

# CM-019P - UHD-HDR 1000 nit ProRes 4444 Rec 2020 PQ Archival Master file - HDR10



Version 3.0: Format Spec Sheet #CM-019P

UHD/HDR 1000 nit ProRes 4444 Rec 2020 PQ Archival Master File for HDR-10

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## 1.0 DELIVERY AND FORMAT SPECIFICATIONS

The ProRes Mezzanine files in this specification should be created as a child asset from 1000 nit Rec 2020 PQ TIFF files, which will be the output from the color correction session. They should not be created any other way without first speaking with your NBCUniversal representative.

1. All Ultra High Definition High Dynamic Range transfers to digital file shall be from the final, color-corrected version, 23.976p, 3840x2160, 1.78:1 (16x9) aspect ratio, encoded to a NBCU Master UHD/HDR ProRes 4444 Rec 2020 PQ Mezzanine:
  - a. A MOV-wrapped, ProRes codec in the Rec 2020 color space, 4:4:4:4, PQ transfer function, 12-bit with embedded multichannel LPCM (Little Endianess) Audio / 48kHz / 24bit.
  - b. Embedded audio must be delivered in mono discrete channels (one track per channel) and properly tagged. (See Section **A.10**)
2. Delivery of the final ProRes File
  - a. Files should be delivered in the following format
    - 1000 nit
    - Pro Res 4:4:4:4 12 bit (**not** Pro Res XQ)
    - UHD resolution 3840x2160
    - PQ transfer function
    - **Rec 2020** container (with mastering monitor in this setting)
    - Limited to P3 Primaries (from color session or with approved LUT / not to exceed P3– if using a LUT, please speak with NBCU technical staff)
    - D65 white point
    - **Decoded as Full Range (see below)**
  - b. During the encoding process, ProRes (all variations) uses YCbCr limited range regardless of whether the source image is full range RGB or limited range YCbCr.
  - c. Please encode this image so it will produce a proper image level when decoded back out as Full range RGB.
    - Some tools on the market can be set up incorrectly and will send a limited range RGB or a Full range YCbCr to the ProRes encoder. This will produce an incorrectly decoded image.
    - In order to verify if this has been done correctly, please include a head format (bars, luminance ramp, etc.) in your file that has gone through the encoded pipeline to ensure proper encoding/decoding has occurred.

- d. If using Clipster Version 6.8 and beyond, this is achieved by choosing the “Pro Res 4444” setting in the Finalize menu to create the Pro Res 4444. Please **do not** choose the selection “Pro Res 4444 (YUV).
3. Delivery of Static Metadata (Max FALL / Max CLL) Information should be provided as data fields in a spreadsheet (format shown below). For MaxFALL and MaxCLL, please use a value of 99.9% of the data. This will allow for outlier peaks not to alter the total movie values.
- a. Delivery of 6 values required – 4 are typically the same
- Max FALL (this will change per movie/TV title)
  - Max CLL (this will change per movie/TV title)
  - White Level peak ( 1000 nit)
  - Black level of mastering monitor (.001,.002 or .005 nit are typical)
  - Transfer function (PQ)
  - Primaries (P3)
- b. NBCUniversal can perform the Max FALL/CLL and gamut limit calculations from Tiff files, should you need. If not, Colorfront Transkoder has been approved for this functionality. Please see below for the specifics to set up Colorfront Transkoder:
- c. All calculations should be on **the program content only**. Do not include bars, slate, or textless when performing these calculations.

#### Colorfront Settings for Max FALL/CLL and P3 Gamut Check

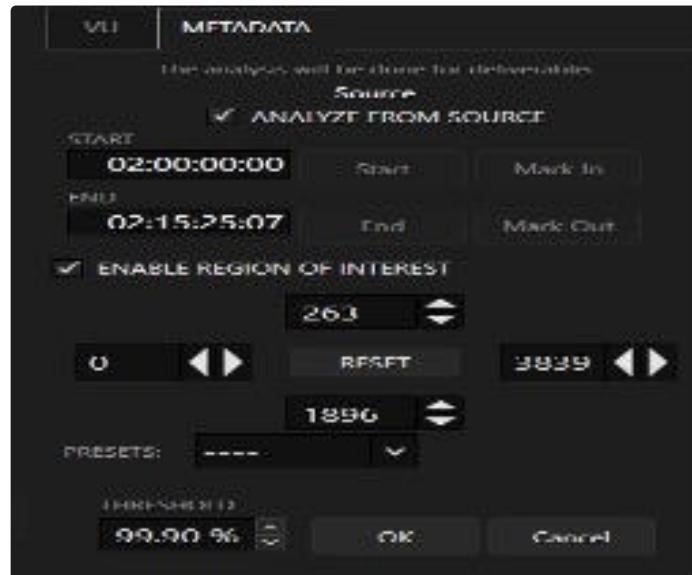
You **must use Colorfront 2020 Release version 47652** and beyond:

1. Load footage/create a timeline and save
2. Use the following hotkeys to set the following settings: **Tab**, then **QC**
  - a. Gamut Tolerance: “0.04”
  - b. Gamut Warning – Set to “P3”
  - c. High Precision Gamut – Set to “On”
  - d. Gamut Warning Tolerance: “0.04”
  - e. Brightness Tolerance: “0.0”
  - f. Brightness Frame Tolerance: “0.1”
3. Press **Tab** to save preferences
4. Press **P** to go to the deliverable page
5. Add a “Frame Light Levels Deliverables” under “Others”
6. Ensure you’ve turned “PDF” on

7. Ensure that you have properly selected the appropriate aspect ratio/framing for the calculation area.
8. Use **CTRL + R** to start the render

### **Cortex (MTI) Settings for Max FALL/CLL**

Please use appropriate timecode and crop settings to only specify content without mattes (region of interest) and from first frame of picture to last frame of picture, no slates, countdowns etc.



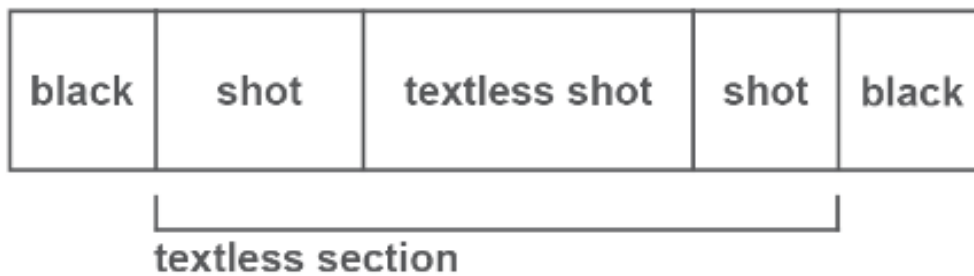
d. Metadata Layout Sample from NBCUniversal generated data:

|                                 |                     |
|---------------------------------|---------------------|
| <b>FILENAME:</b>                | Apollo13_Job_105314 |
| <b>SMPTE ST.2086 METADATA:</b>  |                     |
| • PRIMARIES STANDARD:           | P3                  |
| • WHITE POINT:                  | D65                 |
| • LUMINANCE MIN:                | 0.001               |
| • LUMINANCE MAX                 | 1000                |
| <b>MaxFALL/MaxCLL METADATA:</b> |                     |
| • MaxCLL:                       | 1000                |
| • MaxFALL:                      | 293                 |

4. Each MOV file should contain audio and picture, and be labeled per the NBCU Master UHD/HDR ProRes 4444 PQ file spec below.
5. None of the MOV files should include an essence encryption or other encryption of any kind.
6. Content files (i.e., the video with embedded audio MOV files) should be delivered with an MD5 checksum file. Checksum tools are freely available for all operating systems.
  - a. Sample of MD5 338084e1c7ad6cb81c5bb259cfbaaebd
  - b. If a file has a relative path with MD5
    - 338084e1c7ad6cb81c5bb259cfbaaebd /ProRes file
7. File deliverables should be delivered via hard drive or secured line with encryption approved by NBCUniversal Content Management.
8. Hard drives used to transfer digital files should be compatible with both Mac and PC operating systems and free of any viruses, Trojans, or spyware.
9. Material mastered should contain 23.98p start timecode in the header of the MOV file.
10. The program should be recorded as a long-play file with continuous timecode. The timecode should sync Hour 1 (01:00:00:00) to the first frame of the picture or program start. The file should include the full normal header (See “Head Format”), prior to program start, and textless material after program conclusion. Textless material should be included as part of the longplay UHD/HDR ProRes 4444 PQ MOV file, and should match the HDR Archival source.
11. The audio files must sync to the picture elements. A 2-pop must be included in both the audio and video files.
12. If elements are delivered with pulled commercial blacks and bumpers, then pulled commercial blacks should be :01 second between picture and/or audio, whichever comes last.
13. Format the textless as follows: Starting one (1) minute after the last frame of the program (video or audio ring-out, whichever comes last). Encode textless sections with no breaks in between shots, starting 1 minute after the last frame of the picture. (A section may contain multiple shots of text that will be replaced with textless material in this area. Include all textless backgrounds for all texted and textless shots within a section). If the next texted section occurs within 5-10 seconds of the previous section, please make it inclusive with the previous section. Otherwise, place (1) second of black in between each section.

