Two-Slot Recording Options on the AG-UX90 and AG-UX180

The new AG-UX90 and AG-UX180 camcorders record onto standard SDXC memory cards, and they feature two card slots. In this paper I will explore the various ways the cameras can use those two card slots and the applicability of using those recording options to various shooting scenarios.

Commodity Media And Recording Formats

The AG-UX90 and AG-UX180 were designed to be not only inexpensive to buy, but also inexpensive to operate. The use of reasonable file sizes and standardized recording formats onto standardized, commodity SDXC memory cards opens up options that would not have been possible or as practical on different recording media.

For general use, the camera records onto one card at a time. In this situation, it can record approximately two hours of high-definition footage, or one hour of Ultra High Def (UHD) footage, on a 64GB SDXC card (and four hours of HD, or two hours of UHD, on a 128GB card, etc). Traditionally the camera operator would then eject that memory card and give it to the editor (for in-house post production) or directly to the client (in a shooter-for-hire scenario). Additionally, after recording is finished, the camera can also copy clips from one memory card to another, giving the operator the opportunity to create a trimmed-down card with only selected clips on it. Or, the camera can power and control an external USB hard drive and copy all the clips (or only selected clips) from the memory card onto that hard disk.

However, the presence of the second card slot opens up opportunities to accomplish more while recording, or to reduce or eliminate footage copying, or to ensure footage integrity and redundancy.

## Relay Recording For Extended Recording Time
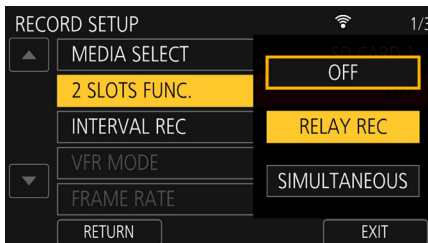
There are times and events where the camera operator will need to roll the camera for lengthy periods of time, and record uninterrupted. While the standard recording times on the AG-UX90 and AG-UX180 are already very generous, they can be effectively extended by using both memory card slots together in a process called "Relay Recording." In Relay Recording, the camera records as normally onto one of its memory cards and, when that card is full, it switches to the other memory card, continuing recording seamlessly, without skipping a beat (or dropping a frame, or suffering any sort of audio dropout or any other negative side effect).

Needless to say, this can be a lifesaver for any shooter who finds themselves covering live events, breaking news, or other scenarios where there is no convenient opportunity to stop recording and swap memory cards.

Relay Recording extends the recording time to unprecedented lengths. As an example, imagine that you're recording footage on Card Slot 1, and you have a fresh blank card in Card Slot 2. When the camera fills up all the available space on Card Slot 1, it will then swap over to Card Slot 2 and continue recording. At this point, you can eject the full memory card out of Card Slot 1, and insert a new blank memory card. The camera will have been continuously recording on Card Slot 2 and, when that card is full, it will then swap back to the newly-inserted blank card in Card Slot 1 (and this process can repeat for as long as you have battery power or, in the case of AC power, it can repeat as long as you need it to).
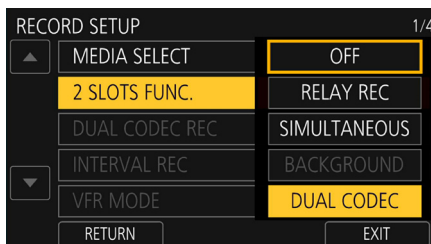
Simultaneous Recording On Both Cards
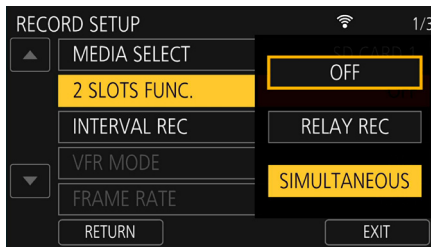
Simultaneous Recording utilizes both card slots to record identical footage, simultaneously, onto two memory cards. The benefits to this method are obvious (and many):

1. By utilizing both card slots, you protect yourself against losing footage due to a memory card failure. If you're shooting irreplaceable footage (such as breaking news or wedding or other events), it can be prudent to have a backup copy of the footage in case something happens to the main memory card. Card failures are rare, but Murphy's Law has never been repealed, and when you're paid to deliver the footage it's always nice to have an additional guarantee that you will indeed be able to deliver the footage. In a case where one memory card fails for any reason, the second card will continue recording uninterrupted.

2. You can save valuable time at the end of the shoot day by not having to make a separate copy of the footage for the client or the editor. Since tapeless cameras first appeared, the ritual of copying footage at the end of the day has extended long shooting days even further. By utilizing Simultaneous Recording, you can eliminate this process entirely; just hand the client the footage.

