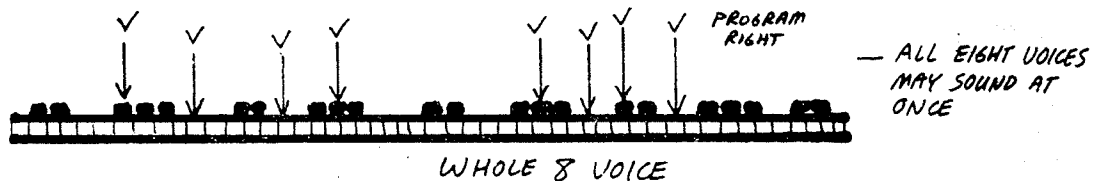
WHOLE 8 VOICE

WHOLE 8 VOICE-- The Voyetra has eight Voices, each of
which is a single monophonic synth. When the Voyetra is in WHOLE
8 keyboard mode, those eight Voices can play eight notes at the
same time. As we showed you back in the exercises, in WHOLE 8
mode all eight Voices play the Program displayed in the PROGRAM
RIGHT readout.

NOTE: When you play more than eight notes at once the internal
computer will "rob" Voices from earlier notes to play the newest
ones. Try it by holding down eight keys and then adding a ninth.
Hear how one of the earlier notes went away? There are two
different kinds of "robbing" effects you can choose from, which
will be described in the section on the Edit Pages.

SPLIT

— Pgm LEFT —   — Pgm RIGHT —

EIGHT NOTES AT
ONCE, BUT TWO
SEPARATE SOUNDS
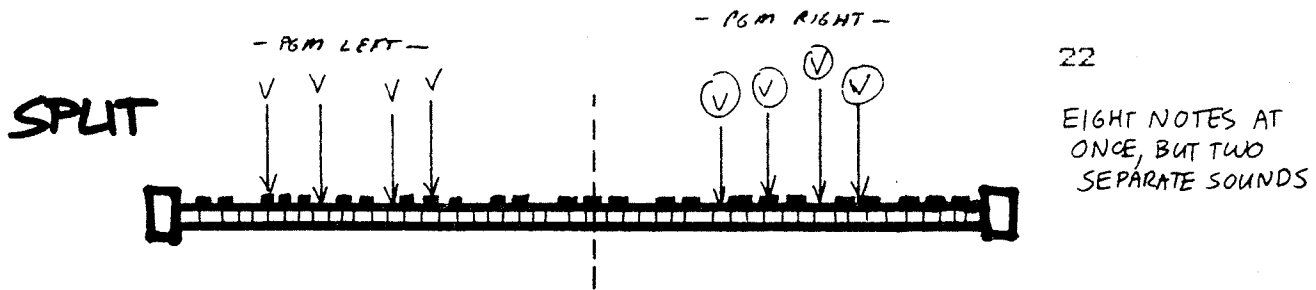
SPLIT-- In this mode, four Voices play PROGRAM LEFT on the left side of the keyboard, and four Voices play PROGRAM RIGHT on the right side. Each side can play *only* four notes at the same time.

When you press the SPLIT button the keyboard's split point is automatically set at the second C from the left. That C becomes the lowest note that will play PROGRAM RIGHT. If you want to set a different split, it's easy--just hold down the key you want the split set at and then tap SPLIT. Presto! Try it a few times.

LAYER

Pgm RIGHT
Pgm LEFT

FOUR NOTES AT A TIME,
SOUNDING BOTH PROGRAMS.
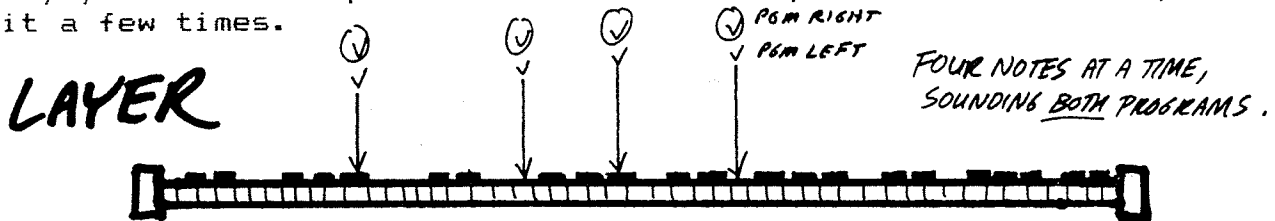
LAYER-- In this mode you get both PROGRAM LEFT and PROGRAM RIGHT whenever you strike a key. And since that means two Voices sound with every keystrike, you can only play four notes at a time before "robbing" begins. LAYER is a particularly good mode for playing thick, rich synth textures.

Experiment with some of the following to get an idea of LAYER's possibilities: alter the volume of the two Programs; give one Program a longer attack rate, or a higher Fc setting, and so on. Later, when you've got a handle on Voyetra features like velocity sensitivity and the Mod Banks, you can apply their power in combination with LAYER mode to make wonderfully complex sounds.

_____

UNISON:
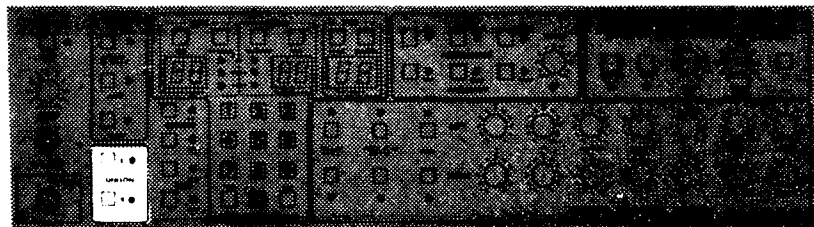
The UNISON section is immediately below the KEYBOARD MODE section. Depending on what keyboard mode you are in, the two buttons there do different things.
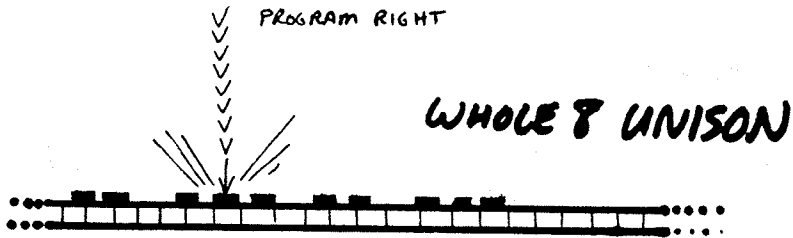
WHOLE 8 UNISON

In **WHOLE 8** mode, UNISON RIGHT makes *all eight Voices* sound together whenever you strike a key. Obviously, this creates an incredible lead synth sound.

SPLIT MODE UNISONS

PROGRAM LEFT   PROGRAM RIGHT
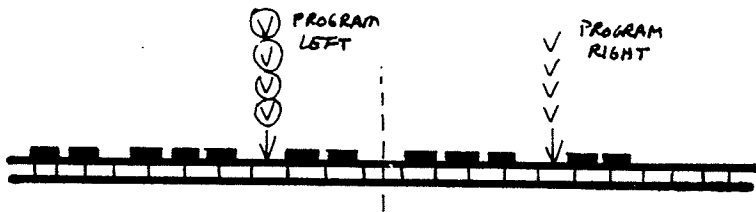
In **SPLIT** mode, pressing UNISON LEFT makes the four Voices playing PROGRAM LEFT sound together, and pressing UNISON RIGHT does the same for the four playing PROGRAM RIGHT. This gives you three choices: chordal left and lead right (good for leads against chords), lead left and chordal right (good for punchy bass lines), or lead left and lead right (good for contrapuntal work).
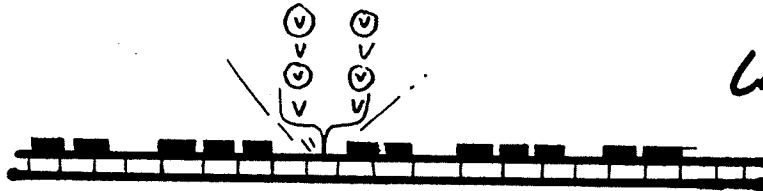
LAYER MODE UNISONS

In **LAYER** mode, pressing UNISON RIGHT makes eight Voices sound together whenever you strike one key, four of them playing PROGRAM RIGHT and four of them playing PROGRAM LEFT. This also creates excellent lead sounds, and used in multi-track recording to build up chordal parts, the sound you can get is nothing short of awesome.

Remember--in WHOLE 8 and LAYER modes, the UNISON LEFT button has no effect at all! That *only* works in SPLIT mode.

NOTE: You'll find that turning on UNISON can turn off some Voyetra functions, like the Arpeggiator. They can be restored by simply turning them back on. Also, changing keyboard modes when already in UNISON will automatically shut UNISON off. If you want UNISON in the new mode, you have to turn it on again.

REMOTE AND TAPE:
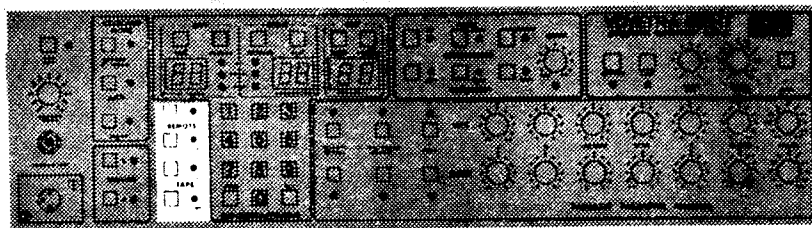
In the area between the UNISON section and PROGRAMMER keypad, there are four buttons. Two grey ones marked REMOTE EDIT and STORE, and two blue ones marked TAPE LOAD and DUMP. We're only going to cover these briefly here, because you don't have any need of their functions just yet.

TAPE LOAD is the button you press when you want to load information into the Voyetra's internal computer from a cassette tape. This could be Programs, Steps, or sequencer information. **TAPE DUMP** is the button you press when you want to store Programs in the Voyetra onto an external cassette for safekeeping and backup. Both of these will be covered in detail in Part Two of this manual, in the section called "Tape Storage and Loading".

EDIT is the button you press when you want to enter and exit the Edit Pages. If you did the exercises earlier, you tested this out.

STORE should not be pushed unless you really mean to, like we said way back on the "Be Careful" page. Why? Because the changes it makes are permanent, and you could accidentally lose a Program you like. Here's an example. You've called up hypothetical Program 22, which sounds like a cosmic flute, and toyed around with it so that now it sounds like a moaning water buffalo. (In other words, you had fun, but the sound you ended up with isn't what you wanted.) If you pressed STORE at this time the Voyetra's internal computer would memorize all the changes you've made, and Program 22 would forevermore be a water buffalo instead of a cosmic flute.

It pays to be careful with STORE. Only use it when you *deliberately want to replace* an earlier version of a Program with a newer, altered one.

Other useful things you should know about STORE are:

1) It won't work if the Memory Protect Switch on the Voyetra's rear panel is on.

2) It only memorizes changes in Programs, *not* Steps. If you want to have the internal computer memorize a Step, press STEP LOAD. (See Level Two, "Steps and Beyond.")

3) Make certain that there are periods in the readout of the

Program you want to change with STORE! If there aren't, the sound you wanted to edit will remain unchanged.

Lastly, and VERY IMPORTANT--

4) If Program 22 was originally a cosmic flute, and you've managed to turn it into a water buffalo, and you want to save it *without* erasing the cosmic flute in Program 22, then use the controls available on the Alternate Page that allow you to put any Program wherever you want in the Voyetra's memory. All the details about that process will be presented later in Part One, in the section called "Putting Programs Where You Want Them".

PROGRAMMER SECTION:
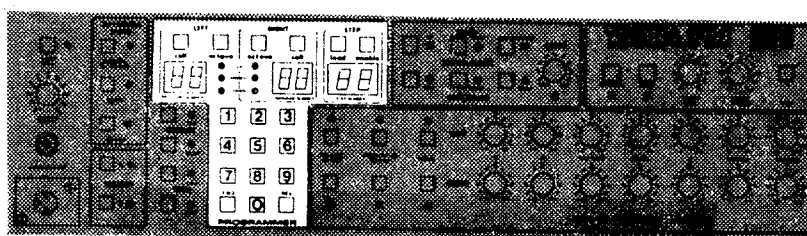
If you did the earlier exercises, you know what this section is all about and how it operates. In the Normal Page, the Programmer keypad is what gives you random and sequential access--through the FORWARD, REVERSE, and number buttons-- to the 100 Programs and Steps in the Voyetra's memory. You can tell what Program or Step you are working with by looking at the periods and numbers in the LEFT, RIGHT, and STEP readouts. You select PROGRAM LEFT by pressing CALL LEFT, PROGRAM RIGHT by pressing CALL RIGHT, and STEP by pressing STEP ENABLE.

There are two controls in this section we haven't mentioned yet, so we'll cover them now.

OCTAVE LEFT and OCTAVE RIGHT-- these are pretty obvious. Test them by putting your instrument in SPLIT mode and then playing the left side of the keyboard, pressing OCTAVE LEFT while you play. Listen to how the pitch changes and watch what happens to the readout light. Then do the same with the right section of the keyboard and OCTAVE RIGHT.

LOAD STEP-- When you want to save a sound combination into a Step in the Voyetra's memory, you press this button and then the number of the Step you would like it stored in. (This procedure sounds very simple. It *is* very simple. But to get the most out of your Stepper you've got to understand how to create Programs first. The Stepper will be explored in Level Two, "Steps and Beyond.")

PROGRAM PARAMETER TRIMMERS:
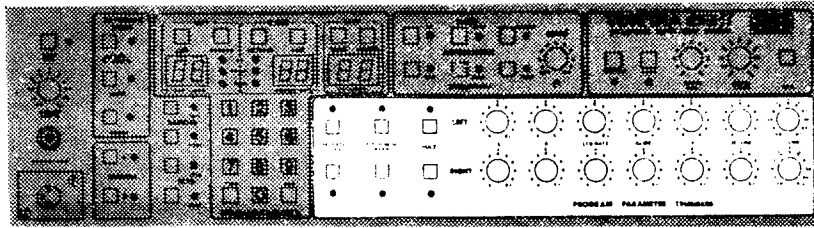
        There are six buttons and fourteen trimmers in the grey-colored
PROGRAM PARAMETER TRIMMER section, arranged in two rows. These
give you immediate control over the major aspects of your sound.
This is very important for performing and for ease in fine-tuning
both Programs and Steps. All of the functions controlled by these
trimmers are found in the Edit Pages--but having them here, too,
is a tremendous convenience.

        LEFT VS. RIGHT-- notice that the two rows are marked LEFT
and RIGHT. Remember what the exercises showed you about left and
right on the Voyetra? The upper (LEFT) row of buttons and trimmers
only work when the Voyetra is in SPLIT or LAYER modes. In WHOLE 8
they do nothing. So if you turn, say, the DETUNE LEFT trimmer and
nothing happens, check to see what keyboard mode you're in!

NOTE: Actually, those trimmers *are* doing something--you just
can't hear it yet, because there are no Voices assigned to playing
PROGRAM LEFT. To demonstrate this, put the Voyetra in LAYER mode
and play for a moment. Remember how it sounds. Then put the Voyetra
into WHOLE EIGHT mode and twist the DETUNE LEFT trimmer all the way
left and then right. Now go back to LAYER mode and play again. Hear
the change?

        There is one other reason you might not hear anything, and
it has to do with the electronics behind the trimmers.

        INCREMENTAL VS. ABSOLUTE KNOB POSITIONING-- all the trimmers
on the Voyetra edit their functions "incrementally," not
"absolutely". If you've worked with programmable synths before,
you know why it has to be this way; when you go from one Program
to another, the actual physical position of the trimmers doesn't
change. It *can't* change. So what the internal computer reads
when you move a trimmer is not *where* it is, but *how much it has
moved*, like the clock in the diagram:
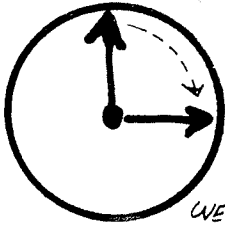
IN ABSOLUTE MEASUREMENT,
WE WOULD SAY THAT THIS
CLOCK HAS MOVED FROM NOON
TO THREE.
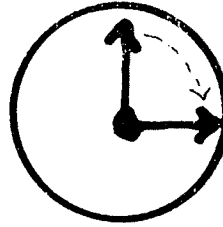
IN INCREMENTAL MEASUREMENT,
WE SAY THIS CLOCK HAS MOVED
THREE HOURS.

        This is why sometimes you can turn a trimmer and hear either
no change or not enough change in the sound--by sheer chance
the trimmer is too far over, and its available movement isn't
enough to make the changes you want. The cure is simple. Just
turn the trimmer all the way in the opposite direction, and then
bring it back. Doing this clears the control, giving you the full
range of sweep.

        PROGRAM AND STEP CHANGES WITH THE PARAMETER TRIMMERS-- You
can radically change a Program's sound with the Parameter Trimmers,
just as in that cosmic flute/water buffalo example we used earlier.
But none of those changes are permanent, so long as you don't press
the STORE button; and calling back your original Program sound is
as easy as pressing the appropriate CALL LEFT or CALL RIGHT button
button (if need be) and then pressing the Program number. Staying
with 22 as our example, so long as you hadn't pressed STORE you
could always banish the buffalo and bring back the flute by
punching 22 on the keypad.

        Whenever you get a sound with the Parameter Trimmers that you
like, and want to save, you have three choices:

    1) Press STORE and replace the old Program sound with the
        new one.

    2) Save it as part of a Step by pressing STEP LOAD, and then
        your choice of STEP NUMBER, leaves the original Program
        unchanged.

    3) Use the controls on the Alternate Page to store the new
        sound under a different Program number than the original.

PARAMETER TRIMMER FUNCTIONS--

PROGRAM PARAMETER TRIMMERS
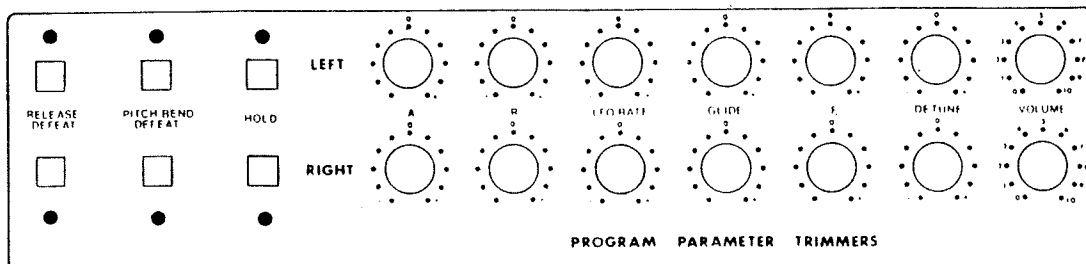
      We'll start with the seven matched sets of trimmers. We encourage
you to try each one--both Left and Right--as you read. To do that
and clearly hear the results, you will need to be in SPLIT mode.

      ATTACK-- (the far left trimmer, marked "A.") A Voyetra Voice
has two ADSRs, one linked to the VCF and the other linked to the
VCA. When you turn the ATTACK trimmer, you add or subtract to both
of these ADSRs *at the same time*. If you want to adjust their
attack rates separately, you must use Edit Page #2.

      RELEASE-- (the second trimmer from the left, marked "R.")
RELEASE works exactly the same as ATTACK, changing both ADSRs at
the same time.

      LFO RATE-- (the third trimmer from the left.) Turning LFO
RATE alters the speed of LFO1. (It does *not* affect LFO2.)

      GLIDE-- (the middle trimmer.) This trimmer allows you to
change the GLIDE and GLISSANDO rates from what's set in the
Program. It affects only their rate; selecting between them is
done on Edit Page #2. *NOTE:* unlike the other LEFT trimmers,
GLIDE LEFT does not function when the Voyetra is in LAYER MODE. It
only works when the instrument is in SPLIT. At all other times,
GLIDE RIGHT dominates. (Different keyboard "assignment" modes
affect GLIDE and GLISSANDO in different ways. This will be
discussed shortly, in the section on the Edit Pages.)

      FILTER CUTOFF-- (the third trimmer from the right, marked
"Fc.") This control simply varies the filter cutoff point of the
VCF from that in the original Program, allowing the cutoff to
be raised or lowered.

      DETUNE-- (the second trimmer from the right.) Each Voyetra
Voice has two VCOs, numbered 1 and 2. The DETUNE trimmer changes
the pitch of VCO1 only, so that chorusing effects between VCO1 and
VCO2 can be created. The control has a maximum detuning of
approximately one semitone. To return VCO1 and VCO2 to normal
tuning, you may either fiddle with the DETUNE trimmer or take a
shortcut into the Alternate Page, where there is a DETUNE DEFEAT
button. (There will be more about this control and the rest of
the Alternate Page later in Level One of this manual, in the
section titled "The Alternate Page.")

   VOLUME-- (the trimmer on the right.) In SPLIT and LAYER
modes, the VOLUME trimmers affect the relative volume of PROGRAM
RIGHT and PROGRAM LEFT. Changes made in relative volume here can
only be heard through the main audio output jacks, and not the
headphone jack.

   Those are all seven sets of trimmers. Now for the three sets
of grey buttons.

   RELEASE DEFEAT-- (the set of buttons on the left.) When you
press RELEASE DEFEAT, the release rate on *both* ADSRs is set to
zero. It stays there until the button is pressed a second time.
(You can also use this button to set the release rate to match the
decay rate, if you want--see the section on Edit Page 2 for more
information. *Please note:* if RELEASE GETS DECAY is already ON
in a Program, then pressing RELEASE DEFEAT will set the Release
rate equal to the decay rate, instead of setting it to zero.)

   While in WHOLE 8 mode, find a Program with a long
release; listen to what happens to it when you press RELEASE
DEFEAT. Also, try using RELEASE DEFEAT while in SPLIT and LAYER
modes; combinations of sounds in which one hangs on and the other
doesn't can be really neat, especially used in tandem with the
Arpeggiator.

   PITCH BEND DEFEAT-- the set of buttons in the middle. When
PITCH BEND DEFEAT RIGHT is on, PROGRAM RIGHT is not affected by
the pitch bending function of the keyboard's joystick (pushing it
up or down, as opposed to left to right). The same goes for PITCH
BEND DEFEAT LEFT and PROGRAM LEFT, when the Voyetra is in SPLIT or
LAYER modes.

   HOLD-- the set of buttons on the right. Its name says it
all. While in WHOLE 8 mode hold down a single key and tap HOLD
RIGHT. Now let up on the key. That note will hang on forever. The
only ways to stop it are to press the HOLD button again, switch to
another Step, or turn off the power.

   HOLD also works well with chords. Try it. HOLD a chord, and
then play some melodies against it. This function is great for
drone effects and can be useful in combination with the arpeggiator.
(It also leaves your hands free to do "synth-playing" with the
switches, trimmers, and Edit Pages, if you're fond of using
more than standard keyboard technique to shape your sound.)

THE ARPEGGIATOR:
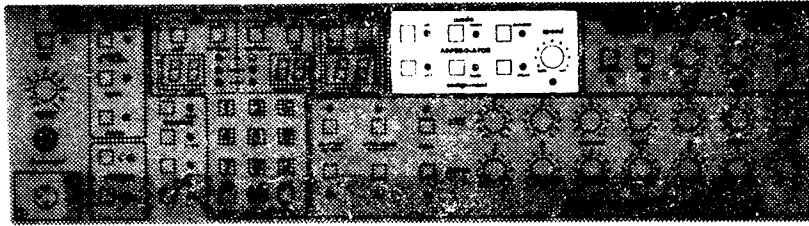
Like many structures in the Voyetra, the Arpeggiator is doubled. There is both a LEFT and a RIGHT. These can be set to different clock sources, rates, modes, and octave shifts *at the same time*. They can even be used effectively in combination with the Poly-Sequencer.

The Arpeggiator takes the notes of whatever chord you hold down on the keyboard and plays them *sequentially*, instead of playing them all at once.

If you've never used an arpeggiator before, you should try the following simple test:

1) press the white UP mode button in the top row of the Arpeggiator section.

2) press the blue RIGHT button in the bottom row.

3) Hold down a C chord.

You should hear the three notes C-E-G repeating themselves, one after another, for as long as you hold the keys down. That's arpeggiation.

Try adjusting the ARPEGGIATOR SPEED trimmer while holding down some keys. Hear the rate of arpeggiation changing?

There are four different arpeggiation modes.

UP-- in UP, the notes will play from low to high pitch, as in the example we just used.
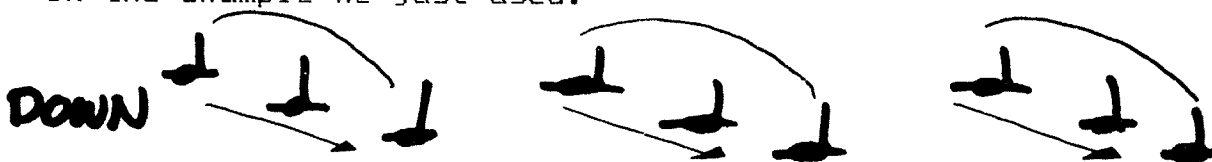
DOWN-- in DOWN, the notes start at the highest pitch and go to the lowest. Press DOWN and a C chord, and you'll get a repeating G-E-C.

UP & DOWN
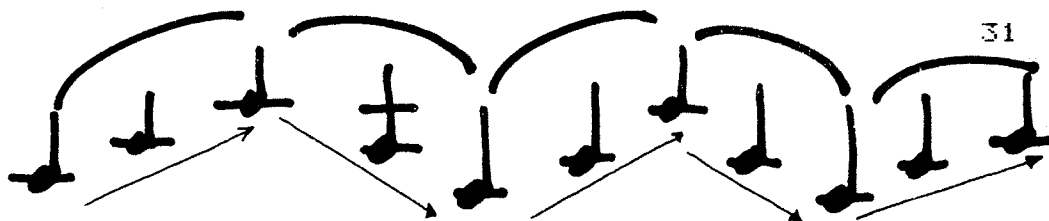
UP AND DOWN-- in UP AND DOWN (which you get by pressing both UP and DOWN; make sure both LEDS are on) the notes do both, so that your C chord would sound like C-E-G-E, repeating.

RANDOM
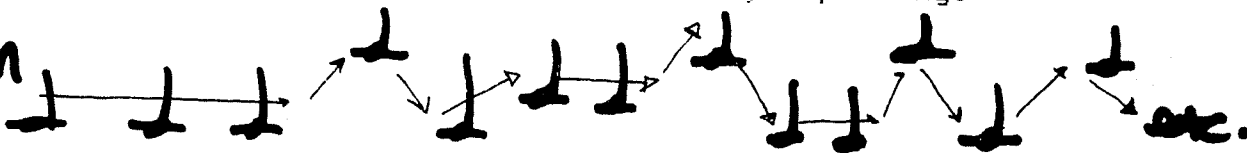
RANDOM-- in RANDOM, they go any which way. Try it.

(You may have noticed when you set UP AND DOWN that pressing DOWN didn't automatically turn off UP. To shift from DOWN to UP, or UP to DOWN, without accidentally landing in UP AND DOWN mode, make sure you press the appropriate button *twice*.)

The rate of the arpeggiation is set by the SPEED trimmer at the right of the section. You can tell what the rate is by the flashing LED immediately below the trimmer. Like the Parameter trimmers, this trimmer is *incremental*. So if you can't get the rate set as slow or fast as you want, clear the trimmer by turning it all the way in both directions, first. It will work fine after that.

Let's examine the bottom three buttons and some special features.

RIGHT and LEFT-- the RIGHT and LEFT buttons are what turn the Arpeggiator on and off. When in WHOLE 8 or LAYER modes, only RIGHT will work. You could push LEFT all day long and nothing would change. But if you are in SPLIT mode, then you get to choose. Do you want arpeggiation on PROGRAM LEFT and none on PROGRAM RIGHT? Press LEFT. The opposite? Press RIGHT. Both Programs arpeggiating at the same time? Press both. (At this point you can set the LEFT and RIGHT Arpeggiators to radically different rates, clock sources, modes, etc., by going into the Alternate Page and resetting the ARPEGGIATOR LEFT controls there. For more details, see the section of this manual that covers the Alternate Page.)

PAUSE-- the PAUSE button interrupts the Arpeggiator. Try it. Set up a nice fast arpeggiation and then hold it down while tapping the PAUSE button on and off. (*Please note:* if any switches in the Poly-Sequencer Page are turned on, then this button will control the Sequencer, not the Arpeggiator.)

AUTOMATIC OCTAVE SHIFTS-- you can set your arpeggiation pattern so that it shifts octaves automatically at the end of every cycle. To do that, hold down A-440 and either OCTAVE LEFT or OCTAVE RIGHT (depending on which Program, Left or Right, or both, you wish to make automatically change octaves).

NOTE: AUTOMATIC OCTAVE SHIFT will not work together with UNISON.

ARPEGGIATOR CLOCK SOURCES––

ARPEGGIATOR RIGHT has only one internal clock source. That
source's rate is set by the RATE trimmer. If you'd rather have the
clock retrigger every time you strike a key, so your playing
doesn't fall "in between" the pulses, so to speak, you can set
that with the ARPEGGIATOR KEYBOARD RETRIGGER button on the
Alternate Page. (Please note that this effect only works if you
play *staccato*––lifting your fingers completely off the keys
between strikes––instead of *legato*.)

ARPEGGIATOR LEFT has three possible internal clock sources––
LFO1, LFO2, or the same standard clock as ARPEGGIATOR RIGHT.
Selecting among these, setting the LEFT rate, and deciding
whether or not LEFT is synched with RIGHT is all done with
controls found on the Alternate Page.

Finally, either Arpeggiator can operate from an external
clock source that can be hooked up through the Voyetra's rear
panel. For more about that and other Arpeggiator features, see
"The Alternate Page."

NOTE: Here's a tip about "auditioning" different sound colors
with the arpeggiator. Press CALL RIGHT and WHOLE 8 and then set
up an arpeggiation you like. Hold the keys down and use the FORWARD
and REVERSE switches to change Programs. The arpeggiation pattern
won't change, but the sound will. In addition, you can adjust the
Program Parameter Trimmers, or alter the sound with the Edit
Pages, working towards what you want, or just plain discovering.

If you're in LAYER or SPLIT modes, you can use the same technique
to experiment with PROGRAM RIGHT and PROGRAM LEFT independently.

AUTO TUNE:
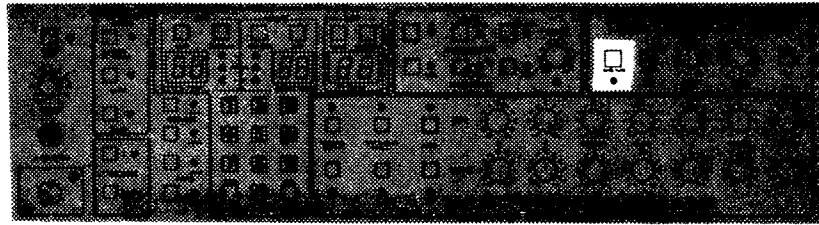
When you press AUTO TUNE you are telling the internal
computer to calibrate the scaling, pulse width, and initial
tuning for all 16 oscillators. While tuning is actually going on
you will see a countdown from 15 to 0 in the readouts, and the
Voyetra won't make any sounds when you play the keyboard.

Earlier, we told you to always allow sufficient time for the
unit to warm up before you tried to tune it. It's a caution worth
repeating, so--always allow five to ten minutes after turning
on the Voyetra, before you try and tune it.

If the internal computer runs into any problems while
tuning, it will display a code letter to the left of the
oscillator number during the countdown, like so:
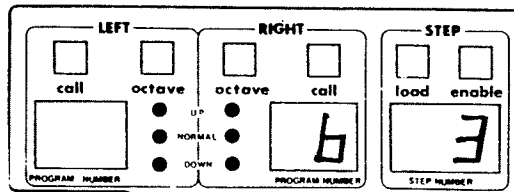
IN THIS EXAMPLE,
OSCILLATOR 3 IS DEFECTIVE

It also automatically disables that Voice, since it hasn't
been able to tune it and therefore assumes it to be defective.
The advantage to this is that if an oscillator *is* actually
defective, you can't be sabotaged up by it on stage or in the
studio. The computer turns it off! No one hears any sour notes,
everyone is happy, and you get the bad oscillator serviced at
your convenience.

But there are other reasons why the computer might not be
able to tune an oscillator the first time through--insufficient
warmup time is just one culprit--so if you see a letter on the
readout do one of two things: 1) let the unit warm up some more
and press AUTO TUNE again, or 2) just press AUTO TUNE again,
and keep pressing it until you see no letters on the readout (if
the same oscillator gets a letter five or six times in a row,
it's a safe bet that it's defective and you should make an
appointment for service.)

Here are the letters and what they mean.

A-- oscillator either totally nonfunctional or
        drastically low in pitch.

b-- computer cannot calibrate initial pitch to within
        specified accuracy.

C-- oscillator is unstable during calibration attempt,
        possibly due to insufficient warmup time.

d-- computer cannot calibrate scaling of oscillator to
        within specified accuracy.

e-- pulse wave is dead.

SPECIAL NOTE: **AUTO TUNE and MEMORY PROTECT--**

The internal computer stores the tuning values that it calculates
in the same section of memory it uses to store the Programs,
because this part of memory is not erased when the Voyetra's
power is turned off. This is both necessary and convenient--but if
you have your MEMORY PROTECT switch on when you try to tune the
Voyetra, the computer won't be able to update its calculations and
the instrument will take forever to get properly tuned. So make
sure your MEMORY PROTECT switch is *off* when you want to use AUTO
TUNE.

_____

A440, MASTER TUNE
AND MASTER VOLUME:
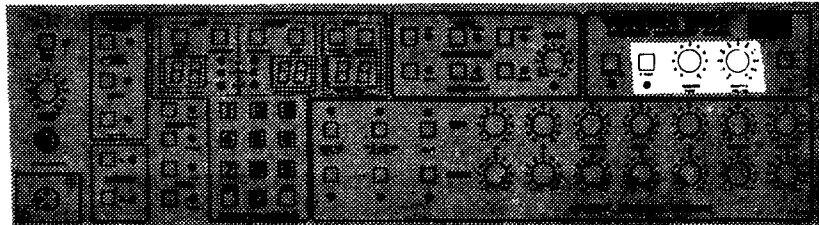
    A-440-- to hear an A-440 tuning reference pitch, press A-440
and AUTO TUNE at the same time. To turn the tone off, just press
AUTO TUNE again. Your Voyetra will go through a normal tuning
procedure and return you to the Normal Page.

    MASTER TUNE-- the MASTER TUNE trimmer transposes the pitch of
the entire Voyetra, with a range of several semitones. It is not a
programmable feature.

MASTER VOLUME-- sets the overall instrument output and is not programmable (as opposed to PROGRAM and STEP VOLUME settings, which are internally variable and programmable). The MASTER VOLUME output does not affect the HEADPHONE MONITOR output, so audience and headphone volumes may be set independently.

Both MASTER TUNE and MASTER VOLUME are active *on every Page*, for your convenience.

CREATING AND MODULATING PROGRAMS (THE EDIT PAGES)

Every Voyetra Voice is actually an independent mono-synth. To create the sound that a Voice plays (a set of instructions which, altogether, are called a Program) we use six Edit Pages. Two of these Pages control *generating* the sound, while the other four *modulate* it.

The six Pages are:

EDIT PAGE 1 (VCO parameters)
EDIT PAGE 2 (VCF and ADSR parameters)
and MOD BANKS A, B, C and D

(There are two other ways to edit and create Programs. One--altering an existing Program with the Program Parameter Trimmers--we have already gone into. The other--using a home computer interface of some kind--will be covered in the section called "Expanding Your System.")

You enter the Edit Pages by pressing EDIT. This will put you in Edit Page 1. To go on to Edit Page 2, Mod Banks A through D, and finally back to Edit Page 1, all you have to do is keep tapping the FORWARD button on the keypad or the keyboard. REVERSE will cycle you through them the other way. We did this in the exercises earlier, but you might like to refresh your memory by doing it again while looking at the diagram on the next page.

There are several special things to remember about sound-editing on the Voyetra.

--the Voyetra remains playable at all times in the editing process. You can always *immediately* hear the effect of the changes you make.

--whenever you are pleased with a sound, you can store it in memory by either 1) Pressing STORE, and thus overwriting the Program you began with, or 2) going to the Alternate Page and using the controls there to store your sound in a new Program slot, leaving the original Program intact.

--also, when you are in SPLIT or LAYER mode you may edit *either* PROGRAM LEFT or PROGRAM RIGHT, as you wish. This is fun stuff.

