A USER FRIENDLY SYNTHESIZER BY MEANS OF A TOUCH INPUT MULTI-PURPOSE LCD GRAPHIC DISPLAY

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ABSTRACT
Due to its complexity, synthesizer programming is generally restricted to specialists, consequently most music lovers use preset sounds on sound cards or devices. In this paper we will describe the HESLER "HELP" synthesizer which makes music programming and sound generation more accessible. We will also show how our design has been designed in order to give access to novice all synthesizer techniques common sound. We wouldn't give an exhaustive technical description of the instrument but we will show its design result in an easy and efficient used for the uses.

1. INTRODUCTION

Computer-aided music composition - a wide LCD graphic screen (480x240 pixels) - A touch sensitive zone on the screen - 12 push buttons for patchazed - A dial and + paper for parameter tuning and eminiscible real-time controls

All programming actions are done through the touch sensitive display. The user can modify up to 20 parameters at time. The LCD provides fast picture switching (about 80 ms for a complete screen) and windowing.

The twelve push buttons are dedicated to patch selection, this action needs a mechanical feel back which is very pleasant for the user. The buttons have little time to watch a screen for confirmation.

The four faders we used for parameter tuning and are assigned 1 to 5. This is the ideal way to use the sound for real-time control.

2. COMMUNICATION (HELP) AND CONCEPTS

The most important touch switch, which is present in all context to the user place, is the "HELP". The help is a concept which means that your manual is always around of the right person. At any point, you can see the "play now" picture which can be considered as the main menu. In this mode you can select any patch, select each control, edit, trim, etc. e.g., go to edit mode, memory utility mode, or storage recording. The center of the screen shows the 8 voices with their algorithm and voice settings.

Only a few concepts are to be known before getting started:

- To select a parameter or to go to another mode, use the control wheel.
- To select a parameter, touch "Touch". "Help" (this stores the new state) or go to another parameter (same effect as and)
- To go back to the "Play now" picture, touch the "End" box in the main picture of the current mode.

The touch action is confirmed either by a blink of the touched area and/or a window/fullscreen switching.

Sound editing now has been designed to give a maximum of flexibility without parameter setting on the main screen, to give a global view of the sound definition. Also when you program a patch like an envelope or a filter, a block, a pitch tracking, you always have a visual support on the screen to immediately check the settings. Default voices and any change is updated in real-time both in sound and on the display.
3. SOUND SYNTHESIS

The A605 sound generation system contains a
digital synthesizer with analog VCFs.

The digital part gives control to 8 voices with
each voice up to:
- 2 OCO
- 4 waveforms (analog 0) and pitch control
- 4 amplitudes

15 algorithms are available that allow different
kinds of modulations between OCO, sine frequency
modulation (FM), phase modulation (PM), amplitude
modulation (AM), FM and PM feedback, double feed-
back, combinations of FM/PM, additive synthesis and
all algorithms subtractive synthesis with the
eight VCFs.

Waveforms are basic sinus, saw tooth...), or
sampled from real sounds, and OCO amplitudes are
controlled via 5-point envelope generators.

VCFs are fully independent i.e. they can use
different algorithms, that can be very useful in a
multi-linear configuration.

Each voice handles 5 LFOs, 5 EGs, 3 keyboard
tracking functions, 3 buzz (recedent modulation),
keybowl velocity and second touch, dual and layer
assignment. All this modules can be assigned on
the same parameters.

4. CONCLUSION

Having touch, vision and audio together, in real-
time has helped us to make things self-explanatory,
and allows a musician to use this synthesizer
without being troubled by unwarranted complexity.

With such a system we tried to get rid of every-
thing which does not concern sound synthesis, and
to make the sound generation abilities commonly
used to give a powerful tool to the musician.