FORUM

WHAT IS THE NEED FOR UNIVERSITY LEVEL EDUCATION IN AUDIO?

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This question arises because I sense that there is a communications gap between the audio profession and the academic community. Many of the things which I personally regard as pseudo science in audio would not happen if the quality of education available in the field were higher. Yet, if you look at the typical university catalog, especially in engineering departments, you will find very little course work offered in this area.

In trying to find some educational ways to remedy this deficiency, I find that I do not know what is needed in the profession. There are several fairly standard educational programs which could be offered if enough students would apply and if we could assure the graduating students of a reasonable chance to apply their education. The standard bachelor of science in electrical engineering with emphasis on computation technique (not computer design) and a smattering of special acoustics courses in the junior and senior years would make a good background for audio. The standard master of science in electrical engineering with about 50% of the course work in traditional areas, 30% graduate level electroacoustics, and a thesis would well equip a student to be immediately useful in advanced development in audio. Are these kinds of graduates needed in audio?

There appears to be a need for continuing education in audio perhaps more than for BS and MS graduates to enter the field. These programs are certainly expensive and a university must have some strong evidence of need before going to the considerable work of designing and marketing any kind of continuing education.

Would the short course be a viable kind of continuing education? How many managers would pay about $1000 for travel, lodging, and tuition (and justify the lost time on the job) for an engineering employee to spend a week in Colorado learning how to apply time shared computers to the design of loudspeakers—to name just one possible short course. How high a price would you pay for a video tape version of such a short course? Would you pay an even higher price to buy the video tapes for your permanent files? How many video tape playback machines are available to the profession?

There are many other questions I could ask but the list above should suffice for starting a bridge across the communications gap. I will be happy to accumulate answers, opinions, and other suggestions and write another letter later if enough data appears and if statistically significant trends develop.

FURTHER ON SIMPLE PSEUDORANDOM PINK NOISE GENERATOR

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Several excellent digital integrated circuits have been made available since the original design and implementation of my pseudorandom pink noise generator[1] that would simplify it even further. For example, a design could be based on IC's manufactured by Signetics by using: Two type 8273 serial-in parallel-out 10-bit shift-registers to form a 20-bit shift-register; one type 555 timer used in the astable mode as a clock generator; and one section of type 8241 quad exclusive-or as the feedback element.

The 20-bit shift-register would generate a sequence length of $2^{20} - 1 = 1{,}048{,}575$ clock periods long. If the clock generator were made to oscillate at about 524 kHz, well within the capabilities of the 555, pseudorandom pink noise with a period of two seconds would be generated which would have much better output characteristics than the generator described in the paper.

The switch labeled "Start" in Fig. 8 may or may not have to be used with the 8273 depending on whether the shift-register resets itself on turn-on. The switch is intended to load a "1" value into the register to start the pseudorandom sequence. (Note: The all zero n-tuple does not appear in the sequence; if it did, the generator would keep shifting zeros ad infinitum).

[1] D. B. Keele, Jr., "The Design and Use of a Simple Pseudorandom Pink Noise Generator." J. Audio Eng. Soc., vol. 21, pp. 33-41 (Jan./Feb. 1973).