CHOOSING WHICH PROGRAM
TO EDIT--

       For a closer look at that LEFT/RIGHT editing trick, try the
following exercise and watch what happens in the readouts.
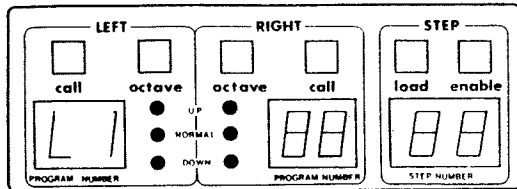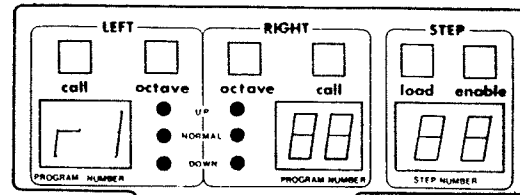
EDITING PROGRAM LEFT   *EDITIING PROGRAM RIGHT*

       Place the Voyetra in SPLIT mode. Press CALL RIGHT to make
sure the periods are in PROGRAM RIGHT. Now press EDIT. You will
see in the LEFT readout a lower case "r" and a 1. That means you
are in Edit Page 1, and that you are editing PROGRAM RIGHT.
At the same time you will see a number in the RIGHT readout, which
is the number of the Program you are editing.

       Now for a variation.

       Press EDIT to return to the Normal Page. Then press CALL LEFT,
putting the periods in the LEFT readout. Now--after taking care
to notice what the number of PROGRAM LEFT is--press EDIT. You
should see a capital "L" and a 1 in the LEFT readout...and surprise,
the number of PROGRAM LEFT in the RIGHT readout.

       Here's why.

       Remember--when you go into a new Page, the readouts and
buttons often have different functions than they did before.
In the Edit Pages the LEFT readouts tell you what Page you are
in (1, 2, A, B, C, or D) and whether you are editing PROGRAM LEFT
or PROGRAM RIGHT (L or R), while the RIGHT readouts tell you the
number of the Program you are working on.

       There are two ways to approach learning about the Edit
Pages. Either is good, but together they're unbeatable, so we
suggest that you use both.

       The first involves that notebook we suggested you start
on, earlier--the one with the descriptions of different Program
sounds and modulations. As we look at the features on the six
Edit Pages your notes will help you find Programs where those
features are being used, so you can examine them in action. (You
can even play around with them, hearing how changes affect the
sound, so long as you remember to be careful about not pressing
STORE unless you want to.)

The second is to use what we call a NULL PROGRAM.

THE NULL PROGRAM: A PLACE TO BEGIN--

The Null Program is an automatic starting point for the creation of sounds. It is permanently stored in the Voyetra's memory and can be called up at any time. Simply put, it's a Program set so that:

--both VCO's are generating sawtooth waves at half-volume.

--the VCF Filter Cutoff (Fc) is fully up, and resonance (Q) fully down.

--the ADSRs are set to full Sustain and fast Attack, Decay, and Release.

--everything in all four Modulation Banks is shut off.

The Null Program can be loaded into either PROGRAM LEFT (by pressing down A440 and CALL LEFT) or PROGRAM RIGHT (by pressing down A440 and CALL RIGHT). Call it up whenever you want a "blank slate" to use to test some function on the Edit Pages.

IMPORTANT NOTE!

As you create new sounds with the Edit Pages, it is important to keep two comforting thoughts firmly in mind.

Comforting Thought #1: if you don't like the sound you've managed to create, KEEP AT IT, because the very next turn of a trimmer or tap of a control switch might turn it into sonic gold.

Comforting thought #2: if you really hate what you've created, and just generally feel like starting all over again from scratch, DON'T WORRY. As long as you haven't pressed STORE while playing around, getting back to home base is a cinch. Just press EDIT to leave the Edit Pages, and then either use A440 and a CALL button to get back the Null Program (if that's where you started) or the CALL button and the keypad (if you started from some other Program). No sweat, no muss, no fuss, no bother. Just remember not to press STORE until you mean to!

EDIT PAGE #1 (VCO PARAMETERS)

r FOR RIGHT
L FOR LEFT

EDITING PAGE NUMBER
PROGRAM BEING EDITED

PULSE W. MOD SOURCE

PWM1 PWM2

PULSE 1   SAW 1   VCO1 KBD TRK

VCO 1 WAVEFORMS

SUB OCT1   TRIANGLE1   PWM 1 KBD TRK

VOYETRA EIGHT
polyphonic synthesizer module

MASTER TUNE   MASTER VOLUME

LEFT   RIGHT
call   octave   octave   call

PROGRAM NUMBER   PROGRAM NUMBER   STEP NUMBER

VCO1 BYP VCF

SYNC

LINEAR FM

FULL
LFO1 KBD TRACK

HALF

REMOTE   EDIT   STORE

1 2 3

PULSE WIDTH MOD SOURCE SELECT
0 = LFO1
1 = LFO2
2 = ADSR1
3 = ADSR2

FWD   REV

PROGRAMMER

PULSE2   SAW2

VCO2 WAVEFORMS

SUB OCT2   TRIANGLE2   PWM2 KBD TRK

VCO1   VCO2

VCO VOLUME   PWM DEPTH   INIT PW   OCT-TUNE-SEMI   DETUNE 1   PROGRAM VOL

GLIDE/GLISS TIME   NOISE VOL

ENTER AND EXIT USING EDIT FROM ANY OF THE EDITING PAGES

CHANGE PAGES WITH FWD REV

All of the controls on this page refer to the BLOCKED items in the diagram below. As you can see, most of the functions on this page relate to the VCO's in the VOYETRA Voice.
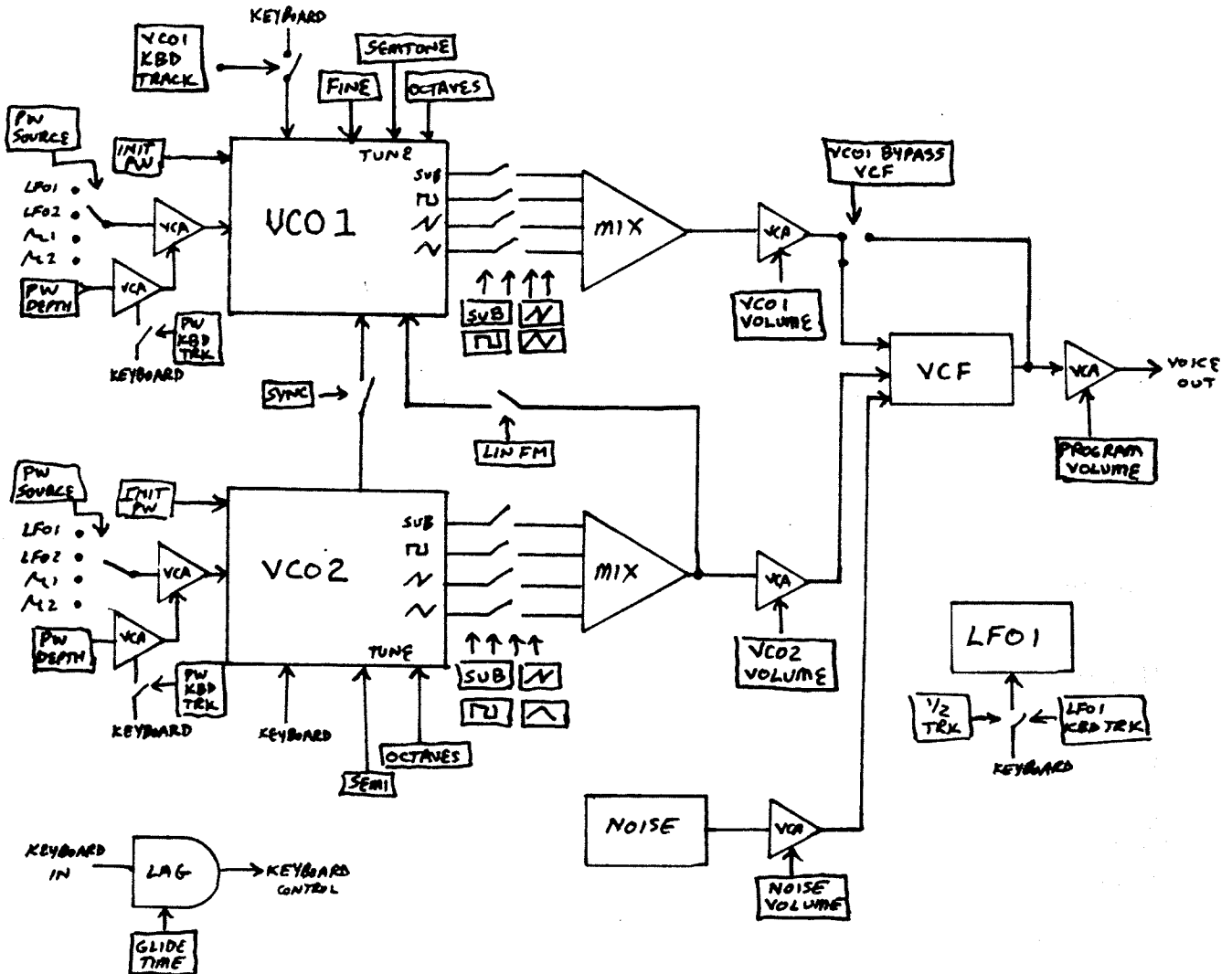
Just as we did with the Normal Page (the front panel as is),
we'll learn the functions of Edit Page 1 from left to right.
Remember--you are in another Page now, and the names on switches
and trimmers *no longer represent what those controls do*. Instead,
they represent the functions in the above diagram. That's why we're
going to show and tell you where they *are*, rather than what
their labels read.

If you experiment with them for yourself, actually testing
functions as we describe them, you will learn your way around
your Voyetra quite quickly.

IMPORTANT-- before experimenting with the Edit Page controls,
be sure that you are in WHOLE 8 mode. Otherwise you'll be hearing
two Programs at once, making it impossible to properly hear the
effects of the controls you are pressing and turning.

The three buttons in KEYBOARD MODE now control:

VCO1 BYPASS VCF ————————————————————

SYNC ——————————————

LINEAR FM ————————————

KEYBOARD MODE

□ ●
whole
8 voice

□ ●
split

□ ●
layer
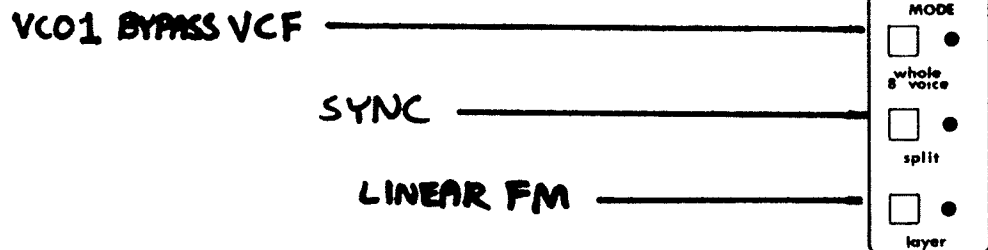
VCO1 BYPASS VCF-- the top button. You have two VCOs in
your sound-creating chain, called 1 and 2. When this switch is
on, VCO1's waveform output is sent directly to your VCA, skipping
the filtering effects of the VCF. This will tend to create thicker
sounds, and allow you to play some intricate sound-building games
in which the modulation on the unfiltered VCO1 interacts
interestingly with the sound of the filtered VCO2. Test it by
listening to several different Programs with this switch both on
and off.

SYNC-- the middle button. Press this and VCO1 becomes
synchronized to VCO2's frequency, for complex timbral effects.

LINEAR FM-- the bottom button. FM stands for Frequency
Modulation. When this is pushed the unfiltered output of VCO2 is
used to modulate VCO1 in a *linear* fashion. This allows ring
modulation effects for gong and bell-like sounds that stay more in
tune over the length of the keyboard, unlike the *exponential* FM
in the Mod Banks. (Don't be confused, by the way--turning
this on doesn't mean you stop hearing the sound being generated by
VCO2. It just means that that signal is being used two ways at
once.)

Both SYNC and LINEAR FM work more effectively when VCO1 is at

a higher pitch than VCO2.

The two buttons in UNISON now control:

LFO1 KEYBOARD ———————————————
     TRACKING
—————————————————
    LFO KEYBOARD ——————————————
    TRACKING, FULL OR
    HALF

        ☐ L ●

       UNISON

        ☐ R ●
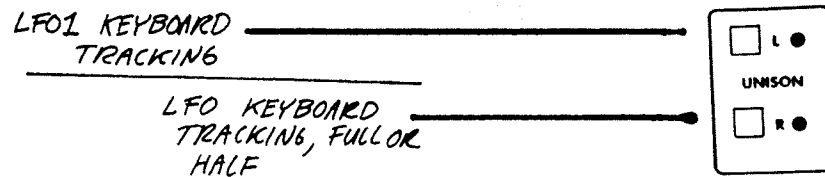
      LFO1 KEYBOARD TRACKING-- is the top button. This turns LFO1 keyboard tracking on and off, allowing you make LFO1 speed up as you play higher on the keyboard. This is useful in creating more realistic vibratos and "flute quaver" effects, especially when used with MODULATION DEPTH KEYBOARD TRACKING.

      LFO1 KEYBOARD TRACKING, FULL OR HALF-- is the bottom button. When this button is pressed, the intensity of LFO1 tracking is cut in half.

On *all* the Edit Pages...

EDIT will send you back to the Normal Page.

STORE will take your new sound and store it, erasing the old Program.

TAPE LOAD and TAPE DUMP do nothing.

The PROGRAMMER Keypad and readouts now work as follows:

———————— DISPLAYS PROGRAM BEING EDITED.

EDIT PAGE 1
INSTRUMENT
SIDE INDICATOR ————

LEFT	RIGHT	STEP
☐ ☐	☐ ☐	☐ ☐
call octave	octave call	load enable
● UP ●		
r 1	● NORMAL ●	3 8	0 0
● DOWN ●		
PROGRAM NUMBER	PROGRAM NUMBER	STEP NUMBER

————— PWM 1 & 2
    SELECTION & INDICATOR
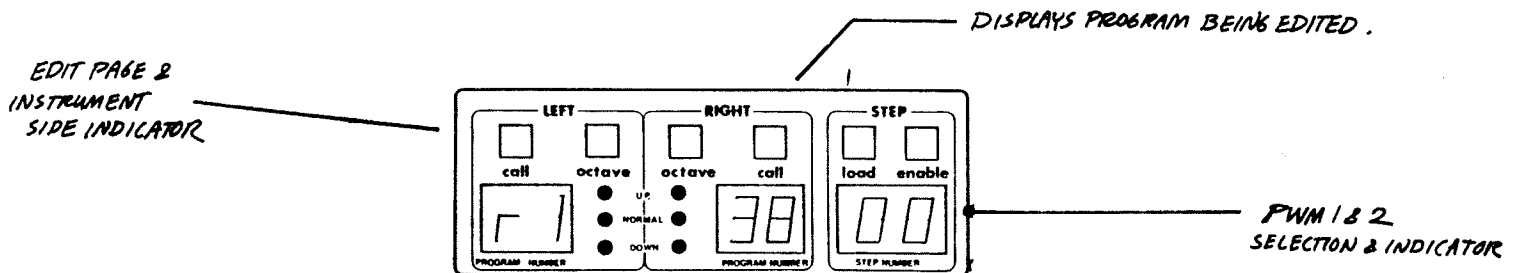
      The LEFT readout will tell you whether you are editing PROGRAM LEFT or PROGRAM RIGHT, by displaying an "L" or an "R". It will also say "1", because you are in Edit Page 1.

      The RIGHT readout will show you the number of the Program being edited.

SELECTING PWM (PULSE WIDTH MODULATION)-- the STEP readout
and the keypad let you choose and display PWM sources for your
VCOs. PWM1 affects VCO1, while PWM2 affects VCO2. There are four
possible PWM sources.

Try this: press the red button above the STEP readout,
and then hit 0, 1, 2, and 3. See how the number below the red
button changed? Press any other numbers, and nothing happens.
Now press the white button above the STEP readout, and 0 through 3.
(Notice how the period moves, showing which one is active?)

The red button selects PWM1 and the white button selects
PWM2, while the readout numbers directly below show which source
each is using. The sources, selected by pressing 0-3 on the
keypad, are as follows--

        0 is LFO1
        1 is LFO2
        2 is ADSR1
        3 is ADSR2

(So, to set a PWM source, decide whether you want it
in PWM1 or 2, press the appropriate red or white button to select
for that, and then press 0-3 to make your selection).

The *depth* of the PWMs for VCO1 and VCO2 are set with the
trimmers in the Program Parameter Trimmer section. *NOTE:* there
will be no audible effect, no matter your choice of source, if
the PWM Depth trimmers are turned all the way down.

The buttons in the ARPEGGIATOR section now control VCO1:
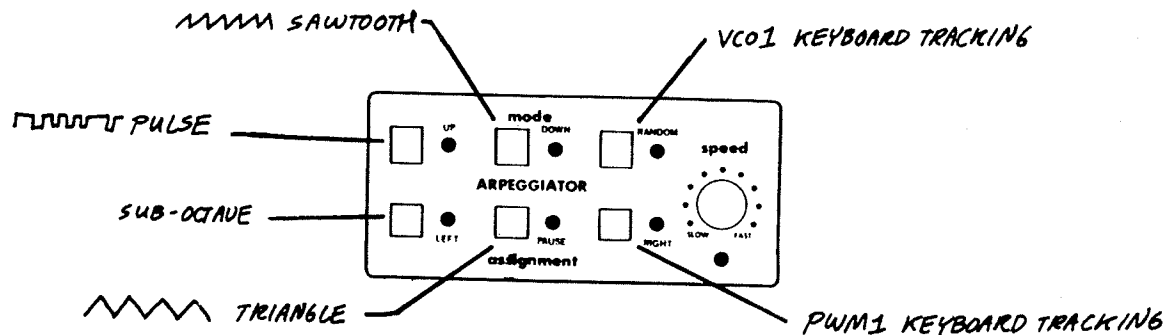
VCO1 WAVEFORM SELECTION-- is done with the left four
buttons. You can have Variable-width Pulse, Sawtooth, Sub-octave
(a square wave one octave below the pitch of the other waveforms),
or Triangle, in any combination. Press these buttons on and off
while playing and listen to the changes. (Make sure you
started in Whole 8 mode, though, so you are only hearing one
Program.)

VCO1 KEYBOARD TRACKING-- is the top right button. When
pressed, it turns *off* VCO1's keyboard tracking , so that VCO1
may be used as a steady drone pitch or a modulation source (this
is very useful when using VCO1 as a polyphonic LFO).

PWM1 KEYBOARD TRACKING-- is the lower right button. It
allows you to make the PWM depth proportional to pitch. Turn
this switch on, and the PWM depth will be less for lower-pitched
notes and greater for higher-pitched ones.

The buttons in the PROGRAM PARAMETER TRIMMER section now control
VCO2:
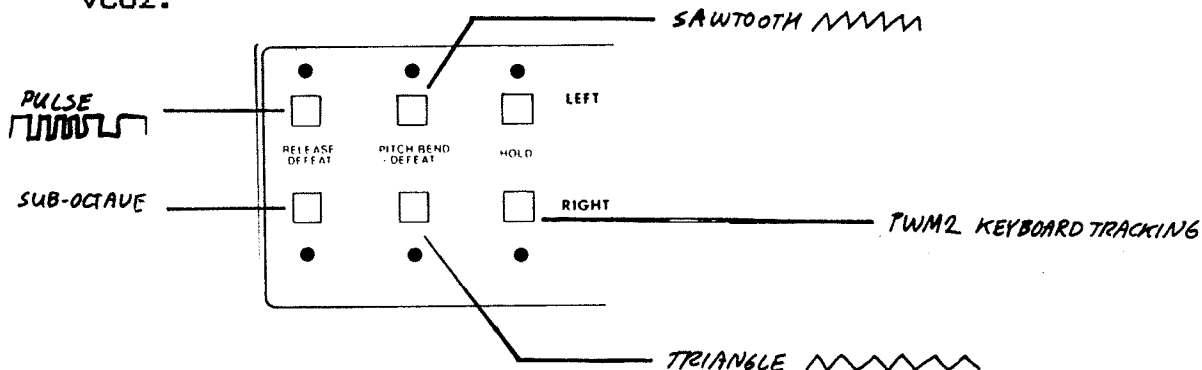
VCO2 WAVEFORM SELECTION-- the left four buttons, same as
described above for VCO1.

PWM2 KEYBOARD TRACKING-- the lower right button, same as
described above for VCO1.

There is no VCO2 keyboard tracking control; VCO2 *always*
tracks the keyboard.

The PROGRAM PARAMETER TRIMMERS now control other VCO and Program
parameters, as follows:
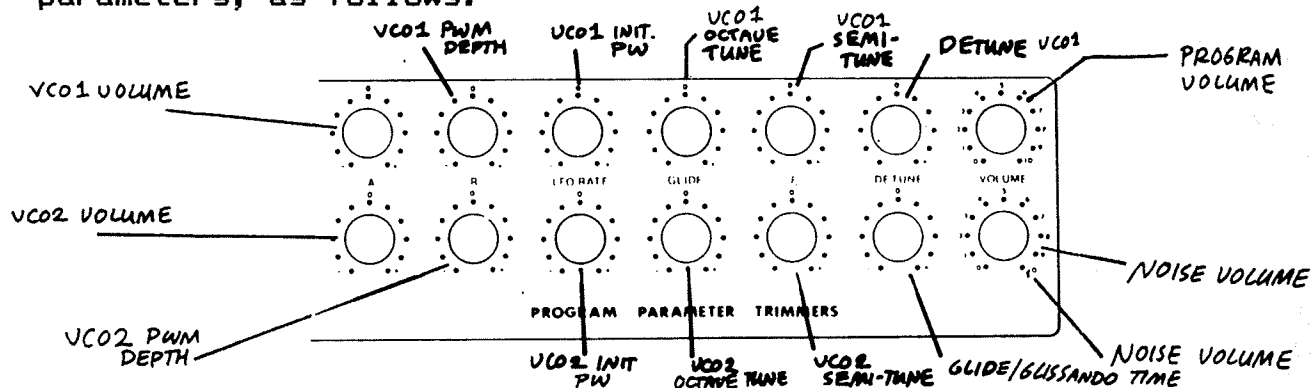
The top row of trimmers (except for the one on the far right)
control things related to VCO1. The bottom row (except for the
two on the right) control things related to VCO2.

VCO VOLUME 1 AND 2-- is set by the leftmost trimmers. These
affect the volume of the oscillator's selected waveforms. They do

not affect the VCO signals that are routed into the Mod Banks as mod sources. Turn them one at a time while listening. (And remember-- the trimmers are incremental, not absolute, as we pointed out earlier. If you don't hear much effect, try clearing them first.)

(*NOTE:* at maximum volume there's a little distortion, which will cause a change in your sound's timbre.)

VCO PWM 1 and 2 DEPTH-- is controlled by the second-to-left trimmers, which set the maximum level of pulse width modulation from the sources you have chosen (as indicated in the STEP readouts).

VCO 1 and 2 INITIAL PULSE WIDTH-- is set by the third-to-left trimmers. With them you can set the width of the initial pulse, in a range from 5 to approximately 95 , which then serves as the starting point for the PWM.

NOTE: To learn more about PWM, see Appendix #2, "Basics of Synthesis." In the meantime, you should be aware of the fact that combining too much PWM DEPTH and too high an INITIAL PULSE WIDTH will actually result in shutting off the pulse wave, so their will be no PWM effect.

VCO 1 AND 2 OCTAVE and SEMITONE TUNING-- are controlled by the center and third-from-right trimmers, respectively. The OCTAVE trimmers shift pitch in jumps of one octave, and the SEMITONE trimmers in jumps of one semitone (also called a half-tone: this is the distance between E and F, or G and G#). Ranges beyond (or between) these can be obtained for VCO2 by modulating it with a DC source in one of the Mod Banks. VCO1 can be variably tuned using the controls in the next paragraph.

NOTE: Tuning changes can only be heard *while* a key is being held down.

VCO1 DETUNE-- is the second-to-right upper trimmer. This is the same control as the DETUNE trimmer on the Normal Page. It allows you to detune VCO1 up or down as much as a semitone from VCO2, to create chorusing effects, or to get perfect harmonics of VCO2.

GLIDE/GLISSANDO TIME-- is the second-to-right lower trimmer, and is identical to the GLIDE trimmer on the Normal Page. It sets the speed of the glide or glissando (depending on which you have selected on Edit Page 2).

PROGRAM VOLUME-- is the upper righthand trimmer. This
programmable control sets the overall volume of a Program, the
same as the VOLUME trimmer on the Normal Page. For the best
signal-to-noise ratio, and clearest output, we suggest that you
keep this control at maximum until you must balance the volume of
one Program against that of another (in order to keep volume
changes in live performance consistent, to set relative Program
volumes in LAYER and SPLIT modes, and so on).

NOISE VOLUME-- is the bottom righthand trimmer. This sets
the volume of the white noise generator that is part of your
sound-generating chain. Judiciously adding noise to your Programs
can create additional color and texture, while adding large
amounts can make for winds, storms, explosions, and other sound
effects.

EDIT PAGE #2 (VCF and
ADSR Parameters):
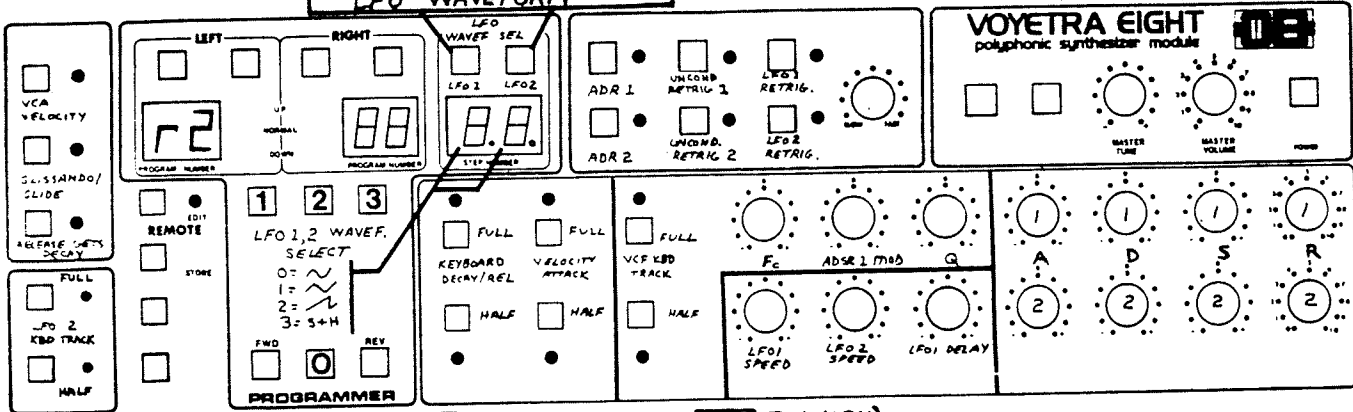
(FULL MUST BE ON FOR HALF TO WORK)

Most of the controls on this page
refer to the VCF, LFO's and ADSR's
in the VOYETRA Voice. The controls
on the page above refer to the
BLOCKED items in the diagram below.
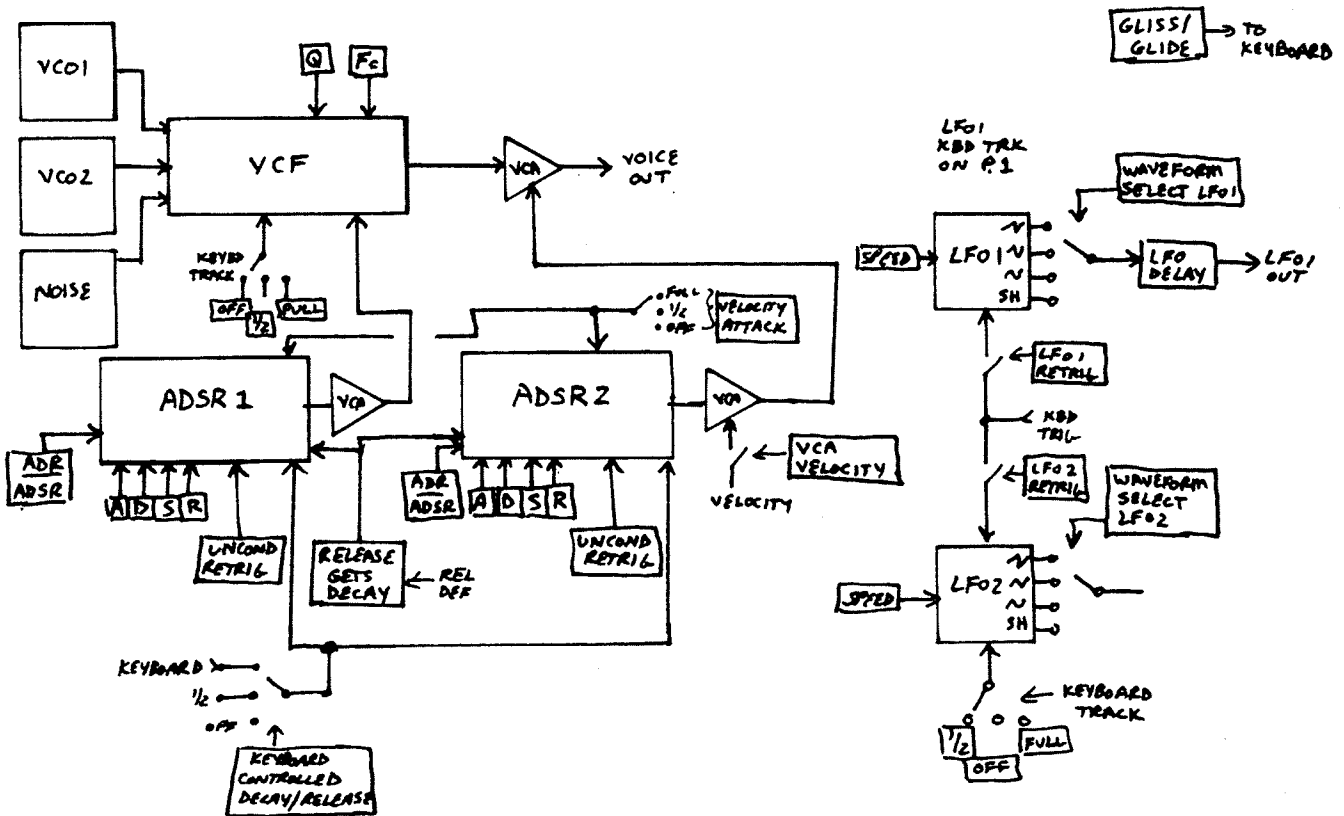
Having entered the Edit Pages by pressing EDIT, you reach
Edit Page #2 by pressing FORWARD. The Voyetra will let you know
you are in Edit Page #2 by putting a 2 in the LEFT readout.

Once again you have all-new functions on the buttons and
trimmers, except that EDIT still returns you to the Normal Page,
STORE will still replace your old Program sound with your
currently-edited one, and the TAPE switches don't do
anything.

Taking the rest section by section...

The three KEYBOARD MODE switches:

VCA VELOCITY

GLISSANDO/GLIDE

RELEASE GETS DECAY

KEYBOARD MODE
8 whole voice
split
layer
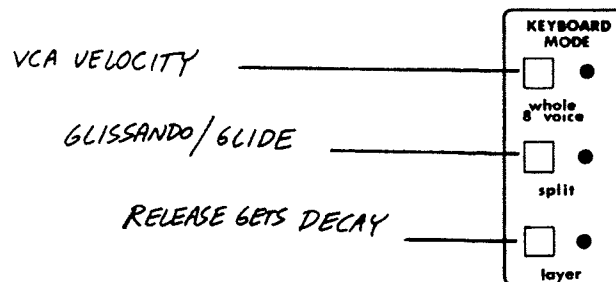
VCA VELOCITY-- is the top button. When you press this, the
loudness of your synth sound will be proportional to the speed
that you strike the keys. Faster equals louder. (Unless you are
using a custom Velocity Taper; for more on that, see "Setting Your
Own Velocity Taper," later in this manual.)

You can use this control in some very interesting ways. Here
is just one example: make a Program's volume velocity-controlled
by turning on this switch, then exit to the Normal Page and turn on
the Arpeggiator. The different notes you arpeggiate will have
different volumes, depending on how fast you strike the keys. This
is especially neat and useful when used with synthesized drum
sounds.

NOTE: this command is repeated in two other places in the
Voyetra. One is pressing A440 and RELEASE DEFEAT LEFT, or
A-440 and RELEASE DEFEAT RIGHT, while in the Normal Page. (This
allows you to choose which Program you want to be velocity
sensitive while in SPLIT or LAYER mode.) The other is a VCA
VELOCITY switch on the Alternate Page. We put this command in
to make it more convenient.

GLISSANDO/GLIDE-- is the middle button. GLIDE--also known as
portamento--is a smooth sweeping from one pitch to another.
GLISSANDO is a chromatic stepping through the notes. This button
is an either/or switch. When the LED is lit then GLISSANDO is
selected. When it is off, GLIDE is selected.

To test this control go back to Edit Page 1. Then turn
up the GLIDE trimmer and play. As soon as you've got those notes
swooping back and forth, return to Edit Page 2 and press
this button on and off while continuing to play. The differences
between GLISSANDO and GLIDE should be clear.

NOTE: GLISSANDO and GLIDE effects are quite different, depending
on what Keyboard Assignment Mode you are in. There are four of
these modes. For more information on what they are and how to select
them, see "The Alternate Page."

RELEASE GETS DECAY-- is the bottom one. Pressing this switch
changes what the RELEASE DEFEAT switch on the Normal Page does. When
this switch is off, then pressing RELEASE DEFEAT while in the Normal
Page makes a Program's Release go to zero. But when this switch
is on, pressing RELEASE DEFEAT from the Normal Page sets the
Release equal to the Decay. (Remember--this button, by itself, has
no audible effect. It only presets what the RELEASE DEFEAT switch
will do.)

The UNISON section now controls:

LF02 KEYBOARD TRACK

LF02 KEYBOARD
TRACKING, HALF OR FULL
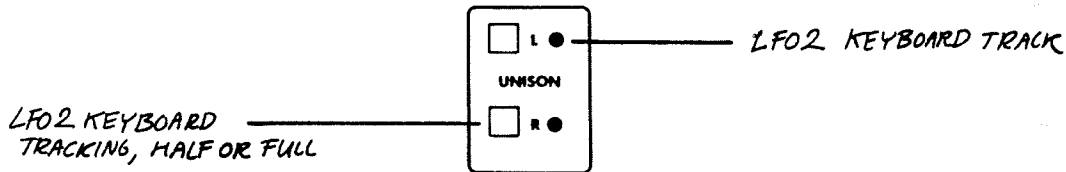
LF02 KEYBOARD TRACK-- is the top button. Just as on Edit Page
1, it turns on keyboard tracking for an LFO--only the number of
the LFO is different.

LF02 KEYBOARD TRACK, FULL OR HALF-- is the bottom button. As
on Edit Page 1, this sets the LFO keyboard tracking intensity; only
the number of the LFO affected is different. When the LED is off
then intensity is FULL. When the LED is on it is cut in half.

The PROGRAMMER section and keypad now control:

PROGRAM BEING EDITED

*EDIT PAGE
& INSTRUMENT
SIDE READOUT*

*LFO 1 & 2
ASSIGNMENT*
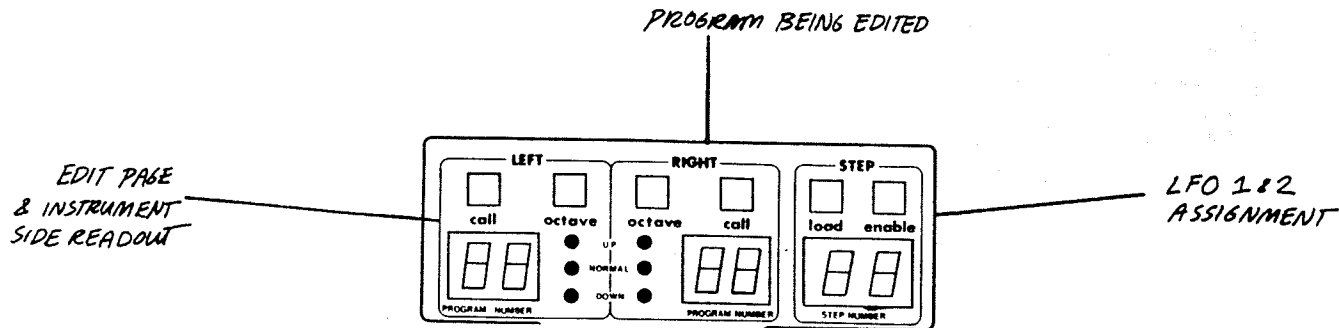
LFO1 AND LFO2 WAVEFORM SELECT-- this section works the same way it did on Edit Page 1, except that it selects LFO number and source instead of PWM number and source.

