USING THE SYNCLAVIER (R) II
DIGITAL GUITAR OPTION

-PRELIMINARY VERSION-

Revised February, 1984

USING THIS MANUAL

FIRST, READ AND FOLLOW CAREFULLY THE DIGITAL GUITAR OPTION
SETUP INSTRUCTIONS.

Then, before you begin playing the guitar, you should
understand how the Synclavier (R) II real-time keyboard
system works. Read and perform the hands-on exercises in
the introductory "Using Synclavier (R) II" in the
Synclavier (R) II User Guide, even if you are not a
keyboard player.

Once you've learned the basics, you can turn to this manual
for instructions on the hardware and software special to
the Digital Guitar Option. The introduction by Pat Metheny
will give you an idea of some of the exciting possibilities
presented by the Digital Guitar Option plus many
suggestions on technique. The rest of the manual explains
the system and all its features in detail. You will learn
many ways to modify the preset timbres through your playing
technique on the strings, and through the guitar knobs, the
guitar button panel, and the guitar pedals.

Synclavier (R) II timbres are constructed and modified with
the control knob and the buttons on the keyboard control
panel. If you wish to develop your own timbres, or gain a
deeper understanding of the synthesis process, you will
want to read the section on "Designing New Timbres" in the
Synclavier (R) II User Guide.

Most of the functions of the Synclavier (R) II memory
recorder are available from the guitar button panel. These
functions are briefly described in this manual, but for
more information turn to "Using the Memory Recorder" in the
Synclavier (R) II User Guide.

TABLE OF CONTENTS

IMPORTANT FACTS ABOUT THE DIGITAL GUITAR

The Synclavier (R) II Digital Guitar Option provides a link between the Roland GR Guitar* and the Synclavier (R) II. With this option, the guitar player can play Synclavier (R) II sounds, with even more sensitivity than at present is offered to the keyboard player, and can access all the powerful capabilities of the Synclavier (R) II Digital Synthesis System.

For good results with the Digital Guitar Option, you must set up the Roland GR guitar and Synclavier (R) II system properly. Please read and follow the setup instructions carefully.

Secondly, you must play the guitar precisely in order to transmit the right pitches and dynamics to the Synclavier (R) II computer and digital synthesizers. Follow these general principles:

*   Tune the guitar to the Synclavier (R) II. This is very easy; see instructions on page 22.

*   Use the right kind of strings. We suggest starting with .010 for E and working down from there. (A list of gauges is provided in the Setup Manual.) Really heavy strings are too slow and really light strings make too much noise.

*   For best results, don't strike the strings too hard. The Synclavier (R) II responds very well to light picking, whereas bouncing strings may send incorrect pitch information. You can get all the power you need from the Synclavier (R) II timbres without heavy-handed playing on the strings.

*   For the purest pitch transmission, make clean breaks between notes. Articulate the notes carefully. (Of course, you can do bends and slides.)

*   Be sure to start out with the MONOPHONIC STRING button on the guitar button panel blinking. In this mode, the envelope of the synthesized sound will resemble the guitar envelope and the guitar will play more like a guitar. The other modes for this button play the synthesized sound with the programmed timbre envelope. It will take some time to develop a sense of timing with timbres which don't follow the natural envelope of the guitar.

*   When playing timbres with long decays, play staccato - lift off with your left hand cleanly or mute the string with your right hand. This will maintain the original pitch throughout the whole note.

Roland GR is a registered trademark of Roland Corporation, Japan.

I. INTRODUCTION TO THE DIGITAL GUITAR OPTION

In the following pages, Pat Metheny, guitarist, composer and
long-time Synclavier (R) II system owner, talks about his
initial experiences with the Synclavier Digital Guitar Option.
He offers some thoughts about the special nature of this guitar
and how to get started playing it. Throughout the manual,
there are many other suggestions from Pat on specific areas,
such as special button and control knob uses.

The Synclavier Digital Guitar Option is an unbelievable
breakthrough for guitar players. Although there have been several
other attempts at guitar synthesis, most them have failed in one way
or another. The only system that's been really usable has been the
Roland GR system. The people at New England Digital have taken a
very logical step and have built upon the superior instrument which
the Roland guitar happens to be. Using that instrument as a
standard, they have devised a system where a guitar player with a
Roland GR guitar can patch into the Synclavier itself, which is
definitely the most advanced synthesizer that any company has yet to
manufacture.

The Synclavier (R) II Digital Guitar Option is the first really
polyphonic guitar synthesizer. The Roland system is polyphonic in
the sense that you can play chords, but with the Synclavier Guitar
Option, you can actually play different sounds on different strings.
You can play up to six different sounds, a different sound on each
string.

You can play any kind of a sound with this system. The sound
doesn't have to follow the volume envelope that the guitar string is
putting out. This is something really unheard of in all the other
attempts at guitar synthesis. Up till now, when a guitar player took
his hand off the neck, the note would stop (unless it was an open
note). With the Synclavier system, it's a whole new ball game. You
can put your finger on a string and play a note, then take your
finger off and the note'll still be ringing. In other words, you can
play a low note and start a sound ringing, and then go up high and
play another note, or a chord, on top of the first note and have all
the sounds ringing together.

I think it's important to say that this instrument is not
anything you're going to be able to just pick up and play. Of
course, you'll be able to do that. But, speaking personally, I've
had a Synclavier now for two years and still, every time I sit down
at it, it's a learning experience. It's unlimited, the way any kind
of complete musical instrument is unlimited, in the sense that it's
up to your imagination what you get out of it. With the Digital
Guitar Option, this is even more true, because the whole way you play
the guitar is undoubtedly going to change.

Along these lines, I'd like to stress that you should start thinking like the timbre you're playing, rather than just playing the guitar. This is a concept that may take a while, because there's a tendency to just play your hip little guitar licks with a violin sound or a vibes sound. And this might be kind of fun, but to somebody who is a little bit jaded it's probably going to sound pretty dumb.

If you're going to play with a vibes sound, you better be thinking like a vibes player. Listen to some vibes and try to get into your mind what vibes players do when they play. For instance, if you play a lot of chromatic notes with a vibes sound (or any sound that's got a really long decay and sustain time), it's just going to turn into mush. All those chromatic notes are just going to run together. Vibes players have to deal with that same situation. They have to think in fifths, or other large intervals. Electric piano players have to deal with the same problem. That is, if you get below middle C and play anything smaller than a fifth, or an octave, it's just going to just sound like mud down there.

The guitar itself is in a very low register relative to the normal chording range of a piano or vibes. You have to think about register problems and all that. Because now it's a matter of a touch of a button to play up an octave or down an octave or to have part of your sound be up an octave or down an octave. (For a description of these functions, see "Overall Tuning" on page 92 and "Tuning" on page 80 of the Synclavier (R) II User Guide.)

On the other hand, sounds that are very staccato, like a marimba sound, will decay faster than a guitar normally would, so you want to get your finger off as quickly as possible to simulate that style of playing. So, practice getting your fingers off quick.

The guitar system is incredibly versatile. New England Digital has taken lots of pains to come up with a system in which the way you get a timbre to respond to your own playing is variable to a fine degree. Each player will make it quite a different instrument depending upon his or her touch and on a series of button and knob decisions.

However, in general, this instrument favors people who play with a light touch and clean phrasing. This is a break from the tradition in guitar synthesis. I play with quite a light touch, and I'm finding that the lighter I play with the sensitivity up to its max (the DYNAMIC RANGE knob on the guitar), the better tracking results I get.

You have to listen real closely to what you're playing, because you're giving instructions to a computer and you want the instructions to be right. Think about it. If you play with a light touch, what the computer's going to hear through that hex pickup down there is mostly note. If you play with a heavy touch, there's a kind of clunk that happens when you pick. The computer has to digest that clunk and try and make sense out of it.

It's a good idea to practice with your Synclavier system off and your amp off and really listen to the sound you're making. If you make a lot of noise with your left hand or your right hand, the computer is going to hear that noise and is going to try and play that too. You want to reduce the noise as much as you can. There are things you can do with the TRIGGER THRESHOLD switch and the TRANSIENT FILTER button to eliminate the noise. But still, the purer the sound that you make with the instrument, the more likely you are to give the right information to the computer, which can then translate your musical thought into the same kind of musical thought through the Synclavier.

You have to be very, very precise in your left hand fingering, because any little thing you do can set off a note. This varies from sound to sound. If the sound has a short decay, you can be as sloppy as you want. But with a long decay, if your finger's slopping around there, it's going to tell the computer, slop along with me. And you don't want the computer to do that. So, practice lifting your fingers up as cleanly as you can on your left hand. Like they used to say, arch your fingers as much as possible. That'll take care of it and make the sound much cleaner.

From a physics point of view, the guitar is impossible to play in tune. If you're playing single-note, lead-type stuff, every note you play is slightly out of tune because when you push the string down behind the fret, you're actually bending the pitch, even if it's just a little bit. That's what makes a guitar sound like a guitar. Now, the Synclavier people have provided a guitar function (the PITCH QUANTIZE (FILTER) button) that will take the raw guitar pitch and tune each note to the semitone so that always sounds perfectly in tune. But my personal favorite for the most expressive soloing is absolute raw pitch (PITCH QUANTIZE (FILTER) button unlit). You can do just about anything and it's right there with you. And if you de-tune the guitar a little you can find yourself getting these wild folk kind of sounds, like some wierd eastern instrument. This really takes advantage of the Synclavier in a way that the keyboard player never could.

I think as guitar players one of the challenges that we have is to justify our entry into the synthesized world by finding effects and certain kinds of sounds that wouldn't be possible with the keyboard. And, in fact, the Synclavier system is just begging for this kind of playing. Having worked with the Synclavier for two years, this guitar makes it a whole new instrument. It's starting to make sounds now that are so human and so natural sounding. Lyle Mays, the keyboard player in my group, came in as I was messing around with this particular effect, and he couldn't believe that it was the same instrument. It just seems to warm it all up when you've got the guitar a little bit out of tune.

Another major advantage that we guitar players have over a keyboard player who would be playing the Synclavier is that we have dynamics. This is probably the one thing that makes music sound like music, more than anything else - the relationships between loud notes and soft notes. We have much more dynamics control than is possible even on a touch sensitive keyboard. When we play with dynamics on a

guitar, we're doing it with both hands. It's happening in a very, very natural way. The whole process is something that's close to us as players. Even with a touch sensitive keyboard, you're basically just giving some signals through your touch that correspond to numbers. The same thing happens with a guitar, but my experience so far has been that it can be incredibly expressive. Not to mention the fact that we can bend strings, we can get all that raw pitch, which makes the guitar sound like a guitar.

This is a real breakthrough for synthesis of any kind. It means you can get all kinds of "inbetween" dynamics combined with "inbetween" pitches from a single source. It's not like you're having to turn a knob while you're playing. It's like you're thinking it as a musician. You play it and it comes out.

Of course, there are times when you don't want any dynamics. For example, when you're trying to simulate the way an electric keyboard, which has no dynamics, would play. This can be done really easily (by turning off the DYNAMIC VOLUME button). In this case, no matter how hard or soft you play, the sound is going to come out the same, giving us a power as guitar players that we've never had before. Because as great as dynamics are, they do take away from the general power. And that's why you hear so many rock and roll guys going duh-duh-duh-duh-duh-duh. The guys who do that best are the ones who play with the least amount of dynamics, often by using a compressor/sustainer to remove their dynamics. By turning off the DYNAMIC VOLUME button, you're instantly as mono-dynamic as you could ever possibly be, which is really fantastic. Then, with the MASTER VOLUME control on the guitar, you can get in there in any mono-dynamic volume you want.

