EQUIPMENT

Eμ 4060 Series Polyphonic Keyboard and Sequencer

Until recently, synthesizer technology left the musician essentially 3 choices: a pre-set synthesizer for fast but limited patch changes, a modular system for complex voltage control patches but restricted use of keyboard voices, and "polyphonic" synthesizers consisting of frequency division sound generation or limited number of voices (up to 8). The advantage of this Eμ keyboard/sequencer is in having the capability of 16 independent voices, provided of course that one also has the 16 VCO's, VCA's and envelopes. The fully developed system ($4110) with all the necessary extra memory modules (CMOS16K ram boards with battery backup. The keyboard above is $2500 and stores 60 key depressions) is capable of storing 6,000 key depressions.

The 4060 consists of the following: a faceplate with jacks for 16 control voltages and 16 gates, each of which has three outputs, and corresponding amber lights indicating which channels are activated. This module would be located in the cabinet. The keyboard has five octaves and a controller section with cassette input/output for storing patches on tape, an external clock input, internal clock rate control to slow or speed up the sequenced tempo, an offset pot for transposing 5 semitones in either direction, a portamento controller, reset switch to erase the memory, an error/battery indicator and a calculator type 16 key touch pad keyboard used in defining operating modes and functions . . . this last item is the main goody. A 16 channel Zilog Z-80

microprocessor is the heart of the system. Outside of private custom designs, the Roland Microcomposer and this system are the best examples of how digital technology will influence synthesists and increase the powers of realization in real time.

The calculator keyboard has two modes of operating: without a prefix, or with a "D" prefix which increases the modes and functions controllable by the microprocessor (see diagram). Some examples: touching the keys D, 3, and then a note on the keyboard splits the keyboard in such a way that the note depressed be-

Above left, a close-up of the Eμ Microprocessor Keyboard control panel. The 16 channel polyphonic output panel is shown above right. Bottom, a complete Eμ modular synthesizer with the Microprocessor Keyboard.

comes the top note of the lower section; each section can be given portamento (glide) independently. To store a sequence, one would first depress the character "#" and a number. The channel would then be erased and readied for the new information, which is promptly memorized as soon as the first note of the

sequence is played on the keyboard. The sequencer remembers the control voltage, gate, glide state and channel assignment for each note played.

Depressing O stops storage and determines the end of the sequence at the instant the key is depressed. To recall a sequence, the character "*" along with the sequence number are depressed, and the sequence begins playing and recycles at the end of the sequence.

The nice feature is the ability to "overdub" sequences in such a way that as you hear the last one played, the new voice is synchronized and can be played independently (that is the old and new control voltages are separated and capable of being edited without affecting any other information stored in other channels). Thus the amazing possibility of sitting

at home composing independent voices (percussion, strings, or, if you prefer, modulation patches of spacey and avant garde quality), then walking into a recording studio with all your memorized note depressions and gates and immediately dumping them on 16 track recorders, or mixing directly from the synthesizer

output. Naturally, other modules besides oscillators may be controlled from these 16 outputs. For example, 6 channels may be implemented in controlling 6 VCO's while 3 channels may control 3 filters, while 4 other channels control ADSR transient parameters, (the envelope or transient generator module has voltage controlled delay, attack, decay, sustain, release) while 2 other channels control the dry/reverbed mix of 2 stereo outputs. Also, that would still leave an extra channel of control voltage to be implemented . . . perhaps to control the sequence tempo (internal clock rate). Gates could be used to step sample/hold modules, trigger transient generators, analog sequencers, and the like.
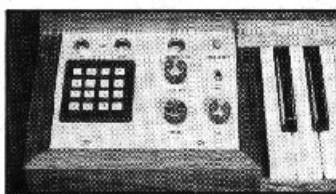
Voltages and gates may be stored on tape by depressing D and the character "#", undergoing error checking procedures as the information is dumped on tape. If an error is detected, the error light stays on. Recalling from tape is accomplished by depressing D and the character "*", loading the sequencer memory from tape.

Other functions of the keyboard include the circular assignment of channels on a rotating basis (depress 6), the transposition of the sequence being recalled (depress 3 and a note from the low C representing the interval desired), and converting the keyboard to the unison mode primarily for tuning purposes.

The reader is directed to Eμ's reprint presented at the Audio Engineering Society convention (May 10-13, 1977) where a more technical description of the functions and design rationale is given by the designers Scott Wedge and Dave Rossum.
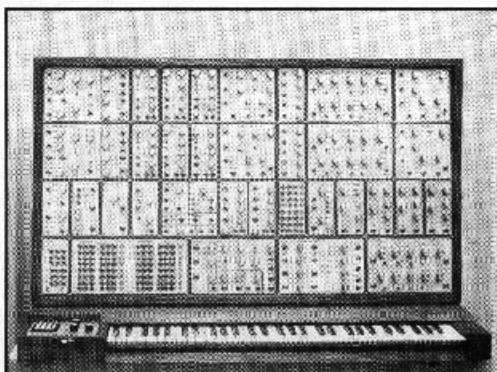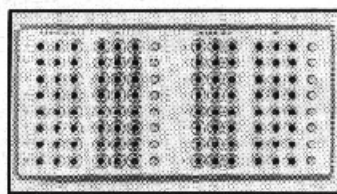
The Eμ keyboard is available separately to be interfaced with other brands of synthesizers, though the manufacturer points out that casings for an Eμ power supply and output panel are necessary. They also express an order of preference for interface, that being: Oberheim (to whom they license some of their keyboard technology), Moog modular 921 VCO's, ARP 2600, and Mirimoog . . . They point out, however, that the keyboard is compatible with any quality 1 volt/octave synthesizer.
Alex Cima