Timecode for the textless material should be continuous from the end of the program through the end of the textless material.

If the Main and/or End Title sections are over black, it is not necessary to place black at the end of the program for those sections.



14. After the end of textless material, encode one **(:01) second** of video black **without** sound. The timecode should be continuous from the end of the textless section through this one-second section of black.
15. If no textless exists, after the conclusion of the program, add **one minute** of black and digital silence.
16. In all types of archival masters (with the exception of the full aperture), all boom mics, camera flags, dolly tracks, frame lines, and optical matte lines, etc, should be eliminated from the video picture entirely and should not be seen when viewed in under-scan. All titles should fit within safe titles for the respective aspect ratio. All titles for the Full Frame versions (16x9 & 4x3) need to be transferred in Full Frame. Letterboxing or matting the titles is not acceptable for the Full Frame versions. Pre-approval from NBCU is required if no other options are available. Please contact your NBCU representative.
17. For HDR content, NBCUniversal targets white titles to be approximately 180-200 nits, unless creative intent prefers differently.
18. Please note that for Title Safe / Action Safe, NBCUniversal now uses the 90/93 screen percentage for all aspect ratios. If you have any questions, please contact your NBCUniversal Representative.
19. Any website / URL information contained anywhere in logo or end credits should be brought to the attention of your NBCUniversal representative for further direction.
20. Any Emergency Alert System- EAS (audio) or Broadcast (video) signals need to be brought to the attention of your NBCUniversal representative.
21. \*Archival masters should have the Universal Logo placed at the start of the program, 01:00:00:00.
- For Focus Features titles, the Focus logo should go at the head of the program.
  - For the TV product, the picture should start at hour 01:00:00:00, without the Universal logo at the head.

- For Acquisition titles where the Universal logo is not available, slug (:24) seconds of black at the head of the program, starting at 01:00:00:00.
- If you are unclear as to what category this file falls into, please check with your NBCUniversal Representative.

22. Universal tour tag should always be removed from the end of the program

23. For feature-length content, the last frame of the picture will be the last frame of the rating card for rated content. For unrated or not rated content, the last frame of the picture is either the end of the audio ring out, the last frame of the fade, or the content. This should be noted in all QC reports

24. For TV product, there is always a logo at tail. The last frame of the picture would be either the last frame of the logo or the end of the audio ring out. This should be noted in all QC reports.

25. The color range of the content **should never** be scaled in any way during the creation of the UHD/HDR 1000 nit ProRes 4444 Rec 2020 PQ MOV file.

## 1.1 VIDEO FORMAT

1. When viewed with a broadcast monitor and scope (measuring nit values/candela per square meter (cd/m<sup>2</sup>), 3840 line mastered material shall comply with SMPTE 2036 (3840 horizontal samples x 2160 active lines)

a. Luminance Level: Max nit value = 1000

Color space Level: Rec 2020 (limited to P3)

NBCUniversal – Content Management – Mastering Team has adopted a requirement that **all OLED** color monitoring be set up with the **“Judd Modification, Modified Target, or Offset”** D65 white point. These settings shall **apply to all** Color Grading, QC, and **any other OLED monitoring** of either High Dynamic Range or Standard Dynamic Range content, when viewed on a professional or consumer OLED monitor.