Different players obviously have whole different conceptions of dynamics. My conception of dynamics is mostly based on playing with a light touch, but keeping the MASTER VOLUME up real loud so that my softest and my loudest are quite different. Somebody who plays really hard most of the time is going to have use the TRIGGER THRESHOLD switch, to compensate for any extra noise that might be heard.

The guitar button panel allows you to access all the main features of the keyboard control panel. Twelve of the buttons will be real familiar to anyone who is a Synclavier user. The first four on the top and the bottom eight are regular turf. But there are these four buttons on the right - these are the ones that are ours! They are extremely crucial to us because they deal exclusively with the guitar. They don't even exist on the keyboard control panel.

Every time you come up with a new timbre, or call up an old one, it will come up with default settings for these four buttons. The defaults are playable, but each sound can be modified with these buttons to make it even more effective. So, if you're a current Synclavier owner and you've already got disks and disks and disks of timbres, you're going to want to go through and make each sound sound the way you want it to, in terms of how you want to play and what kind of a sound it is, and then re-store it. I've already taken the time now to go through most of my favorite things. For instance,

I've found that on one vibes sound I don't want dynamics, and on a
penny whistle sound I want to have the raw pitch, and on a third
sound I want the transient filters on.

These buttons are really crucial and have a major effect on what
the person sitting in the audience is going to hear. (The manual
describes each one in detail.) One thing that I've found is that it's
definitely going to take some time to get your moves together on this
miniature panel. You have to really know what you want to do, really
practice your panel chops. Getting from one function to the other in
a performance takes some deft punching.

That brings us to the controls that are on the guitar. Now, the
Synclavier is famous for being programmable, which it is. It's
totally programmable. Anything you do can be saved on disk and
recalled at any time. The Roland guitar itself is non-programmable.
So, there are moves you are going to have to make each time when you
go from sound to sound. For instance, you might recall a sound which
you've already stored with the PITCH QUANTIZE on, the DYNAMIC VOLUME
off, the MONOPHONIC STRING off, and the TRANSIENT FILTER in the
blinking mode. You're still going to have to remember whether you
had your DYNAMICS RANGE control at the four o'clock position or at
the nine o'clock position, and you're going to have to make that
move. In that sense, you'll be combining a programmable type
activity with a very human activity. If you're going to play a loud
rhythm part, for example, you've got to get the sound up there and
then put that TRIGGER THRESHOLD switch up high where you want it.
(The manual describes the guitar controls in detail.)

Now for some miscellaneous notes on different effects you can
get.

You get a great sound if you mix together the real guitar sound
and the synthesized sound. It's the equivalent of a keyboard player
playing something on the acoustic piano and the exact same thing with
his left hand on an electric piano, which is also a great sound. But
you can do this with one stroke on this guitar. It's just beautiful.
It's also really neat to mix a synthesized sound which follows the
envelope of the guitar with the natural sound of the guitar. You get
this beautiful natural chorusing effect. It's even better if the
synthesized sound is perfectly in tune (read about the PITCH QUANTIZE
(FILTER) button) and the guitar sound is detuned just a little bit.

As I said before, as you play, you're sending pitch information
to the computer. I'll just point out one pitch tracking situation I
discovered when I played on the first, twelfth, or thirteenth frets.
(And if you play acoustic guitar and you listen real close, you'll
hear this same thing happening.) What happens is, if you lift up your
finger from the first fret, the string automatically goes to the
sound of the open string and you hear a note you didn't play. For
example, you're playing C on the first fret of the B string and you
lift up, you will hear a B. When you're playing on the twelfth fret
and you lift up your finger, you tend to activate the octave harmonic
that lives there. And, when you play on the thirteenth fret and lift
your finger, your finger is close enough to the twelfth fret that it
can also activate the octave harmonic. All these notes are very

quiet, but the computer picks them up. And you may start hearing
these notes that you didn't play (if the TRIGGER THRESHOLD is LO and
the DYNAMIC RANGE control is set at MIN). This can be annoying.
Say, for example, you're playing in the key of A flat. You play a C
on the thirteenth fret of the B string and then lift up. The last
note you want to hear is a B natural, but there it is. My suggestion
is avoid those zones whenever possible by playing the same notes in
another area. For instance, if you possibly can, instead of playing
the C on the B string, play it on the eighth fret of the E string.
It's the same pitch but you won't run into that function and it's
going to make the sound a little bit cleaner. (Another thing you
could do would be to raise the TRIGGER THRESHOLD to MED or HIGH so
that the unwanted note would not play.)

     This system lets you split the keyboard on the top key and then
you can play the guitar with one sound while a keyboard player is
playing another sound. If you have the stereo option, you can pan
one sound all the way to the left for the guitar player and the other
all the way to the left for the keyboard player. Basically, it's
like two totally separate instruments. You both have to be aware of
how many notes you're playing so that you don't use up the number of
voices in the system. One thing that's really great is that the
keyboard player can use the volume pedal for the volume of his sound
and you can use your MASTER VOLUME control knob and/or guitar volume
pedal independently of each other. So if he decides he wants to do a
crescendo with the keyboard volume pedal when you're playing a
screaming lead on top, he can, without affecting your volume at all.

     The Synclavier Digital Guitar system allows us to record as many
as sixteen tracks of ourselves into the memory. It allows us to then
push a button and see what was played printed out. Another stroke of
genius is that the volume of the memory recorder is independent of
the guitar volume. You can have one pedal controlling the live
guitar volume and another controlling the recorded sequence volume.

     The way the guitar is set up is crucial to how it's going to
perform. If it's set up wrong, it won't sound the way you want it
to; if it's set up really wrong, it just won't play. The type of
strings that you use, the position of the pickup, the setting of the
string balance screws on the back of the guitar, and the tuning are
very important. Be sure and take the time to read and follow the
setup instructions carefully.

     Finally, the process of learning what to do with this axe is not
something which is going to happen overnight. It's not something
that's going to happen in a week. You'll be able to make progress,
make a few sounds, but what you're getting into here is going to take
months at least, or years, to get a handle on. This is something
you're going to have to just jump in there and do.

                                                    PAT METHENY

THE DIGITAL GUITAR SYSTEM

With the Synclavier (R) II Digital Guitar Control Unit, a Roland GR
series guitar can be used to play Synclavier (R) II timbres, as well
as direct guitar, with any balance between the two sounds.

The Digital Guitar Control Unit reads the pitch and amplitude of the
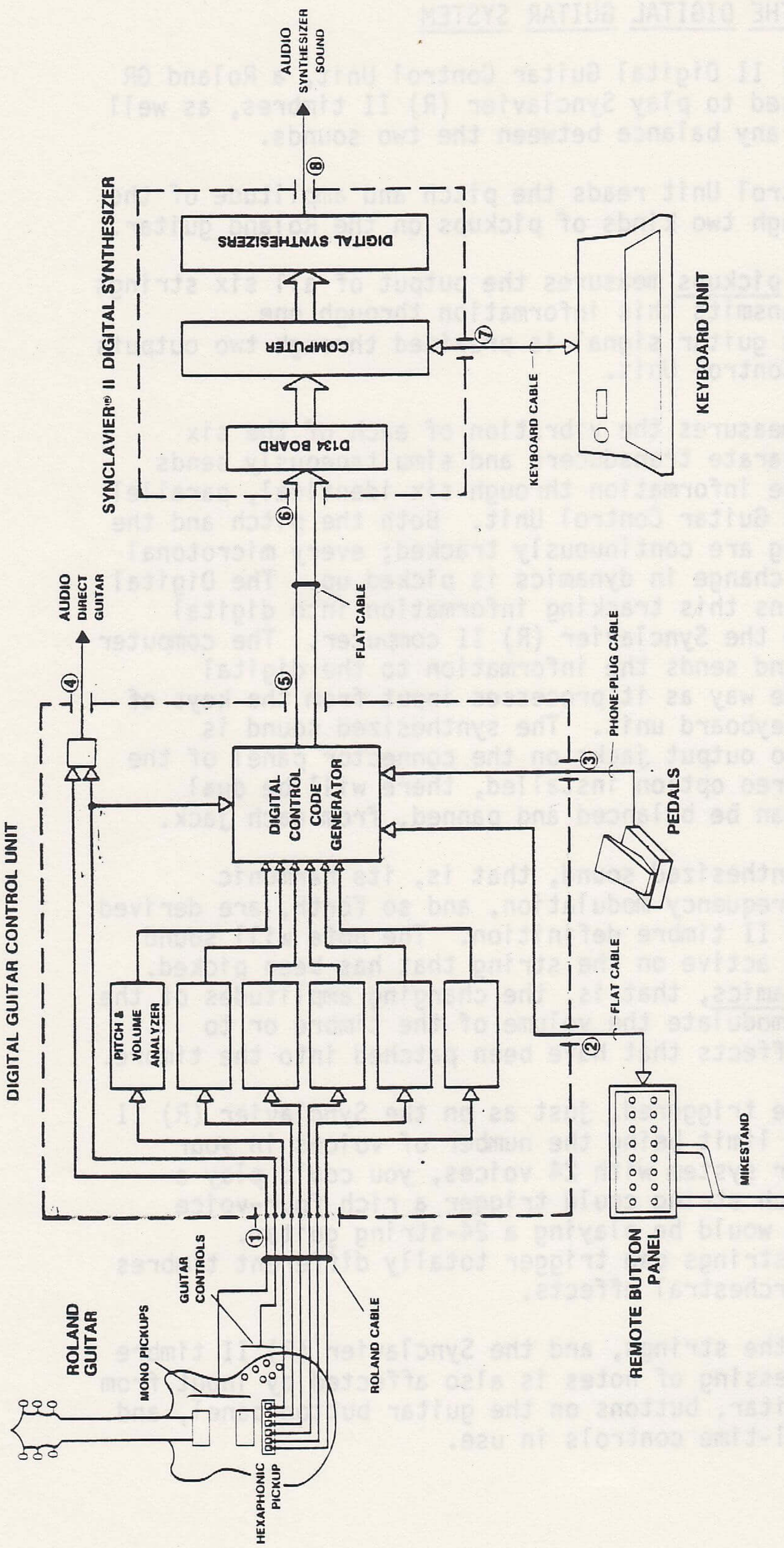vibrating strings through two kinds of pickups on the Roland guitar.

Each of the monophonic pickups measures the output of all six string
summed together and transmits this information through one
transducer. The direct guitar signal is provided through two output
on the Digital Guitar Control Unit.

The hexaphonic pickup measures the vibration of each of the six
strings through six separate transducers and simultaneously sends
this pitch and amplitude information through six identical, parallel
channels to the Digital Guitar Control Unit. Both the pitch and the
amplitude of each string are continuously tracked; every microtonal
pitch change and every change in dynamics is picked up. The Digital
Guitar Control Unit turns this tracking information into digital
codes which are sent to the Synclavier (R) II computer. The compute
processes these codes and sends the information to the digital
synthesizers in the same way as it processes input from the keys of
the Synclavier (R) II keyboard unit. The synthesized sound is
provided through the two output jacks on the connector panel of the
computer. With the stereo option installed, there will be dual
stereo outputs, which can be balanced and panned, from each jack.

