Synchronizing The AU-EVA1's Timecode With Another Camera

(excerpted from "A Guide To The Panasonic AU-EVA1 Camera")

The AU-EVA1 offers the ability to synchronize timecode to another camera, or you can also sync to an external timecode generator, timecode slate, or other device that sends or receives LTC timecode.

The key to synchronizing timecode is to use FREE RUN timecode. For most normal recording situations, it's typical to use REC RUN. However, for synchronizing multiple cameras, FREE RUN is the only way to maintain synchronization if one of the cameras stops recording. With FREE RUN, all of the cameras should maintain sync (or extremely close to sync) no matter how many times a camera operator stops or starts recording. This can make matching up takes in the edit bay easy and effortless.

You'll designate one camera as the "master timecode" camera, and all other cameras will sync to the master camera. Make sure the cameras (or timecode slate or decks or whatever devices you're synchronizing) are set in FREE RUN mode, they all need to be set in the same recording format and frame rate (i.e., all need to be in 1080/50.00p or all need to be in UHD/59.94p or whatever format you're using) and all the cameras need to be set equally to either DROP FRAME or NON DROP FRAME. In short, make sure that the recording modes and timecode settings are identical among all the cameras.

If you're using your AU-EVA1 as the master timecode source, first ensure that it is in camera mode, not playback (press the VIEW button so that you're seeing live pictures). Then:

1) Set the timecode generator to FREE RUN. Go to the REC SETTINGS>TC>FREE/REC RUN menu and choose FREE RUN.

2) Set the timecode preset to whatever you want it to be (typically you'd set it to match the current time of day, or you might set it to 0:00:00:00 at the start of each shoot day.) Use the REC SETTINGS>TC>SET TC menu to program the timecode preset to what you want.

3) Configure your camera's TC IN/OUT port for output. Go to the REC SETTINGS>TC>TC IN/OUT SEL menu and choose TC OUT.

4) You'll also want to make sure that the output timecode is real-time, and not delayed to match the output video. Go to the REC SETTINGS>TC>TC OUT REF menu and choose RECORDING.

At that point, your camera will be able to serve as a master timecode source for any other camera or for devices like a timecode slate or external recorders. At this point you'll want to connect the other cameras so they can receive the timecode. Connect the other cameras or devices to it using a double-shielded BNC cable (the manual recommends a 5C-FB cable). Then, assuming you're connecting another AU-EVA1, you'll want to go into this camera's menus and:

       1) As said before, ensure that the recording format and system frequency are the same as the master camera. They must be set identically.

       2) Set the timecode generator to FREE RUN. Use the REC SETTINGS>TC>FREE/REC RUN menu and choose FREE RUN.

       3) Configure this camera's TC IN/OUT port for INPUT. Go to the REC SETTINGS>TC>TC IN/OUT SEL menu and choose TC IN.

At this point, the camera should be receiving timecode from the master camera and you should see identical timecode on both cameras' displays.

You can leave the cable connected, or you can disconnect it and continue on with your shoot; the cameras should stay basically in sync although, as noted before, you may encounter some timecode drift throughout the day. The receiving camera will conform its timecode to the master camera's timecode so long as the cable is connected, but only when the receiving camera is not currently recording. The timecode will be jammed to the receiving camera during standby, but once the camera goes into record mode it uses its internal timecode generator to advance the clock. There should be little to no drift during the day, but it's possible there will be a small amount of drift if the cameras' clocks are not perfectly synchronized. If you need the timecode to be as consistent as possible, keep the cable connected as much as you can.

Finally, do be aware that the AU-EVA1 does not have GENLOCK capability (meaning, it doesn't have the ability to sense the start of a new frame and synchronize that with the other camera's start of frame). Accordingly, it's possible for the timecode to be out of sync by up to one frame. The timecode will always be transmitted, but if the cameras' cycles are slightly mismatched, the synchronized timecode could be off by no more than one frame. As such, absolute frame accuracy is not guaranteed when using the timecode sync method. It should be very very very close throughout the day, but you cannot expect it to maintain perfect frame alignment among multiple devices when all the devices are running on their own internal clocks. If you notice timecode drift happening, you can always re-sync by re-attaching the cable when the receiving cameras are in recording standby.