### NOTE ON MONITOR CALIBRATION:

1. All OLED (Organic Light-Emitting Diode) monitors, High Dynamic Range or Standard Dynamic Range, must be set to a D65 white point with the “Judd Modification, Modified Target or Offset” applied. The standard X, Y values are listed below for reference.

a. For BVM X300, BVM E-250/250 A

▪ X=0.3067

▪ Y=0.3180

b. For PVM X550

- $X=0.3047$

- $Y=0.3170$

2. Other types of flat monitors (non-OLED) and/or CRT's are required to be set to a standard D65 white point based on the CIE 1931 standard.

a.  $X=0.3047$

b.  $Y=0.3170$

3. Please refer to the specific OLED monitor manufacturer's recommendation for correctly applying the "Judd Modification, Modified Target, or Offset". The Sony specifications for various white points are listed below for reference, should a different white point be needed:

| <i>All but PVM X550</i> |        | <i>CIE 1931 Coordinates</i> |        | <i>Judd Corrected</i> |  |
|-------------------------|--------|-----------------------------|--------|-----------------------|--|
| x                       | y      | x                           | y      |                       |  |
| <i>D93</i>              | 0.2831 | 0.2971                      | 0.2771 | 0.2861                |  |
| <i>D65</i>              | 0.3127 | 0.3290                      | 0.3067 | 0.3180                |  |
| <i>D61</i>              | 0.3198 | 0.3360                      | 0.3138 | 0.3250                |  |
| <i>D55</i>              | 0.3324 | 0.3474                      | 0.3264 | 0.3364                |  |
| <i>DCI White</i>        | 0.3140 | 0.3510                      | 0.3080 | 0.3400                |  |

| <i>For PVM X550</i> |        | <i>CIE 1931 Coordinates</i> |        | <i>Judd Corrected</i> |  |
|---------------------|--------|-----------------------------|--------|-----------------------|--|
| x                   | y      | x                           | y      |                       |  |
| <i>D93</i>          | 0.2831 | 0.2971                      | 0.2751 | 0.2851                |  |
| <i>D65</i>          | 0.3127 | 0.3290                      | 0.3047 | 0.3170                |  |
| <i>D61</i>          | 0.3198 | 0.3360                      | 0.3118 | 0.3240                |  |
| <i>D55</i>          | 0.3324 | 0.3474                      | 0.3244 | 0.3354                |  |
| <i>DCI White</i>    | 0.3140 | 0.3510                      | 0.3060 | 0.3390                |  |

4. NBCUniversal requires Color Tagging of .mov files on any .mov files delivered.

a. The NCLC color tag uses MPEG index values to identify a file's color space. It is used as a conversion equation from RGB to YCbCr. Without this tag, a file can be improperly



identified as standard dynamic range with 601 or 709 color space when it is HDR or as PQ or HLG when it is SDR.

- b. To ensure the information is correct, NBCUniversal requires the following NCLC settings to be included in the .mov file.
- c. If you have questions on verification, etc., please contact your NBCUniversal Representative.

| Commonly A.K.A.                                                                                               | Color Volume | Primary   | Codec   | MPEG Color Primary Value | MPEG Transfer Function Value | MPEG Conversion Matrix Value |
|---------------------------------------------------------------------------------------------------------------|--------------|-----------|---------|--------------------------|------------------------------|------------------------------|
| UHD/HDR                                                                                                       | HDR - 4:2:2  | BT - 2020 | PR .mov | 9                        | 16                           | 9                            |
| UHD/SDR                                                                                                       | SDR          | Rec 709   | PR .mov | 1                        | 1                            | 1                            |
| HD (Rec 709)                                                                                                  | SDR          | Rec 709   | PR .mov | 1                        | 1                            | 1                            |
| NTSC                                                                                                          | SDR          | Rec 601   | PR .mov | 6                        | 6                            | 6                            |
| PAL                                                                                                           | SDR          | Rec 601   | PR .mov | 5                        | 6                            | 5                            |
| UHD/HDR - HLG                                                                                                 | HDR-4:2:2    | BT-2100   | PR .mov | 9                        | 18                           | 9                            |
|                                                                                                               |              |           |         |                          |                              |                              |
| <b>Note: for BT 2100/2020 content that is truly 4:4:4 values on the MPEG conversion matrix, change to "0"</b> |              |           |         |                          |                              |                              |

## 1.2 TYPES OF DIGITAL VIDEO MASTERS REQUIRED - FEATURE

UHD/HDR Digital Video Masters should match the content and specifications below. The information below is provided for reference. **All title elements should fit within the respective aspect ratios' safe title area.**

- \*Please note that for Title Safe / Action Safe, NBCUniversal now uses the 90/93 screen percentage for all aspect ratios. If you have any questions, please contact your NBCUniversal Representative.
1. 16x9 (1.78:1) Full Frame – May be created either by Pan and Scan process (if original film elements are 2.0:1 or greater), or by sizing Super 35 and 1.85 spherical elements to accommodate the 1.78:1 aspect ratio of the UHD/HDR master.