The qualities of the synthesized sound, that is, its harmonic
structure, envelopes, frequency modulation, and so forth, are derive
from the Synclavier (R) II timbre definition. The note will sound
like whatever timbre is active on the string that has been picked.
However, the string dynamics, that is, the changing amplitudes of th
string, can be used to modulate the volume of the timbre or to
control any real time effects that have been patched into the timbre

Polyphonic sounds can be triggered, just as on the Synclavier (R) II
keyboard, with the only limit being the number of voices in your
system. In a Synclavier system with 24 voices, you could play a
six-string chord and each string could trigger a rich four-voice
sound. In a sense, you would be playing a 24-string guitar.
Furthermore, different strings can trigger totally different timbres
to produce incredible orchestral effects.

Besides the input from the strings, and the Synclavier (R) II timbre
definition(s), the processing of notes is also affected by input fro
knob controls on the guitar, buttons on the guitar button panel, and
any pedals or other real-time controls in use.

The knobs on the guitar are used to set:

1. the <u>tone</u> of the direct guitar output

2. the <u>balance</u> between direct guitar and synthesized sound

3. the <u>overall volume</u> of the guitar output (both direct guitar and synthesized sound)

4. the <u>response of the instrument</u> to the player and to the timbre:

    a. the <u>dynamic range</u> (or how much the volume will vary in relation to how hard you play),

    b. <u>volume thresholds</u> for the beginning and end of notes,

5. and the range of any <u>real time affects</u> that have been patched into the timbre definiton.

These knobs can be used to change the sound from the guitar in real time, much like the volume and real time pedals change the sound from the keyboard and memory recorder. They have no affect on the keyboard and memory recorder sound.

There are several new timbre control parameters, especially designed for guitar playability. The defaults for these parameters are set up for the normal performance situation, but they may all be changed by a press of a button on the guitar button panel. These determine:

1. whether or not the characteristic <u>transients</u>, or pitch fluctuations, that occur when a string is picked will be skipped over or played,

2. whether the <u>raw pitch</u> will be <u>played</u> <u>exactly</u>, <u>filtered</u>, or <u>quantized</u> to the semitone,

3. whether variations in force of picking will be used for <u>dynamic volume changes</u>, for other timbral changes, or ignored, and, finally,

4. whether the synthesized sound will follow the volume envelope of the guitar strings or will use the programmed volume envelope

5. whether there will be <u>monophonic</u> or <u>polyphonic (overlapping)</u> <u>decays</u> on notes on the same string.

Aside from these new parameters, the guitar button panel is used for <u>timbre selection</u> for the guitar and for conveniently operating the <u>memory recorder</u> while playing the guitar. You can also assign different timbres to different strings.

Pedals may also be connected to the Digital Guitar Control Unit. They only affect the guitar synthesized sound. The <u>guitar volume pedal</u> may be used to increase or decrease the volume of the synthesized guitar sound in relation to the direct guitar sound, to a sequence in the memory recorder, or to a live keyboard performance.

The guitar RTE pedal may be used to vary the amount of real time effects within the range determined by the RTE knob on the guitar. And the guitar HOLD switch may be used to hold a chord after you play it, freeing your fingers to play other notes on top of the held chord.

The Digital Guitar Option provides a new way to input musical information into the Synclavier (R) II system. It does not affect the way the other modules in the system work. The keyboard unit performs as before. Its buttons may be used in the usual way to program timbres, to operate the memory recorder and so forth. The keyboard itself may be played along with the guitar, provided you don't exceed the number of voices in your system.

The computer terminal may be used for timbre displays and to enter and play SCRIPT compositions and to reverse compile guitar performances. If you have purchased the Music Printing Option, you may use the terminal to print music notation of guitar performances. And finally, if you have purchased the Sample-to-Disk (tm) system, you will be able to play sampled sounds on the guitar and, with the SFM Patch and Recorder Program, place several different sampled sounds on the guitar strings.

II. GETTING STARTED

LOADING THE SYSTEM

You get started with the Digital Guitar Option in the same way as you get started with any Synclavier (R) II system, by turning on the system and loading the operating system.

1. Turn on the disk drives and the computer.

2. Insert the Synclavier (R) II Guitar Real Time System diskette (latest release) in the left-hand drive.

3. Press the LOAD button.

OR

1. Turn on the disk drives, the computer, and the terminal.

2. Insert the SCRIPT Guitar System diskette in the left-hand drive and a SCRIPT user diskette in the right-hand drive.

3. Press the LOAD button.

4. Type

    PLAY

The keyboard unit will look as it always does: the number of voices in your system will be displayed in the digital display window and various buttons will be lit.

On your guitar button panel, the four top right buttons will be lit.

TUNING THE GUITAR

The Roland guitar can be tuned easily to the concert A-440 pitch of the Synclavier (R) II. In fact, as Pat says, "the Synclavier becomes the ultimate most expensive guitar tuning device in the world." If you've just loaded the system, the PITCH QUANTIZE (FILTER) button on the guitar button panel should be lit. When that button is lit, every note you play in the synthesized sound will be tuned for you to the nearest semitone.

1. Start with your strings roughly in the area of E-A-D-G-B-E. So long as the strings are tuned to within a half a semitone of those pitches, the synthesized sound will be perfectly in tune.

2. Center the BALANCE knob on the guitar so that you can hear both the direct guitar and the synthesized sound.

3. Now tune the guitar until the direct guitar sound is in tune with the synthesized sound.

You can also use the same method to tune the guitar to a desired special tuning. For example, some guitarists tune the sixth guitar string down a whole step to D. Just start with the string roughly tuned to the D. Then tune the string as above so that the direct guitar sound matches the synthesized sound on the sixth string.

Due to electrical requirements within the guitar hardware, there are limits to the range of tunings that are allowed for each string. Currently, a string cannot be tuned down by more than a whole step. At present, there is no inherent limit to the amount by which a string can be tuned up. The guitar software also provides a special automatic tuning feature which can be used to retune literally any actual string tunings to the standard E-A-D-G-B-E tuning or to any special tuning. This is described in a later chapter.

The Synclavier (R) II may be tuned to a different pitch by pressing the OVERALL TUNING button and turning the control knob. The individual timbre can be tuned up or down with the PARTIAL TUNING and CHORUS functions. For example, with a touch of the PARTIAL TUNING button, you can play an octave higher than normal. Finally, special tunings may be introduced with the OCTAVE RATIO and SCALE RESET functions. These functions are all explained in the Synclavier (R) II User Guide.

RECALLING TIMBRES FROM THE GUITAR BUTTON PANEL

You may conveniently recall timbres using buttons on the guitar button panel.

To place a new timbre on the guitar strings, as well as on the keyboard, press the TIMBRE RECALL button to assign the timbre recall mode to the numbered buttons. As you do so, the button for the timbre currently active will light up. Then select a timbre by pressing a numbered button. To leave the timbre recall mode, press TIMBRE RECALL again or press BANK, TRACKS, or SEQUENCE RECALL.

To place a new bank of timbres in memory, press the BANK RECALL button to assign the bank recall mode to the lower row of buttons. As you do so, the numbered button for the bank currently in memory will light up. Then, select a bank by pressing a numbered button. To leave the bank recall mode, press BANK RECALL again or press TIMBRE, TRACKS, or SEQUENCE RECALL. The previous timbre will remain active on the guitar until you change it.

Try recalling and experimenting with the different timbres on your system diskette. In the next chapters, you will learn how to use the knobs and buttons to fine tune these timbres to your requirements. For now, make sure the performance buttons and knobs on the guitar are set as described below so that the system will respond in a controlled way. Since all the features are interrelated, it's a good idea to limit the options during the learning process.

The performance buttons on the guitar button panel should be set as follows on all the timbres (press the buttons repeatedly to change from lit to blinking to unlit):

1. The TRANSIENT FILTER button should be unlit for the fastest tracking of your notes. Play with a light touch. If you play really hard, you can introduce transients (un-pitched noise) at the beginning of your notes when this button is unlit.

2. The PITCH QUANTIZE button should be lit. This will round off all your notes to the nearest semitone.

3. The DYNAMIC VOLUME button should be lit. This lets you vary the loudness and softness of your notes by picking with more or less force.

4. The MONOPHONIC STRING button should be blinking. This causes the synthesized notes to follow the envelope coming from the guitar strings rather than the Synclavier II programmed volume envelope. This setting is much easier to play, especially until you have gained real familiarity with the system.

The knobs on the guitar should be set as follows:

1. Turn the MASTER VOLUME knob all the way clockwise.

2. Turn the REAL TIME EFFECTS knob to MAX.

3. Center the SUSTAIN knob.

4. Set the TRIGGER THRESHOLD switch at LO.

5. Set the DYNAMIC RANGE knob at MAX.

As you play, remember the suggestions on technique listed in
"Important Facts About the Guitar" and in Pat Metheny's introduction.

When you are ready to learn more about the control knobs and buttons,
recall Timbre 1-1 and go on to the next section.

THE GUITAR CONTROL KNOBS

The knobs on the guitar affect the processing of the input from the strings in many interrelated ways. Experiment with each control on the guitar as you read about it.

BALANCE

The BALANCE knob is used to adjust the mix between direct guitar and synthesized sound. The guitar and synthesizer capability allows you to play two "instruments" with entirely different sounds "in unison."

Since the synthesized sound and the unprocessed guitar sound come out of different outputs, the balance of the two sounds will also depend on where you have the two sounds patched.

Try the following:

1. Try turning the BALANCE knob clockwise to increase the synthesized sound.

2. Now turn the knob counter-clockwise to increase the direct guitar sound.

3. Balance the two sounds and play in unison.

Very natural chorusing effects can be achieved by detuning the guitar slightly. Then, the synthesized sound will be in perfect pitch (if the PITCH QUANTIZE (FILTER) button on the guitar button panel is lit) and the guitar will be just enough off to be natural.

Note that the guitar volume pedal can be used in combination with the BALANCE knob to bring the synthesized sound in and out. This is described later in the section "Using the Guitar Pedals."

GUITAR TONE

The GUITAR TONE control knob is used to adjust the tone of the direct guitar sound. It works like a tone control on any electric guitar. It has no affect on the synthesized sound.

MASTER VOLUME

The MASTER VOLUME knob is used to adjust the volume of both the guitar and synthesized sound, or the total output from the guitar. The volumes of sounds played from the keyboard or memory recorder are unaffected by this knob. While you can use this control for any volume change, it is most effective when used for swells during sustained notes. Dynamic changes from note to note can be made just by varying the force with which you pick.

Volume changes made with the MASTER VOLUME knob, even those occurring

in the middle of a note, can be recorded in the memory recorder.

Try the following:

1. Turn the BALANCE control so that the guitar and synthesized sound are balanced.

2. Experiment with different volumes.

3. Turn the BALANCE control so that the guitar sound is completely off.

4. Experiment with different volumes.

REAL TIME EFFECTS

The REAL TIME EFFECTS knob is used to change the way a timbre sounds while you play. It can be used to change the overtone content, the length of decays, the depth of vibrato, and other qualities as well. The position of the knob will establish the percentage of any real time effects that have been patched into the timbre, much like the REAL TIME EFFECTS pedal described in the Synclavier II User Guide.

Try the following:

1. Press PARTIAL TIMBRE 1 and VOLUME PK.& SUSTAIN under REAL TIME EFFECTS.

    This means that the volume peak and sustain levels of partial timbre one will be affected when you turn the knob.

2. Press the PEDAL IN/OUT button so that it is lit.

3. Turn the REAL TIME EFFECTS knob counter-clockwise slowly as you play. When the knob has been turned all the way to MIN, no sound will be heard when you pick a string.

    All RTE changes are effective at the beginning of each note. If you move the knob during a note, the change will not be heard until you pick the next note.