The red button above the STEP readout selects for LFO1. The white button selectes for LFO2. And the numbers immediately below each button represents the selected LFO waveform.

0 is sine

1 is triangle

2 is sawtooth

3 is random sample and hold

Look in your notebook for a Program that had a lot of modulation--a heavy vibrato, for example. Call up that Program on the Normal Page, make sure you are in WHOLE 8 mode, and then go to Edit Page 2. Use the red and white buttons above the STEP readout, and the 0-3 buttons on the keypad, to change the selected LFO waveforms, and listen to what happens. (You might also want to play with the two bottom left trimmers, which control LFO1 and 2 speed.)

NOTE: although LFO1 and LFO2 are independent, the choice you make here will carry through the rest of the instrument. If you decide, for example, that LFO1 is generating a sine wave, then the LFO1 available on Edit Page 1 as a PWM source (or in any of the Mod Banks as a modulation source) will be a sine wave too.

There is an LFO1 square wave output that is independent of the settings you choose here. It is available in the Mod Banks as a mod source.

The PROGRAM PARAMETER TRIMMER section now controls:
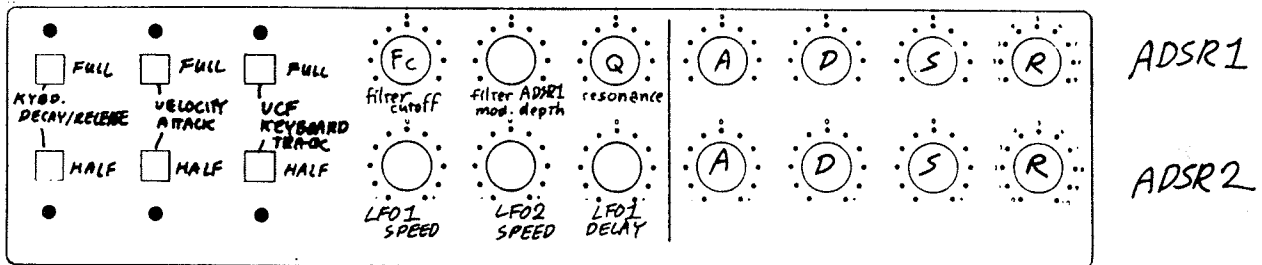
We are going to break away from our normal left-to-right
pattern of explanation, here, in order to put some ground beneath
your feet.

The Voyetra has two ADSR generators. (ADSR stands for Attack-
Decay-Sustain-Release, which are the four phases of standard
synthesizer envelopes.) The voltages put out by these ADSRs are
what allow you to shape the loudness or filtration or modulation
of your synth sound *over time*, starting from when you press the
keyboard.

In the Voyetra, ADSR1 is connected to the VCF (through
the ADSR1 MOD DEPTH trimmer) and ADSR2 is directly connected to
the VCA. How you set these two envelope generators (and any other
controls which vary their effect) are therefore extremely
important. So you should meet your ADSRs right now.

ADSR 1 AND 2-- are controlled by the eight trimmers to the
right. The top row of four control ADSR1, and the lower row of
four control ADSR2. Take some time now to test out how adjusting
these trimmers affect different Programs.

NOTE: you encountered trimmers marked ATTACK and RELEASE on the
Normal Page. These affected *both* ADSRs at the same time. If you
want to play games with the ADSRs separately, or adjust DECAY and
SUSTAIN rates, you must use Edit Page 2.

NOTE: as we mentioned with the LFOs earlier, whatever you do to
the ADSRs with these controls will be carried through at every
point in the instrument where they are available (as PWM or
modulation sources, for example).

SPECIAL NOTE: when the RELEASE DEFEAT switch on the Normal Page
is on, then the release times on both ADSRs will be zero (or
equal to Decay, if RELEASE GETS DECAY is on), and no amount of
playing around with the trimmer on the Edit Page will change it.
Remember to turn that defeat switch off if you want to adjust
RELEASE.)

FILTER RESONANCE (Q)-- is set by the third-from-the-left
trimmer in the top row. Q (that's the shorthand term for resonance)
is a kind of controlled feedback around the cutoff point of the
VCF, and is what creates the "ringing" or "meowing" tone you often
hear from synths. This control can set the Q all the way from 0 to
the point where the feedback goes into endless oscillation.

FILTER ADSR1 MODULATION DEPTH-- is set by the second-from-
the-left trimmer in the top row. At a setting of zero, ADSR1
has no effect on the VCF at all. As you turn it clockwise ADSR1
will modulate the VCF more and more; try this a few times with
different ADSR1 settings, to get a feel for what it can do.

FILTER CUTOFF (Fc)-- is set by the lefthand trimmer in the
top row. This is the same as the Fc trimmer on the Normal Page;
what it does is set the filter cutoff point over the full range of
the VCF, which is approximately 20hz to 20Khz. To your ear, that
translates as making your sound "mellower" or "harder".
Settings on this trimmer have a big impact on how your LFO
modulations will sound.

LFO1 and LFO2 SPEED-- are set by the two lefthand trimmers on
the bottom row. They can be adjusted independently for each
Program, which means that in SPLIT or LAYER modes you could
actually have four different and independent LFO rates. Used
carefully, this can create magnificently rich sound textures.
(The LFO1 SPEED trimmer here is identical in effect to the LFO
SPEED control on the Normal Page.)

LFO1 DELAY TIME-- is the third from the left trimmer in the
bottom row, and while you *set* the amount of delay time with it
on this Page, its real impact is in the Mod Banks, because that's
where it is heard. Set a long delay here, use LFO1 as a mod source
in the banks, and you can get delayed vibrato and pulse effects
when you play.

NOTE: this setting doesn't affect the independent LFO1 square
wave output that is available in the Mod Banks--just the four
LFO waveforms that you can select on this Page.

IMPORTANT:

   The buttons on the next three functions operate a little
differently than the others you have used so far. They offer you a
choice of three levels of sensitivity in terms of keyboard or
velocity tracking: OFF, HALF, or FULL. You use two buttons
together, in the following ways, to set the three different
levels.

←THIS MEANS   OFF   FULL   HALF
LED IS ON.
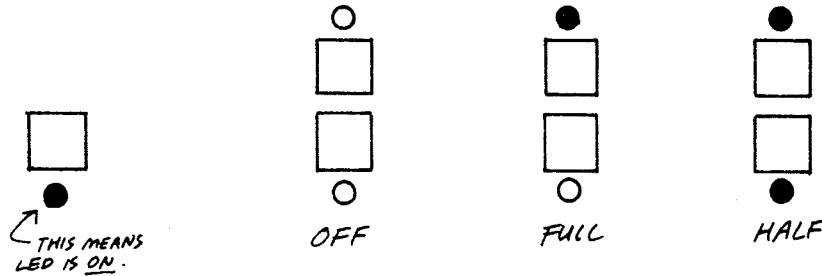
   OFF is easy--neither switch is on. FULL is easy, too, because
only the switch representing "full" is on. But to get HALF you
must press both switches; the "half" switch by itself does
nothing at all.

   This is because what the "half" switch does is cut the
current tracking level in half. When full is on that gets you
half tracking; but when full is off, since half of zero is still
zero, that gets you nothing.

   DECAY/RELEASE KEYBOARD TRACKING-- is controlled, in the
manner outlined just above, by the bottom and top left buttons in
the Trimmer section. These buttons set things so that your decay
and release times will change across the length of the keyboard.
At the bottom they will be whatever you have set with your trimmer
controls. But as you play higher pitches, they will grow shorter
and shorter, like so:
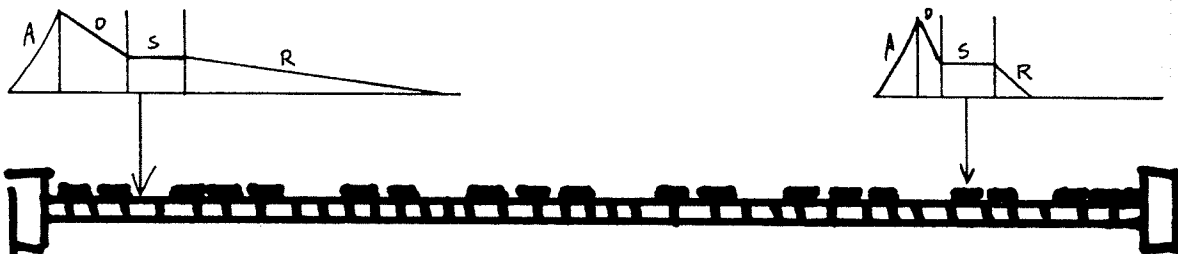
   This effect simulates the natural action of instruments like
the piano, where decay times are proportional to things like string
mass (the heavier, the longer the decay; if you've ever played
notes at the high or low end of a piano while holding down the
sustain pedal, you've heard this in its purest form).

VELOCITY ATTACK-- is controlled by the central top and bottom buttons. When these are used to turn on half or full tracking, then the keyboard velocity directly affects the A (attack) part of both ADSRs. In other words, when you hit the key faster, the attack time on the envelope *also* gets faster. Try some experiments with this. Set both ADSR attacks to fairly slow--or even very slow--and hold down one note. Then turn on full tracking and strike the key rapidly. Hear the difference? Experiment with off, half, and full tracking as they effect different A settings. This diagram will show you what's going on:

SAME *FAST KEYSTRIKE* = *DIFFERENT ATTACK TIMES AT DIFFERENT TRACKING SETTINGS*
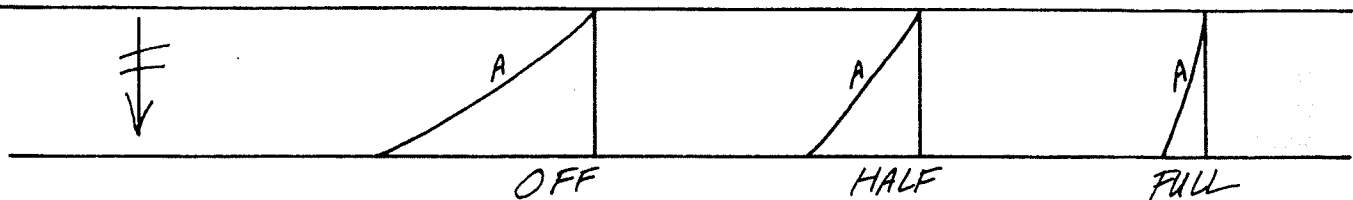
OFF   *HALF*   *FULL*

Used well, this feature offers you the chance to put a lot of expression into your playing technique.

VCF KEYBOARD TRACKING-- this feature is set to off, half, or full tracking by the top and bottom righthand buttons in the Trimmer section, and what it does is cause the Fc--the filter cutoff point--to move up and down as you play up and down the keyboard. In the full tracking mode, it doubles with every octave increase in pitch. In half tracking mode, it doubles with every two octave increase in pitch.

To hear just how this sounds, select a Program from the Normal Page, make certain it's in WHOLE 8, and go to Edit Page 2. Then clear the Fc trimmer and turn it all the way counter-clockwise. Finally, make sure that the VCF KEYBOARD TRACKING switches are off.

Play the lowest and highest notes on the keyboard. Both should sound softer, more muted in tone.

Now press the full tracking switch and try again; you'll notice that the low note is still muted, but the high one is *much* brighter than before. Experiment further with this, and with half-tracking, to get a feel for the variance in textures.

The ARPEGGIATOR section now controls:

ADR1

ADR2

UNCONDITIONAL ADSR1 RETRIGGERING

LFO1 RETRIGGERING

UNCONDITIONAL ADSR2 RETRIGGERING

LFO2 RETRIGGERING

ADR1 AND ADR2 MODES-- the on/off switches for these alternate envelope generating modes are the top and bottom lefthand buttons.

You've worked with your ADSR, by now. Such four-section envelopes are a synthesizer standard. The Voyetra offers you an extra alternative, however--the ADR. This envelope form, which omits Sustain, is excellent for generating complex percussive sounds.

Here's a typical ADSR envelope:

And here's an ADR envelope:

THIS "KNEE" IS DETERMINED BY THE SETTING OF THE "S" CONTROL

As you can see, in the ADR mode there isn't a Sustain section to the envelope...but the *setting* of the Sustain trimmer is still important, because that's what determines at just what point the transition between Decay and Release occurs.

Try the ADRS out for yourself: select a plain, uncluttered Program, make sure it's in WHOLE 8, and go to Edit Page #2. Play one note and hold it down, listening to the Sustain portion of the envelope.

Activate ADR2 (which replaces ADSR2, the one connected to the VCA) and strike the key again. Try this several times, adjusting the Sustain trimmer to different settings. Then turn off ADR2 and try the same experiments with ADR1 (which replaces ADSR1, the one connected to the VCF).

Just as with ADSR1 and 2, ADR1 and ADR2 may be set independently.

Here are some possible ADR envelopes. The *only* difference between them is the setting of the Sustain level.

UNCONDITIONAL ADSR1 and ADSR2 RETRIGGERING-- is turned on and off by the two center top and bottom buttons. In normal triggering mode for the ADSRs, the Release phase begins the instant you lift your finger from the key. But when either of these buttons is pressed, the appropriate envelope goes through its *complete cycle*, every time a key is struck. Lifting the key or tapping it repeatedly does nothing until the cycle is over.

ADSR RESET TO ZERO-- you won't find this effect written on the diagram of Edit Page 2. It's a trick you turn on by pressing both ADSR UNCONDITIONAL TRIGGERING and ADR; and what it does is make the selected ADSR automatically start again from scratch every time you strike a key, no matter where it was in its cycle. A good way to hear this is to find a brassy Program, with a nice swelling effect, and then play it in and out of this mode. The diagram below shows you just what is happening.

NORMAL ADSR

ADSR RESET TO ZERO

KEY DOWN

KEY UP

KEY DOWN
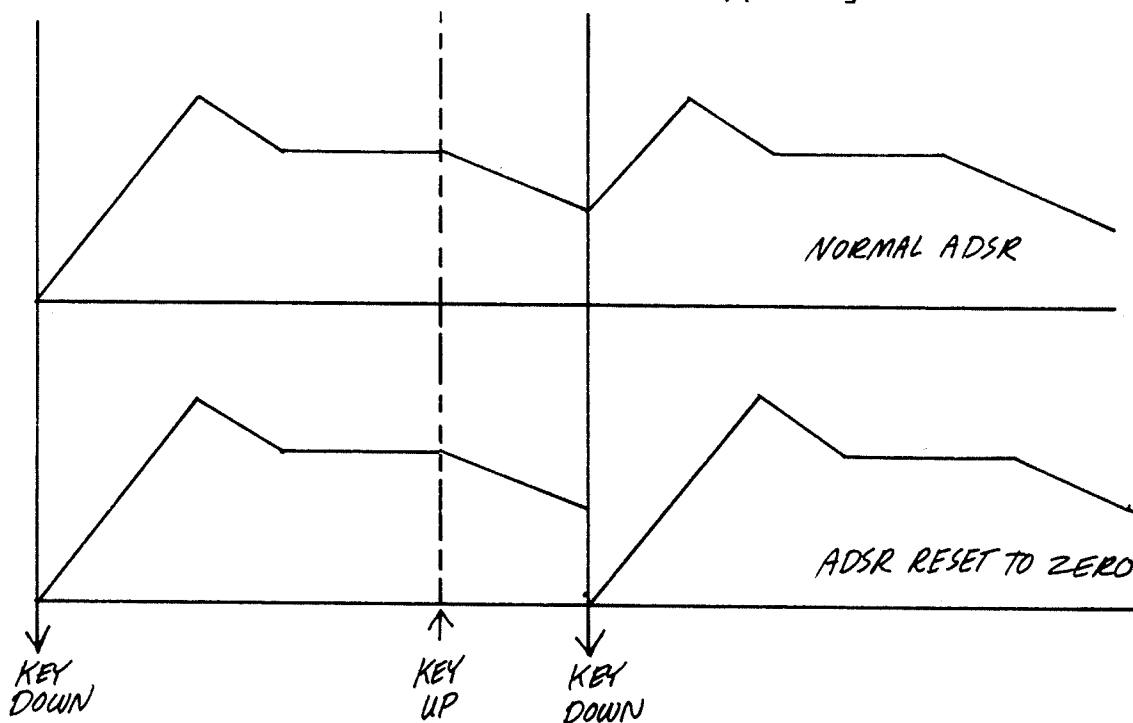
LFO1 AND LFO2 RETRIGGERING-- the righthand top and bottom
buttons control this function. When either of these is on, the
phase of the appropriate LFO's waveform is reset every time a new
key is struck. (This control will make certain that all your
vibratos start in the same direction, for example.)
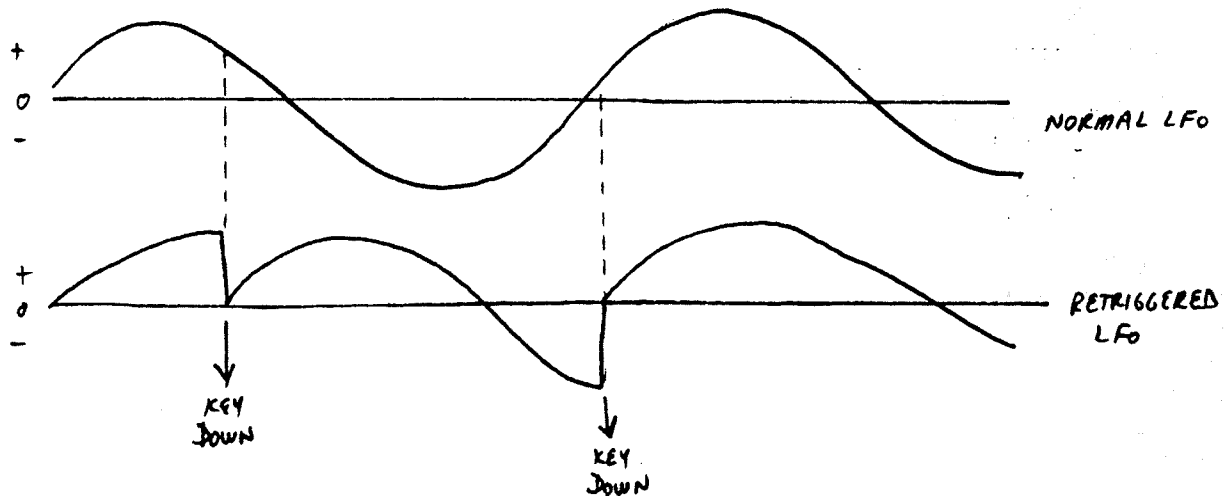
MOD BANKS A THROUGH D
(Program modulation controls):

MODULATION BANK DISPLAY A, B, C, D ONLY A IS ILLUSTRATED

WITH LIGHT ON, KEYBOARD CONTROL VOLTAGE REPLACES VELOCITY IN ALL MODULATION BANKS

BANKS A, B → ADSR1 REPLACES VELOCITY
BANK C → NOISE REPLACES VELOCITY
BANK D → VCF PEDAL BECOMES PROGR. MODULATION PEDAL

SOURCE
0 → DC
1 → LFO 1
2 → LFO 2
3 → LFO1 ⊓
4 → VCO1
5 → VCO2
6 → ADSR1
7 → ADSR2

ENTER OTHER MOD BANKS USING FWD REV

ADSR AND LFO CONTROLS ARE AVAILABLE IN MOD BANKS A-D AND ARE IDENTICAL TO PAGE 2

The four MOD BANK pages are virtually identical except for minor differences in banks C and D which use noise and VCF pedal controllers instead of ADSR1. The controls on the page above refer to the BLOCKED items in the diagram of a typical MOD BANK below.

BASIC MOD BANKS LAYOUT

A   **B**   **C**   **D**

A (Mod Sources)

DC VOLTAGE
LFO1 — SINE, SAW, TRIANGLE, SAMPLE & HOLD
LFO 2
LFO1 SQUARE
VCO1
VCO2
ADSR 1
ADSR 2
- - - - - - - - -
INVERT / NORMAL

B
(SAME)

C
(SAME)

D
(SAME)
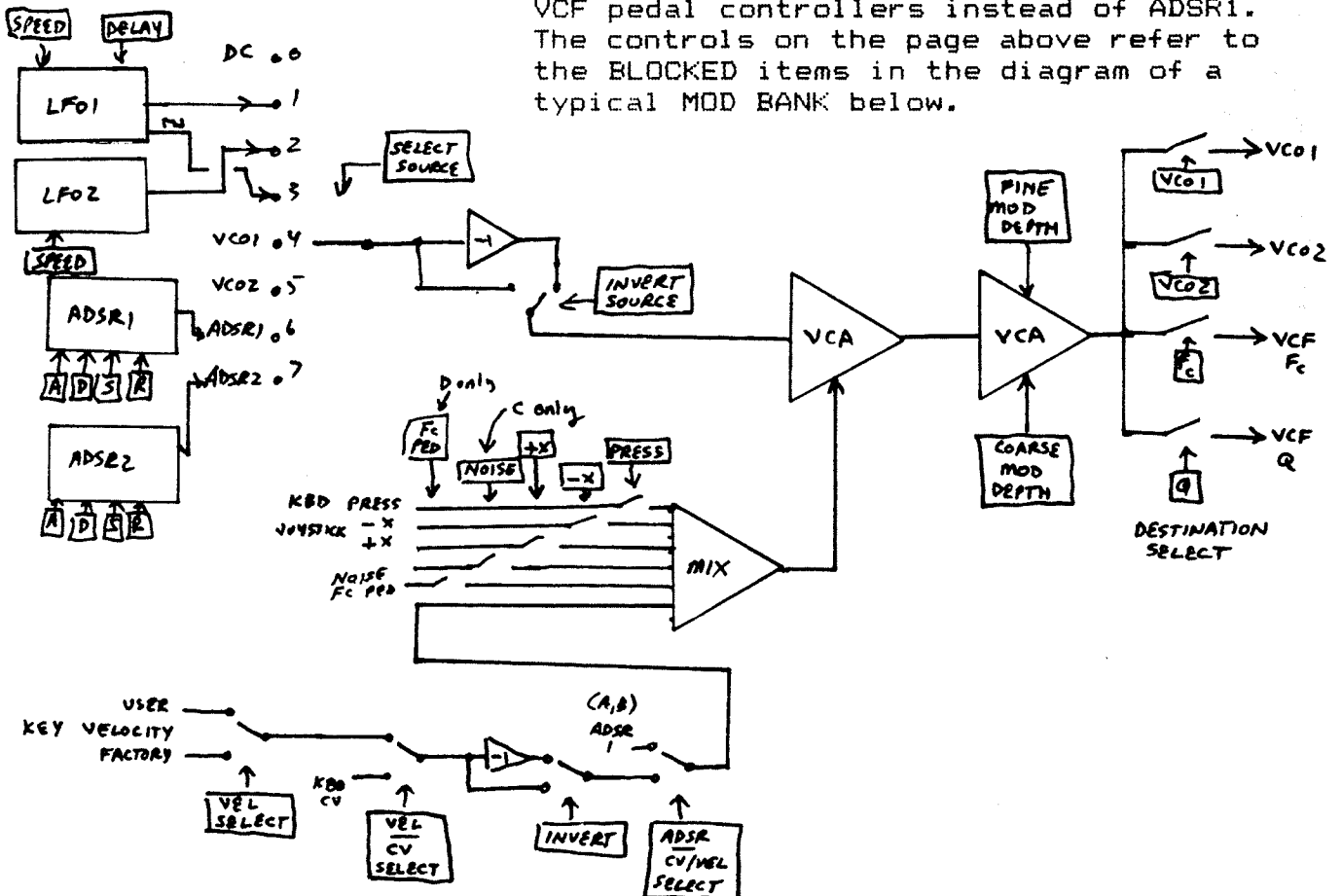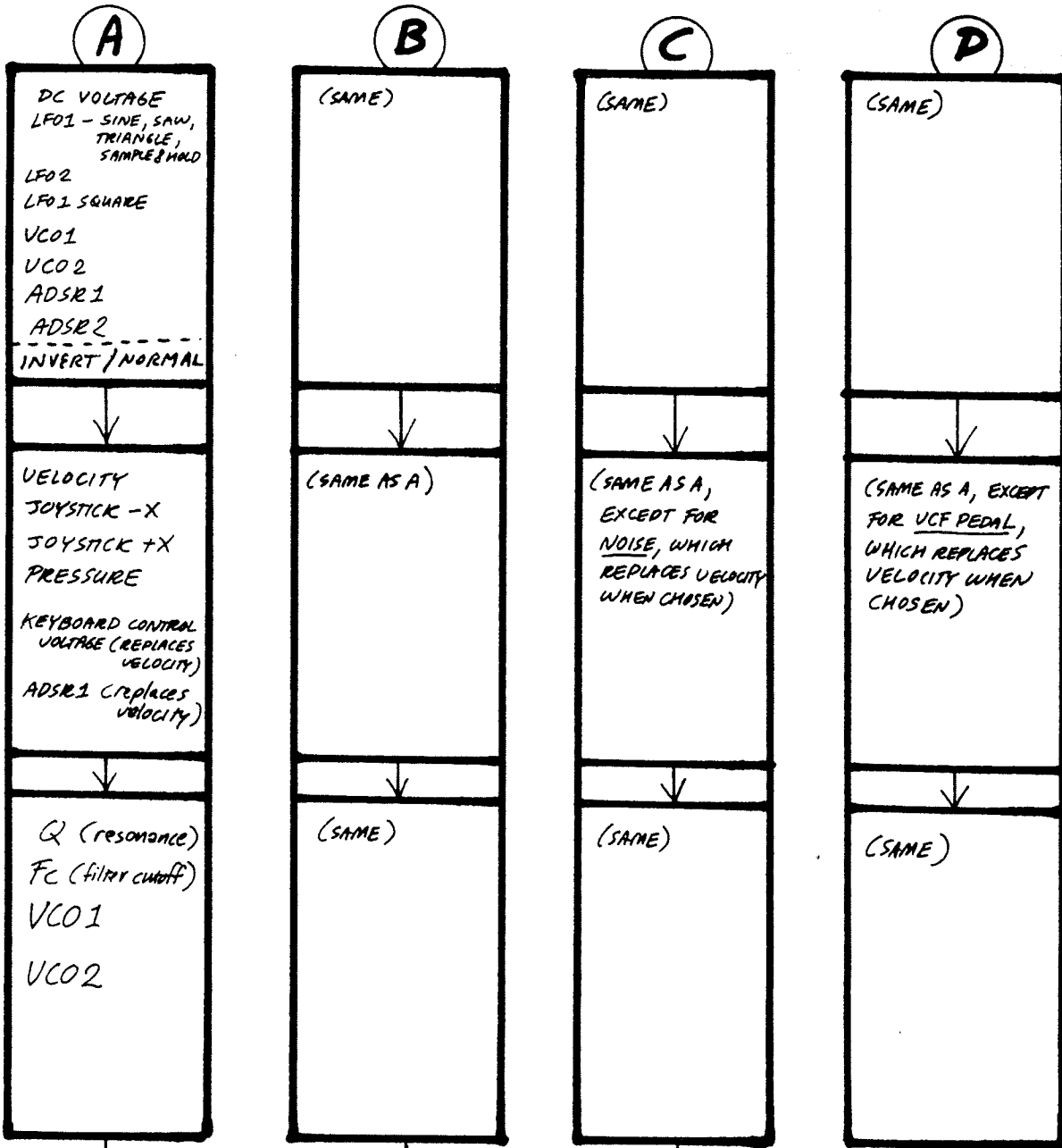
MOD SOURCES
(CHOOSE ONE & WHETHER OR NOT TO INVERT.)

A (Controllers)

VELOCITY
JOYSTICK −X
JOYSTICK +X
PRESSURE

KEYBOARD CONTROL VOLTAGE (REPLACES VELOCITY)
ADSR1 (replaces velocity)

B
(SAME AS A)

C
(SAME AS A, EXCEPT FOR NOISE, WHICH REPLACES VELOCITY WHEN CHOSEN)

D
(SAME AS A, EXCEPT FOR UCF PEDAL, WHICH REPLACES VELOCITY WHEN CHOSEN)

CONTROLLERS
(choose any combination, and set mod depth.)

A (Destinations)

Q (resonance)
Fc (filter cutoff)
VCO1
VCO2

B
(SAME)

C
(SAME)

D
(SAME)

DESTINATIONS
(choose any combination.)

YOUR OWN SOUND

SOURCES:

PRESS HERE TO INVERT SOURCE

LEFT   RIGHT   STEP

ⅠA   -3   00

BANK NAME
& PROGRAM RIGHT OR
LEFT INDICATOR

MOD DEPTH
READOUT

SOURCE INDICATOR

INVERSION
SYMBOL

```
 1   2   3 
 4   5   6 
 7   8   9 
FWD      REV
     0    
PROGRAMMER
```
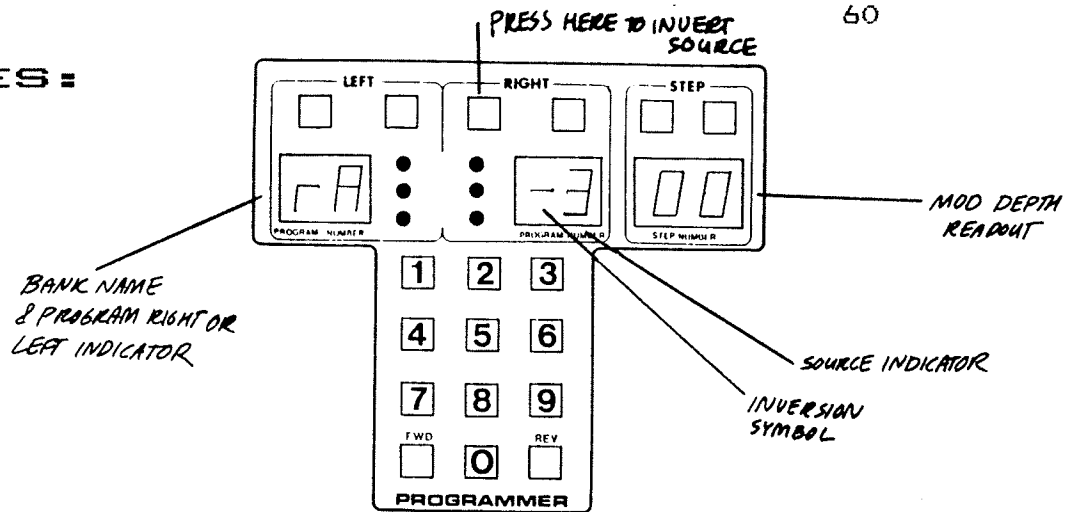
There are two types of sources, monophonic and polyphonic.
A monophonic source generates one signal that gets applied to
all the Voices at the same time. A polyphonic source is one that
is generated separately for every single Voice in the instrument.

You call them up on a Mod Bank by pressing any of the keypad
numbers 0 through 7, which correspond to the following mod
sources:

Monophonic--   0. DC voltage
                1. LFO1 (sine, saw, triangle, or sample and hold)
                2. LFO2 ("   "   "   "   "   "   ")
                3. LFO1 SQUARE

Polyphonic--   4. VCO1 (total waveform output)
                5. VCO2 (total waveform output)
                6. ADSR1
                7. ADSR2

As you use the keypad to make your selection, the numbers
you press will appear in the RIGHT readout.

NOTE: In Voyetras shipped prior to September 1983, 1
selects LFO2 and **2** selects LFO1. If you have a Version
Three Voyetra this notice does not apply to you.

NOTE: LFO1 can be delayed in its attack time by using the
LFO1 DELAY trimmer on Edit Page 2.

SPECIAL NOTE: INVERTING THE SOURCE. Sources may be inverted
by pressing the white button above the RIGHT readout. This
allows you to create "downsweeps" and other unusual modulations.
(When a source has been inverted a minus sign appears in the
RIGHT readout, next to the source selection number.

CONTROLLERS:

ARPEGGIATOR →
SECTION

REPLACES VELOCITY IN ALL BANKS
WHEN ON IN ANY BANK.

VEL.   +X   CONTROL
            VOLTAGE

-X   PRESSURE   ADSR1

REPLACES VELOCITY WHEN ON.
IN BANK C IT IS NOISE.
IN BANK D IT IS VCF PEDAL.
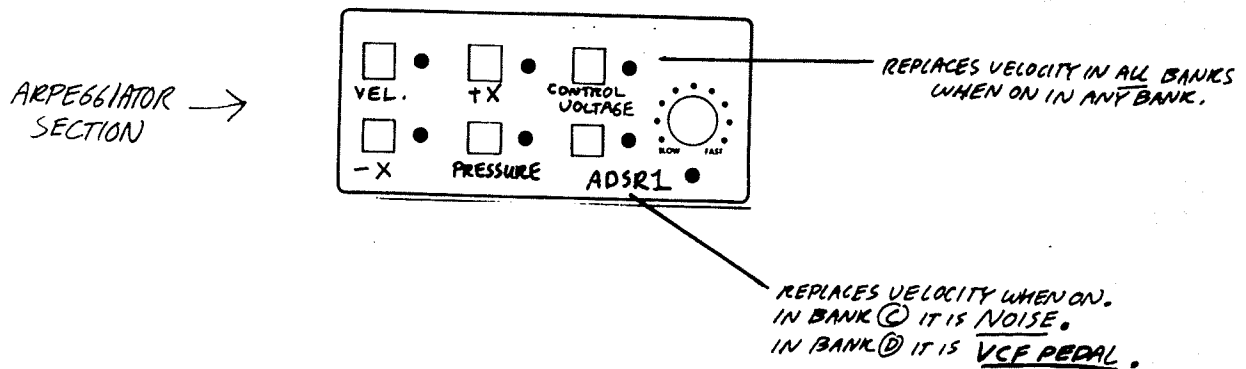
The six available controllers are selected with buttons
in the Arpeggiator section. In Banks A and B, these are:

            top left-- VELOCITY
         bottom left-- JOYSTICK -X (movement to the left)
          top center-- JOYSTICK +X (movement to the right)
       bottom center-- KEY PRESSURE
           top right-- KEYBOARD CONTROL VOLTAGE (replaces velocity in
                       all Mod Banks when this is on)
        bottom right-- ADSR1 (which replaces velocity when on)

In Mod Bank C, the bottom right button selects NOISE as a
controller. In Mod Bank D, it allows you to use the VCF pedal
accessory as a programmable modulation pedal.

NOTE: To turn on CONTROL VOLTAGE or ADSR1 as replacements
for VELOCITY, just press the appropriate buttons and ignore what
does or doesn't happen to the VELOCITY light (with CV it will stay
on, with ADSR1 it turns off).

SETTING PRESSURE SENSITIVITY TO SUIT YOUR STYLE: On the front
left of the VPK-5 keyboard, in front of and down from the joystick,
are control trimmers.

PITCH BEND RANGE UP
"   "   "   DOWN
PRESSURE THRESHOLD
    SENSITIVITY
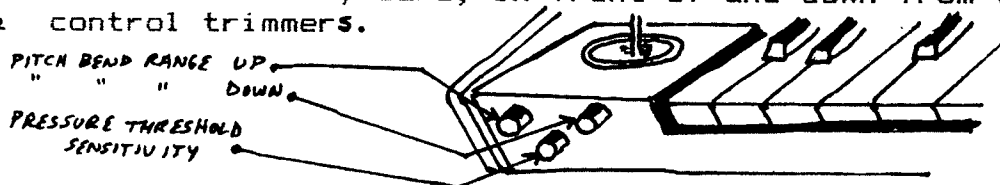
One trimmer sets pressure sensitivity for the keyboard. It's an
absolute control, *not* an incremental one.

Turning it clockwise increases sensitivity.

harder
to bring
in pressure
modulation

easier to bring
in pressure
modulation
(Turned all the way, it
will keep the modulation
on all of the time)

Turning it counter-clockwise decreases it.

For lead lines, set the control so that you can bring out
modulations comfortably with one finger. For chord playing, set it
heavier, so that you aren't modulating things when you don't want
to. These are matters of personal taste and playing style, so
experiment until you're satisfied.

SPECIAL NOTE: If your keyboard sensitivity is set for a light
touch, you might be able to hear modulation on some Programs--
those with very high mod depth settings routed through the
pressure controller--even *without* extra pressure on the keys.
The fix is simple--just turn the keyboard sensitivity trimmer
counter-clockwise to decrease sensitivity until your sound works
the way you want it to.

