Roland SH-201 Analog Synthesis Lab

Purposes:

1. To become familiar with the basic concepts of analog synthesis through experimentation with the Roland SH-201 synthesizer
2. To learn the set up for a "basic patch."
3. To describe and analyze the sounds you create by manipulating the controls of the SH-201. (You are being asked to describe what you hear, not the physics of what is happening to the sound).

I. Setup

1. Locate the power button on the rear side of the SH-201 and switch the keyboard on.
2. Plug a set of headphones into the headphone jack and put them on your ears.
3. Take a moment to look at the layout of the controls on the SH-201. You should recognize some terms we discussed in class. Notice the graphic arrows on the control panel linking each module.

The Roland SH-201 has 32 factory presets stored in its memory (as well as 32 user-definable presets). We have chosen factory preset D8 as a great place to start learning about basic analog synthesis.

II. Set up the "Basic Patch"

1. Find the GROUP, BANK and NUMBER buttons located in the bottom right area of the control panel.
2. In the GROUP category, press PRESET
3. In the BANK category, press D
4. In the NUMBER category, press 8
5. Press some keys on the keyboard and adjust the MASTER VOL control in the lower left on the control panel. You should hear the sound of a basic sawtooth wave patch.

You have now selected the proper patch to begin this lab. Unfortunately, the knobs and faders on the Roland SH-201 don't move into position automatically. So, now let's set the controls to the positions that correspond to the patch you just loaded.

1. Begin in the oscillator section (the controls in the first light gray box labeled OSC 1). Adjust the PITCH and DETUNE knobs to 0. Adjust the PW/FEEDBACK (Pulse Width/Feedback) to MIN.
2. Under the OSC section, to the right of the red box, you'll find the PITCH ENV (pitch envelope) faders. Adjust the first two (**A**ttack and **D**ecay) all the way down. Then, adjust the DEPTH fader to 0 (halfway up).
3. Adjust the BALANCE knob in the MIX/MOD section to OSC 1 (counter clockwise).

4. Under the MIX/MOD section, you'll find the LFO section. Here, adjust the RATE knob to 12 o'clock (halfway), and set the DEPTH controls for DESTINATION 1 and DESTINATION 2 to 0 (12 o'clock).
5. In the FILTER section, adjust the CUTOFF to MAX, RESONANCE to MIN and KEY FOLLOW to 0.
6. Just under the FILTER section, you'll find the FILTER ENV (filter envelope) faders. Adjust the **A**ttack, **D**ecay, **S**ustain, and **R**elease faders all the way down. Now adjust the DEPTH fader to 0 (halfway up).
7. In the AMP section, adjust the LEVEL control to MAX.
8. Just under the AMP section, you'll find the AMP ENV faders. Adjust the **A**ttack, **D**ecay and **R**elease faders all the way down. Now adjust the **S**ustain fader all the way up.

III. Audio Signal Flow

All right, now the controls on the SH-201 are representative of the settings stored in patch D8. The patch should sound just like it did when you first pressed Preset > D8. Now, lets have some fun!

A. In the OSC section, find the black circle labeled WAVE. You can select one of the nine different sound sources by pressing the two black buttons in the circle. Try this.

Question 1: Play some notes and listen to the different characteristics of the first five waveforms and noise Briefly describe the timbre of each sound.
Question 2: What are the five basic waveforms called that you can select with this control?

A. Compare the sound of the waveforms at the 8 o'clock and 11 o'clock positions in the WAVE circle.

Question 3: Which one of these waveforms do you perceive as louder?
Question 4: From what you discussed in class, why is this?

A. Find the buttons for OSC 1 and OSC 2. Select OSC 2 and notice that the selected waveform changed but the sound did not.
B. OSC 1 and OSC 2 are completely independent of each other, allowing you to generate sound from two different oscillators.
C. In the MIX/MOD section, try adjusting the BALANCE control to different settings between OSC 1 and OSC 2 and listen to the variations.
D. Press the OSC 1 button.
E. Now set the BALANCE control back to OSC 1 and try adjusting the PITCH control.

Question 5: Try setting the PITCH control all the way up. What happens to the pitch as compared to the 0 setting? Be specific.
Question 6: When you slowly adjust the PITCH control while pressing a key, you will hear the pitch changing in stepped intervals. What is the interval of these steps?

Question 7: Try pressing the WIDE button and turning the PITCH knob all the way up. What happens to the pitch as compared to your answer for question 5?

A. Now set the PITCH control back to normal at 0.
B. Select OSC 2 and change the waveform to match the one selected on OSC 1.
C. Set the BALANCE control to halfway between OSC 1 and OSC 2.
D. Slowly adjust the DETUNE control on OSC 2 towards the negative side while playing a note.

Question 8: Describe what you hear when you use the DETUNE control while mix OSC 1 and OSC 2 are mixed. What happens to the sound if you use a subtle amount of DETUNE verses an extreme amount?

A. Now set the BALANCE control back to 100 percent OSC 1 and press the OSC 1 button.
B. Select the waveform at 10 o'clock from the WAVE control.
C. Play some notes and adjust the PW/FEEDBACK knob.

Question 9: Describe the sound as you adjust the PW/FEEDBACK up and down.

A. Now set the BALANCE knob to 100 percent OSC 2 and press the OSC 2 button.
B. Notice the INTERVAL buttons located between the oscillator knobs and the MIX/MOD section.
C. Press the button labeled -OCT.

Question 10: What happens to the pitch of OSC 2 when this button is pressed?
Question 11: What happens to the pitch of OSC 2 when the 5th button is pressed? (note: you can press the –OCT and 5th buttons simultaneously to return to the original pitch of OSC 2)
Question 12: Are these intervals based on the fundamental pitch of OSC 1 or OSC 2? Why?

A. Disengage the INTERVAL control buttons by pressing -OCT and 5th at the same time.
B. Now set the BALANCE knob back to OSC 1.
C. Select the waveform at 9 o'clock in the WAVE circle.
D. In the FILTER section, adjust the CUTOFF control while playing some notes.

Question 13: What happens to the sound as you adjust the CUTOFF control?

A. In the filter section press the TYPE button once to select HPF and adjust the CUTOFF control again.

Question 14: Compared to your answer for question 13, what happens to the sound as you adjust the CUTOFF control?
Question 15: What do LPF and HPF stand for?

A. Set the TYPE back to LPF and the CUTOFF back to MAX.
B. Select the waveform at 8 o'clock from the WAVE control on OSC 1.
C. Now set the RESONANCE control to about 2 o'clock.
D. Play some notes as you slowly adjust the CUTOFF knob again.

Question 16: What do you hear that is different in the sound when the RESONANCE control is turned up? You may compare to question 13.

A. Adjust CUTOFF to maximum and RESONANCE to minimum.
B. Adjust the LEVEL control in the AMP section.

Question 17: What happens to the sound as you adjust this parameter? (This may be obvious).

A. Make a sound you like from what you have learned about this keyboard.
B. At the left of the control panel, find the D BEAM controller.
C. Press the pitch button under this controller.
D. Play some notes and move your hand up and down above the D BEAM controller.

Question 18: What happens as you move your hand over the D BEAM controller?

That's it!

Now take some time to randomize the controls on the SH-201 so that the next student can learn the settings for the "basic patch." (This will probably be the only time in your career when you don't have to worry about normaling the controls.)

To Turn In:

Type your answers and turn in a hard copy. Following the lab guidelines for an audio CD, label your hand-in at the top of the page. You must turn in you own answers.