Although it can be used by itself, as in this example, the REAL TIME EFFECTS knob on the guitar is related to the guitar REAL TIME EFFECTS pedal and can be used to scale the real time effects changes you can achieve through the way you pick the notes. The subject of real time effects is described in detail on page 44.

The REAL TIME EFFECTS knob, which is located where the filter
control used to be in all our Roland minds, is unbelievably
useful. You can basically turn your guitar into a custom made
guitar with each sound that you make. You can make that knob
do anything. You can make it bend pitch if you want. You can
make it control the length of the decay of a sound. This is
where a really creative programmer could just go crazy. That
knob also happens to be in a place where you can reach it with
your little finger, at the same time you're picking a note, in
the same way guys like Roy Buchanan have done with the volume
control on a real guitar.

P.M.

CONTROLLING THE RESPONSE TO STRING DYNAMICS

Since the Digital Guitar Control Unit continually tracks the dynamics
coming from the strings, you can amplify or diminish the volume of
the synthesized sound by the way you pick the strings. If you pick a
string hard, the sound will be played loud. If you pick a string
softly, the sound will be played soft.

Three controls on the guitar are used to fine tune the volume
modulation to suit the way you play and the particular sound you are
playing. You use the first control, DYNAMIC RANGE, to control the
relationship between the volume of the synthesized sound and the
actual amplitudes coming from the string. You use the second,
TRIGGER THRESHOLD, to set an "on" threshold, or to specify the lowest
amplitude that will trigger a new note. And you use the third,
SUSTAIN, to set an "off" threshold, or to control the length of the
sustain, or steady state, portion of the note. These three controls
are described in detail below.

Note that the effect of these controls varies depending on the two
performance buttons which also control volume. Details on these
buttons are contained in the next chapter.

DYNAMIC RANGE

The DYNAMIC RANGE knob is used to set up the relationship
between how hard you are picking and how loud the synthesized
sound is going to be. When the knob is all the way
counter-clockwise to MAX, there will be the maximum possible
variation in volume between soft and hard picking. Softly
picked notes will played with a very low volume level;
heavily picked notes will be played at the full programmed
volume level. In other words, with the DYNAMIC RANGE knob
set at MAX, no gain will be applied to the original amplitude
input from the strings.

When the knob is all the way clockwise to MIN, there will be
the minimum difference in volume between soft and hard

picking. Even if you pick a string lightly, the note will still be played with the full programmed volume level. Full gain will be applied to any amplitude input from the strings, even the slightest vibration. You can play very lightly and still get maximum volume.

There are many situations where this full amplification yields undesirable results. For example, if you are playing on the first, twelfth, or thirteenth fret, harmonics can be magnified and sometimes wrong notes can be heard. If the timbre has long decays, the problem can be accentuated.

Try the following:

1. Turn the DYNAMIC RANCE knob all the way counter-clockwise to ~~MIN.~~ MAX.

2. Pick some notes with varying force.

   There should be a range of dynamics.

3. Turn the DYNAMIC RANGE all the way clockwise to ~~MAX.~~ MIN.

4. Pick some notes with varying force.

   All the notes should be played at almost full volume.

TRIGGER THRESHOLD

After the input from the string is processed by the DYNAMIC RANGE control, it must cross a volume threshold before a new note will be triggered. The level of this threshold is set by the TRIGGER THRESHOLD switch. Any amplitude that does not rise above the current threshold will be ignored. The threshold is used to filter out unwanted noise and to prevent the triggering of false notes.

There are three positions: LO, MED, and HI. Corresponding LED's on the Digital Guitar Control Unit indicate the current threshold.

IMPORTANT NOTE: The computer keeps track of when amplitudes cross from below to above the threshold. If the amplitude from a previously picked note on the same string has not dropped below the level of the TRIGGER THRESHOLD, a new note will not be triggered when you pick the string, no matter how hard. Whether the computer thinks the note has decayed below the TRIGGER THRESHOLD is also affected by the positions of both the DYNAMIC RANGE knob and the SUSTAIN knob (see below).

When the DYNAMIC RANGE is set at MAX, your choice of threshold will depend on your touch. If you play with a light, very precise touch, you will probably want the threshold set at LO so that all your notes will be picked up. On the other hand, if you have a heavy-handed picking

technique, you would probably want the TRIGGER THRESHOLD at MED or HI to eliminate any noise or false notes that might be caused by the vibrating strings or left-hand string noise.

When the DYNAMIC RANGE is set at MIN, all but the slightest touches will be amplified to full volume and will be played even with a HI TRIGGER THRESHOLD.

Try the following:

1. Set the DYNAMIC RANGE at MAX.

2. Set the TRIGGER THRESHOLD at LO.

3. Play a variety of notes, slides, loud and soft notes, etc.

4. Now try the same thing with the TRIGGER THRESHOLD set at MED and than at HI.

5. Repeat the above with the DYNAMIC RANGE at MIN.

> The LO TRIGGER THRESHOLD position is the way probably 90% of players will have it all the time. If you're going to really be smacking on the strings or strumming a real hard rhythm part, popping the switch over to its HI or MED position makes a lot of sense.
>
>   P.M.

SUSTAIN

The SUSTAIN knob determines when the sustain, or steady state, portion of the synthesized sound will end. It sets an "off" volume threshold. When the amplitude from the guitar string drops below this threshold, the note will be cut off or will go into final decay if one has been programmed into the timbre.

Just how the position of the SUSTAIN knob will affect the length of the note is somewhat complex. The actual level of the "off" threshold depends on the TRIGGER THRESHOLD setting, as well as on the SUSTAIN setting. Furthermore, the amplitude from the string depends on whether you pick the note heavily or lightly and whether you damp the string or not. The amplitude also depends on the DYNAMIC RANGE setting which may amplify the original string dynamics. Finally, the length of the note is also controlled by the time segments in the timbre definition.

When the SUSTAIN knob is set at MIN, the cutoff level will be at the minimum, or close to zero. The synthesized sound will

be played at sustain level until the string almost completely stops vibrating. When the SUSTAIN knob is set at MAX, the cutoff level will be at the maximum, or just below the "on" level set by the TRIGGER THRESHOLD. The note will be cut off or go into final decay as soon as the amplitude from the string drops below this level. In general, turn the knob counter-clockwise for long notes and clockwise for short notes. With either setting, you must damp your notes quickly for staccato notes.

Remember, the input from the string may be amplified by the DYNAMIC RANGE control. If the DYNAMIC RANGE control is set at MIN, full gain will be applied to any string vibration. In this case, if the SUSTAIN knob is set at any position above MIN, long sustained notes will be heard.

For the longest possible notes, set the DYNAMIC RANGE knob at MIN, center the SUSTAIN knob, and use a timbre with a long final decay. When you use timbres with long final decays, it is important to articulate the notes very carefully. In fact, play staccato by lifting the left hand cleanly or damping out with the right hand so that, as the note decays, the original pitch will be maintained.

For a series of short notes from the same string, you would want to set the DYNAMIC RANGE at MAX, the SUSTAIN knob at MIN, and the TRIGGER THRESHOLD at HI. Otherwise the volume won't be cut off between notes and some notes might be skipped. On the other hand, with a zero VOLUME ENVELOPE SUSTAIN level in the timbre definition, you can very precisely control the length of the note with the length of the INITIAL DECAY.

Try the following:

Timbre with no decays

1. Set the DYNAMIC RANGE at MAX.

2. Set the TRIGGER THRESHOLD at HI.

3. Set the SUSTAIN knob at MIN. Each note should cut off quickly, following the natural guitar envelope.

4. Set the SUSTAIN knob at MAX. The sustained portion of the sound should last longer.

5. Now set the DYNAMIC RANGE at MIN and try different SUSTAIN settings.

Timbre with long final decay

1. Add a long final decay to the timbre.

2. Set the DYNAMIC RANGE at MAX.

3. Try different SUSTAIN settings.

4. Try different THRESHOLD settings.

You should now have a feel for the guitar control knobs. Now let's move on to the button panel.

THE PERFORMANCE BUTTONS

The four buttons on the top right of the Guitar Button Panel are used
for programming special guitar performance functions. These
functions apply to the timbre as a whole and affect the pitch and
dynamics of the sound in significant ways. The current state of each
of these buttons (i.e., whether it is lit, unlit, or blinking) is
saved when you save the timbre on the diskette.

The first two buttons described control the dynamics. The second two
buttons affect the pitch.

The DYNAMIC VOLUME Button

The Digital Guitar Control Unit always tracks the string dynamics.
The state of the DYNAMIC VOLUME button controls whether or not these
string dynamics will be used for volume changes. NOTE: the string
dynamics can also be used for real time effects changes (see "Playing
with Real Time Effects").

When the DYNAMIC VOLUME button is lit, the volume of the synthesized
sound will be modified by the string dynamics. This is the default
state.

When the DYNAMIC VOLUME button is unlit, the volume of the
synthesized sound will not be modified by the string dynamics. Any
note with an amplitude greater than the level set by TRIGGER
THRESHOLD switch will be played with the full volume, no matter how
hard or soft you play. As soon as the string dynamics fall below the
level set by the SUSTAIN knob, the note will be cut off or will go
into final decay if one has been programmed into the timbre.

Try the following:

1. Press the DYNAMIC VOLUME button so that it is unlit.

2. Play some notes.

    They will all have the same volume.

You may find the fixed dynamics mode handy for recording, because
less memory is required for the same sequence of notes. You can then
add the volume changes during playback with the keyboard pedal.

The MONOPHONIC STRING Button

While the DYNAMIC VOLUME button determines whether or not the string
dynamics will be applied to the volume of the sound, the MONOPHONIC
STRING button determines how the string dynamics will be applied.
There are two modes for volume modification: the "guitar envelope"
mode and the "programmed envelope" mode.

In the "guitar envelope" mode, the synthesized sound will follow the string dynamics throughout the note. That is, the programmed volume envelope will be repeatedly scaled by the levels coming from the string. The programmed sustain level will not be maintained at a constant level; it will be quickly diminished just as the sound of a direct guitar note would. When the string dynamics drop below the "off" threshold established by the SUSTAIN knob, the note will be cut off or go into final decay, if one has been programmed. By damping down a string, you can cause the final decay to start at the current level set by the string dynamics. When you play a series of notes, even on the same string, their soft final decays can overlap, providing a nice "reverb" quality. You will undoubtedly find that the guitar feels more guitar-like and more playable in the guitar envelope mode.

In the "programmed envelope" mode, the peak in the string dynamics determines a percentage which is applied to both the programmed peak and sustain levels. Thus, a heavily picked note will produce 100 percent of the programmed peak and sustain levels. A lightly picked note will produce a lower percentage of these levels. Once the percentage has been set, the string dynamics are basically ignored until they drop below the "off" volume threshold. Then the note will stop or will go into final decay if one has been programmed. Use this mode for long notes with the volume sustained at the same level throughout, even as the string dynamics are falling.

If you use the "programmed envelope" mode, you must also choose a "string" mode which determines whether or not overlapping decays of notes on the same string will be cut off. In the "monophonic string" mode, as you pick successive notes on the same string, they will each cut off the previous note. In the "polyphonic string" mode, each note is allowed to decay completely. You can play arpeggios with overlapping decays on the same string; the harmonics can ring out together.

There are three states for the MONOPHONIC STRING button: lit, unlit, and blinking.

When the MONOPHONIC STRING button is <u>lit</u>, the "programmed envelope" and "monophonic string" modes will be selected.

When the MONOPHONIC STRING button is <u>unlit</u>, the "programmed envelope" and "polyphonic string" modes will be selected.