2. For all aspect ratio line counts (first/last), please reference Spec CM-001C
  - a. If the original intended aspect ratio is 1.85:1, the 16x9 Full Frame archival master file should be sized to accommodate the 1.85:1 mat in the transcode, cloning, or down-conversion process. Universal will **not** accept any line variance from those stated in spec CM-001C for the first and last line of the active picture. Matteliness should not fluctuate within the feature. If delivering at a theatrical version and an extended or unrated version, then mattelines must be consistent between versions.
3. 16x9 Letterbox (2.0:1, 2.35:1, etc.) – Letterbox versions are to be consistent with theatrical exhibition aspect ratios. Matte settings should be set according to spec CM-001C. Universal will **not** accept any line variance from those stated in spec CM-001C for the first and last line of the active picture. Matte lines should not fluctuate within the feature. If delivering a theatrical version and an extended or unrated version, then matte lines must be consistent between versions.
4. **(If Applicable / If ordered)** 4x3 (1.33:1) within 16x9 – The 4x3 image contained within the 16x9 aspect ratio of UHD/HDR should be determined by applying a 4x3 reticule to the center of the 16x9 video raster.
  - a. All Super 35 and 1.85:1 spherical elements should be sized to accommodate the 4x3 raster reticule. This will ensure that 4x3 full-frame down conversions will receive the full intended film image during the conversion process.
  - b. When adapting an anamorphic or Cinemascope film element (e.g., 2.35:1 aspect ratio), all Pan and Scan decisions should be made using the 4x3 safe action reticule as displayed by the UHD/HDR monitor.
  - c. When side matting the 4x3 Digital File master, ensure that the side matte is narrower than the 4x3 raster reticule, as displayed on the UHD/HDR monitor, giving approximately 1.35 of picture information.

### 1.3 TYPES OF DIGITAL VIDEO MASTERS REQUIRED - EPISODIC

UHD/HDR Digital Video Masters should match the content and specifications below. The information below is provided for reference. **All title elements should fit within the respective aspect ratios' safe title area.**

- \*Please note that for Title Safe / Action Safe, NBCUniversal now uses the 90/93 screen percentage for all aspect ratios. If you have any questions, please contact your NBCUniversal Representative.

1. 16x9 (1.78:1) Full Frame – May be created either by Pan and Scan process (if original film elements are 2.0:1 or greater), or by sizing Super 35 and 1.85 spherical elements to accommodate the 1.78:1 aspect ratio of the UHD/HDR master.
2. For all aspect ratio line counts (first/last), please reference Spec CM-001C.
  - a. If the original intended aspect ratio is 1.85:1, the 16x9 Full Frame archival master file should be sized to accommodate the 1.85:1 matrix in the transcode, cloning, or down-conversion process.
3. **(If Applicable / If ordered)** 4x3 (1.33:1) within 16x9 – The 4x3 image contained within the 16x9 aspect ratio of UHD/HDR should be determined by applying a 4x3 reticule to the center of the 16x9 video raster.
  - a. All Super 35 and 1.85:1 spherical elements should be sized to accommodate the 4x3 raster reticule. This will ensure that 4x3 full-frame down conversions will receive the full intended film image during the conversion process.
  - b. When adapting an anamorphic or Cinemascope film element (e.g., 2.35:1 aspect ratio), all Pan and Scan decisions should be made using the 4:3 safe action reticule as displayed by the UHD/HDR monitor.
  - c. When side matting the 4x3 Digital File master, ensure that the side matte is narrower than the 4x3 raster reticule, as displayed on the UHD/HDR Monitor, giving approximately 1.35 of picture information.

## 1.4 HEAD FORMAT

The current Universal Content Management head format specification requires 60 seconds of a test signal. Universal Content Management will supply a Color Bar signal for UHD/HDR and a 10,000-nit ramp chart that should be used with the TIFF files used to create the UHD/HDR 1000-nit ProRes 4444 PQ MOV deliverable.

