

could extend beyond the keyboard, and you would have to transpose the instrument to play the notes beyond the keyboard. Knowing this, you can decide how many samples you need to take. There is no need to take a sample for every key, but you will probably need two to four samples per octave to cover the timbre of the instrument you are trying to emulate. You may also want to create more than one patch for the instrument such as an open tone and a muted tone.

### High Quality Samples Can Make the Difference:

The next step is to actually record the samples you plan to use. It's important to pay attention to the acoustics of the room you're in. If it's too active, and you want a deader sound, drape a few quilts, blankets and pillows around. Also watch out for background noise - you can't remove unwanted noise from an otherwise superior sample. I record identical stereo tracks. On playback, I route one to the amplifier and the other to the "Audio In" port of the EPS so I don't have to be in the "Sample" mode on the EPS to audition the tones on the tape.

I record a half dozen notes of each pitch I need, and then audition them before selecting the sample I will use. Be critical about the amplitude levelness of the sample, have the artist play without vibrato since you will create the vibrato from the LFO, and vibrato makes it terribly difficult to loop.

Before you commit a lot of time to create the instrument, practice on a couple of adjacent samples to see if the range of samples you have collected will provide a smooth timbre transition, and the sampling rate selected provides the desired sound quality. Actually sample the same recording at different sample rates and assign them to different octaves of the keyboard. Try, for example, 32.9 kHz and 7.4 kHz. Use G3 as root key for one and G4 for the root key for the other. Don't bother looping them for this test, but set all of the envelopes to "Full On" and compare the sounds, especially a few notes below the root key G. The quality will fall off fast for the 7.4 kHz sample. I've found samples around 14.9 and 17.4 kHz to be quite adequate. When you have selected the proper sampling rate, go ahead and delete the test instrument.

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### Sampling Steps By The Numbers:

Note: Any time I refer to a key on the Ensoniq EPS front panel, I will enclose the name of the key in brackets, eg. [Edit] represents the edit key or [Edit] [Env 1] represents pressing the edit key followed by the ENV 1 or number 1 key

You are now ready to start creating the first instrument patch. Start by creating the instrument. Select [Command] [Instrument] [Enter] and select a vacant instrument button. Next create the first layer. Select [Command] [Layer] [Enter]. You can name the layer under [Edit] [Layer], although this is not at all necessary. You will want to set the OO patch to the layer you are working on, however, and turn all other layers off. Select [Edit] [Instrument] and turn off layers 2 and 3 and leave layer 1 on. It makes little difference here, but later it will be important.

Second, set up to edit the proper layer. Press [Edit] and select layer 1. Again, it is unimportant here since we only have 1 layer, but later it will be important, so it is best to get in the habit of doing it all.

Press the sample button and set the sample rate. I chose 17.4 kHz for the trumpet. Page 23 of the Musician's Manual describes the sampling steps quite well. Take time to read this section and try all of the functions. Since we are drawing our source from a tape recorder, the input level is set to "line." Play the selected recording a few times, and set the recorder

output to just light the "AMP" light the briefest flicker which will insure we use the fullest dynamic range available. When you are satisfied that all is ready, start the recording and press enter just before the selected tone plays. At the end of the tone (or 3-4 seconds) press enter again to stop the sampling. At this point you will be instructed to play the root key. This is the key that represents the pitch of the note on the recorder. If you get it wrong, don't worry - it can be adjusted on the [Edit] [Pitch] page.

The third step is to create the loop and smooth it. Go to [Edit] [Wave] and select "Loop Forward." Set the loop start to a stable segment of the recorded sample. Next set the loop end to a spot that is reasonably clear of clicks and pops. Use the loop position, loop start and loop end to find a region of constant volume and timbre and search for a quiet loop point. Start with the coarsest setting (0 - 99) at the right of the display, then work with the finer controls until you get the best match possible.

I next do two things to each sample. I normalize the gain on the [Command] [Amp] pages which gets all of the wavesamples at a fairly even beginning amplitude. I then "volume smooth" the loop, the next page over. Try different settings including expanding the region to be smoothed a couple percents beyond the loop. If this fails to smooth the loop properly, then try each of the several cross fade devices on the [Command] [Wave] pages. If this much work does not bring the loop under control, seriously consider deleting this wavesample and select another tone to sample. There is no point spending a lot of time creating envelopes and setting all of the parameters, unless you can get a quiet loop.

Once you have a good quiet loop, you can go ahead and set the start of the sample. If you intend to use the instrument's natural envelope for the attack, set the start of sample point at the start of the sample sound, otherwise set the sample start point at or near the start of loop. Set the sample end as far down as it will go using the 0-99 course setting. This is a good time to truncate the loop unless you plan to use parts of the sample in other layers. Go to [Command] [Wave] and find "Truncate Wavesample." For maximum safety, save the instrument after each new sample is added. Place a working disk in the drive and select [Command] [Instrument]. Give the instrument a name and save it.

To best conserve your time and effort, go ahead and sample each of the pitch samples that will make up this layer. Try to work logically either from top to bottom or bottom to top. (It's much easier than trying to remember that sample 3 is below sample 1 and sample 23 is just above sample 7.) Always check the Edit key to see that you are sampling into the correct layer and check the pitch of the next note to sample against some standard instrument so you will know which root key to punch when you get it sampled.

When you have all of the samples for a layer collected, it is time to save the instrument. Save your work often, and you run less risk of losing a whole afternoon's work when someone trips over the power cord.

In the next installment of this article we'll edit the wave-samples we have just collected and looped.

*Bio: Gary Dinsmore took up the organ with a vengeance about 10 years ago, but finally sold it, leaving the pedalboard to people who can walk and chew gum at the same time. He's strictly an amateur musician - although he and a buddy did a couple gigs back in college and formed a little country-western group called the Selkirk Mountain Boys. They did so well that they decided their best bet was to finish college and get "real jobs."*