3. Even if you have to hand the footage to the client, you can protect yourself by retaining a copy of the footage (where permitted by the client, of course). You may be able to use that footage for your reel, but a more important purpose would be to safeguard the footage for purposes of redundancy, especially in a case of the client misplacing or losing their copy of the card (SDXC cards are very small and not hard to misplace). By retaining and safeguarding the footage, you could literally save the project (and look very good in your client's eyes!) if you were able to rescue them from such a situation.

4. Once the footage is in the client's hands, you have no control over what happens to it; if the client were to inadvertently delete one of your shots, for example, then you having a copy could be very helpful because you can always refer back to the card and describe the exact filename of any suspected missed shot.

Dual Codec Recording On Both Cards

The AG-UX180 offers a powerful variation on Simultaneous Recording. On the AG-UX180,

you can have it record footage on both cards simultaneously, but have them recorded in different formats and even in different resolution! You could choose, for example, to record Ultra High Definition footage to your main memory card, and simultaneously record a 1080p HD copy of the footage to the second memory card.

In Dual Codec recording, the filenames are exactly the same on both cards, so in this scenario you could have the editor perform a "rough cut" using the 1080p HD footage, which on many computers may be easier and faster to edit than Ultra HD footage would be. Then, when it's time to finish the project, you would simply substitute the UHD footage; the filenames are exactly the same so the substitution should be trivially easy; re-render the project and you'll now have an Ultra HD master.

In Dual Codec recording, you can have Ultra HD or high-bandwidth Full HD 1080p as your main recording, and you can have a good-quality but lower-bandwidth 50mbps Full HD recording on your second memory card.

Alternatively, you could choose to have a very low-bandwidth 8mbps Full HD recording on your second memory card. These 8mbps files can be utilized in the exact same way for offline/online editing as the 50mbps files would, but they're also eminently suitable for uploading in the field. At 8 mbps, the recorded file size would be almost 20x smaller than a UHD 59.94p recording, or less than 1/10 the size of a UHD 23.98p recording. If you're filming on location and want to upload footage to the editor back at the home office, these 8mbps Dual Codec recordings will be much more practical to upload.

Background Recording On Both Cards
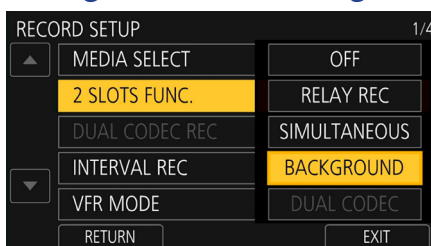
The AG-UX180 offers another alternative take on recording simultaneously to both memory cards, and one that may have specific applicability in live events, speeches, and news coverage. Background Recording supplies a way to have the protection of continuous recording of the entire event, along with the ability to create individual clips of the highlights or key elements.

In Background Recording, the camera utilizes both cards simultaneously. When you start recording, both memory cards commence recording. When you stop recording, only one of the card slots will stop recording; the other slot will continue recording continuously and uninterrupted. The general idea here is that you have the safety of having recorded the entire event, but by starting and stopping the recording on the main card you are in effect creating a "selects reel" of the highlights of the event. You can start and stop recording on the main card as much as you want; the Background card will continue uninterrupted throughout. This gives you a cut-down reel of just the main highlights on one card, which should make your editor very happy; after all, what editor, when faced with a 5:00 deadline, wants to sort through four hours of continuous

event coverage? But, simultaneously, you also have footage of the entire event, uninterrupted. In a case where something happens unexpectedly, and you weren't ready to hit "record" right away, that's okay -- you'll still have a copy of the event on the Background card. Or, maybe an interview subject starts before you were recording; again, it's okay, you'll still have the full recording on the Background card.

Using Background Recording, you can deliver a highlights reel that can be assembled very quickly, while still having continuous recording of the rest of the event for use as b-roll, or for protection in the case of missing a shot or starting recording late. You can even swap out the main card and send that off to the editor in the middle of the event; the Background card will continue recording uninterrupted. You could then swap in a new, fresh memory card for the highlights reel, without missing a frame of the event.

Summary
The AG-UX90 and AG-UX180 make clever use of their two memory card slots to provide recording options that can save your shoot, or save you time in copying footage, or provide protection against loss, or provide for more options and quicker turnaround in the editing suite. The prudent shooter would study these various recording options and determine which of them might apply in their particular shooting situation, to take advantage of the power these new cameras offer.