Working with files from the Sony F65 Camera

White Paper

Software versions: Pablo Rio V2.0 rev 1 and onwards.

Overview
The Sony F65 is one of the new high resolution and high dynamic range cameras that are replacing film for theatrical production and also finding applications in broadcast. In addition to conventional video outputs the F65 supports a complete file-based workflow. The MXF files from the F65 store compressed data from the camera sensor (Bayer data) and the user has a choice of two compression ratios, the original format which is around 3:1 and the newer Lite format with a compression of about 6:1. The MXF files can also contain up to 16 tracks of audio.

As the data is stored as raw sensor data (a common method with modern digital cameras), then the data needs to be processed, or ‘developed’ to use a film analogy, before it can be used. Sony provides an SDK that handles this process that is embedded into the SAM Rio software and is used when importing F65 material. As can be seen from the diagram below there are many processes involved and the Importer provides flexible choices for decoding the frames both spatially and colorimetrically.

Processes provided by the Sony SDK are shown in blue. The SAM Rio processes are shown in grey; they may use information provided by Sony, e.g. to implement the ACES Input Device Transform.

This document provides details on the various import/soft mount choices and when they might be used.

Precision
Raw data is defined here as data values representing the intensity of the light as seen by the sensor. Typically the raw data will be digitised to at least 14 bit precision and, as the noise floor of the camera is very low there is scope for a wide dynamic range.

The precision of the data stored in SAM Rio is chosen with a master setting in the F1 menu and via the Color setting in the import menu.

As with film data we can optimally store this data in log format and for greatest flexibility in post the data should be stored at 16-bit precision. However, just as with film, high quality results can be achieved by storing the data as 10 bit log which reduces the storage requirement.

Quality
This has two options allowing the setting of the debayer quality. Experience shows that it is often very difficult to see the difference between these settings however where the shot being decoded at 4K contains very fine detail then careful examination will show that ‘High Quality’ has reduced aliasing.
Resolution

Sony will decode to a number of set resolutions as shown in the picture to the left. This is the debayer process resizing. Additionally there are the general resize options available through the video attributes section of the import menu. At the time of writing on a SAM Rio the import speed for 4K was about 8.5 frames/sec, for 2K it was about 34 frames/second and at 1K was about 50 frames/sec.

Note:
SAM Rio V2.0 will only support up to 6K on disk and real-time playback off local workspace up to 4k (requires 2 Teslas).

Kelvin

The value shown here defaults to the settings used when the material was shot. This can be changed if required to one of the three available values. A value of 5500 is classed as the ‘daylight’ setting, the remainder, 4300 and 3200, are classed as tungsten settings.

Color Space

This applies a set of matrices to the raw data to transform the original sensor data to a selection of standards. This is a color gamut conversion only.
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**S-Log2**: This Sony profile converts the input data into a film-like density response. When color correcting this material the standard DMin and DMax settings in the pre-process should be set to:

\[ \text{DMin} = 90, \text{DMax} = 582 \]

**ACES**: Converts the data to conform to the ACES standard. ACES selection must be paired with ACES in Color Space for correct operation. The correct DMin and DMax settings in the color corrector pre-process are \( \text{DMin} = 143, \text{DMax} = 494 \).

The Dmin, Dmax defaults settings can be changed in the F1 menu.

**Typical Settings Combinations**

The above settings provide considerable flexibility. The most widely used settings are:

<table>
<thead>
<tr>
<th>Color Space</th>
<th>Profile</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-Gamut</td>
<td>S-log2</td>
<td>Create a look without preconditioning the data for any particular viewing environment</td>
</tr>
<tr>
<td>sRGB/Rec709</td>
<td>S-log2</td>
<td>Precondition the data for display on a TV monitor</td>
</tr>
<tr>
<td>ACES</td>
<td>ACSE</td>
<td>Integrate into ACES workflow</td>
</tr>
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</table>

**Soft Mount**

F65 files can also be soft mounted providing additional functionality on the edit timeline and within the color corrector. To soft mount F65 simply check the box in the import menu. This will then soft mount the media at its current location rather than importing into local workspace.

All of the above functions with the exception of the bit depth precision can now be accessed directly from the timeline. Simply right click / alt + tap on the timeline to access the F65 settings menu.

Any of the above parameters can now be changed live on the timeline or during a grading session.