You can also vary the pitch bend
range on the joystick with the
other two controls. One will let
you change the range of pitch bend
up while the other controls the
range of pitch bend down.
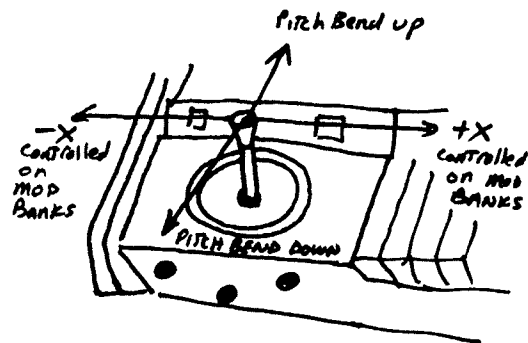
DESTINATIONS:

The buttons that select for modulation destinations are the
four lefthand buttons in the Program Parameter Trimmer section. In
all of the Mod Banks, they are:

```
        top left-- Q (VCF resonance)
     bottom left-- Fc (filter cutoff)
       center top-- VCO1
   center bottom-- VCO2
```
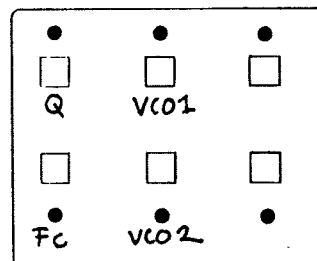
SETTING MODULATION DEPTH:

To set your modulation depth (once you've selected source,
controller, and destination) you'll be using the two upper left
trimmers and the STEP readout in a new way...actually, one new way
and one very old, tried and true way. Whichever you use is your
own choice. Both have advantages.

The old way is by ear. You simply grab the two upper left
trimmers--which are the COARSE and FINE MOD DEPTH controls--and
twirl them around while playing, until you get a modulation depth
your ear tells you is good.

If you do that right now you'll get a glimpse of the newer
method. See how the numbers in the STEP readout changed when you
moved the trimmers? Those numbers represent the 256 different
discrete levels of mod depth the Voyetra is capable of setting.
That's tremendously precise and powerful control, but it is also

the problem: it's kind of hard to write a three-digit number like 256 in a two-digit readout.

Unless you use hexadecimal, that is.

Hex (short for hexadecimal) is nothing special. It's just a different kind of counting that uses 16 numbers instead of the 10 you're used to (the extra six numbers are represented by the letters A through F). The following partial conversion chart should give you the general idea. A complete chart from 0 to 255 is included in this manual as Appendix #3.

NORMAL	HEX	NORMAL	HEX	NORMAL	HEX
0	00	13	0D	26	1A
1	01	14	0E	27	1B
2	02	15	0F	28	1C
3	03	16	10	29	1D
4	04	17	11	30	1E
5	05	18	12	31	1F
6	06	19	13	32	20
7	07	20	14	33	21
8	08	21	15	34	22
9	09	22	16	35	23
10	0A	23	17	36	24
11	0B	24	18	37	25
12	0C	25	19	38	26

...and so on. In practical terms, you can use these numbers to achieve 256 (from 00 to FF in hex) different shadings of modulation.

If you find this confusing, don't worry about it, because you really don't have to know about hex to make the MOD DEPTH function work. Your ears, and remembering that the FINE trimmer changes modulation one step at a time, are more than enough.

Of course, if you like to "hotrod" it with your synths, then the precision offered by the hex readout is a good place to start.

NOTE: if you don't select a controller, then whatever setting the MOD DEPTH trimmers on will directly modulate your selected source (so you can do things like have the Fc continually modulated, and then use the joystick to bring in controlled amounts of Q modulation.)

NOTE: modulation really isn't strong enough to matter until it reaches 18 in hexadecimal (that's 24 in normal numbers).

ADDITIONAL CONTROLS:

```
        ●         ●         ●
       ☐         ☐         ☐ —— LEFT          VELOCITY/CONTROL VOLTAGE
     RELEASE   PITCH BEND   HOLD                      INVERT
     DEFEAT    DEFEAT
       ☐         ☐         ☐ —— RIGHT
        ●         ●         ●              USER TAPER VELOCITY
```
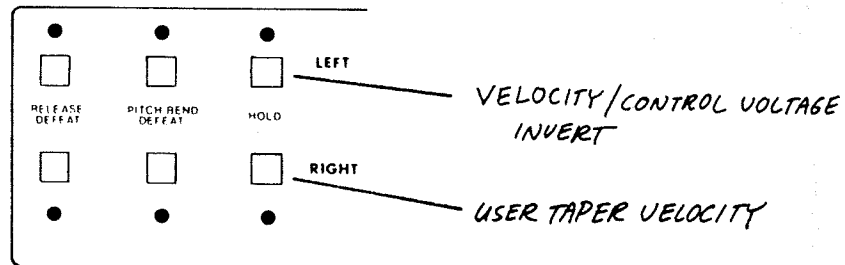
VELOCITY/CONTROL VOLTAGE INVERT-- this button, the top right switch in the Trimmer section, is just like the INVERT switch that affects the source selection--except that when you press this one you invert either your VELOCITY or CONTROL VOLTAGE controller (whichever is selected by the VELOCITY/CV switch above). This "flips" the taper, creating opposite effects.

If you select CONTROL VOLTAGE, for example, modulation increases as you go up the keyboard. But pressing the V/CV INVERT switch will reverse that, so that modulation *decreases* as you go up in pitch. (If VELOCITY had been selected, the V/CV INVERT would make modulation lessen in strength as you struck the keys faster.

USER TAPER VELOCITY-- is called up by the bottom right button in the Trimmer section. The Voyetra allows you to design your own keyboard velocity sensitivity "taper" by using the Velocity Taper Page. Just how you do that, and why, will be covered in the "Velocity Taper Page" section of this manual. In the meantime, all you need to know is that when you want to use your velocity taper in a modulation instead of the factory preset, this is the switch that you press.

NOTE: When this switch is on it also replaces the standard VCA velocity sensitivity, and all the VELOCITY locations in the Mod Banks, with your custom design.

THE BIG TEACHING EXERCISE:

The best way to learn how to get the modulations you want
is to hear what they sound like at full mod depth first. This
will give you a feeling for what they *do.*

Here's the exercise. It's a long one. You don't have to do
it all now, or even ever; just so long as you learn the technique
and can apply it when you need to.

Step one: pick a Program, any Program, preferably one with
a good high Sustain level.

Step two: put the Voyetra in WHOLE 8 and make your way to
the Mod Banks.

Step three: clear 'em! That's not hard. In each of the four
Mod Banks, turn off all the lights that are on, and use the
trimmers to set the MOD DEPTH to 00.

NOTE: Calling up the Null Program would clear the Mod Banks, but
it would also wipe out the Program you're working with.

Step four: go to town. Now that you've got a blank slate to
work from, start filling it up. Pick one mod source, set the mod
depth to full (FF, remember?), and--ignoring the controllers at
first--try that source against different destinations and
combinations of destinations, while holding down notes on the
keyboard. Then INVERT the source and go through the destinations
again. Some surprising differences, right? Finally, when you
finish that, go through the controllers and see just how they
allow you to manipulate the modulation. Some will be more to your
taste than others, depending on what effects you wish to achieve;
after all, a joystick has a different feel than keyboard pressure
does. Learning how to make the most of these differences is
part of what this exercise is about.

Step five: now start varying the MOD DEPTH setting.

Step six: pick another source and do it all over again!

As if this endless playing around with different sources,
controllers, destinations, and intensities weren't enough,
there's an even bigger exercise to tempt you...

THE BIGGER EXERCISE:

Start putting your Mod Banks *together* for effects. (After all, in every Program you have four of them to work with--and when combining Programs in LAYER and SPLIT modes, eight!)

It's an exercise that will be tickling your fancy for as long as you own your Voyetra, because you'll never--ever--be able to try *all* the possible combinations of sources, depths, controllers, destinations, and Banks.

But you'll certainly have a lot of fun doing it.

On the next pages we present a few examples that hint at the endless possibilities. Try setting them up for yourself, and then move on from there.
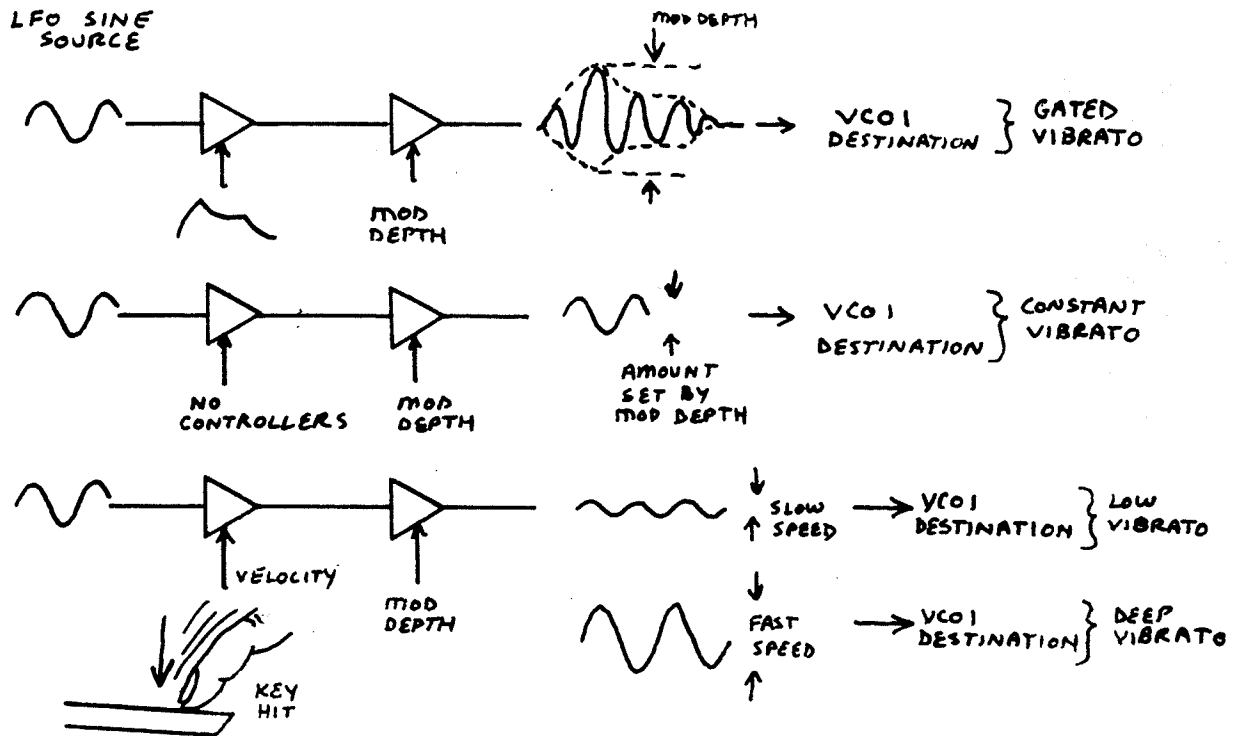
VARIOUS CONTROLLERS PRODUCE DIFFERENT
MODULATION EFFECTS

MOD BANK POSSIBILITIES

INVERTED SOURCES

PEAK DETERMINED
BY MOD DEPTH

MOD
DEPTH

ADSR1
SOURCE

NO CONTROLLERS
SELECTED

VCO1
DESTINATION

VCO1
FREQUENCY

INCREASES
WITH INCREASING
ADSR
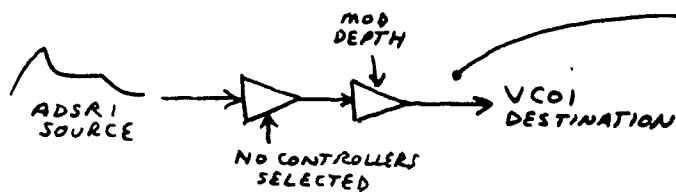
NON INVERTED ADSR
USED FOR FREQUENCY
MODULATION BY ROUTING
TO VCO1 DESTINATION

INVERTED
ADSR
SOURCE

NO CONTROLLERS
SELECTED

VCO1
DESTINATION

VCO1
FREQUENCY

DECREASES
WITH INCREASING
ADSR

INVERTED CONTROLLERS

ADSR1
SOURCE

MOD DEPTH

DEEP
MODULATION

VELOCITY
NON INVERTED

MOD DEPTH

LIGHT
MODULATION

VELOCITY
INVERTED

NON
INVERT

INVERT

FAST HIT
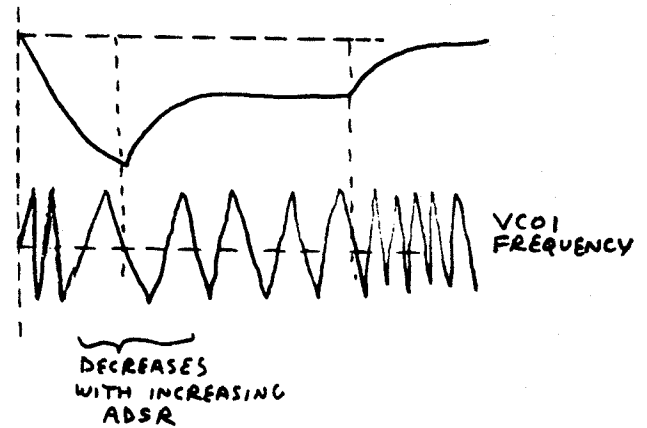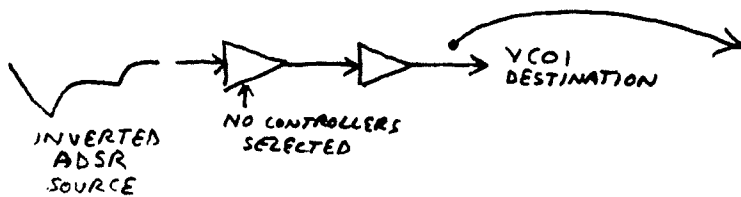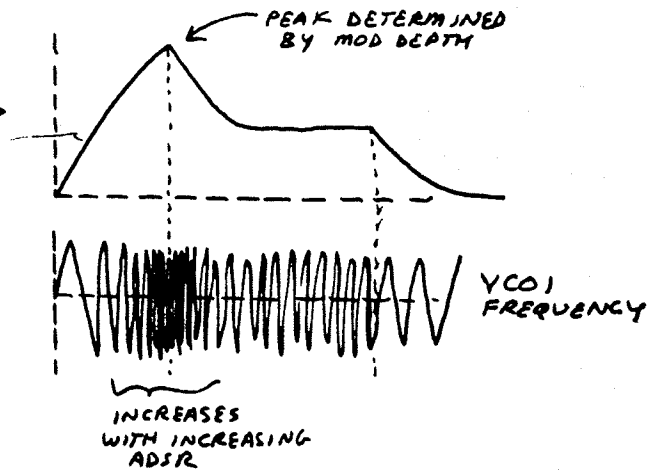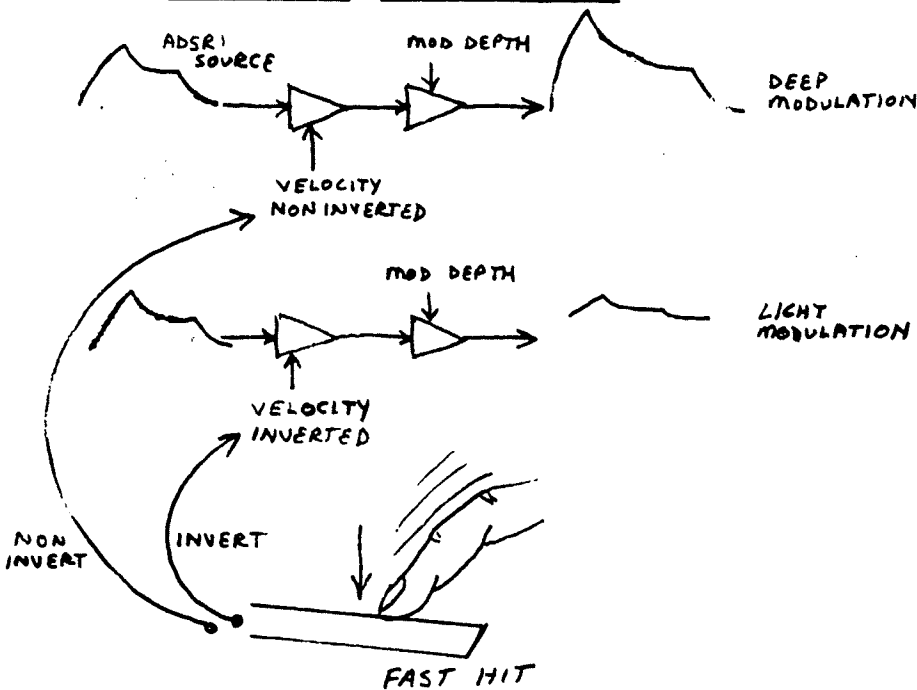
MOD BANK POSSIBILITIES
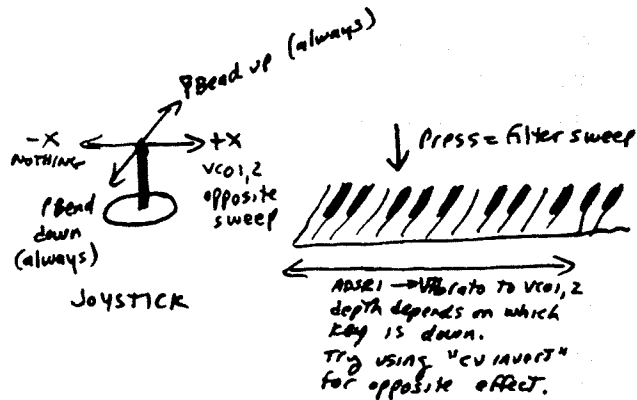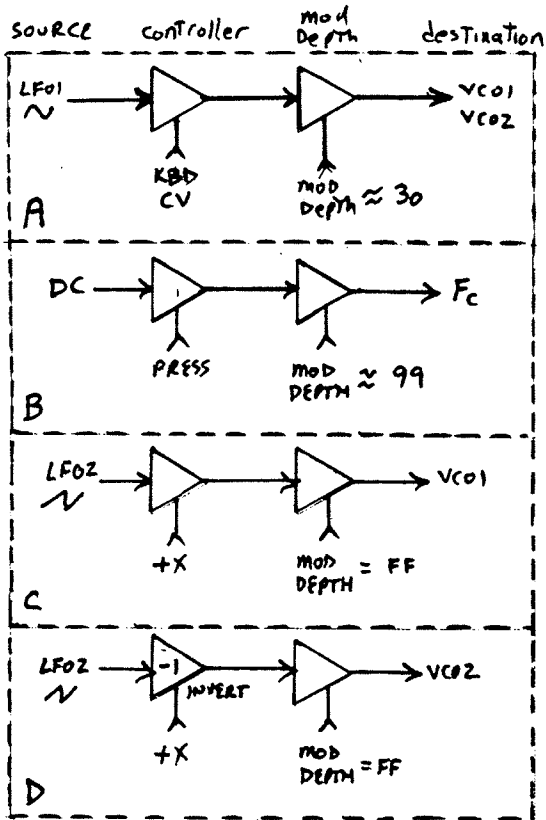
In this example, we have a "keyboard controlled vibrato" by using Keyboard Control Voltage (Kbd CV) as a controller in mod bank A. The source is LFO1 sine (for vibrato) and the destinations are VCO1 and 2. The maximum depth is controlled by the mod depth setting for the bank. You can also try using the keyboard tracking function for LFO1 found on EDIT page 1.

Mod Bank B is used to increase filter Fc as the keyboard is pressed. This is done by using DC as a source, pressure as a controller and Fc as a destination. Adjust the pressure threshold on the keyboard and the sweep amount with the bank mod depth.

Mod banks C and D are used to sweep VCO1 and 2 in opposite directions with the LFO2 sawtooth. This is done by routing the non-inverted sawtooth to VCO1 in Bank C and the inverted sawtooth to VCO2 in Bank D. The +X controller is used in both banks to bring in both modulations.

Remember that in both of these examples, the LFO waveforms are selected on EDIT page 2 and the speeds are accessible on all of the mod bank pages.

MOD BANK POSSIBILITIES
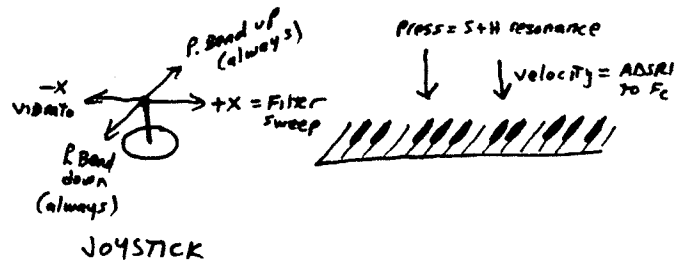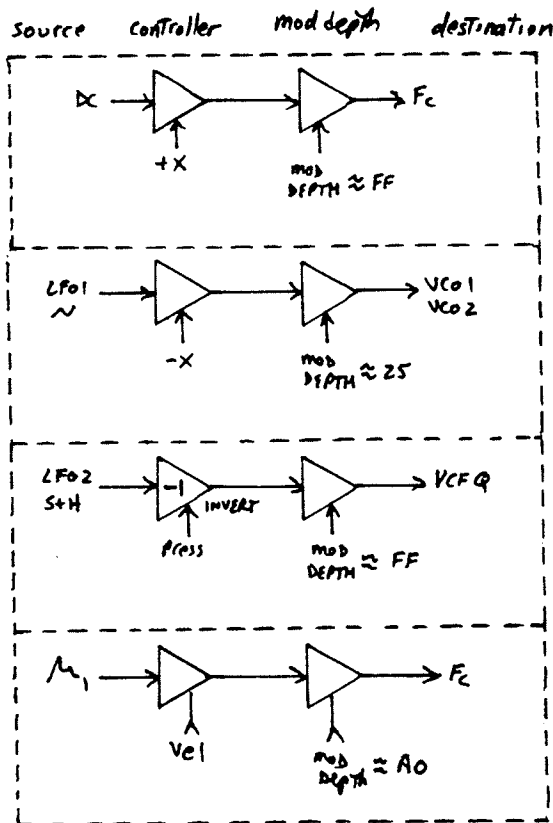
In this example, mod bank A uses the +X controller (right direction on the joystick) to send DC to the VCF Fc so that a filter sweep occurs when the joystick is moved to the right. The maximum amount of sweep will be determined by the modulation depth setting.

Mod bank B uses the -X controller (left direction on the joystick) to add vibrato by routing LFO1 sine to VCO1 and 2. Again, the maximum vibrato amount is determined by the modulation depth setting for the bank.

Mod Bank C is used to route LFO2 set for Sample & Hold to the VCF resonance (Q) whenever the keyboard is pressed (pressure). We use the inverted source here because the resonance increases as the source control voltage becomes more negative. The pressure sensitivity can be set by both the bank mod depth and the pressure sensitivity control on the keyboard.

Mod bank D is used to add ADSR1 modulation to the VCF Fc whenever the keys are hit fast. This is done by using Velocity as a controller, ADSR1 as a source and VCF Fc as a destination. The amount of ADSR modulation is determined by the mod depth setting for the bank.

WHAT A PROGRAM MEMORIZES

VCO settings--   initial pitch
                  any combination of waveforms
                  volume (pre-filter)
                  initial pulse width
                  pulse width mod depth
                  pulse width mod source
                  pulse width mod keyboard track, on/off
                  VCO1 detune
                  VCO1 keyboard track, on/off
                  VCO2 linear FM of VCO1, on/off
                  VCO1 sync to VCO2, on/off
                  VCO1 bypass VCF, on/off

VCF settings--   Fc (filter cutoff)
                  Q (filter resonance)
                  VCF keyboard tracking, off/half/full
                  VCF modulation by ADSR1

ADSR settings--   Attack time
                  Decay time
                  Sustain level
                  Release time
                  ADR 1 and 2, on/off
                  Unconditional ADSR1/ADSR2 retriggering, on/off
                  ADSR retrigger from zero, on/off
                  velocity-controlled attack, off/half/full
                  decay/release keyboard tracking, off/half/full

.VCA settings--   volume
                  velocity-control of VCA, on/off

LFO settings--   speed
                  waveform
                  LFO keyboard retrigger, on/off
                  LFO speed keyboard tracking, off/half/full
                  LFO1 delay

Mod Bank settings--

 for each Mod Bank:
choice of source
mod source invert, on/off
choice of controller or controllers
mod depth
choice of destination or destinations

for entire Mod Bank system:
keyboard control voltage replaces velocity, on/off
velocity (or control voltage) invert, on/off
Bank A--ADSR1 replaces velocity, on/off
Bank B--ADSR1 replaces velocity, on/off
Bank C--Noise replaces velocity, on/off
Bank D--Fc pedal replaces velocity, on/off

Other settings--   choice of glide or glissando
glide/glissando rate
noise volume
user velocity taper replaces factory preset, on/off

PUTTING PROGRAMS WHERE YOU WANT THEM
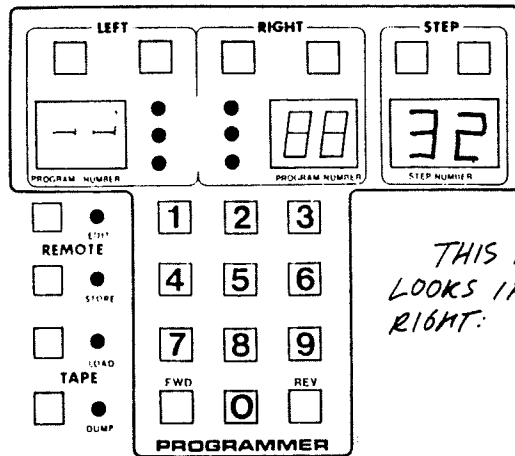
THESE ARE KEYBOARD ASSIGNMENT MODE, FORGET THEM FOR NOW

THIS IS HOW THE READOUT LOOKS IF YOU ARE MOVING PROGRAM RIGHT:

Enter the world of convenience! Want to rearrange your Program order because your stageshow has changed? Want to save a new sound you've created with the Editing Pages without losing the old one? It's very easy with the controls on the Alternate Page that we are about to show you. (The rest of the Alternate Page will be covered in Level Two of this manual.)

Remember the cosmic flute and water buffalo we used as examples earlier, when telling you to be careful with the STORE button? Let's return to those.

Now imagine that you called up Program 55--the cosmic flute-- and fooled around with the Editing Page and Alternate Page controls until the flute had become a water buffalo. Further, imagine that you have decided you want to keep them both, instead of replacing the flute with the buffalo by pressing STORE. Here's how you do it, step by step.

1) Enter the Alternate Page, if you aren't there already. (Press A-440 and STEP ENABLE.)

2) Press either CALL LEFT or CALL RIGHT (depending on whether the water buffalo sound is PROGRAM LEFT or PROGRAM RIGHT.) The dashes in the RIGHT or LEFT readout will change to 00 to show you that the Voyetra is ready and waiting for your next instruction.

3) At this point you have to decide what Program number, from 00 to 99, you want to assign the water buffalo to. 55 is right out (because that's the number of the original cosmic flute, and you want to save that one, not lose it). But let's say you think 67 is awful--you've never used it at all, and have sworn a blood oath you never will, it sounds so bad--so you decide to replace it with the water buffalo.

4) Having made your decision, you put it into effect by pressing 67 on the keypad. The 00 in the RIGHT readout will change to 67.

CAREFUL! Up until this point you can still change your mind. You can alter 67 to 75, or 88, or 01, or you can start all over again by exiting the Alternate Page. Don't go on to the next instruction unless you are certain you want to.

5) *Now* press STORE. And it's done.

The same technique applies for all transferring of Programs. Call up the one you want to transfer, use the Alternate Page keypad to designate where you want to transfer it *to*, and press STORE. It's that simple.

THE VOYETRA VOICE:
AUDIO CHAIN SCHEMATIC
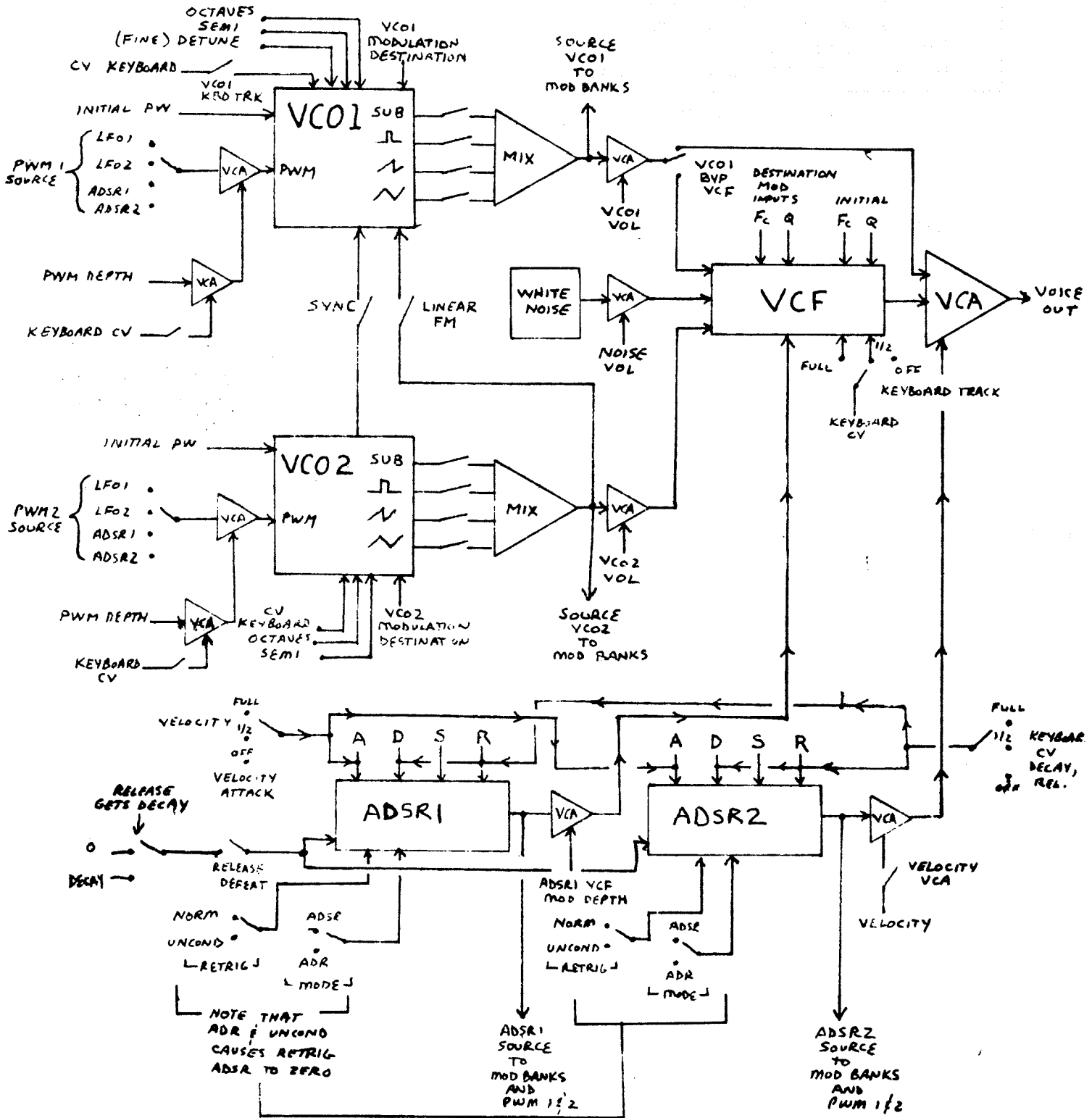
VOYETRA VOICE AUDIO CHAIN
THE CONTROLS FOR THIS DIAGRAM
ARE ON INTERNAL EDIT PAGES 1 & 2

THE VOYETRA VOICE:
MOD BANK SCHEMATIC

WAVEFORM SELECT

∿ ∿ /∿ SH

DELAY

VCA

ARPEG CK RST

LFO I

LFO1 SPEED

• FULL
• HALF } KEYBOARD TRACK

KEYBOARD RETRIG

LFO2

LFO2 SPEED

• FULL
• HALF } KEYBOARD TRACK

LFO TO PWM 1/2

ARPEG CK RST LFO2

NOTE: ARPEG CK RST ON LFU'S IS ONLY FOR LPFT SIDE AND ONLY IF LFO IS ARPEG CLOCK SOURCE

∿ ∿ /∿ SH
WAVEFORM SELECT

DC o
LFO 2 o
LFO 1 o
LFO1 /2 o

INVERT

-1

NORMAL

VCA

VCA

MOD DEPTH

VCO1
VCO2
VCF Fc
Q
} DEST.

DESTINATION SELECT

POLY MOD FROM EACH VOICE {
VCO 1 o
VCO2 o
ADSR1 o
ADSR2 o
}

SELECT SOURCE

VELOCITY
USER TAPER   FACTORY TAPER

TO VCA

(BANK A,B)
ADSR1

TO OTHER 3 MOD BANKS

-1

NORM/ INVERT

KEYBOARD CV

COMMON TO ALL 4 BANKS

MIX

Fc PED (BANK D)
NOISE (BANK C)
JOYSTICK +X
JOYSTICK -X
KEYBOARD PRESSURE

CONTROLLER SELECT

VOYETRA MODULATION BANK
(ONE OF FOUR ILLUSTRATED)

THE CONTROLS FOR THIS DIAGRAM ARE ON INTERNAL EDIT PAGES A-D

THE VOYETRA VOICE:
COMPLETE SCHEMATIC

INTERNAL
EDIT
PAGES
1 & 2

VCO1

VCO2

NOISE

AUDIO
CHAIN

VCF   Fc Q

VCA   VOICE OUT

ADSR1   ADSR2

MOD BANK D

MOD BANK C

MOD BANK B

MOD DEPTH

DC
LFO2
LFO1
LFO1 M2
VCO1
VCO2
ADSR1
ADSR2

INV/
NORM

Q

Fc

VCO2

VCO1

DEST

INTERNAL
EDIT
PAGES
A, B, C, D

SOURCE

VEL
CV
ADSR1
+X
-X
PRESS

MOD BANK A

TO NEXT VOICE

LFO1

LFO2
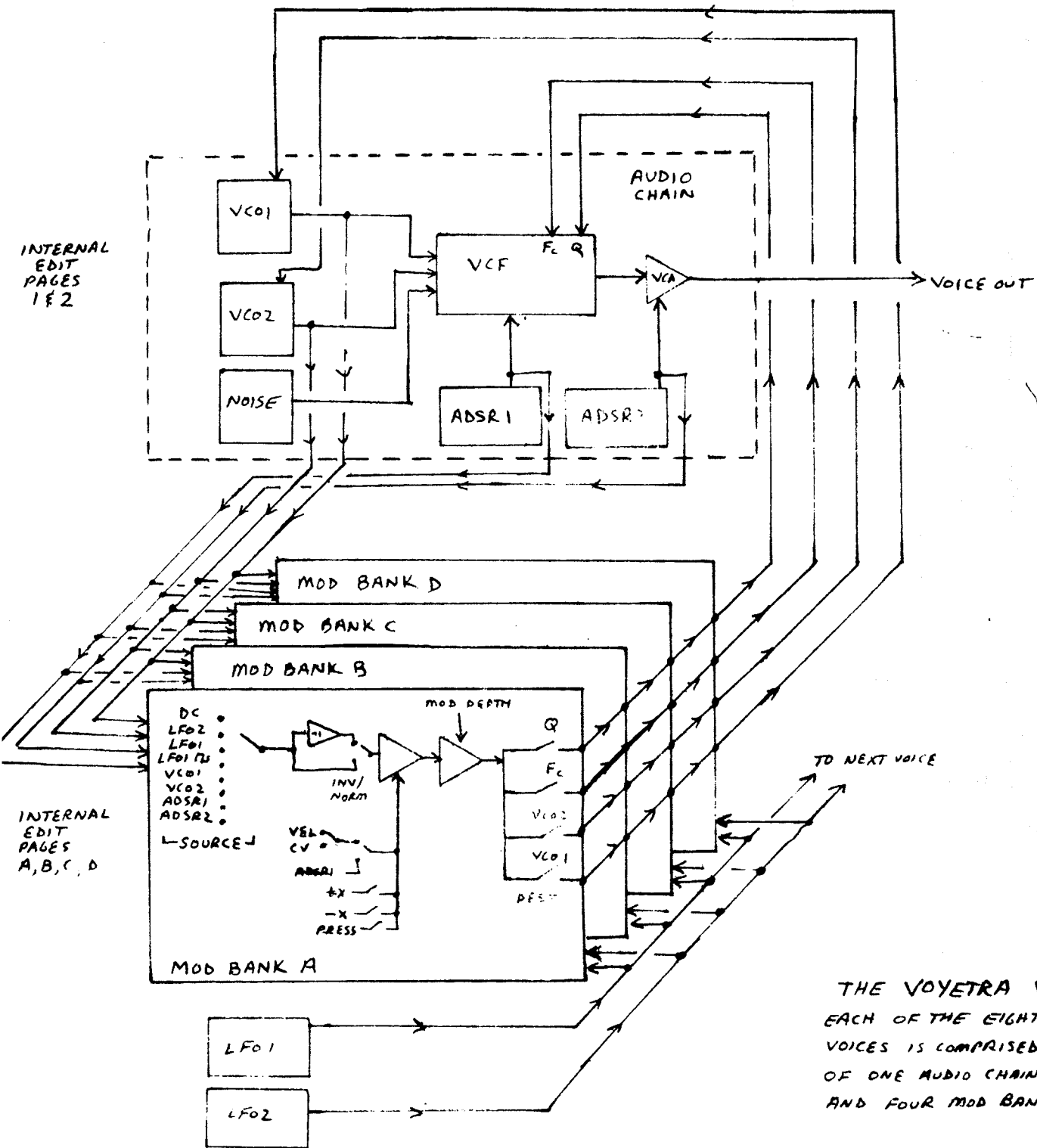
THE VOYETRA VOICE
EACH OF THE EIGHT
VOICES IS COMPRISED
OF ONE AUDIO CHAIN
AND FOUR MOD BANKS

THE VOYETRA EIGHT:
OVERALL STRUCTURE

SYNC L/R

| LFO1 LEFT | LFO2 LEFT | | LFO1 RT | LFO2 RT |

8

7

6

5

4

3

2

1

VOYETRA VOICE

MOD BANKS

VCO1

VCO2

NOISE

ADSR1

ADSR2

VCF

VCA

MIXER

RIGHT

MONO

LEFT

AUDIO OUT

CONTROLS ALL VOICES

VOYETRA COMPUTER

P. BEND → VELOCITY → PRESSURE → + → × → -X → KEYS

XLR MIC CABLE

VPK-5 KEYBOARD CONTROLLER

OVERALL VIEW OF VOYETRA DESIGN

LEVEL TWO:

STEPS AND BEYOND

MAIN MEMORY

① PRESS [CALL RIGHT]

CALL RIGHT

[ASSUME WE BEGIN WITH:] THEN WE

[16] PGM L   [12] PGM R

| 00 |
| 01 |
| 02 |
| 03 |

② SELECT PROGRAM

CALL → [01]

| 97 |
| 98 |
| 99 |

100 PROGRAM MEMORIES

③ PROGRAM IS PULLED OUT OF MAIN MEMORY AND PLACED IN A HOLDING AREA

④ CHANGING PARAMETER TRIMMER AFFECTS HOLDING AREA NOT MAIN MEMORY

PARAMETER TRIMMERS

EDITING HOLDING AREA

PRESSING [STORE] WILL LOAD THE CHANGES MADE WITH THE PARAMETER TRIMMERS INTO THE MAIN MEMORY INSTEAD OF THE STEP.