When the MONOPHONIC STRING button is <u>blinking</u>, the "guitar envelope" mode will be selected. Note that in the "guitar envelope" mode, the strings are always "polyphonic", but any overlapping decays will be much softer.

Experiment with some timbres with long decays with the three different settings. Remember, when you are playing notes with long decays, you must articulate the notes carefully so that the computer will know which pitch to use for the decays.

On sounds that have real long decays, like vibes, strings, or
voices, I would say you almost always want to turn the
MONOPHONIC STRING selector switch off or blinking. Because you
want those notes to ring together the way they naturally would
if they were played by a section of instruments. What happens
if you have the MONOPHONIC STRING function in the blinking mode
is that the timbre starts to play very guitar-like. Again,
it's a matter of trying to think like the timbre rather than
like the guitar.

P.M.

If you wish to play a timbre monophonically on different strings, use
the keyboard polyphony feature, described on page 85 of the
Synclavier (R) II User Guide. A monophonic timbre will only sound
one note at a time on any string (or key on the keyboard). When you
use a monophonic timbre on the guitar and also have the PITCH
QUANTIZE (FILTER) button off (for raw pitch) and the TRANSIENT FILTER
button off, you get the fastest possible pitch tracking. It's also a
very clean sound.

The TRANSIENT FILTER Button

When a guitar string is picked, the pitch of the string can vary
quite widely during the first few cycles. This is particularly true
if the guitar string is picked very loudly, such as often happens in
rhythm playing.

With some synthesized sounds, these pitch variations, or transients,
are desirable. However, other synthesized sounds (particularly those
with sharp attacks) sound better if they are delayed slightly until
the pitch of the guitar string has settled down. The TRANSIENT
FILTER button gives you control over the amount of delay. You can
choose whether you want to skip over all the transients, some of the
transients, or none of the transients.

The guitar software continuously polls the Digital Guitar Control
Unit to check for new notes on each string. When it detects a valid
pitch measurement and a volume measurement that is above the TRIGGER
THRESHOLD setting, it will take action depending on the setting of
the TRANSIENT FILTER button.

When the TRANSIENT FILTER button is lit, the computer will wait until
the transients lie within a range of one half a semitone before it
will begin playing the note. This default setting results in a very
clean sound, but it can result in a short delay before the note will
sound. For the open low E string, this delay can be as long as 30
milliseconds, so you must compensate by playing slightly ahead of the
beat. NOTE: The harder you beat on the strings, the more transients
there will be, and the longer the delay.

When the TRANSIENT FILTER button is <u>blinking</u>, the computer will wait until the transients lie within a range of two semitones before starting the note. This results in shorter delays, yet it still provides some transient rejection.

When the TRANSIENT FILTER button is <u>unlit</u>, the computer will start the synthesized sound upon receiving the <u>first</u> valid pitch measurement, provided the volume is above the TRIGGER THRESHOLD setting. This unlit state is used for maximum tracking speed or choppy rhythm playing. With this setting, notes will begin within three milliseconds of the first pitch cycle.

IMPORTANT NOTE: There is always a compromise between delay and transient rejection because of the required observation time by the computer. You can achieve minimum delay <u>and</u> less glitching if you pick <u>lightly</u> and leave the TRANSIENT FILTER <u>off</u>. <u>Remember, on this guitar you need not play hard to play powerfully.</u> The synthesized timbre gives you all the <u>power</u> you'll ever need!

Experiment with different TRANSIENT FILTER settings with different timbres and different ways of playing. Try fast runs, slow parts, rhythmic strumming, and high and low notes.

Think about what happens when you hit a guitar string. If you could imagine a slowed down version of a guitar string sounding, the first thing you would hear is this incredible noise. And this is quadrupally true on the low E and the low A strings. On those lower strings, it takes a while for the pitch to establish itself. First, there's this sound and then the note starts.

The TRANSIENT FILTER allows you to clean up a lot of that wierd stuff. The one thing you should know about this filter is that it does slow down the tracking time a little bit. It's not real noticeable but it's there. If you pick really hard, you're probably going to want the TRANSIENT FILTER button on most of the time, because if you don't, you're going to get some wierd sounds. But, if you pick real light and you want some super fast stuff in there, take it off and the computer'll follow you as fast as you can play. You can even look at the guitar funny and the computer will follow you. That can be really effective, but it's risky if you have that filter off. Those transients can cause some wierd glitching sounds, some very unpleasant noises, which you'll want to watch out for.

If you're recording, you might want the TRANSIENT FILTER on or else glitches may get into your recording and mess it up. Also, if you're going to play a rhythm part where you're really going to be beating on the strings (<u>NOT RECOMMENDED</u>), you definitely want the TRANSIENT FILTER button on. When you start strumming heavily, the computer may get a little bit confused and start spitting out some wierd noise. If you've got the TRANSIENT FILTER button on, it really cleans it up a lot.

P.M.

The <u>PITCH QUANTIZE (FILTER)</u> Button

The Digital Guitar Control Unit detects the subtle microtonal
variations in pitch that occur as the guitar is played. Slides,
vibrato, pitch bend, as well as out of tune notes, are all accurately
transmitted into the unit.

At times, you may not want every slight pitch change to be played.
The PITCH QUANTIZE (FILTER) button can be used to tune up each note
and to reinterpret all or some of the pitches that lie between
semitones.

When the PITCH QUANTIZE (FILTER) button is <u>lit</u>, the raw pitch coming
from the strings will be quantized, or stepped up or down, to the
closest semitone. That is, you will be able to produce only those
notes from the guitar that you would from the keys of a keyboard.
With this default setting, the guitar will sound perfectly in tune
and pressing a string harder with the left hand won't change the
pitch. During slides and bends, pitches will jump from semitone to
semitone.

When the PITCH QUANTIZE (FILTER) button is <u>blinking</u>, the raw pitch
will be filtered, or rounded off to increments of one/eighth of a
semitone. Thus, any small pitch variations that occur around a
semitone will be smoothed out, notes will be in tune, and any
vibrations or buzzing sounds will be eliminated. However, when you
bend pitches, or play finger vibrato, and slides, pitch changes that
are as large as one/eighth of a semitone will be played. This mode
is useful for recording such effects.

When the PITCH QUANTIZE (FILTER) button is <u>off</u>, every change in the
raw pitch coming from the string will be played exactly. This
setting permits the most expressive soloing. You will have to
articulate each note very carefully and make clean breaks between
notes. It's a good idea to use the MAX DYNAMIC RANGE with this
setting so that small nuances will be treated as such rather than
amplified into blasts of the wrong pitch. Recording in this mode
will use up many memory recorder "notes" for each note played on the
guitar.

Experiment with the three different settings with a variety of
timbres. Try pitch bend, slides, vibrato, and so forth.

This may be the most important decision you'll make when you're
making or storing your timbres.

With the default QUANTIZE (lit) mode, it means that if your
guitar is a little bit out of tune, or even really out of tune,
each note is going to be quantized to the nearest half step.
When you bend a note, you can really bend it. Instead of a
portamento effect, you're going to hear it step through the

various half steps from note to note. This is a far out effect which you'll undoubtedly try. Some guitar players are capable of bending their strings as much as a fourth or a fifth away. I can imagine somebody who is an expert string bender really taking advantage of this effect. It's pretty wild.

In the blinking mode, it sounds like raw pitch, like it's following the actual shape of the string. But what's actually happening is that it's going by increments of one/eigth of semitone each time. The advantage of this mode is that you get the effect of raw pitch using less recording space.

Now, my personal favorite for the most expressive soloing is absolute raw pitch, which means that if the guitar's a little bit out of tune, it's going to sound out of tune. If you bend a note funny, and you don't quite make it up to the note, it's not going to make it up there for you. If you move your tuning pegs to tune the pitch up a little bit, you'll hear the pitch move. You can really get some funky sounds. It's important to note that this is also the way it's going to track fastest. If you think about it, the computer is having to make a few less decisions. It's not having to decide whether to go up or down if the note's a little out of tune. It's just spitting it out. My experience has been that it feels really fast. That you can do just about anything and it's right there with you. The sound is also most "guitar-y" when it's in the raw pitch mode.

If a real instrument has quantized pitch, like a keyboard, you'll probably want to simulate this when you play the sound on the guitar. For instance, you'd probably want to have a marimba sound quantized. And you would definitely want to quantize a vibes sound. Of course, you could try bending vibes. It sounds kind of neat and kind of wierd. And you might want to show it off to somebody. But the fact is, vibes out of tune wouldn't really happen in real life.

If you're playing a string section, you definitely want to quantize the timbres. A whole section of unquantized strings sounds like a fifth grade orchestra tuning up, since the guitar is just naturally always a little out of tune.

On the other hand, you'd probably want to play instruments like penny whistles or harmonicas in raw pitch form to take advantage of the portamento that's possible from your hand on the guitar.

I found that organ sounds are interesting midway (in the blinking mode). You can get that sort of Jimmy Smith sound where it sounds like you're playing definite pitch but then you can bend the note and it really sounds pretty neat.

                                                                    P.M.

PLAYING MULTIPLE TIMBRES AT ONCE

Different timbres can be played on the guitar at the same time.
There are several ways to do this: selecting different strings for
different partial timbres; splitting the fretboard into upper- and
lower-pitch strings with a different timbre on each group; and using
different timbres for different pitches, regardless of string, by
means of the Release H keyboard envelope feature. It is also
possible to assign one timbre to the keyboard and another to the
guitar.

STRING SELECT

Normally, all partial timbres in a timbre are active on all strings.
With the string select function, you can de-activate certain of the
partial timbres in a timbre on certain of the strings, thus,
subtractively designing different sounds for each of the strings.
Before you use this feature, you can program the timbre to consist of
any combination of different partial timbres, using the Partial
Timbre Bounce and Recall features described on page 82 of the
Synclavier (R) II User Guide.

Unlike the other guitar performance functions, the STRING SELECT
function applies to individual partial timbres. Therefore, you must
first select the partial timbre you wish to restrict to certain
strings. Make sure the appropriate PARTIAL TIMBRE SELECT button is
lit or blinking. Then, by pressing the SEQUENCE RECALL (STRING
SELECT) button twice on the guitar button panel, put the numbered
buttons in the string select mode. By default, buttons 1 through 6
(one for each string) will be lit, indicating that all six strings
are selected for the selected partial timbre. Simply press the
button (unlight it) for any string you wish to de-activate. Repeat
the process with any partial timbre in the timbre. To exit from the
string select mode, press the SEQUENCE RECALL (STRING SELECT) button
until it is unlit.

When you save the timbre on diskette, the string selections will be
saved as well.

Try the following:

1. Recall Timbre 2-2, a timbre with three very different sounding
    partial timbres.

2. As you play, you will hear all three partial timbres active on
    all six strings.

3. Solo Partial Timbre 1 (press button 1 under PARTIAL TIMBRE SELECT
    on the keyboard panel until it blinks).

    Now you will hear a piano like sound on each string on the
    guitar.

4. Press the SEQUENCE RECALL (STRING SELECT) button on the guitar
   button panel <u>twice</u>. Make it <u>blink</u>.

   Buttons 1 through 6 below should light up.

5. Press buttons 5 and 6.

   They will become unlit. Now if you play the first through the
   fourth strings, you will hear the soloed partial timbre. On the
   fifth or sixth strings, there will be no sound.

6. Now solo PARTIAL TIMBRE 2.

7. Press STRING SELECT.

   Again, buttons 1 through 6 below should light up and the sound
   should be active on all six strings.

