

Pauline —

Here is my hybrid proposal. I would have given it to you sooner, but I thought that had received it. I would appreciate any comments from you about this proposal, especially aimed at showing it around. Should it have a budget page etc. Thanks,

this is OK for in house -
Budget would be helpful if
funding agency comes up, then
proposal would have to be rewritten to address the agency.

Bruce R.

CME RESEARCH PROPOSAL

Bruce Rittenbach - February 1978

This proposal is intended as a statement of my primary research aims, meaning that I would anticipate spending most of my CME time on this project, and that this project is in addition to my other CME commitments as listed on my job description.

The following is my proposal for the creation of a new hybrid music system. The need for such a system is generated by the following inadequacies of the existing CME hybrid system:

1. **Reliability:** The hardware of the existing system is unreliable to the point of excluding use by all but the most tenacious composers. The proposed system would use 1/4 to 1/6 the amount of hardware (with associated increase of reliability) while being much more powerful.
2. **System Power (Thru - Put):** When all 16 channels of the existing system are operating, the system often "comes apart," meaning that operation becomes extremely erratic or ceases altogether because of the computer's inability to supply data to the hardware. This means that the composer must "work around" this problem, and is kept from using the full potential of the system. The new system will have more powerful hardware, allowing more output channels (32), while easing the burden on the computer, allowing for consistent operation.
3. **System Flexibility:** While Hybrid IV is innovative in many ways, there are serious compositional limitations caused by it's lack of ability to store and recall envelopes, and it's lack of ability to create control hierarchies (implying nested macro abilities).
4. **Cost and Transportability:** The existing system contains a rack full of hardware and a \$20K computer, making it unreasonable to duplicate. The proposed system would contain much less hardware and would be capable of operation with a \$2K, LSI-11 computer. This would allow for duplication in the Music Department and elsewhere.

Salient characteristics of the proposed system briefly listed are: 32 analog output channels with hardware envelope generators/system will not slow down in run mode/improved language is more uniform--hence easier to learn--and yet more powerful/computer control of analog patch/keyboard or "outside world" inputs to call macros on trigger events/nested macro and envelope capability.

The creation of the proposed hybrid system breaks roughly into the following steps:

1. Design of Language and Hardware: I believe this can be accomplished by the end of the current academic year, as I have already done a considerable amount of work in this area. The language design involves a study of existing hybrid systems, such as the Buchla 500 series system, and systems at Illinois, Iowa, and Albany, N.Y. Completion of the design phase will result in publishable documentation.
2. Hardware Construction: I believe this can be accomplished by the end of the next academic year, assuming 50% CME employment on my part and the aid of a part-time technician to help with fabrication.
3. Software Development: This area is most problematical for estimating development time. While the global design of the required software should be completed by the beginning of next year, the actual coding will require the services of an experienced programmer. Given a 50% programmer, I believe the job could be done in a year, hopefully concurrent with the hardware construction.

Two additional research areas related to the proposed hybrid system are the development of key analog modules, and my continued use of the existing system. A hybrid system with the power described merits the use of analog modules incorporating all current technologies (including linear FM), and a level of accuracy (known relationships between computer inputs and outputs) such that they can be used for serious research in music and psychoacoustics. Currently such modules are available only as expensive electronic test instruments, such as the Wavetek oscillators used with the Groove system. Part of my research would involve the creation of a limited number of analog modules

specifically designed for use in a computer controlled environment.

My current research with HYB IV involves an exploration of what variety of sounds may be produced by a fixed configuration of analog modules under computer control. Since a hybrid system of infinite power is useless without techniques for analog synthesis, I believe the continuation of my personal research is vital to the conceptualizations and design of any new system.