STORE

⑤ PRESSING [STORE] LOADS THE HOLDING AREA BACK INTO MAIN MEMORY
—OR—

LOAD STEP

⑥ PRESS [LOAD STEP]

[LOAD STEP] WILL SAVE THE PROGRAM L,R NUMBERS AND THE CHANGES MADE, BUT WON'T AFFECT THE MAIN MEMORY CONTENTS.

THEN SELECT STEP NUMBER TO TRANSFER PROGRAM NUMBERS, CHANGES AND PANEL SETTINGS TO STEP MEMORY

L	R	STEP #
73	22	00
16	01	01
36	71	02
...	...	...
96	03	98
15	27	99

PGM L   PGM R   PANEL SETTINGS

16 STAYS BECAUSE IT WASN'T CHANGED

STEPPER MEMORY CONTAINS THE PAIR OF PROGRAM NUMBERS AND THE CHANGES MADE TO THE PROGRAMS USING THE PARAMETER TRIMMERS

ANALYZING THE EFFECTS OF COMMON PROGRAMMER KEYPAD FUNCTIONS AS THEY OCCUR IN THE VOYETRA COMPUTER MEMORY

NOTE THE "VOICE EDITING PAGES" CHANGE THE SETTINGS OF THE PROGRAM IN THE "HOLDING AREA". PRESSING [STORE] TRANSFERS THE CONTENTS OF THIS HOLDING AREA BACK INTO MAIN MEMORY AT THE LOCATION SPECIFIED BY "PROGRAM RIGHT"
THE "MEMORY PROTECT" SWITCH BLOCKS THE TRANSFER OF THE "HOLDING AREA" TO MAIN MEMORY.

THE POWER OF THE STEPPER

A Step is a set of two "programmed Programs." The exercises you did in the Overview section introduced you to the basic concept of the Step, how it differed from a Program, and some of what it could do. Here we are going to extend that knowledge and show you a few tricks.

WHAT A STEP *IS*:

| PROGRAM LEFT SETTINGS / PROGRAM RIGHT SETTINGS | + | VARIATIONS IN THEIR SUNDRY PARAMETER TRIMMERS | + | performance settings like keyboard mode, split, unison, etc. | + | special effects like arpeggiator settings and slave synth assignment |
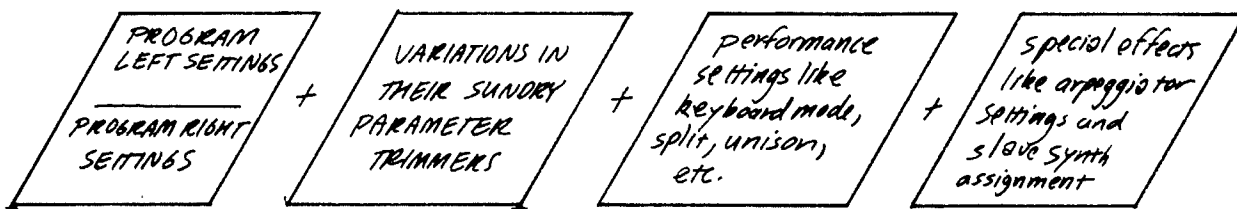
A Step is actually three things; two Programs and a set of instructions that tell the Voyetra how to *vary* those Programs from their original sounds: what keyboard mode they should be in, where the split point is (in SPLIT mode), their relative volumes (in SPLIT and LAYER), or defeat switch settings, or Parameter Trimmer settings, or Arpeggiator rates, or...well, just about whatever changes you feel like making. And then 100 of these different sets of Program variations can be stored as Steps, and called up sequentially or at random by using the FORWARD and REVERSE buttons on the keyboard, the keypad, or the optional footswitch.

WHAT YOU CAN DO WITH THEM:

Virtually anything. Here are some examples.

1) For total ease on stage, you can preset everything you would need during a performance. If, in one set, you need to go through 30 different changes—including different split points on the keyboard, arpeggiator settings, ADSR settings, octave transposings, or more—all you have to do is perfect your sounds and controls beforehand and store them in Steps 00 through 29. At the gig the sounds will be right there, in proper order, only a touch away. Never again will you have to frantically turn knobs and flick switches to be ready for a tricky change during a song. (And if you use the optional FORWARD/REVERSE footswitch, you'll never even have to lift your hands off the keys.)

2) You can store 300 different sounds in the Voyetra's onboard memory. Remember, each Step has two Program variations in

it, which can be anything from Very Radical to extremely subtle.

PLAYING PROGRAM VARIATIONS SEPARATELY:

There are three ways to play PROGRAM RIGHT's Step variation
without hearing PROGRAM LEFT. They are all done while still in
Step mode (i.e., the periods are in the STEP readout).

    --Press WHOLE 8. That will allow PROGRAM RIGHT to play up
to eight notes at a time over the entire keyboard.

    --Press SPLIT while holding down the lowest D-Flat on the
keyboard. This will allow PROGRAM RIGHT to play up to four notes
at a time, from that D key on up. (You might think that
you could play the lowest C and press SPLIT and get PROGRAM
RIGHT over the entire keyboard, but for technical reasons it
doesn't work that way. Try it and see--what happens is that the
internal computer sets the split point at the middle C default.)

    --Press LAYER, and then use the VOLUME LEFT knob in the
Program Parameter Trimmer section to turn off PROGRAM LEFT's
volume, leaving only PROGRAM RIGHT audible. This allows you to
play up to four notes at a time across the *entire* keyboard
(unlike SPLIT, above).

There are only *two* ways to play PROGRAM LEFT's variation without
hearing PROGRAM RIGHT. Both are four-Voice polyphonic. Pressing
WHOLE 8 doesn't work with PROGRAM LEFT variations.

    --Press SPLIT while holding down the highest B on the
keyboard. PROGRAM LEFT will now play up to four notes at a time on
the keyboard, from the highest A down (leaving the high B and C
keys playing PROGRAM RIGHT).

    --Press LAYER, and then use the VOLUME RIGHT knob in the
Program Parameter Trimmer section to turn off PROGRAM RIGHT's
volume, leaving only PROGRAM LEFT audible. This allows you to
play up to four notes at a time over the entire keyboard.

---

    3) You can create thicker, richer versions of Programs you
like, by calling the same Program into both LEFT and RIGHT sides
and then making slight variations in their previously identical
tuning, attack settings, filter ctoff, LFO rate, and so on.

    4) You can plug new Program sounds into your Steps to create
instant variations by simply calling up a Step, pressing CALL LEFT
or CALL RIGHT, and then using the keypad, FORWARD, or REVERSE
switches while in SPLIT or LAYER mode.

    5) You can store and call up wildly different arpeggiation
patterns; with the right sounds, this turns your Voyetra into a
complex rhythm/drum machine, able to shift pre-programmed
downbeats at the flick of a footswitch. (In today's music, where
the synth parts are often as much rhythmic as melodic, this can be

especially useful.

Begin to get the picture? The Stepper's power is that of total convenience; and as such, is only limited by how far you decide to take it.

STORING A STEP:

To store a Step, once you've got your settings the way you like them, make sure you are in the Normal Page and then

1) Press STEP LOAD, and

2) Press the number of the Step you would like to assign these settings to. That's it.

To test this, find a Step that you don't think has a thrilling sound, and play with its trimmer and switch settings until you've made it more interesting. Then press STEP LOAD, followed by the Step's own number, and use FORWARD and REVERSE to see how the changes you've made are now stored in memory.

THE ALTERNATE PAGE

---

enter; A440 & STEP ENABLE
exit; , STEP ENABLE

1 = NORMAL KEYBOARD ASSIGNMENT
2 = NORMAL WITH SINGLE
3 = CIRCULAR KEYBOARD ASSIGNMENT
4 = CIRCULAR WITH SINGLE

ARPEGGIATOR CONTROLS FOR
LEFT SIDE OF KEYBOARD
IN SPLIT MODE

WITH EXTERNAL ARPEGGIATOR CLOCK,
THIS KNOB SETS THE GATE DURATION →

VOYETRA EIGHT
polyphonic synthesizer module

program transfer;

```
CALL     OR   CALL      →  SELECT          →  STORE
LEFT          RT            DESTINATION
                            NUMBER ON       └ LOADS SOURCE PROGRAM ┘
 └ SOURCE PROGRAM ┘         KEYPAD             TO DESTINATION SELECTED
```

MIDI
CONTROLS
USED FOR
SLAVING
VOYETRA
MODULES

SLAVE SYNTH
ASSIGNMENT
TO LEFT HALF
OF KEYBOARD
SPLIT
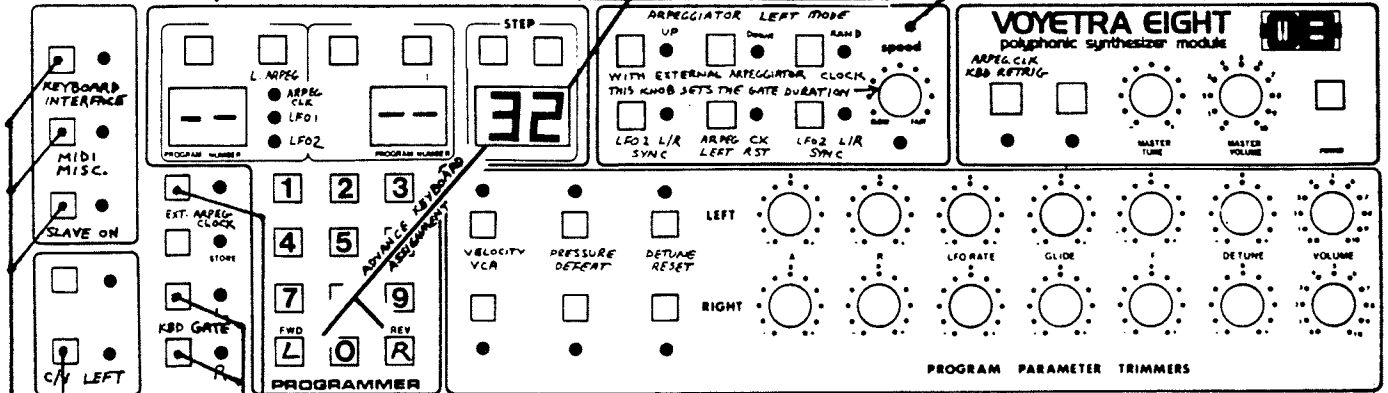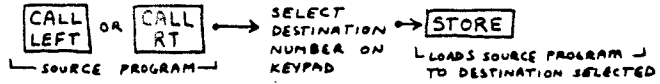
LETS YOU USE AN EXTERNAL CLOCK TO
GATE THE ARPEGGIATOR

USED FOR GATING CHORDS ON
THE KEYBOARD WITH
AN EXTERNAL CLOCK OR
WITH THE ARPEGGIATOR
CLOCK.

WHEN YOU USE THIS, THE SPEED
CONTROL NOW BECOMES A NOTE
DURATION CONTROL SINCE IT
DETERMINES HOW LONG THE GATE
WILL STAY HIGH AFTER THE
EXTERNAL CLOCK TRIGGERS THE
ARPEGGIATOR

TO CLEAR THE ALTERNATE PAGE, PRESS: A440 + STEP/LOAD (see page 89)

On the ALTERNATE PAGE there are a number of special extras.
They give you:

> -- additional control over the Arpeggiator, the LFOs,
>   and Keyboard Assignment
> -- some useful "Defeat" options
> -- the power to put Programs anywhere you want in
>   the Voyetra's memory
> -- command of your instrument's MIDI (Musical
>   Instrument Digital Interface).

Since Program moving has been covered, and MIDI has an
upcoming section of its own, we'll concentrate here on the new
Arpeggiator, LFO, Keyboard Assignment, and Defeat controls.

ARPEGGIATOR CONTROLS

ARPEGGIATOR LEFT MODES
AND CLOCK SOURCES:

We've shown you several times now how some features of the
Voyetra are doubled, and can be set independently from one another
(so that complex and *useful* combinations can be created.) The
Arpeggiator is like that too.

Of course, you knew that already from the fact that the
Arpeggiator section on the Normal Page has a switch to turn on
ARPEGGIATOR LEFT. Now it's time for you to learn how to control
ARPEGGIATOR LEFT separately.
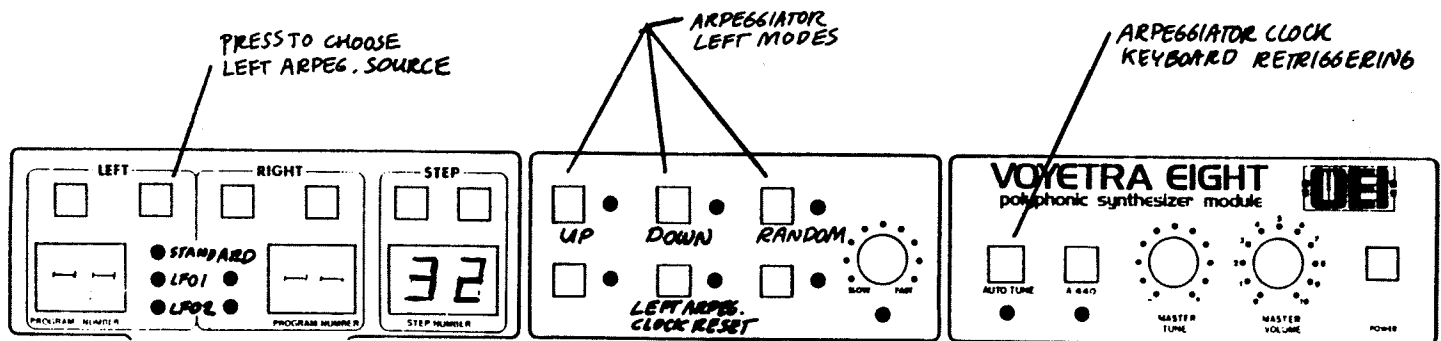
First, put the keyboard in SPLIT mode. (ARPEGGIATOR LEFT can
only be turned on in SPLIT mode.) Then turn ARPEGGIATOR LEFT on
and enter the Alternate Page by pressing A-440 and STEP ENABLE at
the same time, just as you did in your very first exercise with
the Page concept, back in the Overview. You'll know you are in the
Alternate Page because of the dashes in the readouts.

At this point, holding down a chord on the left half of the
keyboard should get you an arpeggiation. Try it. (If no
arpeggiation occurs, go back to the Normal Page and make sure
that you are in SPLIT mode with ARPEGGIATOR LEFT turned on.)

TO CHOOSE AN ARPEGGIATOR LEFT SOURCE-- press the OCTAVE

LEFT button. It will cycle you through three choices; the standard arpeggiator clock, LFO1, and LFO2.

TO SET THE ARPEGGIATOR LEFT RATE-- this depends on just what source you choose. If your source is the standard arpeggiator clock, then changing the rate is done by adjusting the SPEED knob in the Arpeggiator section. If your source is LFO1, you use the LFO RATE LEFT trimmer in the Program Parameter Trimmer section (this remains active when you are in the Alternate Page, for your convenience). Adjusting LFO2 is a little trickier. To do that, you must leave the Alternate Page, press CALL LEFT to make sure that the periods are in the LEFT readout, and then go to Edit Page 2 and adjust the LFO2 SPEED trimmer there.

TO SET THE ARPEGGIATOR LEFT MODE-- use the three buttons across the top of the Arpeggiator section exactly as you did with ARPEGGIATOR RIGHT. There are four available modes: UP, DOWN, UP AND DOWN, and RANDOM.

ARPEGGIATOR CLOCK LEFT RESET-- is set with the white switch in the lower row of the Arpeggiator section. Turn it on, and ARPEGGIATOR LEFT will restart its cycle from the beginning every time ARPEGGIATOR RIGHT does.

To hear this effect for yourself, set up totally different arpeggiation rates for the two sides of the keyboard, hold down a chord on the left side, and then start playing the right side with and without this control on...it's basically an ARPEGGIATOR LEFT/RIGHT synchronization switch, except that all it does is make them *start* their cycles together. If you want ARPEGGIATOR LEFT and RIGHT truly in synch, you must have ARPEGGIATOR LEFT set to the standard arpeggiator clock source.

ARPEGGIATOR CLOCK KEYBOARD RETRIGGERING-- is turned on by pressing the AUTO TUNE button while on the Alternate Page. This affects ARPEGGIATOR LEFT and RIGHT at the same time, and causes both to trigger every time you strike a key. This helps prevent playing "in between" the arpeggiated notes. (You should be aware that it helps, but not *totally*--if your arpeggiation rate is sufficiently slow, some key strikes will still be lost.)

USING AN EXTERNAL CLOCK FOR THE ARPEGGIATOR:

You can plug an external clock into your Voyetra's Arpeggiator through the Arpeggiator Clock Input Jack on the back panel, and then select whether you want to use that or the internal clock by using the EXTERNAL ARPEGGIATOR CLOCK control (the grey EDIT button). When this light is on, then the external clock is active. When it's off, the internal clock is active.

The clock input is edge-sensitive. This means any positive-going pulse can be used to clock the arpeggiator, such as those provided by drum machine triggers, sequencer metronome outputs, foot pedals, or envelope followers.

Since The clock is edge-sensitive, it ignores the *duration* of
the external clock's trigger input. Because of this, you must tell
the Arpeggiator how long to sustain a note after triggering. This
is done with the ARPEGGIATOR SPEED trimmer (since arpeggiator speed
is now being controlled externally, this control is free for other
uses). By adjusting this, the duration of externally-arpeggiated
notes can be programmed. The ARPEGGIATOR RATE LED will flash in
time with the external clock.

KEYBOARD GATE:

When this control is on, you don't get arpeggiation of whatever
chord you're holding down. Instead, the entire chord turns on and
off automatically at the arpeggiator clock rate.

To turn on KEYBOARD GATE RIGHT, press TAPE LOAD while in the
Alternate Page. To turn on KEYBOARD GATE LEFT, press TAPE DUMP while
in the Alternate Page.

Using the internal clock, this feature allows for auto-repeat
of chords and pseudo-tremelo effects. Used with an external clock
source, it allows you to synchronize the chords you play to a
sequencer or a drum machine. (If the clock is fed from an envelope
follower or the trigger output of a noise gate, you can synch up
your playing with the rhythm of another instrument, or the signal
on a tape track.)

THE EXTRA LFO CONTROLS:

SYNC LFO1 LEFT WITH LFO1 RIGHT

SYNC LFO2 LEFT WITH LFO2 RIGHT
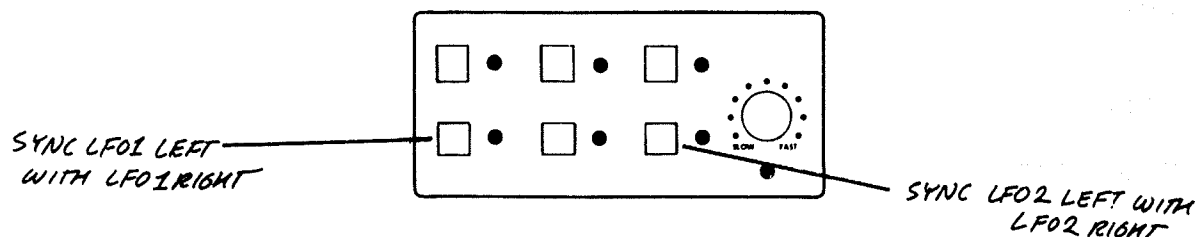
LFO SYNCH-- The two blue buttons in the bottom row of the
Arpeggiator section allow you to selectively synchronize LFO1 LEFT
with LFO1 RIGHT (the left blue button), or LFO2 LEFT with LFO2
RIGHT (the right blue button). These will come in handy when you
start combining different Programs in LAYER mode, to prevent
unwanted phasing and chorusing effects caused by differing LFO
rates.

KEYBOARD ASSIGNMENT MODES:

KEYBOARD ASSIGNMENT MODE LEFT DISPLAYED HERE

KEYBOARD ASSIGNMENT MODE RIGHT DISPLAYED HERE
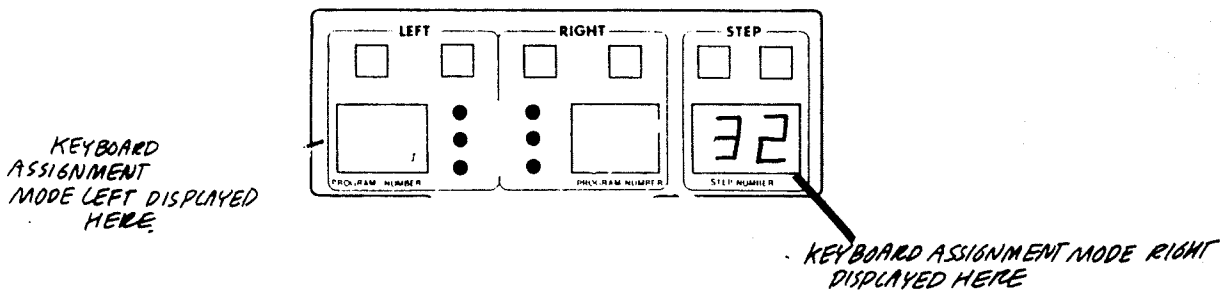
There are four keyboard assignment modes. These tell the internal computer of the Voyetra just how to assign the eight Voices of the instrument. The four modes are:

```
0 -- Normal
1 -- Normal With Single
2 -- Circular
3 -- Circular With Single
```

The mode number for KEYBOARD ASSIGNMENT MODE LEFT is displayed in the LEFT readout. You select a new mode by pressing FORWARD.

The mode number for KEYBOARD ASSIGNMENT MODE RIGHT is displayed in the RIGHT readout. You select a new mode by pressing REVERSE.

Choice of keyboard assignment modes is stored in a Step.

Now, what do they *do?*

NORMAL-- in NORMAL, the computer will "rob" Voices that are still sounding, in order to keep up with the keys being played.

CIRCULAR-- in CIRCULAR, this robbing does not occur.

WITH SINGLE-- CIRCULAR used together with SINGLE offers tremendously improved GLIDE and GLISSANDO effects, because what SINGLE does is make the internal computer assign any new note to the most recently played Voice, if it's available.. This results in GLIDE and GLISSANDO being less random--for example, if you played a single note run up the keyboard, each note would be assigned to the same Voice, and GLIDE would always start at the pitch of the previous note. (*Note:* Mode 1, NORMAL WITH SINGLE, is not very useful, though you may wish to try it yourself as a special effect.)

NEW DEFEAT SWITCHES:
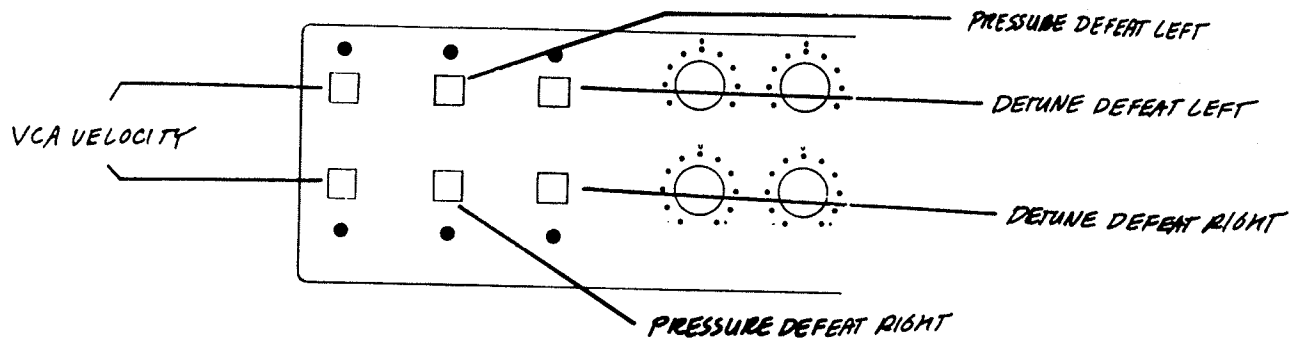
PRESSURE DEFEAT LEFT AND RIGHT-- is set by the top and
bottom center switches in the Program Parameter Trimmer section.
Like the defeat switches on the Normal Page, pressing these turn
off a function--in this case, pressure sensitivity. This
allows you to set things up in SPLIT and LAYER modes so that
pressure only affects the Program you want it to affect, instead
of both of them.

DETUNE DEFEAT LEFT AND RIGHT-- Something special here. These
righthand top and bottom controls are strictly OFF buttons. When
you use them, any detuning you might have set up with the VCO1
detune trimmers is automatically set back to zero. It's an instant
way to stop annoying "beating" between oscillators caused by a
detuned VCO1. (It's also a good diagnostic tool, because if you
use it and you can still hear beats, then either A) VCO2 is
detuned, not VCO1, and you should adjust it with the VCO tuning
controls on Edit Page 1, or B) the whole instrument is out of tune
and you should run AUTO TUNE.)

NOTE: The DETUNE DEFEAT switches don't turn on and off. Just
off. So when you press them, no light goes on.

VCA VELOCITY-- the left top and bottom switches in the
Trimmer section turn on the VCA VELOCITY. It's exactly the same
control you encountered on Edit Page 2, and what it does is turn
on the velocity sensitivity of the VCA, so that the faster you
strike a key, the louder a Program plays. This is particularly
nice in LAYER mode for adding expressiveness to your playing,
because not only volume but tone *color* will change with your
strike. (Another way to turn on the VCA's volume sensitivity is
from the Normal Page; you press A-440 and RELEASE DEFEAT LEFT or
RIGHT at the same time. Choosing RIGHT or LEFT will determine
which Program's volume will become velocity sensitive.)

CONTROL VOLTAGE/GATE OUTPUT:

There is one control voltage output for controlling a slave
synthesizer. The UNISON RIGHT button in the Alternate Page assigns
it to either the left or right sides of the keyboard. When the
LED is on, the slave output will track the left side. When it is
off, the slave output will track the right side.

If the slave output is set to LEFT, but the Voyetra is not
in SPLIT mode, then the slave synth will not play because there is
nothing for the slave output to track.

This setting is stored in the Stepper.

CLEARING THE ALTERNATE PAGE

There are going to be times when you just want to start all over
again, and you don't want to press a dozen different controls to
do it. So, to clear ALL of the Alternate Page controls, go to
the Normal Page and press A-440 and STEP LOAD. That will:

        Turn off VELOCITY VCA LEFT and RIGHT
        Turn off PRESSURE DEFEAT LEFT and RIGHT
        Turn off LFO SYNCH LEFT and RIGHT
        Turn off ARPEGGIATOR RETRIGGER
        Make ARPEGGIATOR LEFT mode the same as ARPEGGIATOR RIGHT
        Set ARPEGGIATOR LEFT CLOCK equal to ARPEGGIATOR RIGHT

It also turns back on any Voices you might hae deliberately turned
off with the controls on the Set Page. See the section of the
manual concerning the Set Page for more details.

WHAT A STEP MEMORIZES:

Step number

Program numbers, Left and Right
Program volumes, Left and Right
Program octave settings, Left and Right

Keyboard modes, including Unisons
Keyboard split point
Keyboard Voice assignment modes, Left or Right

All Program Parameter Trimmer settings on Normal Page (memorizes
     difference from original Program setting)

Arpeggiator on/off, Left and Right
Arpeggiator modes, Left and Right
Arpeggiator auto-octave shift, Left and Right
Arpeggiator clock speed
Arpeggiator clock keyboard retriggering
Arpeggiator Left clock source
Arpeggiator Left clock retriggering from Arpeggiator Right
External Arpeggiator clock, on/off
Arpeggiator keyboard gate, Left and Right

LFO1 and 2 synchronization
LFO1 Left sync to LFO1 Right
LFO2 Left sync to LFO2 Right

Pressure defeat, Left and Right
Pitch Bend defeat, Left and Right
Release Defeat, Left and Right
Velocity-controlled volume, Left and Right

Voice disable settings

Slave synth CV/Gate output assignment, Left or Right

TAPE STORAGE AND LOADING
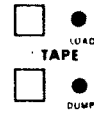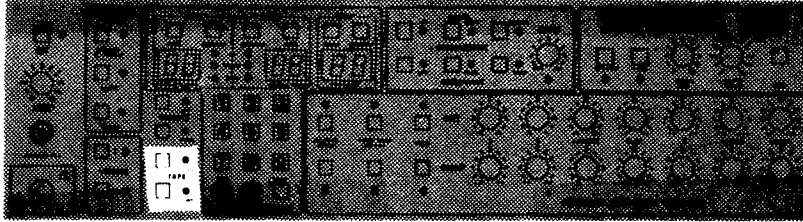
The TAPE DUMP and TAPE LOAD switches on the front panel of
the Voyetra control a variety of functions, depending on what Page
you are in and just what you want to accomplish. First, though,
you have to hook up your tape recorder, like so:
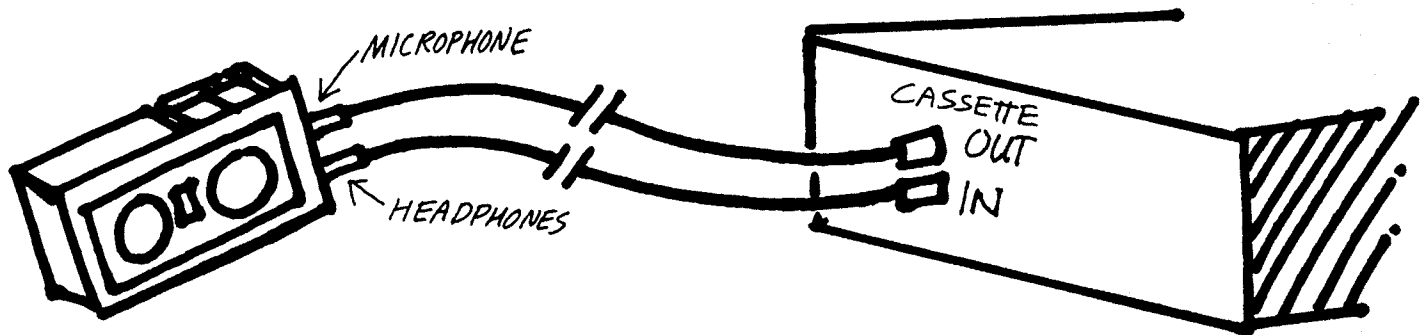
Turn your Voyetra around and find the two jacks labelled
CASSETTE INTERFACE. Connect the jack marked OUT to your tape
recorder's microphone input, and the one marked IN to your
recorder's headphone (or auxillary) output. You will need cables
with quarter-inch phone plugs on one end and Mini Plugs on
the other, if you intend to use a portable "Walkman"-like
tape machine for storage. You should be able to find such
cables at your local electronics or stereo stores. If not,
they are available at low cost from OEI.

NOTE: Connect the *cassette output* jack only to a *microphone* input,
not a line level one. Otherwise your recorded signal level will be
too weak.

NOTE: With some tape recorders, there will be grounding problems
if input and output are connected to the Voyetra at the same time.
The simple solution is to connnect only one line, input or
output, as needed. If problems occur during tape loading or
dumping, this should be tried as a possible solution.

NOTE: Cassette LOAD and DUMP will *not* work if the MEMORY
PROTECT switch on the rear panel is on.

SAVING AND LOADING PROGRAMS AND STEPS:

Saving all 100 Steps and 100 Programs on tape is simple. Make sure that the Voyetra and your tape recorder have been connected properly (OUT connected to recorder microphone jack), put the tape recorder on RECORD, and let the tape run. Then press the TAPE DUMP switch on the Voyetra. As the contents of the Voyetra's memory are recorded onto your tape, numbers in the STEP readout will count up from 00 to 99. When the process is finshed, the Voyetra will return to Step 00 and you can shut your tape recorder off.

(You can test whether or not your tape came out right by using the loading procedure in the next paragraph. If something went wrong in the tape dump, the Voyetra will not accept the tape data and will instead display an EE in the readouts. This will not harm your Voyetra or the sounds in it in any way, so don't get upset. We'll get to possible problems and fixes in just a bit.)

To load a full set of Steps and Programs, connect the tape recorder's headphone (or auxillary) output to the IN jack, place the tape with the data in the tape recorder, rewind to the clicks just before the recorded Program information, and press TAPE LOAD on the Voyetra. Then play the tape. Your Voyetra will lock on to the clicks; and the STEP readout, once Program information begins, will start counting up from 00 to 99 as new data is stored in the Voyetra's memory. If something goes wrong with the loading process, everything will stop and the Voyetra will display an EE in the readout (indicating an error). To return to the Normal Page, just press any switch on the front panel.

(If you haven't worked with digital data recorded on cassettes before, take a moment to listen to it. You'll hear, first, a series of clicks. Then a high-pitched whiny kind of buzz, somewhat annoying, which is the data itself. It's VERY important that you start the tape rolling during the clicks and not the buzz, or else your Voyetra will have no way to latch on to the data.)

KEEP A BACKUP: Tapes can be damaged by heat, impact, magnetic fields such as those in loudspeakers and headphones and TV sets...in fact, any number of things. The wise course is to always make two copies, or even more, so you have a backup. Your sounds are your reasons for owning a synth--protect them.

WHAT TO DO IF...

YOU GET AN "EE"-- check your connections first. Then try adjusting the output volume on your tape recorder. The Voyetra has a built-in automatic gain control circuit, with a wide range, so it should be relatively easy to find a compatible volume setting. If that still doesn't work, then it is possible that either your tape or your recorder are defective; try another tape, or another tape player (or change its batteries if they were low) and see.

THE READOUTS DON'T DO ANYTHING-- check your connections, and make sure that you started your tape during the clicks and not the buzz.

TAPE LOAD IS INTERRUPTED AT SOME NUMBER-- this can happen if a tape has a gap, or an accidental erasure in the middle of otherwise valid data. The fix is to turn the Voyetra off and then on again, to restart the internal computer, and then use a backup cassette.)

EVERYTHING SEEMED TO GO JUST FINE BUT NONE OF THE SOUNDS YOU JUST LOADED ARE ACTUALLY THERE-- when this happens, check to make sure that the MEMORY PROTECT SWITCH on the back of the Voyetra is *off*. Odds are it was on; which prevents the instrument from accepting the new data. Turn it off and try again.

SELECTIVE TAPE LOADING:

When programmable synths first came on the scene, everybody was thrilled...and then they discovered how tedious the process of getting Programs into the right order could be. Well, the Program moving technique we showed you in the Alternate Page section goes a long way towards ending the problem, and our selective tape loading feature does it in completely.

But it does require that you know two things before you start: the number of the Program you want to selectively load, and the number of the Program slot you want to store it in. (This is another good reason for keeping a notebook listing all your Programs.) Here's how you do it, step by step.