8. Press buttons 1, 2, 3, and 4.

   Now if you play the first through the fourth strings, there will
   be no sound. On the fifth and sixth strings, you will hear the
   soloed partial timbre.

9. Now solo PARTIAL TIMBRE 3.

10. Press STRING SELECT.

11. Press buttons 2 through 6.

    The octave trill will only be heard on the first string.

12. Press button 1 again under PARTIAL TIMBRE SELECT. It should be
    <u>lit</u>.

13. Play all six strings. Partial timbre 1 will be active on the
    first through fourth strings. Partial timbre 2 will be active on
    the fifth and sixth strings. Partial timbre 3 will be active on
    the first string.

The string select function can also be used in recording. All
partials in the same timbre will be recorded on the same track.

The string select function can be combined with the split fretboard
function, to be described next, to program even more different sounds
onto the guitar strings. You would then have up to eight different
sounds to assign and combine in different ways on the guitar strings.

SPLITTING THE FRETBOARD

The six strings of the guitar can be divided into treble and bass
strings with a different timbre active on each group. You can
selectively replace either timbre and choose the string where you
want the timbre to change.

To split the fretboard, you use the BANK and TIMBRE RECALL buttons and the numbered buttons on the guitar button panel and the strings themselves.

To assign a new timbre to the three _treble_ strings, follow this procedure: First, make sure that the timbre bank which contains the desired timbre is in computer memory. Then, press both TIMBRE RECALL and BANK RECALL buttons simultaneously _once_, and, finally, press the numbered button for the desired timbre.

To assign a new timbre to the three _bass_ strings, follow this procedure: Again, make sure that the timbre bank which contains the desired timbre is in memory. Then, press both TIMBRE RECALL and BANK RECALL buttons simultaneously _twice_, and, finally, press the numbered button for the desired timbre.

To change the split string (from the third string to some other string), press the BANK RECALL and TIMBRE RECALL buttons simultaneously once or twice, and then play the string which you want to be the bottom string in the upper group. Then, select the timbre by pressing a numbered button.

You can then change upper or lower timbres as described above. The split string will remain in memory until you recall a timbre without first pressing BANK and TIMBRE RECALL simultaneously, thus assigning a single timbre to all six strings.

Since you are using two completely different timbres, they can have different settings for any of the guitar performance functions. For example, you might use a raw pitch harmonica with no transient filter on the upper strings and a quantized bass timbre with the transient filter on the lower strings.

IMPORTANT: The split fretboard function should be used for live performance only, since the notes played with the lower timbre cannot be recorded. If you want to record different sounds coming from different strings, use the STRING SELECT function.

Try the following:

1. Recall Timbre 3-5. The vibes sound will be active on all guitar strings.

2. Press BANK RECALL and TIMBRE RECALL _once_.

    All the buttons on the guitar button panel will start blinking.

3. Press button 7.

    The blinking lights will go out.

    Timbre 3-5 (vibes) will be active on the three lower (bass) strings. Timbre 3-7 (flute) will be active on the three upper (treble) strings.

4. Now press BANK RECALL and TIMBRE RECALL _twice_.

5. Pick the fourth string on the guitar.

6. Press button 6, a bass sound.

    Now a flute will be active on the first through the fourth
    strings and the bass will be active on the fifth and sixth
    strings.

PLAYING GUITAR AND KEYBOARD

When you split the fretboard, the same two timbres will be assigned
to the split keyboard. By placing the keyboard split point on the
top key and then placing the guitar split point on the sixth string
on the guitar, you can assign one timbre to the keyboard and another
to the guitar. The upper timbre will be active on the guitar and the
lower timbre will be active on the keyboard. Once you have set up
the split points in this way, you can change upper and lower timbres
as described above from the guitar button panel.

If you recall a timbre without pressing SKT on the keyboard or BANK
and TIMBRE RECALL on the guitar, you will lose both split points.

Try the following:

1. Recall Timbre 4-1.

    A calimba sound will now be active on both the keyboard and the
    guitar.

2. Press the SKT button on the keyboard control panel _once_. This
    prepares the system to change the _upper_ timbre.

3. Press the highest key on the keyboard. This selects the bottom
    key in the upper timbre.

4. Press TIMBRE ENTRY 7 on the keyboard control panel.

    Now Timbre 4-1 is active on all keys on the keyboard, except for
    the highest C. Timbre 4-1 is the lower timbre on the guitar and
    Timbre 4-7 is the upper timbre.

5. Now press TIMBRE and BANK RECALL twice, pick the sixth string,
    and press button 1.

    The flute should be active on all strings. The calimba should be
    active on all keys.

6. To change the guitar timbre, press SKT _once_ and then press a
    TIMBRE ENTRY button. To change the keyboard timbre, press SKT
    twice and then a TIMBRE ENTRY button.

The split point will remain in memory until you press a TIMBRE ENTRY
button without first pressing SKT, thus assigning a single timbre to

both guitar and keyboard.

USING THE KEYBOARD ENVELOPE

For smooth timbral shifts on the basis of pitch, rather than string, you can use the keyboard envelope feature of Release H. Use the keyboard and keyboard control panel to set up the envelope. Then each fretted note will be mapped to a key on the keyboard and will be played with the partial timbre(s) assigned to that key. Realize, however, that the same pitch can be played in many positions on the guitar. Thus, there will be some string overlap of such keyboard envelopes.

AUTOMATIC STANDARD TUNING

Normally, the Synclavier (R) II plays synthesized sounds which match, quantize, or filter the actual raw pitches coming from the guitar strings. Before playing, you tune up the guitar strings to the E-A-D-G-B-E on the Synclavier (R) II.

The guitar software provides an automatic tuning feature which can be used to retune any string tunings to the standard E-A-D-G-B-E tuning. When a special tuning is activated, the raw pitches coming from the strings will be reinterpreted before they are played.

The procedure for automatic tuning is to enter the actual tunings into memory by strumming the strings and then pressing the TIMBRE and TRACK RECALL buttons on the guitar button panel twice while the strings are still vibrating. The instant the two buttons are pressed for the second time, the Synclavier (R) II will measure the exact vibrating pitch of each of the six strings. These six measured pitches will be stored in memory and will be mapped to the standard E-A-D-G-B-E open string tunings. From then on, the Synclavier will play synthesized sounds with interpreted pitches, based on the E-A-D-G-B-E tunings, rather than with the actual pitches, coming from the strings. The same interval between actual and interpreted pitch will be used for all notes produced by each string.

You do not have to enter a measured pitch for all six strings. Any string that is not vibrating when you press the buttons the second time will be unaffected by the automatic tuning feature.

The measured pitches will continue to be used as reference points for interpreting the pitches of synthesized sounds until another set of measured tunings are entered, or until the power is turned off. They are not affected when you recall a different timbre or recall a sequence or press the ERASE button.

Try the following:

1. Turn the BALANCE knob all the way to SYNTH so you only hear synthesized sound.

2. Detune several of the strings. Strum the open strings to hear that they are out of tune.

3. Now strum the six open strings firmly. Let the strings continue to ring.

4. Quickly press the TIMBRE and TRACK RECALL buttons together twice on the guitar button panel. Use a quick tap-tap motion with two fingers.

5. Now strum the open guitar strings again. The synthesized sounds are now E-A-D-G-B-E.

6. Center the BALANCE knob so that you can hear both synthesized sound and direct guitar sound.

7. Strum the strings again. You will hear that the two pitches do not match. The direct guitar sound will have the actual pitches of the strings; the synthesized sound will have interpreted pitches.

CREATING A SPECIAL TUNING

The automatic tuning feature can also be used to set up special guitar tunings.

You use the same procedure as described above except you use one or more fretted notes instead of all open strings for the measured pitches. Whatever actual pitch is sounding on a string when you press the TIMBRE and TRACK RECALL buttons the second time will be the measured pitch that is mapped to the standard open tuning for that string. Thus, if a fretted note is sounding, it will be reinterpreted as the open note for that string. This tunes the guitar down by the same interval as that between the actual fretted note and the standard open note for the string.

Suppose your guitar is tuned to E-A-D-G-B-E and you want to automatically tune the sixth string down from the E to D.

1. Press the low E string at the second fret. Since the string is tuned to E, you will be playing F#.

2. Now activate the automatic tuning for the sixth string by strumming the sixth string and then pressing the TIMBRE and TRACK RECALL buttons twice. Be sure to continue to hold the low E string at the second fret until the buttons have been pressed a second time. The other strings will not be affected by this process.

3. Now strum the strings still holding the second fret. The chord that you will hear will be E-A-D-G-B-E. The F# is played as E; the interpreted pitch is two semitones below the actual pitch coming from the sixth string.

4. Now strum the open strings. The chord that you will hear will be D-A-D-G-B-E. The open sixth string is interpreted as a D, two semitones below the actual pitch coming from the string.

Any tuning can be achieved with this procedure. The direct guitar sound will be unaffected.

STORING AND RECALLING SPECIAL TUNINGS

It is also possible to build up a library of up to 64 special tunings which you can access readily during a performance. This feature allows you to completely retune the guitar by touching a few buttons.

Special tunings are stored on the diskette in a similar way as are timbres. There can be up to eight banks, each with eight tunings. You will receive an empty file (.TUNDATA) for these banks on your system diskette. You may use it to store any special tuning you want. This file may be copied onto the Winchester if desired.

Special tunings should be used with the guitar physically tuned to standard E-A-D-G-B-E. Otherwise the interpreted pitches, which will be a specific <u>interval</u> above or below the actual pitch coming from the string, won't have the same actual pitch base to start from.

Entering the Special Tuning Mode

Any action associated with storing or recalling special tunings is always initiated by pressing the TIMBRE and TRACK RECALL buttons simultaneously. This puts the BANK and TIMBRE RECALL and numbered buttons in a special tuning mode. They will stay in that mode until the command is finished.

Reading a Bank into Memory

Before you can store or recall a special tuning, you must read in a tuning bank. The operating system does not automatically read in a tuning bank for you. Once a tuning bank has been read into memory, it will stay there until the power is turned off or until another bank is read in.

Recalling a tuning bank is done in the same manner as recalling a timbre bank <u>except</u> you must first enter the special tuning mode.

1. Press TIMBRE and TRACK RECALL simultaneously to enter the special tuning mode.

2. Press the BANK RECALL button.

3. Select a bank by pressing any of the numbered buttons in the bottom row.

4. To leave the special tuning mode, press the BANK RECALL button.

Storing A Tuning in a Bank

When you have created a special tuning, as described previously, you may store it in a bank.

1. Enter the tuning into memory by strumming the desired (fretted) chord and pressing TIMBRE and TRACK RECALL twice quickly (as described previously).

2. Now press TIMBRE and TRACK RECALL to activate the special tuning mode.

3. Press BANK and TIMBRE RECALL simultaneously to indicate a <u>store</u>.

4. Press a numbered button to store the tuning currently in memory. You will automatically leave the special tuning mode as you store the tuning.

Currently, you can only store tuning banks on the main drive (FO or Winchester disk). The DRIVE SELECT button is not available for use with special tunings.

Recalling <u>a</u> Special Tuning

You can easily recall a special tuning. To select a tuning in the current tuning bank, proceed as follows:

1. Enter the special tuning mode by pressing TIMBRE and TRACK RECALL simultaneously.

2. Press TIMBRE RECALL.

3. Press a numbered button to recall the desired tuning. Now the notes you pick on the strings will now be reinterpreted according to this tuning.

4. Press TIMBRE RECALL again to leave the special tuning mode. The tuning you just recalled will remain active. Only the buttons are affected by exiting the special tuning mode.

