October, 1988
No. 6

APPLICATION

VIDEOTEK INC.

243 Shoemaker Road, Pottstown, Pennsylvania 19464 / (610) 327-2292 FAX (610) 327-9295

Synchronizers

Last issue I hinted that this one would get into the world of synchronizers. Well here we are, and sure enough, the subject is just that. There are a lot of different types of products in the past and present which address the subject. I'll try to cover them all, and talk about why one fits better than another in any given application. The first frame synchronizer that I ever saw was made in Japan and was about eight feet tall. That was in 1973 or so. It was so complicated that the guy who sold it was hired by the customer to keep it operating. A lot has happened over the last fifteen years. In synchronizers, they have become smaller, less expensive and easier to operate. We have had field syncs, frame syncs and four field syncs pop up all over the place. We have seen proc amps, TBC's, and effects units added to the basic boxes. I also intended to help sort out the differences between all of these features.

What is a Synchronizer?

Synchronizers are electronic devices which record, store and play back video pictures. The purpose of a synchronizer is to lock a video source to a local system when genlocking that source is not possible. The situation might not be possible when using a picture off satellite, or from a network feed. If that is the case then how can you mix and fade to a non synchronous picture? Well, no one can but if you could record the picture and play it back just a little bit later on a machine which you could genlock to your studio, then all would be well. If you do that record and playback on a VTR, it's called delayed broadcast. If the record and playback is done in a fraction of a second, then it's called synchronization. What goes on in a synchronizer then is a record section and a playback section — in digital, not tape. So, synchronized video is not live. It is delayed some minimum amount of time and possibly up to 1/15th of a second. I will not go into just how they work, but I feel that some basic understanding will help explain why use them at all.

Why not just genlock your system to that remote feed? That's a fair question, and the answer is with another question. Will you accept the disruption of your signal when that remote signal is removed or disturbed? If you can accept the possible random disruptions to your whole system, then genlock is a solution. If you can not risk disruption from some uncontrolled outside source, then you should synchronize that signal to your system. Who will have controlling influence on your total picture output?

Basic Choices

The first issue (one, two or four fields) has some sub issues. The first designs were introduced before SC/H phase was a factor for consideration in systems. Most single field synchronizers were designed in those days. These machines store input video digitally. They then report the presence and position of vertical and horizontal sync to a controller. The controller has local reference sync to look at and tells the output section when to "playback" the "recorded" picture. Now since only one field is stored, the output has a one in four chance of being correct as far as color field is concerned. In most cases, the output will have to truncate half a line or invent half a line. Refer back to SC/H phase, and remember that the output might also have to shift color phase depending on the color field relationship. Single field synchronizers are useful in situations where color framing and field accuracy (input to output) are not an issue.

A missing statement in this discussion of single field syncs is that they almost must have an output proc amp. In digital it takes less memory to note where all of the sync signals are located, then to actually digitize the entire sync signal over and over. Nearly every manufacturer notes where sync belongs and then discards the input sync signals. They all use an output processing amplifier to add local system sync to the output pictures. The signals I'm talking about are all of vertical sync from line 1 to at least line 10 and sometimes up to line 21. In horizontal, it is all of the blanking interval including sync and burst.

I won't force you to extrapolate what a two field and four field synchronizer do. I will, however, ask you to wait until next month for the continuation of this subject.

In the mean time, keep those cards and letters coming. I try to write this for the benefit of the readers, and I only receive directions if you offer them. Write or call Mark Everett at Videotek with your questions, comments, and criticisms.