Step One) Hook your tape recorder up to your Voyetra, and put in the cassette containing the specific Program you want to call up (make sure tape is rewound to the clicks before the appropriate Program data).

Step Two) Enter selective loading mode by pressing A-440 and TAPE LOAD at the same time. The readouts will go blank, waiting for your next commands.

Step Three) Press the number of the Program you want to call up. This will appear in the LEFT readout. Then press the number

you want the Program to be stored under. This will appear in the RIGHT readout.

Step Four) Play the tape. The STEP readout will start counting up from 00, as the Voyetra scans the incoming data for the Program it has been instructed to load. When that Program (the one in the LEFT readout) is reached, loading occurs and the Voyetra automatically goes back to the Normal Page.

USING OLD VOYETRA DATA TAPES IN VERSION 3 INSTRUMENTS:

The Version Three Voyetra has many new features which are recorded as parts of Steps or Programs, which means that the data structures are different than those used by Version Two Voyetras.

However, the Version Three Voyetra *will* accept a Version Two data tape. The instrument senses when a Version Two tape is being loaded and automatically adjusts, setting the new features to their OFF states.

Although you can continue to use your Version Two tapes, we recommend that you make new cassettes using your instrument's TAPE DUMP command. These will be in the Version Three data structure, which will be loadable into Version Four Voyetras when they become available—or when you have your own Version Three upgraded to a Four (or a Five, or a Six...) someday. The battle against obsolescence in synthesizers goes on.

Version One Voyetra tapes will *not* load into a Version Three instrument. If you have a Version One, Octave-plateau can upgrade it to a Version Three at a nominal charge.

STORING AND LOADING SEQUENCES:

In the next section of this manual, we'll be introducing you to the Voyetra's powerful polyphonic sequencer. Using the following procedure you can store and load any of the sequencer work you do with your instrument.

To load or dump sequencer data, you must be in the Poly-Sequencer Page. That's accomplishd by pressing A-440 and ARPEGGIATOR RIGHT at the same time. From this Page, TAPE LOAD and TAPE DUMP work exactly as they do on the Normal Page, except that only sequencer information will be stored and loaded. Programs will not.

Selective tape load will *not* work with sequences.

Also, sequence-loading has no effect on the Programs already in memory and Program-loading has no effect on the sequences

already in memory.

```
┌──────────────────────────────────────────────────────────────┐
│                                                              │
│  NOTE: We strongly recommend that you keep sequencer data stored │
│  on different cassettes than Program data, just to help keep track │
│  of things...and mark your tapes clearly!                    │
│                                                              │
└──────────────────────────────────────────────────────────────┘
```

STORING AND LOADING VELOCITY TAPERS:

With the Voyetra, you can custom-design your velocity
sensitivity. This will be described in detail later in this
manual. You can also store and load these customizations with
your TAPE LOAD and DUMP functions.

To store a velocity taper, just do a normal tape dump.
Whatever custom velocity taper you have created will be recorded
onto tape at the end of the Program data. (Remember to mark your
cassette so that you know what Program data has a velocity taper
you'll want to call back.)

To load a velocity taper, you do something special. You start
by pressing A-440 and TAPE LOAD, as if you were doing a selective
Program load; and then, when the readouts go blank, you press
AUDIO MUTE and start the tape rolling. A special display (like the
one just below) will appear in the LEFT readout:
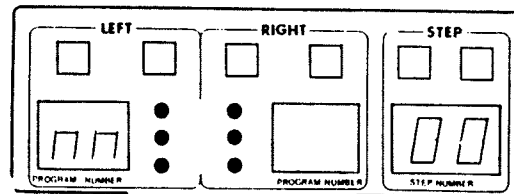
This indicates that the Voyetra is waiting for velocity
taper information. The count in the STEP readout will proceed
from 00 to 99, as always, and then the velocity taper data stored
just after the Programs will be loaded.

CREATING AND STORING SEQUENCES
(THE POLY-SEQUENCER PAGE)

---

enter; A440 & ARPEG RT.
exit; ARPEG RT.

POLY·SEQUENCER PAGE

METRONOME BEATS
0 = QUARTER NOTE
1 = EIGHTH NOTE
2 = SIXTEENTH NOTE

SEQUENCER QUANTIZATION
0 = NO QUANTIZE   3 = 32 NOTE   6 = 8 NOTE TRIPLETS   9 = 4 NOTE
1 = 64 NOTE   4 = 16 NOTE TRIPLET   7 = 8 NOTE   A = 2 NOTE TRIPLET
2 = 32 NOTE TRIPLETS   5 = 16 NOTE   8 = 4 NOTE TRIPLETS
EXAMPLE: 4 MEANS SEQUENCER WILL QUANTIZE TO SIXTEENTH NOTE TRIPLETS

TO CHANGE PLAYBACK SPEED:
PRESS "BPM" THEN ENTER METRONOME
BEATS PER MINUTE ON KEYPAD BY PRESSING
THREE NUMBERS BETWEEN 20-251
OR USING FWD REV SWITCHES

TAPE LOAD AND DUMP ON THIS
PAGE ARE USED TO SAVE AND RECALL
SEQUENCER NOTES FROM TAPE

RECORD MODE: DISPLAYS NUMBER OF EVENTS LEFT IN
SEQUENCER MEMORY

OTHERWISE: DISPLAYS THE METRONOME BEATS PER MINUTE
LOADED BY PRESSING "BPM" AND THEN A NUMBER
BETWEEN 20-251 ON THE KEYPAD

---

enter & exit

SONG PAGE

ENTER SEQ NUMBERS BY PRESSING
FOUR CONSECUTIVE NUMBERS ON THE
KEYPAD

EXAMPLE: 03 05 MEANS THAT SEQUENCE 1
WILL PLAY 3 TIMES AND SEQUENCE 2
WILL PLAY 5 TIMES.

EACH SEQUENCE CAN PLAY UP TO 99 TIMES

NOTE   OTHER SEQUENCER CONTROL BUTTONS THAT
ARE AVAILABLE ON THE SEQUENCER PAGE ARE
ALSO AVAILABLE ON THE SONG PAGE.

NOTE: THE METRONOME AUDIBLE CLICK IS AVAILABLE
AT THE REAR PANEL JACK LABELLED "ARPEGGIATOR
CLOCK OUTPUT" → CAREFUL, IT'S PRETTY STRONG
FOR AUDIO, SO YOU MAY WANT TO PAD IT.

A LOW LEVEL OUTPUT IS AVAILABLE AT THE
"CASSETTE OUTPUT" JACK.

For all intents and purposes, the Voyetra's Poly-Sequencer is
a two-track tape recorder: except that it uses a computer to store
what you play, not tape, making it possible to do all sorts of
things that a tape recorder never could (like instantly playing
back a sequence, or automatically bouncing channels as you record
overdubs, or making your timing perfect for you).

We'll quickly review the new function switches on this Page,
tell you a few things it's good to keep in mind, and then introduce
you to the Sequencer's different modes. Don't just read about them--
try them out. There's no substitute for hands-on learning.

THE SEQUENCER CONTROLS:

THE RIGHT, LEFT, AND STEP READOUTS-- show all *kinds* of
things. At all times except when recording, they reveal the
following:
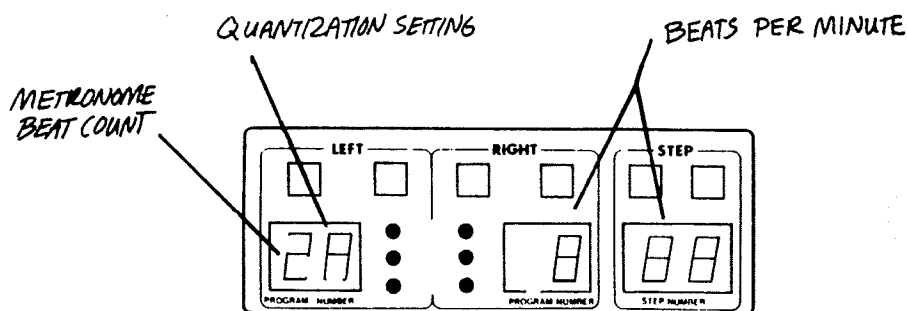
--the number on the left side of the LEFT readout represents
   the METRONOME BEAT COUNT.

--the number on the right side of the LEFT readout represents
   QUANTIZATION SETTING (we'll tell you all about quantizing
   later in this section).

--the numbers in the RIGHT and STEP readouts represent the
   TEMPO in BEATS PER MINUTE.

When recording, the readout changes to one of these two and
does a countdown of the sequencer "events" you are recording
(each note you play consists of two events; the key going down and the
key coming up):

SET METRONOME BEAT COUNT-- is done with the red button above
the LEFT readout (which puts a period next to that readout's
left digit) and then the keypad. The metronome can be set to
tick on quarter notes (0), eighth notes (1), or 16th notes (2).

SET QUANTIZE INTERVAL-- is done with the white button above
the LEFT readout (again, shifting the period) and then the keypad.
There are eleven possible quantize intervals.

SET TEMPO-- is done with the white button above the RIGHT
readout (shifting the period) and then the keypad. It has a range
from 20 to 251 beats per minute, though not *all* numbers in that
range are possible, for technical reasons.

SET CLOCK RATE TO 96 (the Voyetra standard)-- is done with
the bottom button in the Keyboard Mode section.

SET CLOCK RATE TO 48-- is done with the top button in the
Unison section.

SET CLOCK RATE TO 24-- is done with the bottom button in the
Unison section.

METRONOME ENABLE-- is done with the top grey button in the
Remote section. This turns the metronome on, which means that if
you have an amplifier hooked up to the Arpeggiator Clock output
on the rear panel, you will hear a ticking consistent with the
various clock, tempo, and beat counts that are set.

EXTERNAL CLOCK ENABLE-- is the top left button in the
Arpeggiator section. It turns off the Sequencer's internal clock
and allows it to be controlled by external drum machines or
triggering devices.

INSTANT RECORD-- is the top middle button in the Arpeggiator
section. If this light is off, the Sequencer will not start
recording until the first key is struck. If it's on, the Sequencer
starts recording the moment the START/STOP button is hit.

CLEAR-- is the lefthand blue button in the Arpeggiator
section. This turns off all the switches, so you can start from
scratch.

START/STOP-- is the bottom white button in the Arpeggiator section. This is the button you push *after* you've used the other buttons to select a sequencer mode, when you are all set and ready to begin playing. It's also the button you press when you're done.

EXIT-- is the righthand blue button in the Arpeggiator section. Press this to leave the Poly-Sequencer Page.

CHANNEL 1 AND 2 PLAY-- are the lefthand top and bottom buttons in the Parameter Trimmer section. After you have recorded something on a channel, you must press the appropriate PLAY button in order to hear it on playback (which is triggered with the START/STOP button).

CHANNEL 1 AND 2 RECORD-- are the center top and bottom buttons in the Parameter Trimmer section. You press one of these to put your selected channel in RECORD mode.

LOOP-- is the top righthand button in the Parameter Trimmer section. This control, used correctly, will make your recorded sequences automatically repeat.

LOCK-- is the bottom righthand button in the Parameter Trimmer section. This is a multi-function switch that does different things in different modes. We'll cover these shortly.

SET SONG-- is the middle button in the Keyboard Mode section. Pressing this changes the readout display and allows you to program how many times each Channel of the Sequencer will play when in Song Mode.

SONG-- is the top button in the Keyboard Mode section. Once you've programmed how often you want the channels to play (using the SET SONG command just above) and selected which Channel should start, this is the button you press to actually activate SONG mode. After pressing this, as soon as you press START the Voyetra's Sequencer will automatically reapeat channels as you wished.

SOME THINGS TO KEEP IN MIND:

--Each channel can record 850 *events*. Since each note you play consists of two events (key down and key up) that means each channel can record 425 notes. If you need to record a longer sequence than that, the two channels can be linked end-to-end, giving you space to record 850 notes (1700 events). Even longer sequences, thousands of notes in length, can be recorded if you've interfaced your Voyetra with a home computer. (See the section of this manual about "Expanding Your System".)

--The two channels of the sequencer can not be played back simultaneously.

--Learn to keep track of the readout so you don't overplay your chosen channel's capacity.

--You can play along with a sequencer pattern at all times, but you can't play the same notes it does. In other words, if it hits middle C and you hit middle C, only its middle C will sound, not yours.

--When you loop a sequence to make it repeat, the timing involved in pressing the START/STOP button is critical. We definitely recommend that you use the optional ARPEGGIATOR PAUSE footswitch if you have it. (When you are in the Poly-Sequencer Page it controls SEQUENCER START/STOP.) Most musicians have spent years keeping time by tapping one of their feet, and will find a footswitch easier to be accurate with. Also, using the footswitch means you have both hands available to play whatever sequence you wish to record.

--Sequencer settings are not stored in Steps.

SPECIAL NOTE

The rest of the Voyetra remains functional at all times while the sequencer is running. This means that you can start a sequence going--this is especially good with looped sequences--and then do *anything* to it: change keyboard modes, change Steps or Programs, adjust the ADSR, massively modulate it, run it through the arpeggiator...anything! Just exit from the Poly-Sequencer Page by pressing ARPEGGIATOR RIGHT, and then use the other Pages and controls of the Voyetra as usual.

Whenever any switch on the Poly-Sequencer Page is on, the ARPEGGIATOR PAUSE switch on the Normal Page is replaced by SEQUENCER START/STOP, so you can turn sequences on and off without having to enter the Poly-Sequencer Page. For most people this will make performance use of the Sequencer easier, since they can just leave it preset in the proper mode and turn it on from the Normal Page, or with the ARPEGGIATOR PAUSE footswitch, when they need it. But if you plan to use ARPEGGIATOR PAUSE as an Arpeggiator control at some other time in a set, you must remember to enter the Poly-Sequencer Page and turn off all the Sequencer switches.

REMEMBER! you program one of your footswitches to act as an arpeggiator pause switch! See the SET PAGE on p 117.

CLOCK RATES:

The Voyetra's internal clock runs at 96 ticks per beat. At
virtually all times that's where it should be left, because that's
where it has the greatest timing accuracy. But there are
exceptions...

...notably when you are attempting to synchronize your
Voyetra with drum machines, or sequencers, or other eternal
devices, that have a different standard clock rate, such as 48 or
24. These can be obtained by entering the Poly-Sequencer Page and
pressing UNISON LEFT or RIGHT.

UNISON LEFT sets 48 ticks per beat

UNISON RIGHT sets 24 ticks per beat

If you want to return to a clock rate of 96, press **LAYER.**

THE METRONOME:

If you need help keeping time while recording sequences, the
Metronome feature can help you do it. Just press the METRONOME
ENABLE button (EDIT) while in the Poly-Sequencer Page, and the
Voyetra will provide a steady ten volt pulse from the Arpeggiator
Clock output jack on the module's rear panel. Attaching that to
an amplifier gives a clear metronome count.

The metronome's click is set by pressing the METRONOME BEAT
COUNT button (CALL LEFT) and using the keypad and FORWARD/REVERSE
buttons to select either 0,1, or 2.

0 sets one tick every quarter note (once per beat)

1 sets one tick every eighth note (two per beat)

2 sets one tick every sixteenth note (four per beat)

The metronome's tempo is displayed in the RIGHT and STEP
readouts (unless the Sequencer is recording). Press TEMPO (CALL
RIGHT) to activate it, and then adjust the rate between 20 and
251 with the keypad and FORWARD/REVERSE buttons. Not all the
numbers in that range will be possible; though most of the skips
are at tempos so fast you are unlikely to be using them.

NOTE: The output signal is fairly strong for an audio
signal, and should be run into a high level input jack.*

NOTE: The Arpeggiator Clock output can not be used as a
metronome and an Arpeggiator Clock output at the same time.

*A low level metronome output
is available at the cassette
output jack!

If the METRONOME function is turned on, the sequence will not
begin to play or record until the first metronome pulse comes
along. This makes it easy to start on beat. When the metronome
is on, the VOYETRA acts as though the "instant record" feature
on the sequencer is turned on.

USING AN EXTERNAL CLOCK SOURCE:

To use an external clock source to drive your Voyetra's
sequencer, you must first press EXTERNAL CLOCK ENABLE
(ARPEGGIATOR UP) while in the Poly-Sequencer Page. When this LED
is lit, the internal Sequencer clock is disabled.

Simply plug the external clock in, be it drum machine or
whatever, through the SEQUENCER CLOCK jack on the module's rear
panel (note that if the external clock source has a different
clock rate than the Voyetra's, the Voyetra's will have to be
modified, as discussed easrlier in "Clock Rates") and you're all
set.

In addition, you may use the INSTANT RECORD switch
(ARPEGGIATOR DOWN) to make things easier. When this LED is on, the
Voyetra's Sequencer will start recording from the moment you press
the START/STOP button, or when it receives the first trigger
signal from the external clock source, whichever comes *last*.
This will aid you considerably in synching your Voyetra to, say, a
drum machine.

A typical recorsing session with a external clock source
would be as follows:

Connect the source to the Voyetra. Then set the Sequencer for
RECORD 1, EXTERNAL CLOCK ENABLE, and INSTANT RECORD. Make certain
that the clock source is off, and then press START/STOP. Now we
can turn on our source--let's say it's a drum machine--and the
Voyetra Sequencer. which has been waiting for its signals, is
triggered to begin recording. (If the drum machine has been
programmed to give a four beat to get you set and into the tempo,
that will be recorded, too--a convenience for both the first take
and future overdubs.) After you're finished with recording, press
START/STOP again to stop, and turn off the drum machine. At this
point you could play back the song, adjusting the Voyetra's tempo
by changing the drum machine's, or go on to record overdubs in one
of the various ways that will be shown you later in this section.

QUANTIZATION:

First, a definition. To "quantize" something means to break
it down into small, discrete, evenly-sized pieces.

If you quantize the notes you record in a sequence, you can
make their time *perfect*, no matter how iffy they were while you
were playing. The Voyetra will round off your errors, and shift
the beginnings and endings of notes, so that everything sounds
immaculate.

If you know how to use it, that is. Like anything else this

powerful, it requires a little care and thoughtful consideration.

To select quantization of your sequences, press SET QUANTIZE
INTERVAL (OCTAVE LEFT) and then use the keypad and FORWARD/REVERSE
switches to choose the type of note you want things rounded off
to. This choice will be displayed as the right digit in the LEFT
readout. Your options are:

0 = no quantizing

1 = sixty-fourth notes

2 = thirty-second note triplets

3 = thirty-second notes

4 = sixteenth note triplets

5 = sixteenth notes

6 = eighth note triplets

7 = eighth notes

8 = quarter note triplets

9 = quarter notes

A = half note triplets

Here's how it works. Say you chose to quantize to *half*
notes, and started recording. The top line in the diagram below is
what you played, and the bottom line is the quarter note beat the
Sequencer is keeping as a reference.
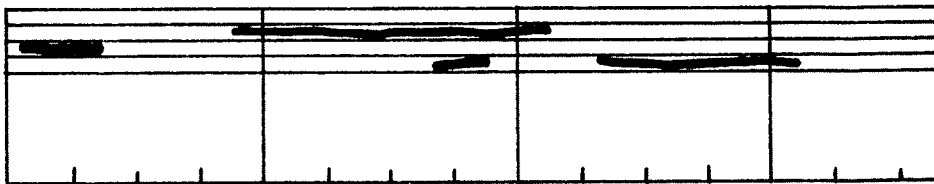
Now here's what it looks like when you play it back,
quantized.
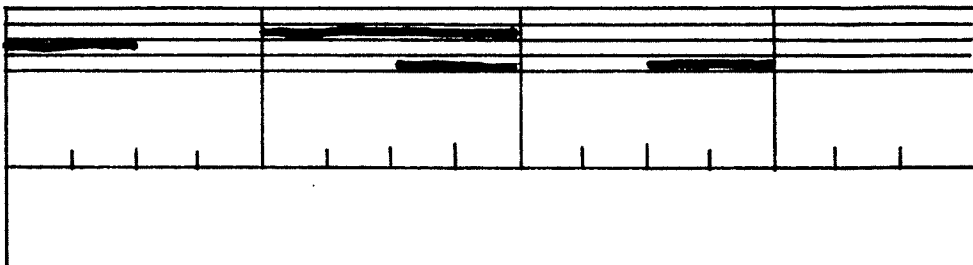
Quite a difference! But it's like we said, everything was rounded off to the nearest quarter note.

Obviously, if you want greater and greater precision, you'll set smaller and smaller quantizing intervals. But there's a tradeoff. The smaller the interval, the more precisely *you* have to play to take proper advantage of it. A good general rule of thumb, especially while you are learning to use the quantizing feature of the Voyetra Sequencer, is to select an interval twice as fast as the fastest note you want to quantize to. If you want everything rounded off neatly to quarter notes, set the quantize interval to eighths. Sixteenths? Set it to thirty-seconds. And so on.

Some things you should be aware of before you start working with the quantizing feature are:

1) the AUTO-RECORDING modes don't workvery well with quantizing.

2) The quantize interval should not be changed while recording or overdubbing, or it will rearrange everything you've already done.

and 3) quantizing will affect not only when you pressed the key down, but also when you let it up. This needs a bit more explanation. The Voyetra's sequencer doesn't actually record notes—it records events. Since an event is defined as every time a key goes up or down, that means there are two events per note...and it's *events* that are quantized. This won't be much trouble if you're quantizing to really fast intervals. But if you're working in slower ones, like sixteenths and up (or at fast intervals with extremely slow tempos), then it's possible to play in such a way that you confuse the Sequencer.

Here are the two things that can go wrong.

The quantizing interval is set to quarter notes, like so:

And you play this (the bar represents graphically just how long the key was held down):
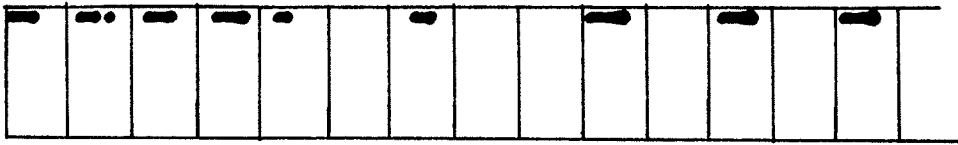
The result, after quantizing, is this:
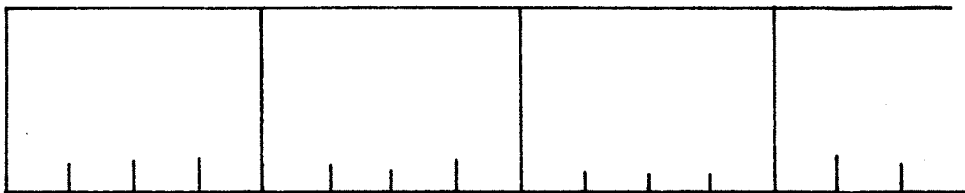
Precisely nothing. At least as far as the computer is concerned. By it's measurement, the key went down and up in the very same timeslot. Net result: zero.

That's a problem with playing too short. The other problem comes from playing too long. Again with a quantization of quarter notes, you play this:

etc.
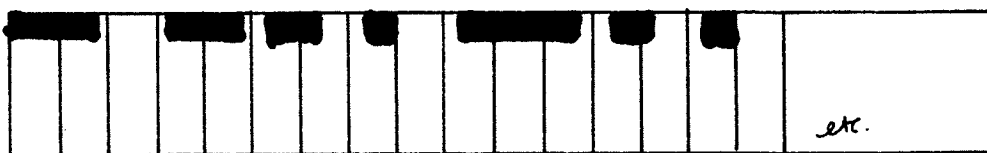
Only what you get on playback is this:

etc.

This time the quantizing has arranged things so that a new note is triggered at the beginning of every time interval. That's not too bad as long as you are playing different pitches--a little strange and inhuman sounding, maybe, because there are no gaps at

all between the notes--but it's terrible if you are repeating ome
pitch. What happens then on playback is that four shorter notes
become one long, seamless note. Like so:

♪♫♫ could become ♩ !
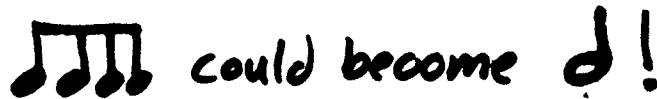
        The two-fold solution for these problems is always to <u>use a
quantizing interval faster than the fastest note you plan to play</u>,
and...practice. It's a very precise system, and you'll gain in
precision as you learn to work with it.

THE SEQUENCER MODES

There are eight Sequencer modes: SINGLE RECORDING
                                 DOUBLE-CHANNEL
                                 AUTO-PLAYBACK
                                 OVERDUBBING
                                 CONTINUOUS OVERDUBBING
                                 AUTO-CONTINUOUS OVERDUBBING
                                 SONG
                                 and STEVENSON

NOTE: The Sequencer will only accept commands in combination
with certain other commands. If you press the buttons in the wrong
order, they won't light up. Should that happen, check the
instructions and try again.

SINGLE RECORDING MODE:
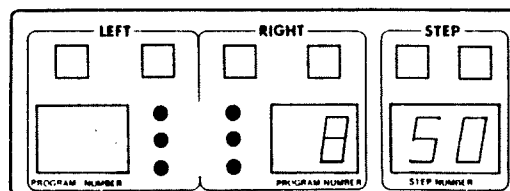
        To record: REC 1 or REC 2, then START/STOP.
        Playback: PLAY 1 or PLAY 2, then START/STOP.
        Repeating playback: PLAY 1 or PLAY 2, LOOP, then START/STOP.

This lets you record a passage of up to 425 notes (850 events) and have it ready for later use at the push of the START/STOP button. Press REC 1 to record in channel 1 (or REC 2 for channel 2) and then press START/STOP. The number **850** will appear in the RIGHT and STEP readouts, and the Voyetra will wait for you to begin playing. As soon as you do, it will record. When you are done playing, press START/STOP.

To play back what you've just done, press PLAY 1 (or PLAY 2 if you recorded in Channel 2) and then START/STOP. You can interrupt playback and start it again any number of times using the START/STOP switch.

If you want playback to repeat over and over, press LOOP before START/STOP. The sequence won't stop until you shut it off with the START/STOP or CLEAR buttons. (If you plan to LOOP a sequence, keep in mind that pressing START/STOP is a sequencer event just like any other, and can be quantized so that its loop time is perfectly on the beat.)

AUTO-PLAYBACK MODE:
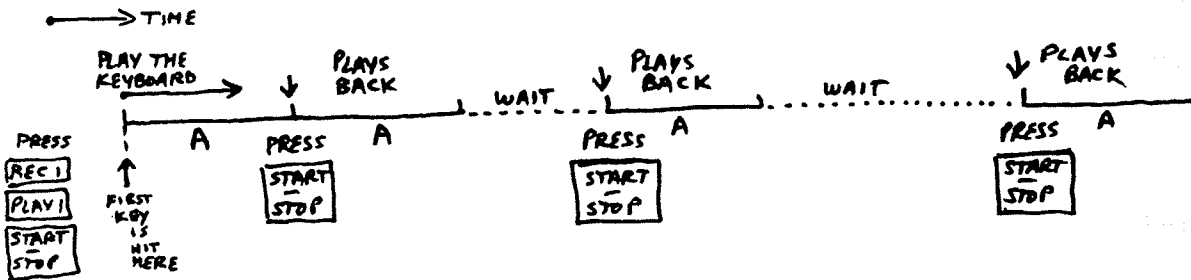
To record: REC 1 and PLAY 1 (or REC 2 and PLAY 2), then
            START/STOP.
Playback: START/STOP.
Repeating Playback: LOOP, then START/STOP.

This is a variation on SINGLE mode, in which the sequence you recorded plays back as soon as you stop the recording. Since PLAY is already on, further repeats are triggered by just pressing START/STOP. The LOOP functions the same here as in SINGLE mode.

OVERDUBBING MODE:

PLAYBACK CH 2
RECORD CH 1
A+B+C

RECORD CH 1
A

PLAYBACK
ONTO
2
WHILE
PLAYING
B

RECORD
CH 2
A+B
PLAYBACK
CH 1

PLAYBACK 2
recording iT onTo 1
and playing C

PLAYBACK 1
recording iT onTo 2
and playing D

etc

A+B+C+D
RECORD CH 2
PLAYBACK CH 1
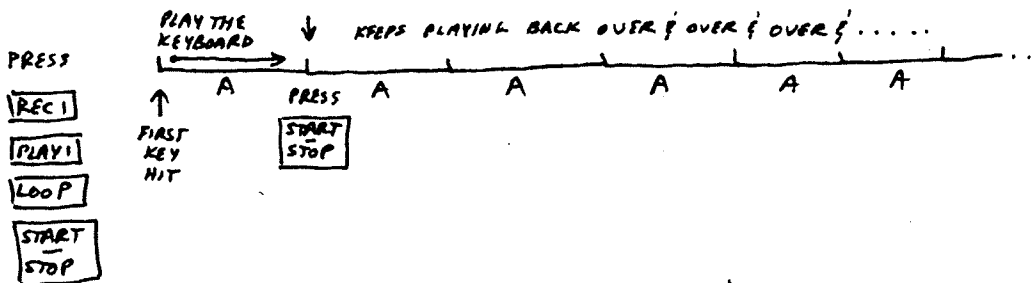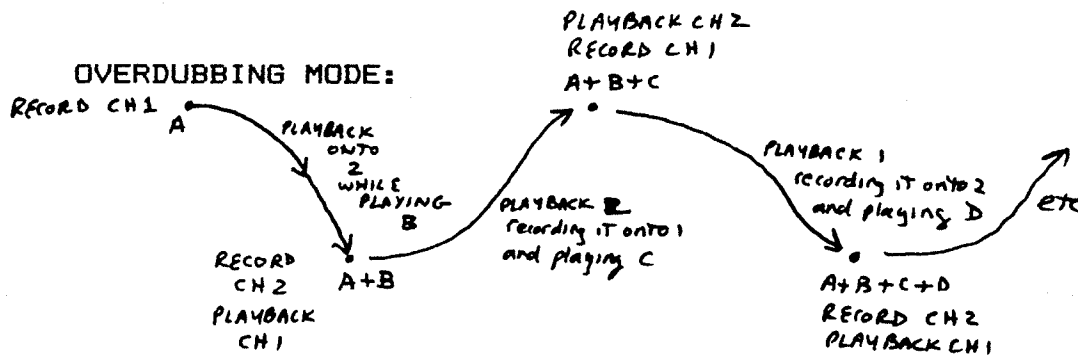
To record first channel: REC 1 (or REC 2), then START/STOP.
To overdub: PLAY on the channel just recorded, REC on the
               other one, then START/STOP.
Playback: PLAY on last channel recorded, then START/STOP.
Repeating playback: PLAY on last channel recorded, LOOP, then
               START/STOP.

Lay down your first line as in SINGLE mode. To overdub you
then press PLAY on the channel you just recorded, and REC on the
other channel, and then START/STOP. The new channel will now
record *both* the old channel and whatever new notes you play on
thekeyboard. You can add any number of lines by continuing with
this procedure, bouncing from one channel to another, until you
run out of available events.

This gives you a safety net. If you don't like what you have
just overdubbed, you can always replace it by leaving your REC and
PLAY settings as they were, and then press START/STOP to begin
recording again.

OVERDUBBING WITH LOOP-- this is a special trick you can apply
if you want to. In normal overdubbing LOOP is off, and with each
new overdub you can extend the length, and therefore time, of your
recorded sequence. But what if your sequence has to be tailored to
a specific length? (Example: the first recorded track was a bass
line that loops *perfectly*, and you don't want to lose that.)
To do this, press LOOP before START/STOP when starting to record
overdubs. It automatically turns RECORD off at the original
sequence's stopping point.

CONTINUOUS OVERDUBBING MODE:

To record first track: REC 1 (or REC 2), then START/STOP.
To continuously overdub: PLAY on the channel just recorded,
       REC on the other one, LOCK, then START/STOP.
Playback: PLAY on last channel recorded, then START/STOP.
Repeating playback: PLAY on last channel recorded, LOOP, then
       START/STOP.

Meet the LOCK button. It lets you tell the Sequencer to repeat certain functions by itself, so you don't have to keep tapping buttons if you don't feel like it.

In CONTINUOUS OVERDUBBING mode, LOCK makes the two channels automatically bounce from one to another, allowing you to record without having to lift your hands from the keyboard.

In this mode the length of the sequence is limited to that of the first recorded track, similarly to the LOOP trick we mentioned just above.

When you've recorded the last thing you want to, end the automatic bouncing process by pressing START/STOP. The LOCK light will go out, *but the passage you've built up won't stop until it reaches its conclusion. DO NOT PRESS STOP AGAIN!...because if you do, the sequencer WILL stop, at the wrong time, and thus ruin your recording.*
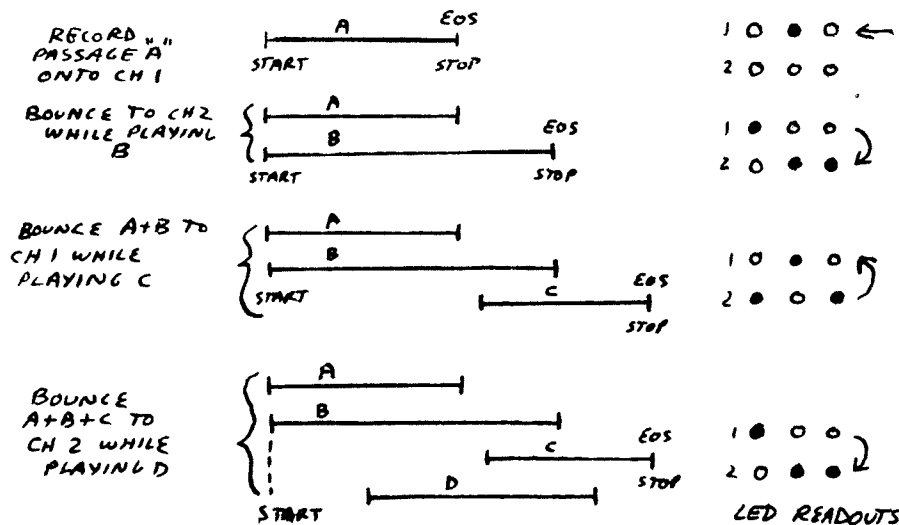
(ETC. UNTIL ALL EVENTS ARE USED UP)

CONTINUOUS OVERDUBBING

AUTO-CONTINUOUS OVERDUBBING MODE:

To record first track: REC 1 (or REC 2), LOCK, then
       START/STOP.
To begin AUTO-CONTINUOUS OVERDUBBING: press START/STOP at the
       conclusion of the first track.
Playback: PLAY on the last channel recorded, then START/STOP.

Repeating playback: PLAY on the last channel recorded, LOOP,
                    then START/STOP.

    In this mode, the Sequencer leaps into CONTINUOUS OVERDUBBING
mode (where the two channels automatically bounce between each
other) the instant you press START/STOP to end the first track.

DOUBLE-CHANNEL MODE:
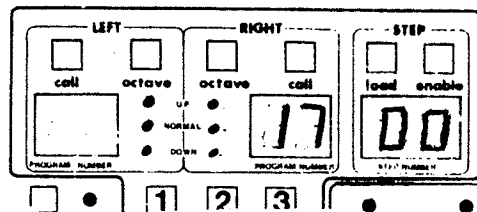
    To record: press REC 1 and REC 2, then START/STOP.
    Playback: PLAY 1, then START/STOP.
    Repeating playback: PLAY 1, LOOP, then START/STOP.

    This mode allows you to record sequences longer than 850
events. It links the two channels together end to end, for a total
memory space of 1700 events (which is why the RIGHT and STEP
readouts will display 1700 after you press START/STOP and are
ready to begin playing).

    Pressing PLAY 1, REC 1 and REC 2 (in that order) will
place you in the AUTO-PLAYBACK version of this mode, making your
sequence repeat itself once beginning the instant you conclude
recording.

    LOOP functions with this mode just as it does with SINGLE
mode.

SONG MODE:
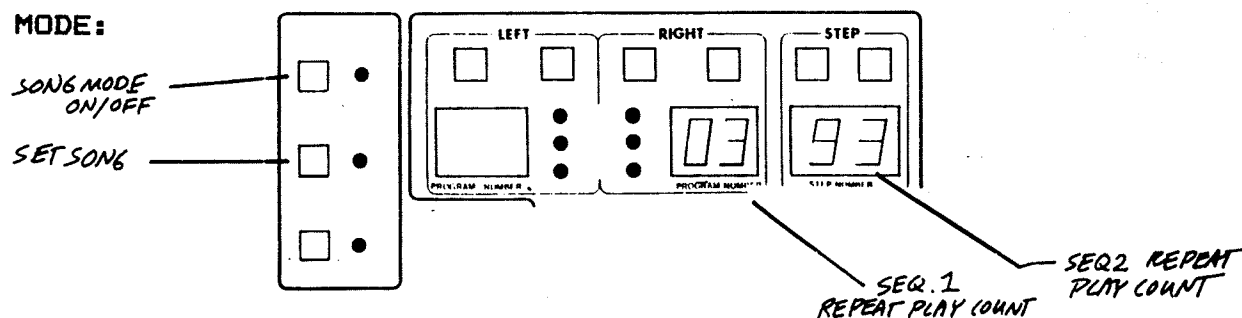
    To program: press SET SONG and then two two-digit numbers
                representing how many times you want each
                Channel to play. Press SET SONG a second time
                to return to normal Poly-Sequencer Page.
    To play: Press PLAY 1 or PLAY 2, depending on which Channel
                you wish to have start. Then press SONG. Then

                    START/STOP.
    Repeating programmed playback: PLAY 1 or 2, LOOP, SONG,
                    START/STOP.