To select a tuning in a different tuning bank, proceed in a slightly different way:

1. Enter the special tuning mode by pressing TIMBRE and TRACK RECALL simultaneously.

2. Then select a new bank by pressing BANK RECALL followed by a numbered button.

3. Next, press TIMBRE RECALL followed by a numbered button.

4. Press TIMBRE RECALL again to leave the special tuning mode.

Returning to Standard Tuning

A final feature is provided for easily returning from any special tuning to the standard tuning E-A-D-G-B-E.

1. First enter the special tuning mode by pressing TIMBRE and TRACK RECALL simultaneously.

2. Then press BANK and TIMBRE RECALL twice. Normal tuning will be instantly restored.

PLAYING WITH REAL TIME EFFECTS

There are three related ways to make real time effects (RTE) changes
in the guitar sound as you play: turning the REAL TIME EFFECTS knob
on the guitar, moving the pedal connected to the REAL TIME EFFECTS
jack on the Digital Guitar Control Unit, and picking the strings
harder and softer.

The pedal connected to the REAL TIME EFFECTS jack on the rear of the
keyboard unit is also used for real time effects on sounds from the
keyboard, the guitar and the memory recorder. This section covers
RTE changes of the synthesized guitar sound only. Using the keyboard
pedal is covered on page 102 of the Synclavier (R) II User Guide.

Setting Up a Timbre for Real Time Effects

As with the keyboard system, before you can add real time effects,
you must first "patch in" the timbre by pressing buttons in the REAL
TIME EFFECTS panel on the keyboard unit.

You select the partial timbres you wish to change by pressing
numbered buttons under PATCHING and you select the RTE parameters you
wish to change by pressing buttons in the bottom row. If no buttons
are lit in the bottom row, the selected RTE parameter will be the
vibrato depth setting.

Then you can press the PEDAL IN/OUT button to "turn on" the RTE knob
on the guitar and the RTE pedal. The PEDAL IN/OUT button has three
states (unlit, lit, and blinking) which determine how the knob and
pedal will operate. When the PEDAL IN/OUT button is unlit, turning
the REAL TIME EFFECTS knob or moving the pedal will not change the
timbre. The full dialed-in value for the selected parameter(s) will
be maintained. The lit and blinking states function differently for
the knob and the pedal and are described below.

If you wish to use the strings for real time effects, you press the
VELOCITY IN/OUT button to "turn on" the dynamic real time effects
function. The VELOCITY IN/OUT button has three states (unlit, lit,
and blinking) which determine how the string dynamics will be used.
When the VELOCITY IN/OUT button is unlit, picking the strings harder
and softer will not change the timbre. The lit and blinking states
are described below under "Using the String Dynamics."

It is important to have an idea how the three controls interact.

How the Three Controls Interact

The maximum value for any RTE parameter is determined by the level or
time interval originally dialed in for the partial timbre. The RTE
knob, the pedal, and the string dynamics can all be used to scale
down this value.

The RTE knob can be used to change the value as you play or to
establish a lower maximum value for the parameter for use with the

pedal. The pedal can be used to change the value within the range
set by the knob or to establish an even lower maximum value for the
parameter for use with the string dynamics. Finally, with the strin
dynamics, you may change the timbre on an intuitive, note-by-note
basis within the range set by the dialed-in setting, as scaled by th
knob position and the pedal position. Remember, if the knob and
pedal are not activated (PEDAL IN/OUT is unlit), it is as if they ar
set at the fully on position.

Using the RTE Knob

When the PEDAL IN/OUT button is lit, turning the RTE knob clockwise
towards MAX will increase the percentage of any selected RTE
parameter(s). If the RTE knob is turned all the way to MAX, each
selected partial timbre will be given 100 percent of any selected RT
parameter(s); that is, the current dialed-in setting for the
parameter(s) will be used. Any other knob position will scale down
the setting. And, if the RTE knob is turned all the way to MIN, the
parameter(s) will be scaled down to zero.

When the PEDAL IN/OUT button is blinking, the operation of the knob
is inverted. Turning the knob counter-clockwise will increase the
percentage of any RTE parameter(s).

Using the Pedal

The pedal affects the sound within the range set by the RTE knob
position.

When the PEDAL IN/OUT button is lit, pushing the pedal down increase
the percentage of any RTE parameter(s). The further down you push
the pedal the greater will be the percentage until, with the pedal
all the way down, the percentage of real time effects set by the RTE
knob will be used.

When the PEDAL IN/OUT button is blinking, the operation of the peda
will be inverted. When the pedal is all the way up, the percentage
of real time effects used will be the same as that set by the knob.
As you push the pedal down, the percentage will be decreased. This
state is particularly effective when you are controlling attacks.
Then, as you push the pedal down, the attacks get shorter; as you
raise the pedal, the attacks get longer.

Note that, in either the lit or blinking states, if the pedal is
connected and is turned off, this will set all real time effects
percentages to zero.

Using Dynamic Real Time Effects

The string dynamics affect the sound within the range set by the knob position and the pedal position if PEDAL IN/OUT is lit or blinking and within the full range if PEDAL IN/OUT is unlit.

When the VELOCITY IN/OUT button is unlit, the string dynamics will not affect the real time effects percentages.

When the VELOCITY IN/OUT button is lit, the harder you play the closer you will get to the maximum of any selected real time effects. For example, if the selected RTE parameter is volume PK.& SUSTAIN, the sound will become louder as you play harder. With any RTE parameter affecting time intervals, the time interval will become longer as you play harder.

When the VELOCIY IN/OUT button is blinking, the string dynamics will be inverted and the effect of your force of picking will be reversed. The lighter you play the closer you will get to the maximum for any selected real time effects. This state is especially useful for time interval parameters. For example, you can get a faster attack by picking harder in this inverted mode.

Try the following:

1. Recall Timbre 3-7. Then make sure the following buttons are lit in the REAL TIME EFFECTS panel on the keyboard:

    a. PARTIAL TIMBRE 1 and 2

    b. VOLUME ENVELOPE PK.&SUSTAIN
    c. HARMONIC ENVELOPE PEAK

    d. PEDAL IN/OUT

    With this timbre, you can change the volume and the harmonics in the attack of the sound of partial timbres one and two as you play.

2. Press the VELOCITY IN/OUT on the keyboard control panel so it is lit.

3. Press the DYNAMIC VOLUME button on the guitar button panel so that it is unlit. The fixed volume will allow you to concentrate on the changing real time effect.

4. Set the REAL TIME EFFECTS knob at MAX and the pedal, if any, all the way down.

5. Now play. The breathy quality should be more pronounced the harder you play.

6. Experiment with different ranges for this effect by changing the knob and pedal positions.

If both the VELOCITY IN/OUT button on the keyboard panel and the DYNAMIC VOLUME on the guitar button panel are lit, then the string dynamics will be used for both volume and real time effects changes. In this situation, if you "patch in" the VOLUME ENVELOPE PK.& SUSTAIN parameter, you will have a form of volume expansion control for your sound, that will make the soft notes softer. Heavily picked notes will still be played full volume, but the diminishing effect for soft notes will be doubled. This function calls for a more controlled performance on the part of the guitar player, since it is possible to play too softly and lose some notes.

USING THE VOLUME PEDAL

When a pedal is connected to the VOLUME jack on the Digital Guitar Control Unit, it can be used to modulate the volume of the timbre being played on the guitar. This pedal only affects the guitar timbre. It does not affect the volume of the direct guitar output, the keyboard timbre, or the sequence in the memory recorder. For instance, you can use this pedal to bring a timbre in and out of a mix of direct guitar with synthesized sound.

Try the following:

1. Connect a pedal to the VOLUME jack on the Digital Guitar Control Unit.

2. Recall Timbre 8-1.

3. Set the BALANCE knob at mid position so that both direct guitar and synthesized timbre are heard.

4. While playing, slowly press down the pedal.

   The sound of the timbre will become louder, while the direct guitar will keep the same volume.

USING THE HOLD SWITCH

If a foot switch is connected to the HOLD jack on the Digital Guitar Control Unit, it can be used to hold a note or chord. You play a note or chord, and while they are sounding, you press the foot switch. The notes will be held until you release the switch, at which time the notes will begin their final decays. In the meantime, you can play new notes, which will not be held, on top of the held notes. Furthermore, the VOLUME control knob on the guitar will only affect the new notes, not the held notes. You can strum a chord, press the switch, increase the volume and/or change the mix to straight guitar, and play lead guitar notes on top of the sustained chord.

Basically, this function is identical to the keyboard HOLD switch function. Except it is affecting the guitar sound only.

IV. USING THE MEMORY RECORDER

GENERAL CONSIDERATIONS

Sequences played on the guitar can be recorded in the memory recorder in the usual way.

In order to save on memory, you should, in general, record with the PITCH QUANTIZE (FILTER) button in the quantize (lit) mode. To record pitch bend or slides, use the PITCH QUANTIZE (FILTER) button in the filter (blinking) mode. In this case, each pitch bend will use up to 100 notes of memory, depending on the length of the bend. You can record raw pitch, but memory will be gobbled up so fast that this is not recommended.

Any volume changes you make will be recorded. This includes those made by the way you play and those made with the MASTER VOLUME knob. Note that all these changes will use up more memory. Particularly if you use the "guitar envelope" mode, where the envelope from the guitar string is tracked throughout the note, 50 notes of memory or more can be used for a single note.

You can also record real time effects made with the strings (VELOCITY IN/OUT) or with the pedal and/or REAL TIME EFFECTS knob on the guitar.

You can also add volume changes and real-time changes to the sequence after it is recorded. Use the pedal connected to the VOLUME jack on the keyboard unit, as described in the Release H documentation.

You should not record more than one guitar performance on the same track. Otherwise you will lose information. Record each performance on a separate track and then bounce them together.

You may use rhythmic justification for picked notes but not for hammered and glide pitches.

USING THE BUTTONS

Most recorder functions can be accessed through the guitar button panel. If you are new to recording, please read the section on "Using the Memory Recorder" in the Synclavier (R) II User Guide.

To recall a sequence, press SEQUENCE RECALL and then the numbered button in the bottom row.

IMPORTANT NOTE: The bottom row of buttons function as recorder controls only if none of the four top left function buttons are active (lit or blinking).

Then, the START, STOP, RECORD, CONTINUE, and LOOP buttons operate as they do on the keyboard button panel. When you press START, RECORD, or CONTINUE, the four top left buttons will blink one after another in time to the click track.

To solo tracks 1 to 8, press the TRACKS button once and then the numbered button in the bottom row. To solo tracks 9 to 16, press the

TRACKS button <u>twice</u> and then the numbered button in the bottom row. As always, soloed tracks can be played back, recorded on, transposed, and have independent loops.

To transpose, press the TRANSPOSE button and then play the pitch on the guitar that represents the interval you wish to transpose. Remember, the Synclavier (R) II calculates all transpositions from a root of middle C. It will take the interval between the note you play and middle C and transpose all notes in the sequence or soloed track(s) up or down that exact interval. Whenever the TRANSPOSE button is lit, you will be transposing the sequence in the memory recorder, not triggering a note when you pick a string.

To erase a sequence or soloed track(s), press both ERASE buttons simultaneously <u>twice</u>.

You can also use the BANK and TIMBRE RECALL buttons much as the SKT button in order to recall a timbre from a track. Press the BANK and TIMBRE RECALL buttons simultaneously. Then, press the TRACK RECALL button <u>once</u> if you want a timbre on tracks 1 through 8 or <u>twice</u> if you want a timbre on tracks 9 through 16. Finally, select the track by pressing one of the numbered buttons. The timbre on that track will become active on the guitar and the keyboard.

