



# APPLICATION

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## Master Synchronizing Generator

The last four issues have been talking all around what to expect from a sync generator. I feel that all of the major issues have been defined, and all that's left are the fine points. This month's note will address the issues and compromises that go into building and buying a master sync generator.

First, the easy stuff. Look at your system design and decide what pulses that you do (or might) need. Don't be too hasty at eliminating Horizontal and Vertical drives. They are often used by some computer "video" devices. Sync and Subcarrier are often required by time base correctors, some production switchers and probably half of the digital effects products on the market. Blanking is drifting away from popularity, but is often used in proc amps and encoders. I haven't seen a system use for either Vertical or Horizontal Sync in over ten years. Black Burst is probably the most common sync signal used today, and it's not even a sync pulse signal. It is a composite video signal, made internal to the sync generator. It is made from composite sync, composite blanking, some setup and a sample of subcarrier every so often.

## Genlock?

The first real selection available is genlock. That's the ability to lock the pulse output of one generator to the output of another. If your system is such that it is truly an island to itself then genlock is not important. If your system might be locked, even once, to some other source, then you need genlock. Some reasons to genlock your system to another source could be occasions where you rent a mobile production van and the quickest way to hook up and use all of the combined equipment is to lock your facility to the van. Another situation might be where some complex equipment demonstration can be most quickly accomplished by locking to that device, rather than a bunch of cables, delay lines and the such to install it in the system. Genlock is almost never the only choice, but it often can be the most efficient choice. How that genlock works is very important. You probably don't want to lock to a bad signal, and let that bad signal drive your system. You would probably be better off using a frame sync in such a case (more on that in a future issue). How SC/H genlock should work is explained, in detail, in issue 4.

## What to look for in a Genlock Sync Generator

Is it really an SC/H phased sync generator? If the generator has knobs and meters to adjust and SC/H phase then it certainly presents opportunities for mis-adjustments and drift. The best SC/H phased generators on the market today do not have and do not need any such adjustments and meters. The reason is that all pulses are controlled internally such that relative drift one to the other is not possible. If the pulses can't drift relative to each other, then relative adjustment is not only unnecessary, but illogical.

How about RS-170A? There is no such animal. Yes, there is general agreement, but the Electronics Industries Association has yet to agree on and publish what will probably be known as EIA RS-170A. We have all seen one very busy timing chart, known officially as Industrial Electronics Tentative Standard No. 1. Many manufacturers build to that standard and state that they meet RS-170A. We at Videotek do the same, but we are all in the same boat. If the EIA issues RS-170A it might be different than what we expect. No matter what, a sync generator built to "RS-170A", is a safer bet than one which is not.

How does it lock? "Very well, thank you" is not acceptable. If the generator is asked to lock to a non SC/H phased signal, what does it do? The probable best choice is to lock to the subcarrier, and then set the Horizontal and vertical as close as legally possible in keeping with the rules of SC/H phasing. The color phase will allow exact phasing, but the Horizontal can be only close (+/- 150 nsec. or so). The result of locking to a non SC/H phased signal will then allow exact match of colors, but you will have a slight horizontal shift between that picture and any of your system pictures. There are two other ways of solving the problem. The first is to lock the horizontal phase exactly, and then the color phase is always wrong (Green people, and Blue corn flakes). The other is to forget SC/H phase and lock to whatever is coming in, just don't expect to ever make the pictures right.

The last trap in the jungle of genlock is the following general assumption. Simply having a master sync generator which is SC/H phased does not guarantee that the whole system is SC/H phased. All distributed Sync and Subcarrier must have identical path lengths from the sync generator to the driven device. A path length difference will shift the relative phase of Sync to Subcarrier. All devices driven by Black Burst or any other composite signal must be SC/H phased devices, or the input can not be guaranteed over time. It is possible to correctly set the SC/H phase of a non SC/H phased device, but it will most likely drift requiring constant monitoring and readjustment.

I do appreciate all of the compliments and I still encourage you to write or call with your questions, comments or problems. Contact Mark Everett at Videotek with your input.