     To use this function, you must already have sequences stored
in both Channels. This mode will *not* function if any RECORD
buttons are pressed. SONG will not light up, in that case.

     The maximum number of times you can program a Channel to
repeat is 99.

     LOOP works very well with this mode.

STEVENSON MODE:
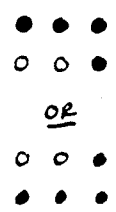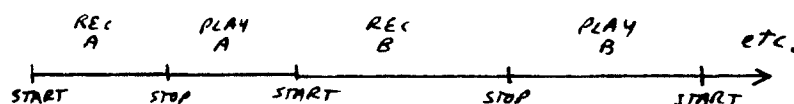
STEVENSON MODE ALLOWS "HANDS FREE"
RECORD/PLAYBACK IF USED WITH OPTIONAL
FOOTSWITCH FOR START/STOP

To record: either PLAY 1 and REC 1 (or PLAY 2 and REC 2),
               LOOP, LOCK, then START/STOP.
Repeating playback: START/STOP.

     This is a very powerful mode that lets you record a passage
and have it play back looped, then record another passage and have
it play back looped, then record *another* passage and have *it*
play back looped...one right after another, for as long as you
want, and **all with one switch.**

     You should definitely try this one out. Set it up and play a
short sequence, then press the START/STOP switch. Do you hear
how what you recorded is being played back in a loop? Now press
START/STOP, quickly play a few new chords, and press START/STOP
again. Bingo! Your old sequence is gone, and your new sequence is
repeating in a loop.

     This mode has lots of stage and recording applications, and
becomes even more convenient when you use the optional ARPEGGIATOR
PAUSE footswitch to START/STOP it. That way, even the most
complicated two-handed sequences can be made to repeat flawlessly,
with just a single tap of your toe.

     STEVENSON mode is like having a combined playback and record
function, all in one button. (And since we know you're curious,
we'll tell you: it was named after Rick Stevenson, the New York
synthesist who first suggested we make our Sequencer do it.)

USING INSTANT RECORD:

INSTANT RECORD will work with all eight Sequencer modes and their variations. Normally, when you record a first track, the Voyetra waits until you actually press a key to begin recording. When INSTANT RECORD is pressed the Voyetra starts recording the moment you press START/STOP, so that whatever wait you wish to insert before beginning a sequence will be preserved. Try it for yourself.

If the METRONOME is on, then INSTANT RECORD is on automatically, and the Sequencer will not start to play or record until the first metronome tick.

SEQUENCER TAPE STORAGE:

The notes recorded with the Sequencer can be stored onto cassette tape, or loaded into the Voyetra from cassette, by using the TAPE LOAD and TAPE DUMP switches while in the Poly-Sequencer Page. Refer to the "Tape Storage and Loading" section of this manual for details.

SETTING YOUR OWN VELOCITY CONTROL
(The User-Taper Velocity Page)

---

enter or exit; A440 & AUDIO MUTE

USER·TAPER VELOCITY PAGE

KEY SPEED

KEY STRIKE SPEED IS
DISPLAYED AS A VELOCITY
VALUE BETWEEN 0 - F
WHERE EACH VALUE HAS A
CORRESPONDING KNOB AS
SHOWN
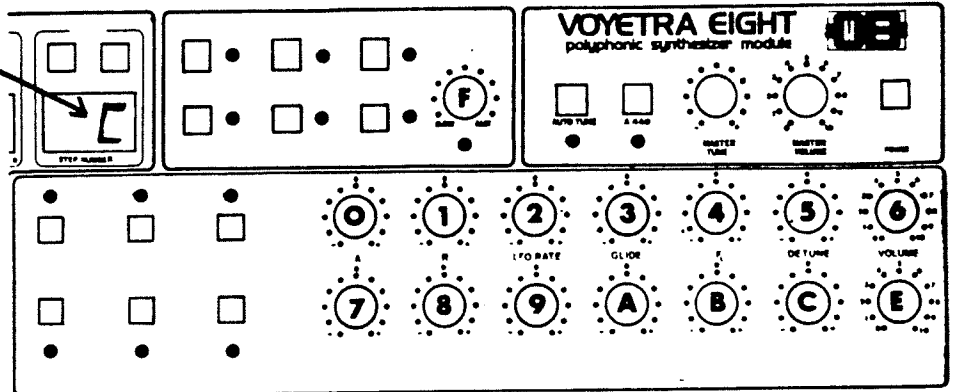
IMPORTANT NOTE: Your Voyetra comes preset with two Velocity
Tapers--the standard "Factory Preset" and also a "User Taper."
Do not enter the Velocity Taper Page unless you actually wish to
design your own User Taper, because the moment you enter the Page
the current User Taper, set here at the factory, is scrubbed from
the Voyetra computer's memory and replaced by whatever random
readings the parameter trimmers represent.

This does not affect the "Factory Preset" taper, which is
permanently stored in your Voyetra's memory.

This section will explain why that happens. Read it before you
experiment with the Velocity Taper feature of your Voyetra.

Every time you hit a key on the VPK-5 keyboard, the Voyetra's
internal computer measures how fast you struck it. It does this so
that you can, if you wish, use key-strike velocity to add the
human touch to your synthesizer's sound, making it more
expressive.

Use velocity to control the VCA, for example, and you can
make your notes louder or softer depending on how fast you strike
them. Or you can use velocity as a modulation controller, to add
filtering effects on faster passages (this is good for string
patches).

Most synthesizers that are velocity sensitive come with that
sensitivity preset at the factory, and there's no way to change
it. With the Voyetra, however, you can design your own custom
"velocity tapers," and use them in place of the factory setting.
Take another look at the examples in the previous paragraph. What
if you wanted your gently-played passages to be the loud ones,
and the filtering effects to come in only at one specific speed
(and not above or below that)? The Voyetra will let you do
those things. Here's how.

SETTING YOUR OWN VELOCITY TAPER:

The Voyetra measures the speed of a key-strike in 15
discrete stages, which are numbered 0-E (remember our use of
hexadecimal back when we were learning the Edit Pages?). When you
strike a key, the internal computer decides which of the 15
stages of velocity your keystrike fits--0 represents the fastest
keystrike, E the slowest--and then sends out the appropriate
control voltage.

What the User-Taper Velocity Page allows you to do is change
that control voltage, using the knobs in the Program Parameter
Trimmer section. Each one, as shown in the diagram at the beginning
of this section, corresponds to a different velocity.

If you turned trimmer 3 all the way counter-clockwise, for example, you would shut off the signal generated by any keystrike with a velocity of 3...which means that, if velocity were controlling volume, a note played at a speed of 3 wouldn't make a sound at all!

Here are some possible velocity tapers that could be used. Keep in mind that the lower the number, the faster the keystrike:

A:

B:

C:

0 1 2 3 4 5 6 7 8 9 A B C D E   ETC.
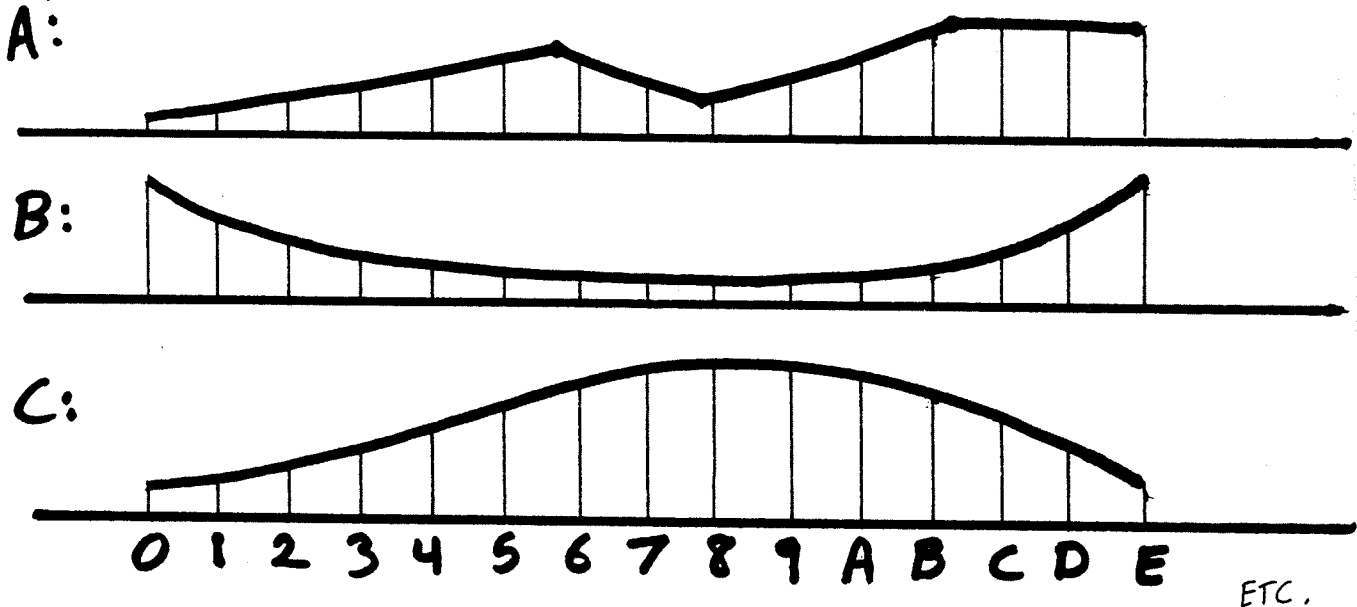
The first thing to do in creating a new User-Taper is to decide whether you want to use it to control volume or whether you want it as a controller in the Mod Banks. Decide, and then turn on your choice, as follows:

_____

To turn on velocity-controlled volume: from the Normal Page, press A-440 and either RELEASE DEFEAT LEFT or RIGHT (depending on which side of the Voyetra you wish to have your User Taper on, when in SPLIT and LAYER modes); from the Alternate Page, use the VELOCITY ON/OFF LEFT and RIGHT controls; and from Editing Page #2, use the VCA VELOCITY button.

To turn on User-Taper velocity in the Mod Banks, press the USER/FACTORY VELOCITY button on any of them.

_____

That done, press WHOLE 8, and then enter the User Taper Velocity Page by pressing A-440 and AUDIO MUTE.

Play any key. A number will appear in the STEP readout. This number is the speed you struck the key with. Try playing very slow and very fast, getting a feel for what strike speeds correspond to what numbers in the readout. (This feature is useful, but not essential, feedback. You'll actually rely most on

your ears, just as you did when working with modulation depths in
the Mod Banks.)

Now adjust your User Velocity Taper with the trimmers, always
keeping in mind that the lower the knob number, the faster the
velocity that it controls. You will be able to hear your
adjustments as you go. When they are to your liking, simply exit
the User Taper Velocity Page by pressing AUDIO MUTE. The new User
Taper is automatically stored when you do this.

**WHY ENTERING THE VELOCITY-TAPER PAGE DESTROYS THE FACTORY PRESET
"USER TAPER":**

In order for this Page to work properly, the Parameter Trimmers
can no longer be Incremental, as they are in all other
Pages--instead, they *must* be Absolute. Once you enter this Page
they become so, and wherever they happen to be from all the other
playing adjustments you've made will automatically be read into
the Voyetra's memory as the new settings for the User Taper.

**HOW TO REGAIN THE ORIGINAL "USER TAPER" IF YOU ACIDENTALLY WIPE
IT OUT:**

Just hook up your cassette machine and do a standard TAPE LOAD
routine, using the original Factory Preset tape that came with
your Voyetra.

STORING AND LOADING
USER-TAPER VELOCITY SETTINGS:

This is covered in detail in the "Tape Storage and Loading"
section of this manual.

VOICE DISABLE AND FOOTSWITCH PROGRAMMING (The Set Page)

---

enter; A440 & RANDOM

exit; RANDOM

SET PAGE

FOOTSWITCH NUMBER

0 = B RIGHT   2 = A RIGHT
1 = B LEFT   3 = A LEFT

MOMENTARY / TOGGLE
H   µ

EXAMPLE: 2H MEANS FOOTSWITCH "A RIGHT" IS SET AS A MOMENTARY SWITCH (i.e., PUSH ON — RELEASE OFF)

VOICE DISABLE

WHEN LIGHT IS ON, THE VOICE IS DISABLED AND NO LONGER ASSIGNED BY THE KEYBOARD

ENTER PROGRAMMABLE FOOTSWITCH FUNCTIONS BY PRESSING FOUR NUMBERS ON KEYPAD.

EXAMPLE: 20 58 would BE ENTERED BY PRESSING 2-0-5-8.

FOOTSWITCH PROGRAMMING

FTSW # PRESS → SELECT FOOTSWITCH NUMBER → FWD / REV PRESS → SELECT FUNCTIONS FOR SWITCH (99 MEANS "NO FUNCTION") USE KEYPAD TO SELECT → SELECT MOMENTARY OR TOGGLE RESPONSE WITH m/T SWITCH → STEP LOAD

PROGRAMMABLE FOOTSWITCH CONTROL CODES

00 = Unison Left	29 = Edit	08 = 0
01 = " Right	30 = Auto Tune	09 = 1
02 = Split	32 = Call Right	10 = 2
03 = Layer	33 = " Left	11 = 3
04 = Hold Left	34 = Step Enable	12 = 4
05 = " Right	35 = " Load	13 = 5
06 = Whole 8	40 = Pitch Bend Defeat R	14 = 6
18 = Reverse	41 = " " " L	15 = 7
19 = Forward	43 = Audio Mute	16 = 8
20 = Glide on/off Right	48 = Release Defeat Right	17 = 9
21 = " " Left	49 = " " Left	
24 = Octave Right	50 = Arpeggiator Right	
25 = " Left	51 = " Left	
26 = Tape Load	52 = " Pause	
27 = " Dump	56 = " Down	
28 = Store	57 = " Random	
	58 = " Up	

NOTE: 99 = NO FUNCTION

The Set Page is used to control features which you will tend to want to "set" and then leave alone. You enter it by pressing A-440 and RANDOM.

It has two principal functions--the selective, deliberate disabling of Voices; and the setting of the programmable footswitches.

SELECTIVE VOICE DISABLE--

You can turn off any of the Voyetra's eight Voices by pressing the following switches while in the Set Page. When the LED is ON, then the Voice is turned off, or "disabled."

VOICE	SWITCH
7	Split
6	Layer
5	Unison Left
4	Unison Right
3	Edit
2	Store
1	Tape Load
0	Tape Dump

Four things to note:

1) If AUTO-TUNE turned a Voice off because of tuning error (you would know this by the code letter flashed in the readouts during the tuning procedure) then the LED representing that Voice on the Set Page will be ON. Pressing the switch will *not* turn the LED off and the Voice back on, in this situation. If you wish to restore that Voice, try AUTO-TUNE again until no code letters flash; and if that doesn't work, get the defective Voice repaired.

2) In LAYER mode, Voices are paired off: 7/3, 6/2, 5/1, 4/0. In this keyboard mode, if one Voice is disabled its partner will be, too. (However, that partnered Voice will snap right back on if you shift out of LAYER, into SPLIT or WHOLE 8, leaving only the originally disabled Voice off.)

3) Voice disable settings are memorized in the STEP.

4) If you want to turn on the Voices you've disabled, without having to go back to the Set Page and press each switch, just use the ALTERNATE CLEAR command (A-440 and STEP LOAD while in the Normal Page).

PROGRAMMING THE
FOOTSWITCHES--

On the rear panel of the Voyetra are two stereo jacks which
allow you to plug in and use two different programmable stereo
footswitches. In turn, each side of each footswitch can be
programmed to control either one Voyetra function, or two at the
same time. This gives you the possibility of controlling up to
eight different Voyetra functions *of your choice* while leaving
your hands free to play.

Here's how to do it:

Since each stereo footswitch has two independently
programmable sides, programming them is done as if they were four
separate footswitches--0 and 1 are the footswitches plugged into
the B jack, and 2 and 3 plug into the A jack.

TO SELECT WHICH FOOTSWITCH TO PROGRAM-- In the Set Page, the
left digit in the STEP readout represents your choice of
footswitch. You select 0,1,2 or 3 by using the FORWARD and REVERSE
buttons.

TO SELECT THE FOOTSWITCH'S FIRST AND SECOND FUNCTIONS-- to
select the first function, press the appropriate two-digit code
for that feature (all of these codes are listed at the end of
this section). It will be displayed in the LEFT readout. To select
the second function, press another two digit code, which will be
displayed in the RIGHT readout. If you don't want a second
function on the footswitch, press 99, which is the code for "No
Function."

NOTE: If you make a mistake, or change your mind, you have to
finish out the set of commands and start again by pressing four
more numbers. Here's an example. To control UNISON LEFT (control
code 00), as function one, and OCTAVE LEFT (control code 25) as
function two, you would press 0-0-2-5. But if you changed your
mind halfway through about UNISON LEFT and wanted to make it HOLD
LEFT (control code 04), you couldn't just stop and hit 0-4. You
would have to finish out all four numbers before you could begin
again. Try this a few times, to get clear on how it works.

**TO CHOOSE BETWEEN FOOTSWITCH SINGLE-STRIKE OR DOUBLE-STRIKE
MODES--** normally the footswitches are in SINGLE-STRIKE mode, which
means that every time you press the switch it sends one trigger
signal. By pressing STEP ENABLE you activate DOUBLE-STRIKE mode,
which means the footswitch sends *two* trigger signals--one when
you put your foot down, and another when you lift it. You can tell
which mode you are in by the symbol on the right side of the STEP
readout, as shown below.

"backwards Y" is single strike mode
double strike mode is "H"
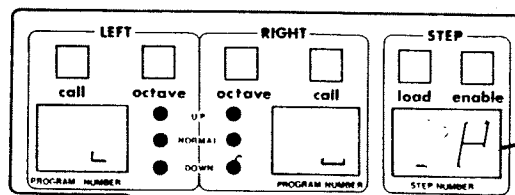
Just what effect these two modes have depends entirely on your choice of control function. ON/OFF type switches will not work the same way as, say, the FORWARD or TUNE commands. For more discussion of this, see the list of control codes.

Furthermore, how these footswitches work will depend heavily on what's in the Step or Program you are playing.

An example: if UNISON LEFT is off in your Step, then pressing a UNISON LEFT footswitch command will turn it on. But the opposite is just as true--if UNISON LEFT had already been on, pressing a UNISON LEFT footswitch would turn it *off*.

There are several important things to remember.

--be careful how you mix and match footswitches. They can interfere with each other, just as normal front panel controls do. If you've turned on ARPEGGIATOR RIGHT with a footswitch, then turning on UNISON RIGHT with a footswitch will automatically turn the Arpeggiator off.

--the footswitches do only what you program them to do, no matter what Page you are in.

--**LASTLY, AND MOST IMPORTANT**...once you've selected a footswitch and a set of functions, and are certain they are what you want, you MUST enter them into the Voyetra's memory by pressing STEP LOAD before they will actually function! (This will *not* work if the MEMORY PROTECT switch is on.)

PROGRAMMABLE FOOTSWITCH
CONTROL CODES

(NOTE: the actions described under the headings SINGLE-STRIKE
MODE and DOUBLE-STRIKE MODE are based on the assumption that the
ON/OFF-type Voyetra features in question are OFF. If they were ON
in your Program or Step, the footswitches would usually act
opposite of the description.)

CODE	FUNCTION	SINGLE-STRIKE	DOUBLE-STRIKE
00	Unison Left	ON	ON/OFF
01	Unison Right	ON	ON/OFF
02	Split	ON	ON/ON
03	Layer	ON	ON/ON
04	Hold Left	ON	ON/OFF
05	Hold Right	ON	ON/OFF
06	Whole 8	ON	ON/ON
18	REVERSE	ON	ON/ON
19	FORWARD	ON	ON/ON
20	Glide Right On/Off	ON	ON/OFF
21	Glide Left On/Off	ON	ON/OFF
24	Octave Right	ON	ON/ON
25	Octave Left	ON	ON/ON
26	Tape Load	ON	ON/ON
27	Tape Dump	ON	ON/ON
28	Store	ON	ON/ON
29	Edit	ON	ON/OFF
30	Tune	ON	ON/ON
32	Call Right	ON	ON/ON
33	Call Left	ON	ON/ON
34	Step Enable	ON	ON/ON
35	Step Load	ON	ON/ON
40	Pitch Bend Defeat Right	ON	ON/OFF
41	Pitch Bend Defeat Left	ON	ON/OFF
43	Audio Mute	ON	ON/OFF
48	Release Defeat Right	ON	ON/OFF
49	Release Defeat Left	ON	ON/OFF
50	Arpeggiator Right	ON	ON/OFF
51	Arpeggiator Left	ON	ON/OFF
52	Arpeggiator Pause	ON	ON/OFF
56	Arpeggiator DOWN	ON	ON/ON
57	Arpeggiator RANDOM	ON	ON/ON
58	Arpeggiator UP	ON	ON/ON
99	No Function	--	-----

| | Keypad numerals 0-9 | ON | ON/OFF |

08 = 0	10 = 2	12 = 4	14 = 6	16 = 8
09 = 1	11 = 3	13 = 5	15 = 7	17 = 9

THESE CONNECTORS ARE USED TO PATCH THE +X, -K AND PRESSURE CONTROLLERS, AND THE PITCH BEND, TO VOYETRAS CONNECTED IN SERIES

THESE ARE THE AUDIO IN/OUT TO INTERFACE TO A TAPE DECK. THE OUTPUT IS MIC LEVEL AND THE INPUT IS LINE LEVEL

THESE ARE STEREO JACKS USED FOR EXTERNAL CLOCK INTERFACING TO THE ARPEGGIATOR AND SEQUENCER. THE ARPEG CLOCK OUT ALSO SERVES AS A METRONOME OUT.

out

in

CONTROLLERS

MIDI

IN   OUT   THRU
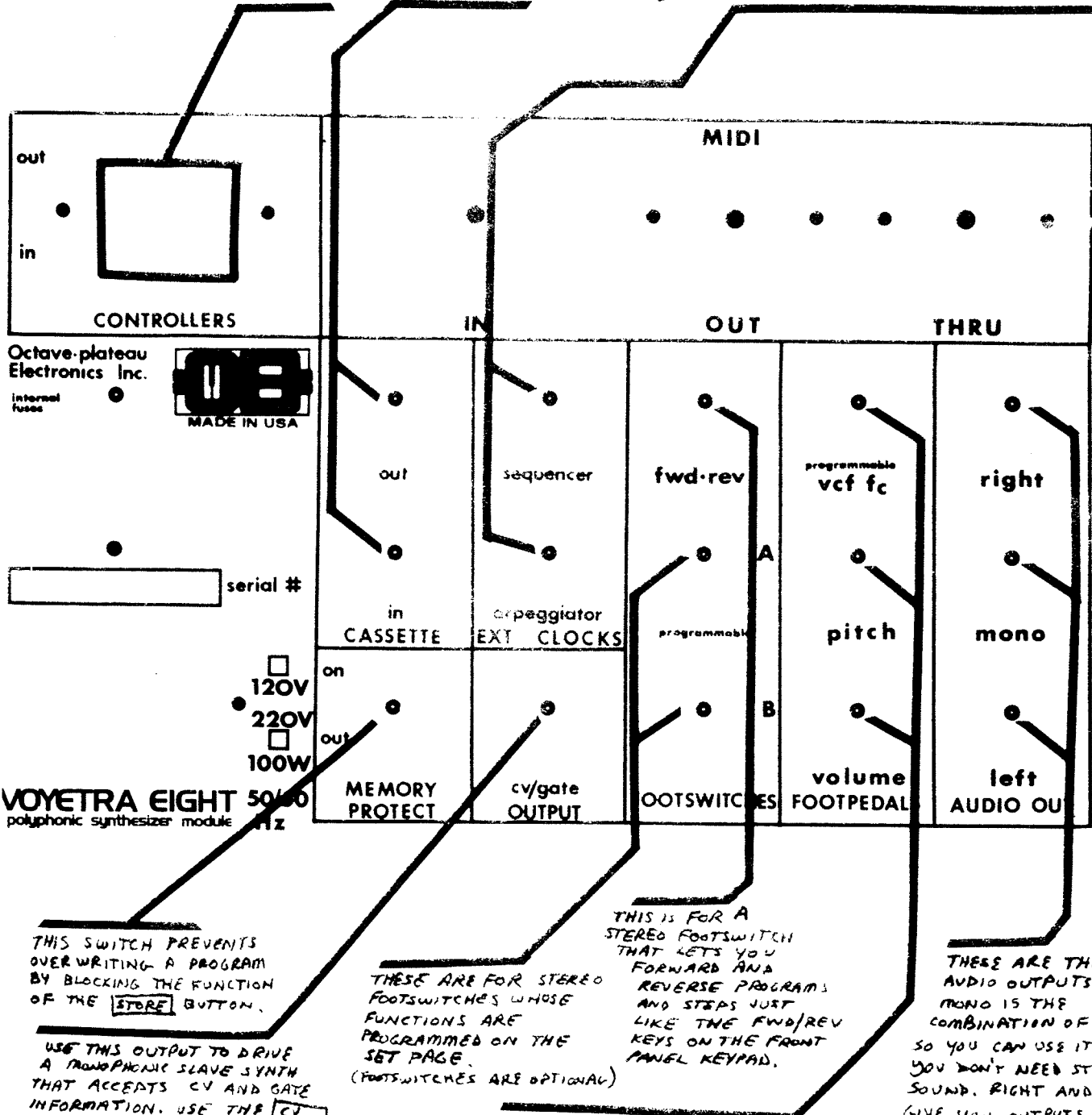
Octave·plateau
Electronics Inc.

internal fuses

08
MADE IN USA

serial #

out

sequencer

fwd·rev

A

programmable
vcf fc

right

in

arpeggiator
EXT CLOCKS

CASSETTE

programmable

pitch

mono

B

☐ 120V
• 220V
☐ 100W

on

out

MEMORY
PROTECT

cv/gate
OUTPUT

FOOTSWITCHES

volume
FOOTPEDAL

left
AUDIO OUT

VOYETRA EIGHT 50/60
polyphonic synthesizer module Hz

THIS SWITCH PREVENTS OVERWRITING A PROGRAM BY BLOCKING THE FUNCTION OF THE STORE BUTTON.

USE THIS OUTPUT TO DRIVE A MONOPHONIC SLAVE SYNTH THAT ACCEPTS CV AND GATE INFORMATION. USE THE CV LEFT BUTTON ON THE ALTERNATE PAGE TO ASSIGN THIS OUTPUT TO THE LEFT SIDE OF THE KEYBOARD IN SPLIT MODE.

THESE ARE FOR STEREO FOOTSWITCHES WHOSE FUNCTIONS ARE PROGRAMMED ON THE SET PAGE.
(FOOTSWITCHES ARE OPTIONAL)

THIS IS FOR A STEREO FOOTSWITCH THAT LETS YOU FORWARD AND REVERSE PROGRAMS AND STEPS JUST LIKE THE FWD/REV KEYS ON THE FRONT PANEL KEYPAD.

THESE ARE THE AUDIO OUTPUTS. MONO IS THE COMBINATION OF L AND R SO YOU CAN USE IT WHEN YOU DON'T NEED STEREO SOUND. RIGHT AND LEFT GIVE YOU OUTPUTS THAT ARE ISOLATED FOR PROGRAM L AND R. THIS IS USED TO INDIVIDUALLY PROCESS THE SOUNDS. IN MODE 8, THE VOICES ARE PANNED BETWEEN THE L, R OUTPUTS.

THESE JACKS ARE FOR FOOTPEDAL CONTROL OF VOLUME, PITCH BEND AND VCF CUTOFF. THE VCF Fc INPUT IS PROGRAMMABLE ON BANK D OF THE VOYETRA VOICE MODULATION SYSTEM AND IF USED AS SUCH, IT WILL NO LONGER AFFECT Fc. THE VOYETRA FOOTPEDALS HAVE SENSITIVITY ADJUSTMENTS ON THEM FOR SETTING THE PEDAL SWEEP RANGE.
(PEDALS ARE OPTIONAL)

ALL NECESSARY CABLES AND FOOTSWITCHES FOR THE VOYETRA EIGHT ARE AVAILABLE FROM YOUR DEALER, OR DIRECTLY FROM OEI. *(see appendix 5)*

CASSETTE JACKS:

The **OUT** jack connects to the microphone jack on your tape recorder. The **IN** jack connects to your tape recorder's output (or headphone) jack. Together, these jacks allow you to store and load Programs, Steps, Sequencer data, and User-Velocity Tapers with an external cassette tape recorder. (See "Tape Storage and Loading" for details.)

CV/GATE OUTPUT:

The Voyetra can control an external monophonic synth that is connected to this jack. The external synths can be made to track either the left or right sides of the keyboard by selecting the appropriate SLAVE OUTPUT setting in the Alternate Page.

ARPEGGIATOR AND SEQUENCER EXTERNAL CLOCK JACKS:

These two stereo jacks allow you to control the Voyetra's Arpeggiator and/or Sequencer from external clock sources, or to use them in order to control external devices. (See the sections dealing with the Poly-Sequencer and Arpeggiator for more details.)

MEMORY PROTECT SWITCH:

This switch, in the "on" position, guards against accidental erasure of the Voyetra's Programs. It must be in the "off" position if you wish to load new Programs into the Voyetra, or use its AUTO-TUNE function.

DUAL FOOT SWITCHES:

These stereo input jacks accept a Voyetra Dual Footswitch.

FORWARD AND REVERSE-- this footswitch functions in exactly the same way as the FORWARD and REVERSE switches in the Programmer keypad and on the keyboard.

PROGRAMMABLE A and B-- these two stereo footswitches are completely programmable (see "The Set Page" for details), and allow you to control up to eight different Voyetra functions of your choice.

FOOTPEDALS:

These monophonic jacks accept specially-wired Voyetra foot

pedal controllers, which connect to the jacks with standard guitar-type coaxial cables. (Note that external control voltages may be applied to these inputs instead of pedals, so that external voltages sources--such as other synths or synth controllers--can be used to control these functions.)

VOLUME-- this jack allows the footpedal to control the instrument's MASTER VOLUME output.

VCF Fc/PROGRAMMABLE-- this input allows the filter cutoff frequency to be swept by about seven octaves. This same pedal doubles as a programmable pedal controller in Mod Bank D (please note that the pedal can't be used for both functions at the same time).

PITCH-- this input allows the VCOs to be swept up in pitch. Sensitivity of the pedal is continuously adjustable, and can be set from zero to a maximum sweep of about an octave and a fifth. This is a greater range than that of the keyboard's joystick.

AUDIO OUTPUTS:

There are three audio outputs--LEFT and RIGHT STEREO, and MONO. They can all be connected to different outboard processors at the same time, for special recording and performance effects.

MONO is just that; the complete output of the instrument, at all times, in a mono signal.

The Voyetra's eight Voices are assigned to LEFT and RIGHT outputs in different ways, depending on what keyboard mode has been chosen. In WHOLE 8, both stereo outputs have all eight Voices panned in the stereo spectrum. *(see p 18)*

In SPLIT and LAYER modes, PROGRAM LEFT and PROGRAM RIGHT are split to the LEFT and RIGHT outputs so that they can be routed to different tracks of a mixing board, or to different sound processing devices.

The audio outputs are typically line level and can output as much as 2 vpp with the MASTER VOLUME control set to maximum.

MIDI (Musical Instrument Digital Interface) CONNECTIONS:

The MIDI in your Voyetra allows you to interface with other Voyetras, home computers, and other MIDI-equipped audio gear.

MIDI OUT and MIDI THRU are open collector serial data lines that transmit data from the Voyetra to other machines. The MIDI IN is an optocoupled serial data input that will accept information from a MIDI OUT or MIDI THRU connector.

For information on practical uses of your MIDI, see "Expanding Your System."

ANALOG CONTROLLERS INTERFACE:

The **OUT** and **IN** jacks here accept special Controller cables
that work together with the MIDI to link two Voyetra modules
together, allowing you to control them both from one keyboard.

— Buffers —

CV/GATE OUT

TIP = GATE   0,⁺10V
RING = CV   0.25V - 5.25V

EXTERNAL CLOCKS

ARPEGGIATOR

TIP = OUTPUT 0→15V
RING = INPUT +2.5V Th.

SEQUENCER

TIP = OUTPUT 0→15V
RING = INPUT +2.5V th.

TIP = FWD
RING = REV

FWD/REV
FOOTSWITCH

TIP = 3AL
RING = 2AR

TIP = 1BL
RING = ⌀BR

•A• PROGRAMMABLE FOOTSWITCHES •B•

VCF Fc PEDAL INPUT
(programmable)

PITCH BEND
PEDAL
INPUT

VOLUME
PEDAL
INPUT

Buffers

NOTE pedal inputs can
serve as external control
voltage inputs, but the voltage
range must not go below
ground or above 15 volts.

REAR
PANEL
SCHEMATIC

NOTE Footswitch inputs are pulled up to +5V with 10k resistors and
turn on when the inputs are shorted to ground. As such,
these inputs can be driven by open collector logic outputs. Since
the buffer thresholds are about 2.5V, TTL outputs will also drive
them directly.

(REFER TO APPENDIX 5
FOR INTERFACING
CABLES)

MIDI

IN

SLAVE

MIDI

TURN
ON | MIDI KBD | , | MIDI MISC |
AND | SLAVE |

SLAVE

IN THRU

MIDI

TURN
ON | MIDI KBD | AND | MIDI MISC |

OUT

MASTER

⌐ ON ALTERNATE ⌐
PAGE

VOYETRA
VPK-5 KEYBOARD

TO MASTER KEYBOARD INPUT

THE KEYBOARD
CONNECTED TO
THE MASTER WILL
CONTROL THE MASTER
AND ALL OF THE SLAVES.

SLAVING
VOYETRA
MODULES

MIDI INTERFACE
TRANSMITS DIGITAL
INFORMATION FROM
MASTER TO SLAVES

ANALOG CONTROLLERS INTERFACE TRANSMITS ANALOG INFORMATION
TO SLAVES. THE TRANSMITTED CONTROLLERS ARE +X, -X, PRESSURE
AND PITCH BAND.
NOTE THAT TWO OR MORE SLAVES REQUIRE A "DAISY CHAINED"
FLAT CABLE CONNECTOR.

EXPANDING YOUR SYSTEM

SLAVE SYNTHS:

Controlling external synthesizers from a Voyetra Eight is as simple as hooking up the Voyetra's Control Voltage output jack to one or more of the slave synth's input jacks (depending on just what synth you may have.) If this does not work with your would-be slave synth, please contact OEI for specific instructions.

An excellent synth to use as a slave to the Voyetra Eight is the OEI Cat SRM II, a multi-featured duophonic synthesizer, that is available from OEI.   . It slaves to the Voyetra simply by connecting a standard male-to-male stereo cable from the Voyetra's CV output jack to the Cat's "From Master" input jack.

MIDI:

Implementation of the MIDI protocol, cable compatibility with other company's MIDI jacks, and MIDI-support software packages are still being finalized at the time of this writing. As hardware and software is finalized and released, section updates of this manual will be issued.

In the meantime, you may use your MIDI connections to link two Voyetras together, as follows:

LINKED VOYETRAS:

HOW TO LINK VOYETRA MODULES--

Here's how you link two Voyetra modules together to create an 8 Voice (32 oscillator) polyphonic synthesizer, capable of using both instrument's features from one controlling keyboard.

1) Connect the audio outputs from both modules to a mixing board or amplifier, with the volume off.

2) Choose which of the two modules will be the Master, and which the Slave. Plug your VPK-5 keyboard into the one you select to be Master.

3) Connect a standard XLR microphone cable from the MIDI OUT
jack on the rear panel of the Master to the MIDI IN jack on the
rear panel of the Slave.

4) Connect a 10-pin CONTROLLER cable from the CONTROLLER OUT
jack on the rear panel of the Master to the CONTROLLER IN jack on
the rear panel of the Slave. (This is only needed if you want
the keyboard mod controllers to affect both synths.)