Other recorder functions, such as storing sequences and bouncing tracks, may be performed from the keyboard control panel as usual.

V. THE GUITAR AND OTHER SOFTWARE MODULES

The guitar software does not affect the operation of the other software modules in the Synclavier (R) II system (SCRIPT, Music Printing, Signal File Manager). Refer to the appropriate documentation for information on those systems.

Be sure to save your current recorded sequence on diskette before you activate the SCRIPT reverse compiler or Music Printing software. While most of the volume changes and pitch changes that you play will be displayed in both SCRIPT and Music Printing, some of the nuances that can be played on a guitar may be lost.

USING THE REVERSE COMPILER

When you use the SCRIPT reverse compiler, you will note additional words in the timbre definitions which relate to the guitar performance buttons.

You will also note additional entries in notelists in the computer music format. There are now two kinds of lines: note lines and update lines. The note line indicates the beginning of a musical "event", which may consist of more than one note; the update lines indicate the changes in pitch and volume that occur during the event. An update line can be distinguished from a note line because it always has a zero duration (0.000 in the third entry on the line). In addition, both note and update lines contain guitar string numbers, indicated as G(1) to G(6). This enables the system to keep track of updates on several strings at once.

An event begins when the amplitude from a string crosses the TRIGGER THRESHOLD. This will occur when you pick a string with sufficient force to cause the amplitudes to make that crossing. The event ends when the amplitude from the string drops below the level set by the SUSTAIN knob. Remember, the DYNAMIC RANGE knob setting affects the string dynamics. Slides, bends, hammered notes and pulloffs will be considered as parts of an event triggered by a picked note, not as separate notes.

Examine the following excerpt from a notelist. It is a reverse compiled bend from C to C#:

                          -excerpt to come-

Line --- is the note line. Its first three entries indicate the starting time, pitch, and duration of the total bend. The next entry (G3) indicates the guitar string that was used to play the bend. The next entry (S) indicates that the note was slurred. The next entry (M) indicates that the monophonic string feature was in use. The final entry (87) on the line indicates the volume of the note, in the range from 0 to 100.

The remaining lines in the notelist are update lines. An update line is displayed for every change in pitch or volume that occurs during the event. The first two entries indicate the time and pitch of the event at the moment of the update. The third entry will always be

0.000 in an update line, because an update has no duration in itself, but merely registers a change.

The next entry indicates the amount the pitch differs from the pitch listed on the line. The pitch variations are listed in fractions each one equal to 1/1024 of an octave. The first update in the bend, U(+??) indicates the pitch is actually ??/1024 of an octave above the C. The number 85 would equal one twelfth of an octave, or one semitone.

The state of the PITCH QUANTIZE (FILTER) button affects the pitch updates. If the button is lit (for quantized pitch) during recording, the pitch updates will be in semitones, that is, in 85/1024 of an octave. If the button is blinking (for filtered pitch), the updates will be in approximately 11/1024 of an octave. If th button is unlit, for raw pitch, the updates can occur every 1/1024 of an octave.

The final entry on the update line gives the current volume at the time of the update.

These update lines allow you to examine your performances minutely. By tinkering with the update lines, you could polish an imperfect bend or create some impossible-to-play slide.

-example to come showing volume changes in update lines-

USING MUSIC PRINTING

The Music Printing system will allow you to print out your guitar performances in standard notation. The same precision in playing that produces good music printing from the keyboard is also required from the guitar. You should record in the PITCH QUANTIZE mode. You can print out slides and bends, where pitch changes that are more than half a semitone will be printed as slurred notes. You can also decide to print only the beginning note of the slide or bend.

USING THE SFM PATCH PROGRAM TO PLAY SAMPLED SOUNDS

If you enter the SFM program and then type PATCH, you will be able to play SFM patches on the guitar. The BANK and TIMBRE RECALL buttons on the guitar button panel can be used to recall the patches.

The fretted notes on the guitar are mapped to the keys of the keyboard. Because the SFM patches permit the assignments of sampled sounds to even single frets (or keys), some fantastic effects can be realized. For example, an entire drum kit can be designed to play on successive frets on adjacent strings for rapid drum soloing.

VI. KNOB AND BUTTON INDEX

THE BUTTONS

Recalling Timbres

BANK RECALL	Press button ("light" it). Then press numbered button.	Loads selected timbre bank into memory.	23
TIMBRE RECALL	Press button ("light" it). Then press numbered button.	Activates selected timbre on guitar and keyboard.	23

Recalling Two Timbres

BANK RECALL and TIMBRE RECALL	Press simultaneously once. Then press numbered button.	Splits fretboard, with selected timbre on treble strings.	41-4
	Press simultaneously twice. Then press numbered button.	Splits fretboard, with selected timbre on bass strings.	
	Press simultaneously once or twice. Then pick string. Then press numbered button.	Splits fretboard, with new split string.	

Selecting String

SEQUENCE RECALL (STRING SELECT)	Press button twice (make it blink.) Then press numbered buttons ("unlight" them).	De-activates soloed partial timbre from strings with same numbers.	40

Automatic Tuning

TIMBRE RECALL and TRACK RECALL	Strum open string(s). Then quickly press two buttons simultaneously twice.	Stores actual tunings in memory. They will be reinterpreted as standard E-A-D-G-B-E.	45,4
	Strum fretted string(s). Then quickly press two buttons simultaneously twice.	Stores actual tunings in memory. The fretted string(s) will be reinterpreted as standard open tuning; the open string(s) will have special tuning.	46

Using Tuning Banks - Start with Strings in Standard Tuning

TIMBRE RECALL and TRACK RECALL	Press simultaneously once. Then press BANK RECALL. Then press numbered button.	Recalls special tuning bank.	47
	Press simultaneously once. Then press TIMBRE RECALL. Then press numbered button.	Recalls and activates special tuning.	48
	Press simultaneously once. Then press BANK and TIMBRE RECALL once. Then press numbered button.	Stores active special tuning in bank.	47
	Press simultaneously once. Then press BANK and TIMBRE RECALL twice.	Restores standard E-A-D-G-B-E tuning.	49

Guitar Performance Functions

TRANSIENT FILTER	Press button ("light" it).	Delays start of note until pitch fluctuations are less than half a semitone.	36
	Press button (make it blink).	Delays start of note until pitch fluctuations are less than two semitones.	
	Press button ("unlight" it).	Starts note with first valid pitch.	
PITCH QUANTIZE (FILTER)	Press button ("light" it).	Quantizes all notes to nearest semitone.	38
	Press button (make it blink).	Smoothes all notes to increments of eighths of of a semitone.	
	Press button ("unlight" it).	Tracks raw pitch.	
DYNAMIC VOLUME	Press button ("light" it).	Uses string dynamics to modulate volume envelope.	34
	Press button ("unlight" it).	Plays all notes with pro-grammed volume envelope.	

MONOPHONIC STRING	Press button ("light" it).	Selects "programmed envelope" mode. Cuts off decay of note when another is played on same string.	34
	Press button ("unlight" it).	Selects "programmed envelope" mode. Does not cut off decays of previous notes, but provides overlapping decays.	
	Press button (make it blink).	Selects "guitar envelope" mode. Does not cut off decays of previous notes.	

On the Keyboard

VELOCITY IN/OUT	Press button ("light" it).	Uses string dynamics for patched in real-time effects. The harder you pick, the greater the percentages for real-time effects.	50,52,53
	Press button (make it blink).	Same as above, only inverted. The harder you pick, the smaller the percentages for real-time effects.	
	Press button ("unlight" it).	Does not use string dynamics for real-time effects.	
PEDAL IN/OUT	Press button ("light" it).	Patches RTE knob on guitar and guitar pedal to real-time effects. Turn knob clockwise and press pedal down to increase real-time effects percentages.	50,51
	Press button (make it blink).	Same as above, only inverted. Turn knob counter-clockwise and move pedal up to increase real-time effects percentages.	
	Press button ("unlight" it).	De-activates knob and pedal. Real-time effects percentages will stay at 100 percent.	

RECORDER BUTTONS

Selection Buttons

SEQUENCE RECALL	Press button ("light" it). Press numbered button.	Places sequence in memory.	57
TRACKS 1-8 (9-16)	Press button once ("light" it). Then press numbered button.	Solos track 1-8.	57
	Press button twice ("unlight" it).Then press numbered button.	Solos track 9-16.	57
BANK RECALL and TIMBRE RECALL	Press simultaneously once. Then press TRACK RECALL once or twice. Then press numbered button.	Recalls timbre from selected track.	58

Performance buttons - when none of the top four left buttons are lit

START	Press once.	Starts playback with first click.	57
	Press twice.	Starts playback with first note.	57
STOP	Press once.	Stops recording or playback.	57
RECORD	Press once.	Starts recording.	57
CONTINUE	Press once.	Continues playback from point in mid-sequence.	57
LOOP	Press once at loop point.	Returns to first note, plays to loop point until you press STOP.	57
TRANSPOSE	Press button. Pick note.	Transposes sequence based on interval of note to middle C. If track is soloed, transposes only that track.	58
ERASE	Press both buttons twice.	Erases sequence in memory recorder. If track is soloed, erases only that track.	58

USING THE VELOCITY KEYBOARD/GUITAR SOFTWARE

A new version of the Velocity Keyboard software has been prepared for use with the Synclavier Guitar. This is a more or less experimental version of a more comprehensive software release for the Velocity Keyboard expected sometime in November.

Hardware

This system requires a Synclavier system with at least 56K of internal memory, and at least one M128K memory card, with or without sampling, plus a Velocity Keyboard. The Velocity Keyboard must be plugged in whenever this software is activated.

Diskettes

Three diskettes are provided: one for stand-alone operation, one for use with SCRIPT, and one for use with the Guitar/Patch program for the SFM.

1. Synclavier Velocity Keyboard/Guitar Operating System

    Insert this diskette in the main disk drive and press the LOAD button. Once the LOAD has finished, insert appropriate timbre or sequence disk to call up musical information.

    Note: Do not use this software on Winchester Disk based systems. Use the SCRIPT software (below).

2. Velocity Keyboard/Guitar Files to Use with SCRIPT

    This diskette contains two files: "V-GTR" and ".SSWP-5". Move these files to your Winchester Disk system, then type:

    PLAY V-GTR

    Note: Several other disks in this collection contain a file called ".SSWP-5". Be sure to get both "V-GTR" and ".SSWP-5" from the same diskette.

    Note: A Winchester based system is required for this software.

3. Velocity Keyboard/Guitar/"Patch"

    This diskette contains one file called "PAT-VGTR". Save this file on your Winchester. Then type:

    PATCH PAT-VGTR

    from either SFM or the Monitor.

Performance Notes

The Velocity Keyboard/Guitar software allows the guitarist to take advantage of the greatly expanded Real-Time effects capabilities of the Velocity Keyboard. These new Real-Time effects are explained in the Velocity Keyboard User Documentation.

For the guitarist, the guitar volume knob controls the overall volume and is recorded. The velocity button can be used to route the guitar string velocity for any desired musical effect. The pressure button and associated pressure response filter can be used to route the guitar "Real-Time Effects" knob as required. Other Real-Time effects inputs such as the Pedal 1, Pedal 2, and breath controller will effect both the keyboard and guitar. While this feature limits the simultaneous use of the system by both a keyboardist and the guitarist, it allows the solo guitarist to take full advantage of the Velocity Keyboard's Real-Time Effects capabilties.