5) Now turn on the software that allows the two machines to
communicate. Start by turning both instruments on and pressing
A-440 and STEP ENABLE on both to put them in their Alternate
Pages. Once there, do the following:

>--on the Master, turn on MIDI KEYBOARD and
>   MIDI MISC.

>--on the Slave, turn on MIDI KEYBOARD, MIDI MISC,
>   and SLAVE.

WHAT TWO VOYETRA MODULES WILL DO TOGETHER--

1) Whatever notes are played on the keyboard will be played
by both modules.

2) The keyboard's velocity sensitivity, pressure
sensitivity, and joystick will affect both modules at once--
although precisely how each module reacts to these signals is
dependent on how they have been programmed. (The velocity control
signal is sent over the MIDI cable. Pressure and joystick are
sent over the CONTROLLER cable; if you do not have a CONTROLLER
cable between the two modules, then pressure and joystick moves
on the keyboard will not affect the Slave Voyetra.)

3) When a Step is changed on the Master, it also changes on
the SLAVE. This applies to all FORWARD and REVERSE buttons and
also the numerical keypad. For example, press FORWARD to advance
the Master Voyetra from Step 22 to Step 23, and the Slave will go
from 22 to 23 as well. Or use the keypad to call up 37 on the
Master and you will automatically call up 37 on the Slave at the
same time. (If you do *not* want this to happen, i.e., you want
the Slave to stay in one Step setting while you change the Step
on the Master, you must turn off the Slave's MIDI MISC switch.)

NOTE: Just because the Steps are *numbered* the same when the
Master and Slave are linked doesn't mean they *are* the same. You,
and only you, decide what's in a Step. Being able to link them to
play at the same time is only a way of increasing the range,
usefulness, and potential complexity of your sound.

> *NOTE:* The two modules remain independent synthesizers, even
> though when linked they share the same keyboard and keyboard
> controllers. This means that turning a knob or activating a
> footswitch on one module will *not* affect the operation of the
> other, and vice-versa.

HOME COMPUTERS--

With the MIDI plus the appropriate software and hardware,
your Voyetra can be interfaced to a home computer. This will
dramatically widen your range of musical possibilities.

Interface cards, cables, and software are under development
for the IBM PC and Apple II Plus/IIE computers, and will be
released in 1984. These packages and future enhancements will
offer increased sequencer memory (up to tens of thousands of
notes); extended multi-track sequencing and editing; more precise
control over Program and Step settings; automatic translation
to musical notation of whatever you play on the keyboard; and
more.

This section of this manual will be expanded to cover full
implementation of these packages when they are released. Please
send in your warranty cards, so we know where to send you
notification of their availibility and features.

A-440 SWITCH: Voyetra Hidden Features

By holding down the A-440 button while pressing certain other
buttons on the front panel, special functions may be accessed
on the VOYETRA EIGHT. These second functions are as follows:

A-440 & AUDIO MUTE	Front panel transforms into the USER VELOCITY page
A-440 & ARPEG RIGHT	Front panel transforms into the SEQUENCER page
A-440 & STEP ENABLE	Front panel transforms into the ALTERNATE PANEL page
A-440 & TAPE LOAD	Allows selective tape loading of any program number on tape to any program location in the VOYETRA memory
A-440 & TAPE LOAD, then AUDIO MUTE	This activates tape load when the TAPE LOAD button is pressed, and then tells the VOYETRA to load the USER TAPER velocity from tape into the VOYETRA memory
A-440 & RELEASE DEFEAT LEFT	Turns on the VELOCITY VOLUME TAPER for the left program
A-440 & RELEASE DEFEAT RIGHT	Same except for the right program
A-440 & OCTAVE LEFT	Turns on the AUTO OCTAVE SHIFT function on the ARPEGGIATOR for the left program
A-440 & OCTAVE RIGHT	Same except for the right program
A-440 & AUTO TUNE	Turns on the A-440 tone
A-440 & STEP LOAD	Resets the ALTERNATE PANEL as follows: *turns off VCA VELOCITY L/R *turns off PRESSURE DEFEAT L/R *turns off LFO L/R SYNC *turns off ARPEGGIATOR RETRIGGER *sets ARPEG MODE L equal to ARPEG MODE R *sets ARPEG CLK L to ARPEG CLK R
A-440 & CALL LEFT	Loads the NULL PROGRAM into program left
A-440 & CALL RIGHT	Loads the NULL PROGRAM into program right

KEY SPEED

KEY STRIKE SPEED IS DISPLAYED AS A VELOCITY VALUE BETWEEN 0-F WHERE EACH VALUE HAS A CORRESPONDING KNOB AS SHOWN

VOYETRA EIGHT
polyphonic synthesizer module

FOOTSWITCH NUMBER
0= B RIGHT   2= A RIGHT
1= B LEFT   3= A LEFT

MOMENTARY/TOGGLE
H   μ

EXAMPLE: 2H MEANS FOOTSWITCH "A RIGHT" IS SET AS A MOMENTARY SWITCH (i.e., PUSH ON) RELEASE OFF

VOICE DISABLE

WHEN LIGHT IS ON, THE VOICE IS DISABLED AND NO LONGER ASSIGNED BY THE KEYBOARD

ENTER PROGRAMMABLE FOOTSWITCH FUNCTIONS BY PRESSING FOUR NUMBERS ON KEYPAD.

EXAMPLE: 20 58 would BE ENTERED BY PRESSING 2-0-5-8.

FOOTSWITCH PROGRAMMING

FTSW # PRESS → SELECT FOOTSWITCH NUMBER

FWD / REV PRESS → SELECT FUNCTIONS FOR SWITCH (99 MEANS "NO FUNCTION") USE KEYPAD TO SELECT

→ SELECT MOMENTARY OR TOGGLE RESPONSE WITH m/t SWITCH

→ STEP LOAD   LOAD SELECTION INTO MEMORY

PROGRAMMABLE FOOTSWITCH CONTROL CODES

00 = Unison Left	29 = Edit	08 = 0
01 = " Right	30 = Auto Tune	09 = 1
02 = Split	32 = Call Right	10 = 2
03 = Layer	33 = " Left	11 = 3
04 = Hold Left	34 = Step Enable	12 = 4
05 = " Right	35 = " Load	13 = 5
06 = Whole 8	40 = Pitch Bend Defeat R	14 = 6
18 = Reverse	41 = " " " L	15 = 7
19 = Forward	43 = Audio Mute	16 = 8
20 = Glide on/off Right	48 = Release Defeat Right	17 = 9
21 = " " Left	49 = " " Left	
24 = Octave Right	50 = Arpeggiator Right	
25 = " Left	51 = " Left	
26 = Tape Load	52 = " Pause	
27 = " Dump	56 = " Down	
28 = Store	57 = " Random	
	58 = " Up	

NOTE: 99 = NO FUNCTION

ALTERNATE·PANEL PAGE

enter; A440 & STEP ENABLE

exit; STEP ENABLE

* CLEAR USING A440 + STEP LOAD *

1 = NORMAL KEYBOARD ASSIGNMENT
2 = NORMAL WITH SINGLE
3 = CIRCULAR KEYBOARD ASSIGNMENT
4 = CIRCULAR WITH SINGLE

VOYETRA EIGHT
polyphonic synthesizer module

ARPEG.CLK
KBD RETRIG

STEP
L   R
32

KEYBOARD INTERFACE
MIDI MISC.
SLAVE ON
C/N LEFT

L.ARPEG
ARPEG CLK
LFO1
LFO2
PROGRAM NUMBER
EXT. ARPEG CLOCK
STORE
KBD GATE
FWD   REV
L   R
1 2 3
4 5 6
7   9
L O R
PROGRAMMER

ADVANCE KEYBOARD ASSIGNMENT

ARPEGGIATOR LEFT MODE
UP   DOWN   RAND   speed
WITH EXTERNAL ARPEGGIATOR CLOCK
THIS KNOB SETS THE GATE DURATION
LFO1 L/R SYNC   ARPEG LEFT RST   LFO2 L/R SYNC

VELOCITY VCA   PRESSURE DEFEAT   DETUNE RESET
LEFT
RIGHT

MASTER TUNE   MASTER VOLUME   POWER
LFO RATE   GLIDE   F   DETUNE   VOLUME
PROGRAM PARAMETER TRIMMERS

program transfer;

CALL LEFT   or   CALL RT   →   SELECT DESTINATION NUMBER ON KEYPAD   →   STORE
└ SOURCE PROGRAM ┘   └ LOADS SOURCE PROGRAM TO DESTINATION SELECTED ┘

POLY·SEQUENCER PAGE

enter; A440 & ARPEG RT.

exit; ARPEG RT.

METRONOME BEATS
0 = QUARTER NOTE
1 = EIGHTH NOTE
2 = SIXTEENTH NOTE

SEQUENCER QUANTIZATION
0 = NO QUANTIZE   3 = 32 NOTE   6 = 8 NOTE TRIPLETS   9 = 4 NOTE
1 = 64 NOTE   4 = 16 NOTE TRIPLET   7 = 8 NOTE   A = 2 NOTE TRIPLET
2 = 32 NOTE TRIPLETS   5 = 16 NOTE   8 = 4 NOTE TRIPLETS
EXAMPLE: 4 MEANS SEQUENCER WILL QUANTIZE TO SIXTEENTH NOTE TRIPLETS

TO CHANGE PLAYBACK SPEED:
PRESS "BPM" THEN ENTER METRONOME BEATS PER MINUTE ON KEYPAD BY PRESSING THREE NUMBERS BETWEEN 20-251 OR USING FWD REV SWITCHES

VOYETRA EIGHT
polyphonic synthesizer module

MET   QUANTIZE   BPM
05   8 50
EVENT MONITOR
UP
NORMAL
DOWN

EXT CLK   INSTANT REC.   speed
CLEAR   START STOP   RETURN TO NORMAL PACE

MASTER TUNE   MASTER VOLUME   POWER

SONG ON/LOOP MODE
ENTER SONG PAGE
96
CLOCK RATE
48
24

METRONOME ON
STORE
LOAD
TAPE
DUMP
1 2 3
4 5 6
7 8 9
FWD O REV
PROGRAMMER

CH 1
PLAY   RECORD
CH 2
LOOP
LOCK

L   R
A   R   LFO RATE   GLIDE   F   DETUNE   VOLUME
PROGRAM PARAMETER TRIMMERS

TAPE LOAD AND DUMP ON THIS PAGE ARE USED TO SAVE AND RECALL SEQUENCER NOTES FROM TAPE

RECORD MODE: DISPLAYS NUMBER OF EVENTS LEFT IN SEQUENCER MEMORY
OTHERWISE: DISPLAYS THE METRONOME BEATS PER MINUTE LOADED BY PRESSING "BPM" AND THEN A NUMBER BETWEEN 20-251 ON THE KEYPAD

SONG PAGE

enter & exit

ENTER SEQ NUMBERS BY PRESSING FOUR CONSECUTIVE NUMBERS ON THE KEYPAD

NORMAL
UP
DOWN
03   05
SEQ 1   SEQ 2

ENTER SEQ PAGE
1 2 3
4 5 6
7 8 9
FWD O REV
PROGRAMMER

EXAMPLE: 03 05 MEANS THAT SEQUENCE 1 WILL PLAY 3 TIMES AND SEQUENCE 2 WILL PLAY 5 TIMES.

EACH SEQUENCE CAN PLAY UP TO 99 TIMES

NOTE   OTHER SEQUENCER CONTROL BUTTONS THAT ARE AVAILABLE ON THE SEQUENCER PAGE ARE ALSO AVAILABLE ON THE SONG PAGE.

r FOR RIGHT
L FOR LEFT

EDITING PAGE NUMBER
PROGRAM BEING EDITED

VOYETRA EIGHT
polyphonic synthesizer module

VCO1 BYP
VCF

SYNC

LINEAR FM

LFO1
KBD TRACK

HALF

LEFT   RIGHT   PULSE W. MOD SOURCE

call   octave   octave   call   PWM1   PWM2

r1   88   88

PROGRAM NUMBER   PROGRAM NUMBER   STEP NUMBER

REMOTE   EDIT

STORE

1 2 3

PULSE WIDTH MOD SOURCE SELECT
0 = LFO1
1 = LFO2
2 = ADSR1
3 = ADSR2

FWD   REV

O

PROGRAMMER

PULSE 1   SAW 1   VCO1 KBD TRK

VCO 1 WAVEFORMS

SUB OCT 1   TRIANGLE 1   KBD TRK   PWM 1

PULSE 2   SAW 2

VCO2 WAVEFORMS

SUB OCT 2   TRIANGLE 2   PWM 2 KBD TRK

VCO1

VCO2

VCO VOLUME — PWM DEPTH — INIT PW — OCT · TUNE · SEMI — DETUNE 1 — PROGRAM VOL

MASTER TUNE   MASTER VOLUME

GLIDE/GLISS TIME   NOISE VOL

ENTER AND EXIT USING EDIT FROM ANY OF THE EDITING PAGES

CHANGE PAGES WITH FWD REV

PRESSING STORE ON ANY PAGE WILL REPLACE THE PROGRAM BEING DISPLAYED WITH THE SOUND HEARD

PRESS BUTTON TO SELECT LFO1 OR LFO2, THEN USE KEYPAD TO SELECT LFO WAVEFORM

VOYETRA EIGHT
polyphonic synthesizer module

VCA VELOCITY

GLISSANDO/GLIDE

RELEASE GETS DECAY

LFO 2 KBD TRACK

HALF

LEFT   RIGHT   LFO WAVEF SEL

LFO1   LFO2

r2   88   88

PROGRAM NUMBER   PROGRAM NUMBER   STEP NUMBER

REMOTE   EDIT

STORE

1 2 3

LFO 1,2 WAVEF. SELECT
0 = ∿
1 = ∼
2 = ⎍
3 = S+H

FWD   REV

O

PROGRAMMER

ADR 1   UNCOND RETRIG 1   LFO1 RETRIG.

ADR 2   UNCOND. RETRIG 2   LFO2 RETRIG.

FULL   FULL   FULL

KEYBOARD DECAY/REL   VELOCITY ATTACK   VCF KBD. TRACK

HALF   HALF   HALF

Fc   ADSR 1 MOD   Q

LFO1 SPEED   LFO2 SPEED   LFO1 DELAY

A   P   S   R

MASTER TUNE   MASTER VOLUME

(FULL MUST BE ON FOR HALF TO WORK)

MODULATION BANK DISPLAY A, B, C, D ONLY A IS ILLUSTRATED

WITH LIGHT ON, KEYBOARD CONTROL VOLTAGE REPLACES VELOCITY IN ALL MODULATION BANKS

BANKS A, B → ADSR1 REPLACES VELOCITY
BANK C → NOISE REPLACES VELOCITY
BANK D → VCF PEDAL BECOMES PROGR. MODULATION PEDAL

SOURCE
0 → DC
1 → LFO 1
2 → LFO 2
3 → LFO1 ⎍
4 → VCO1
5 → VCO2
6 → ADSR1
7 → ADSR2

VOYETRA EIGHT
polyphonic synthesizer module

LEFT   RIGHT   STEP

INVERT

rA   -0   F3

PROGRAM NUMBER   SOURCE   MOD DEPTH

REMOTE   EDIT

STORE

1 2 3
4 5 6
7

SELECT SOURCE

FWD   REV

O

PROGRAMMER

VELOCITY   +X

CONTROLLERS   VELOCITY CV

-X   PRESS.   ADSR1→A,B NOISE→C VCF PED→D

Q   VCO1   VEL/CV INVERT

DESTINATION

Fc   VCO2   USER/FACTORY VEL TAPER

MOD COARSE   DEPTH FINE

LFO1 SPEED   LFO2 SPEED   LFO1 DELAY

A   D   S   R

MASTER TUNE   MASTER VOLUME

ENTER OTHER MOD BANKS USING FWD REV

ADSR AND LFO CONTROLS ARE AVAILABLE IN MOD BANKS A-D AND ARE IDENTICAL TO PAGE 2

Appendix #2:

BASICS OF SYNTHESIS

It would be impossible to cover all that's important in synthesis in just one brief appendix, so we're not going to even try. The basic structures and definitions presented here are just that--BASIC--and intended to do no more than offer a friendly helping hand to any beginners in the audience.

Beyond that, if you really want to learn synthesis, we recommend a few ways to go about it.

1) Keep up with the magazines, especially *KEYBOARD* (and its "Synthesizer Basics" column every moth).

2) Read books on the subject. *THE COMPLETE SYNTHESIZER*, by David Crombie, is particularly good. It was published by Omnibus Press.

3) Get to know other synth players and ask as many questions as you can.

4) Most importantly of all, keep playing and KEEP EXPERIMENTING. Never going beyond your instrument's presets is just like standing in the corner with your face to the wall.

VCOs--

To have a sound, first you have to have something that generates it. That's the **VCO**, or **VOLTAGE-CONTROLLED OSCILLATOR.** It's an electronic circuit that generates a changing voltage level in a regular, repeating, periodic way. Down the line that voltage signal will be translated by speakers into sound for your ears to revel in. In the meantime, it is important that you know that the *shape* of that voltage level--called the **waveform**--has a lot to do with the timbre of your sound.

In the Voyetra you have two oscillators sounding in each Voice, and each of these Oscillators can simltaneously produce up to four different waveforms--triangle waves, sawtooth waves, pulse waves, and sub-octave waves.

 TRIANGLE WAVES

Triangle waves have a voltage level that rises to a peak and falls to zero again at the same constant, uniform rate. They

have a muted kind of tone quality.

SAWTOOTH WAVES

Sawtooth waves do indeed look like the teeth of a saw; not surprisingly, they sound a good deal buzzier than triangle waves.

PULSE WAVES

Pulse waves alternate between being at high and low levels of voltage, changing from one to the other instantly. These have a hollow kind of sound, something like a woodwind.

SUB-OCTAVE SQUARE

Sub-Octave waves are actually just square waves, a special kind pulse wave where the pulse-*on* time precisely equals the pulse-*off* time. What makes them worth separating is that they are precisely one octave lower in pitch than the other waveforms being generated in the oscillator, which makes them useful for "thickening" up a sound.

PHASE--

An oscillator generating a sound all by itself is a very simple system. But if you add just one other oscillator it gets more complex fast, and we have to worry about preventing accidental phasing effects (or else deliberately using them musically, as witness the popular phaser effects pedal).

When two oscillators produce the same waveform at precisely the same time they are said to be **in phase** with each other. If they produce the same waveform, but not at precisely the same time, they are said to be **out of phase**.

And when things that are out of phase with each other are played at the same time, you get **cancellation effects**. Sound is changes in waves of greater and lesser air pressure, you see, so if you get two contradictory waves of pressure (one saying "more!" and the other saying "less!") they add up to zero and *presto*, no sound. (If you have ever tuned a guitar, you've probably used the "beating" sounds caused by phase cancellation effects between string harmonics to get things right. It's exactly the same thing.)

Using the various retriggering commands the Voyetra offers,
plus the synchronization and tuning controls, you can keep your
oscillators in or out of phase to the degree you wish. Out of
phase *ever-so-slightly* is actually pretty good, because it
causes subtle beating effects that make a sound feel bigger and
richer.

PWM (PULSE WIDTH MODULATION) --

Modulating a signal means to take it and *alter* it with
something else. In a synthesizer, that usually means taking one
pattern of voltages and changing it with another one. What
PWM, or Pulse Width Modulation, is, is taking a Pulse wave and
modulating it with another, much slower signal (like that
generated for precisely this purpose by the Low Frequency
Oscillator, or **LFO**). This causes the pulses in the wave to
vary in length from pulse to pulse, making the basic sound much
more complex harmonically, and therefore richer sounding. Also,
since the pulse widths are steadily changing, the sound seems to
have a sense of internal *movement*.

ORIGINAL PULSE WAVE   +   MODULATING LFO SINE WAVE

=   etc.

pulse-width modulation
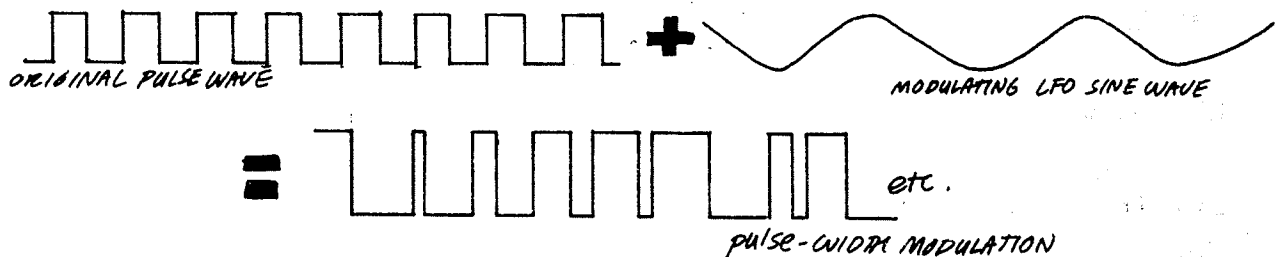
VCFs--

A VCF is **Voltage-Controlled Filter**. What a filter
does is to *remove* parts of the waveforms being generated by the
VCOs. JUst what gets removed, and how, is determined entirely by
the type of filter it is. "High-Pass" filters cut out lower
frequencies and let higher ones through. "Low-pass" filters, which
are what most synths have, cut out the highs and let the lows
through. The effect of the latter is to mellow and smooth a sound.
And since the **filter cutoff (Fc)** point in the filter is
variable you can adjust how much of this effect you want.

VCO
WAVEFORM   +   VCF
FILTER CUTOFF   =   ALTERED
WAVEFORM
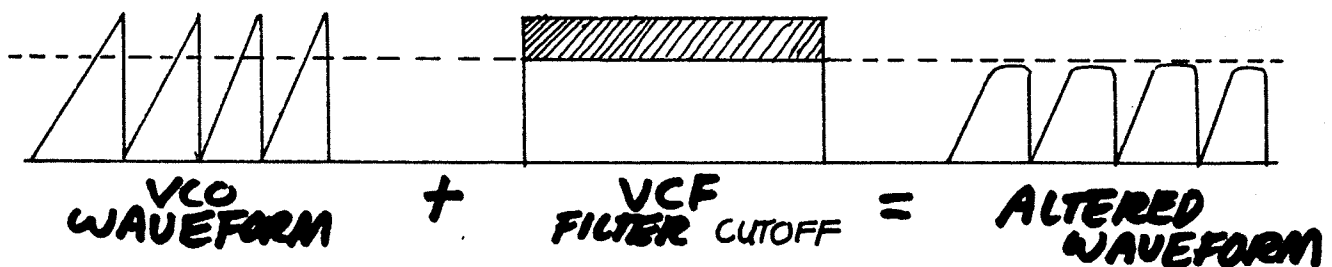
Q, also known as **Resonance**, is a kind of controlled feedback at the VCF's filter cutoff point. You get it the same way you get guitar or microphone feedback--by sending some of the filter's output back around and into the filter again. As you increase the amount you get more and more of that classic synth "meowing" effect--as you can see in the diagram--until the filter goes into total feedback whine (a state in which it is actually no longer a filter, but a *sine wave oscillator*, producing a sine wave with a frequency that matches the filter's cutoff point.

"Q" CONTROLLED FEEDBACK

filter cutoff
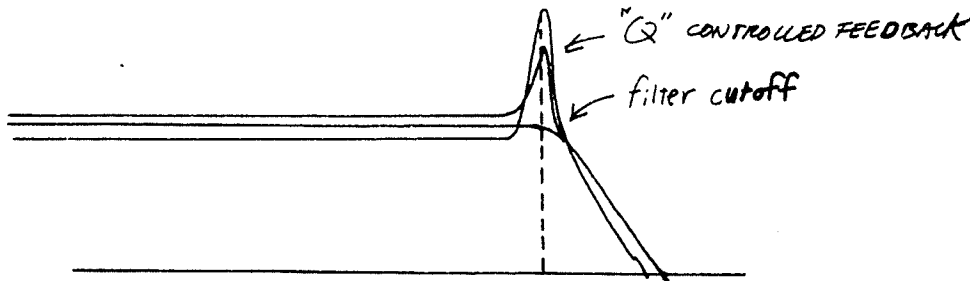
Needless to say, the effects of your Fc and Q settings will vary fairly radically depending on the waveforms being filtered and a variety of other Voyetra features. Keep on experimenting.

VCAs--

A **VCA** is a **Voltage-Controlled Amplifier**. Its simplest job is to amplify the voltage signal passing through it. But if that were all it did, wewouldn't need to put it here. No, what's importnt about a VCA (about any of these VC-things, actually) are those foirst two initials. Voltage-*controlled*. In other words, they do their job, but can be told how to do it by some source of changing voltage.

That's where **envelopes** come in. In the Voyetra there are two envelope generators, called **ADSRs** (which stands for Attack/Decay/Sustain/Release). One of them sends a control voltage to the VCA, so that a note's volume changes in some constant fashion over the course of its relatively grief life. (Another ADSR sends a controlling voltage to the VCF, so that the sound *texture* of a note can also be changing over time.

MODULATION--

Earlier we mentioned PWM, or Pulse-Width Modulation. But in a synthesizer, virtually anything could be modulated by anything else--all you need for modulation is two electrical signals to run together.

     In the Vovetra's Modulation Banks, this principle is easy to
follow and work with. You just select one of several different
Sources (the signals that will do th modulating); route it
through aaf **Controller** (the device or devices that will
let that signal through); and send it on to one of four possible
Destinations (the signal being modulated).

Appendix #3:

HEXADECIMAL/DECIMAL CONVERSION CHART

DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX
0	00	32	20	64	40	96	60
1	01	33	21	65	41	97	61
2	02	34	22	66	42	98	62
3	03	35	23	67	43	99	63
4	04	36	24	68	44	100	64
5	05	37	25	69	45	101	65
6	06	38	26	70	46	102	66
7	07	39	27	71	47	103	67
8	08	40	28	72	48	104	68
9	09	41	29	73	49	105	69
10	0A	42	2A	74	4A	106	6A
11	0B	43	2B	75	4B	107	6B
12	0C	44	2C	76	4C	108	6C
13	0D	45	2D	77	4D	109	6D
14	0E	46	2E	78	4E	110	6E
15	0F	47	2F	79	4F	111	6F
16	10	48	30	80	50	112	70
17	11	49	31	81	51	113	71
18	12	50	32	82	52	114	72
19	13	51	33	83	53	115	73
20	14	52	34	84	54	116	74
21	15	53	35	85	55	117	75
22	16	54	36	86	56	118	76
23	17	55	37	87	57	119	77
24	18	56	38	88	58	120	78
25	19	57	39	89	59	121	79
26	1A	58	3A	90	5A	122	7A
27	1B	59	3B	91	5B	123	7B
28	1C	60	3C	92	5C	124	7C
29	1D	61	3D	93	5D	125	7D
30	1E	62	3E	94	5E	126	7E
31	1F	63	3F	95	5F	127	7F

DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX
128	80	160	A0	192	C0	224	E0
129	81	161	A1	193	C1	225	E1
130	82	162	A2	194	C2	226	E2
131	83	163	A3	195	C3	227	E3
132	84	164	A4	196	C4	228	E4
133	85	165	A5	197	C5	229	E5
134	86	166	A6	198	C6	230	E6
135	87	167	A7	199	C7	231	E7
136	88	168	A8	200	C8	232	E8
137	89	169	A9	201	C9	233	E9
138	8A	170	AA	202	CA	234	EA
139	8B	171	AB	203	CB	235	EB
140	8C	172	AC	204	CC	236	EC
141	8D	173	AD	205	CD	237	ED
142	8E	174	AE	206	CE	238	EE
143	8F	175	AF	207	CF	239	EF
144	90	176	B0	208	C0	240	F0
145	91	177	B1	209	C1	241	F1
146	92	178	B2	210	C2	242	F2
147	93	179	B3	211	C3	243	F3
148	94	180	B4	212	C4	244	F4
149	95	181	B5	213	C5	245	F5
150	96	182	B6	214	C6	246	F6
151	97	183	B7	215	C7	247	F7
152	98	184	B8	216	C8	248	F8
153	99	185	B9	217	C9	249	F9
154	9A	186	BA	218	CA	250	FA
155	9B	187	BB	219	CB	251	FB
156	9C	188	BC	220	CC	252	FC
157	9D	189	BD	221	CD	253	FD
158	9E	190	BE	222	CE	254	FE
159	9F	191	BF	223	CF	255	FF

Appendix #4: GLOSSARY:

A——

A-440: the pitch represented by 440 cycles per second; the
most common tuning standard in Western music.

Absolute positioning: the mode in which a knob's exact
position, not how *much* it is moved, determines its
effect on the Voyetra sound.

ADR: Attack/Decay/Release; a type of envelope contour.

ADSR: Attack/Decay/Sustain/Release; a type of envelope
contour.

Arpeggiator: the section of the synthesizer which will trigger
notes to play automatically for as long as you hold their
keys down.

Assignment: in polyphonic synthesizers, this refers to the
various selection schemes that determine what Voice
module will play what note.

Attack: The first part of an envelope contour; the time it
takes for the output voltage to reach its peak strength.

C——

Clock: a standard reference pulse either internal or external
to the instrument, used to drive and synchronize features
such as the arpeggiator, sequencer, etc.

Controller: the elements in the Mod Banks which determine how
the modulating signal will or will not be passed on to
a chosen Destination.

D——

DC: direct current; a Source in the Mod Banks.

Decay: the second part of a standard envelope contour; the
rate at which initial output voltage drops from its
Attack peak to its Sustain level.

Decimal: standard base ten mathematics, the stuff you balance
your checkbook with.

Defeat switch: a control which allows you to turn off a
function, such as pitch bend or pressure, selectively.

Destination: in the Mod Banks, the VCO or VCF feature being
modulated by a Source signal.

Detune: the control that allows you to deliberately place
oscillators out of tune, for certain effects.

E——

Envelope: a voltage that changes over time; this is used to
change the volume and timbre of a note.

Exponential FM: frequency modulation on a non-linear scale.

External clock: a controlling and synchronizing time signal
from a device outside the Voyetra itself.

F——

Fc: filter cutoff; the variable point at which the filter
cuts out sound frequencies.

FM: see "frequency modulation."

Feedback: routing a signal back into itself.

Filter: a device which removes or blocks certain frequencies
from an audio signal.

Filter cutoff: see "Fc."

Frequency modulation: altering a frequency, usually that of a
VCO or VCF, by applying a control voltage to it.

G——

Gate: an on/off signal generated by some controller, which
either triggers or lets through a voltage; the most
common is the gate signal generate every time you press
down a note on the keyboard.

Glide: a smooth change in pitch between two different notes.

Glissando: a change in pitch between two notes that steps by
discrete semitones.

H——

Hexadecimal: base-sixteen mathematics, in which 0 through 16

are represented by 0,1,2,3,4,5,6,7,8,9,A,B,C,D,E, and F;
a useful numbering system for certain computer-controlled
applications, such as Modulation Depth settings.

I ——

Incremental positioning: the mode in which a knob's effect is
determined by how *much* it is moved, not its position.

Invert: to flip; to reverse in effect.

L ——

Layer: the Voyetra keyboard mode in which both Program Right
and left play simultaneously when you strike a key.

LED: Light-Emitting Diode; such as those long-lived red lights
on the Voyetra's front panel.

LFO: Low Frequency Oscillator; an oscillator which provides
a variety of sub-audio range waveforms useful for various
synthesis techniques.

Linear FM: frequency modulation on a non-exponential scale.

M ——

MIDI: Musical Instrument Digital Interface; a *de facto*
standard communications protocol, or code, for directly
linking in to an instrument's microprocessor.

Mod Bank: the portion of the Voyetra respeonsible for
setting and controlling the modulation of a programmed
sound.

Modulation: altering and manipulating voltage-controllable
synth parameters by applying periodic or aperiodic
control voltages.

Monophonic: the capacity to play only one note at a time.

N ——

Noise: random voltage fluctuations, like the fuzz between
channels on a radio; there are several different kinds,
the type of which is determined by what frequencies are
emphasized.

Noise source: a device that generates random voltage flux.

O――

Oscillator: an electronic circuit that generates constantly
       repeating waveforms.

P――

PWM: Pulse Width Modulation.

Page: an organizational structure of the Voyetra, in which
       groups of features and related controls are called up
       together by specific commands.

Phase: wherever an oscillator is within its waveform-creating
       cycle.

Polyphonic: the capacity to play more than one note at a time.

Program: a collection of Voice and control settings, stored
       together in the instrument's computer memory.

Programmable: the capacity to store and call back clusters of
       linked commands, so a sound can be created now and
       consistently called back later.

Pulse Width Modulation: an automatic variance in the *width*
       of the pulses in a pulse wave, usually created by altering
       the pulse wave with a control signal from an LFO. This
       creates a "thicker" oscillator sound.

Q――

Q: shorthand for "resonance;" the term used for a kind of
       controlled feedback around the filter cutoff point of the
       VCF.

Quantized: reorganized into discrete, regular bits.

R――

Release: the final portion of an envelope contour; the time
       it takes for output voltage to return to zero after the
       original triggering gate--such as a keystrike--closes.

Resonance: also called "Q;" a controlled feedback around the
       VCF'S filter cutoff setting.

S——

Sample and hold: a device that records the current voltage
level of some aspect of the synthesizer, and which holds
that level reading in its own circuit memory until it is
triggered--by whatever clock it is tied into--to record
again.

Sawtooth wave: an oscillator waveform that rises smoothly to
a peak and then instantly drops back to zero before starting
to rise again.

Sequencer: a device capable of recording synthesizer events
as a series of control voltages, which can then be played
back or altered.

Sine wave: the fundamental waveform, smooth and continuously
changing, free of harmonics and overtones.

Source: the signal in the Mod Banks that is used to modulate
a Destination.

Split: the Voyetra keyboard mode in which Program Left and
Program Right are available individually on separate
portions of the keyboard.

Square wave: A pulse wave in which all pulses are of equal
width.

Step: a set of "programmed programs" in the Voyetra,
consisting of two Programs, alterations in the Program
Parameter Trimmers, and the settings of performance
features such as the Arpeggiator.

Sub-octave wave: a square wave one octave below the pitch
being played; useful for thickening a sound.

Sustain: the third portion of a standard envelope contour;
the stable level that voltage finaly reaches and stays at
while the triggering gate is open.

Sync: the locking together of multiple oscillators or clock
sources so that their cycles stay in perfect time with one
another.

T——

Taper: the overall contour of the Voyetra's velocity
sensitivity.

Tremelo: modulations of an audio signal's amplitude.

Triangle wave: a waveform that rises smoothly to a peak
voltage and then drops back to zero at the same smooth

rate.

Trigger: the signal that begins a function within the
synth; the most common is the trigger impulse that
goes from keyboard to Voice module when you press a key.

U——

Unison: groups of oscillators being triggered simultaneously
at the same frequency.

V——

VCA: Voltage-Controlled Amplifier.

VCF: Voltage-Controlled Filter.

VCO: Voltage-Controlled Oscillator.

Velocity: the speed with which you strike a key, which the
Voyetra can sense and use to control aspects of the audio
signal.

Velocity taper: the overall contour setting that determines
what effects velocity will have when used to affect the
audio signal.

Vibrato: modulation of pitch.

Voice: the basic structure in the Voyetra sound-generating
structure; each Voice is essentially an independent
monophonic synthesizer.

W——

Waveform: a regular pattern of voltages generated by an
oscillator.

Whole 8: the Voyetra keyboard mode in which only Program Right
is heard, across the entire keyboard.

X——

XLR: a standard low-impedance microphone-type cable, used to
connect Voyetra module and keyboard, and Voyetra
MIDI-to-MIDI.

Appendix #5:

VOYETRA ACCESSORIES   · Available January 1984

Part #   Description

(all cables are supplied in 6 ft. length unless otherwise noted)

DIN-M   XLR Male to DIN Cable
             (VOYETRA MIDI in to other MIDI Out)
DIN-F   XLR Female to DIN Cable
             (VOYETRA MIDI OUT to other MIDI in)
MINI-Q   1/4" Phone Plug to Mini Plug
             (VOYETRA to mini cassette input)
XLR-MF6   XLR Male to XLR Female
             (VPK-5 Keyboard Cable)
XLR-MF2   XLR Male to XLR Female 2' length
             (VOYETRA to VOYETRA MIDI cable)
SM2   1/4" Stereo Plug to two mono female jacks
             (Stereo jack splitter cable for ftswitches and clocks)
AC6   VOYETRA AC cable
FC-10   10 Pin 6" flat cable
             (for connecting controllers between slaved VOYETRAs)
FS-1   Single Footswitch (normally open)
FS-2   Dual Footswitch (normally open)
FP-1   Foot Pedal with Sensitivity Control
             (includes connecting cable)
RH-2   VOYETRA module rack handles
             (set of two handles with screws)
FF-1   Fan Filter replacement

Please contact the OEI factory for pricing and delivery of all
 accesory items listed.