The head format should follow the layout below for file deliverables.

| Time Code   | Video                               | Audio           |
|-------------|-------------------------------------|-----------------|
| 00:57:30:00 | BT 2111 HDR Bars in PQ – 30 Seconds | 1KHz tone       |
| 00:58:00:00 | 10,000 nit ramp chart - 30 Seconds  | 1KHz tone       |
| 00:58:30:00 | Slate (30 sec.)                     | Digital Silence |
| 00:59:00:00 | Digital Black                       | Digital Silence |

|             |                            |          |  |
|-------------|----------------------------|----------|--|
| 00:59:58:00 | Flash Frame (2 over black) | Sync Pop |  |
| 01:00:00:00 | Program                    | Program  |  |

## 1.5 TAIL FORMAT

1. Only if TV Episodic product - Episodic Logo At Tail (not at head of content)
2. After the conclusion of the program (before any textless material), add **one minute** of black and digital silence before the start of textless.
3. After the end of the textless record, **one second (:01)** of video black and digital silence to indicate the end of the file.

## 1.6 TEXTED / TEXTLESS INFORMATION & VERSIONS

### TEXTED (Subtitled) MASTERS:

All Texted Masters are to include any or all of the following text: Main and End Titles, Dates, Locals, Epilogues, Prologues, and Subtitles. **All Textless Material should be recorded 1 minute after the end of the program on a UHD/HDR ProRes 4444 PQ MOV file.** The time code on the Textless backgrounds should be continuous, including pre-roll and post-roll of at least 01 second of black per background. If the Main and/or End Titles are over black, it is not necessary to place black at the end of the program. Slates should indicate this is a Texted Master. Please see the diagram in the previous section. If you have any questions, please contact your NBCUniversal representative.

**If there are more than 20 texted shots, it will also be necessary to provide a fully Textless Master. (Shots means actual shots with text in them. If there are multiple lines of text in one shot, that only counts as one texted shot.)**

### TEXTLESS MASTERS:

All full Textless Masters are to include only Texted Main and End Titles. (And will consist of all textless backgrounds within the program for all subtitles, epilogues, prologues, dates, and locals). Only the Textless Background of the Main and End Titles should be recorded 1 minute after the end of the program on the last part of the file. The time code on the Textless backgrounds should be continuous, including pre-roll and post-roll of at least 01 second of black per background. If the Main and/or End Titles are over black, it is not necessary to place black at the end of the program. Slates should indicate this is a Textless Master.

## 1.7 MAIN & END CREDITS: (INCLUDING ALL TEXT)

1. **If there is a 1.33:1 deliverable required, then the following shall apply:**

2. If the title sequences projected for Theatrical Distribution do not fit within a 1:33 Full-Frame Video, then a TV-safe 1:33 Flat File will be required. This file will need to be created immediately after the original titles are completed, so that it can be delivered in time for use.
3. Any applicable backgrounds must be repositioned and/or pushed into so that no mattes, unrendered black areas, or any grip equipment is visible in TV 1:33. The Full Frame image should be clear of anything that will require a blow-up during the mastering process. The titles should be re-composited over the new background, keeping uniformity, and should be in safe action\*.
4. \*No title may exceed safe action. Any title going beyond safe action must be re- composited to fit into safeaction.

## 1.8 AUDIO FORMATS

1. Audio should be delivered as uncompressed linear PCM (Little Endian) / 48kHz / 24-bit files, fully embedded and wrapped in a single MOV file, along with video, in accordance with the NBCU UHD/HDR ProRes 4444 PQ MOV specs.
2. All audio channels should contain a 1K tone “2-pop” for one full frame, 2 seconds before the hour of each program part (00:59:58.00 for Hour 1, part 1, 02:59:58.00 for Hour 3, part 2, etc).

*(Note: Since NBCU requires long-play files, more than one part per title and version will be an exception.)*

Sound Format for ALL Versions:

**If 6-Track (5.1 Audio):**

| Channel #  | Channel Assignment |
|------------|--------------------|
| Channel 1: | Left               |
| Channel 2: | Right              |
| Channel 3: | Center             |
| Channel 4: | L.F.E.             |
| Channel 5: | Left Surround      |
| Channel 6: | Right Surround     |
| Channel 7: | LT +12dB (PL2)     |
| Channel 8: | RT + 12dB (PL2)    |

|             |                                   |
|-------------|-----------------------------------|
| Channel 9   | M&E LT +12dB (PL2) (Fully Filled) |
| Channel 10: | M&E RT +12dB (PL2) (Fully Filled) |
| Channel 11: | LT +20dB (PL2)                    |
| Channel 12: | RT +20dB (PL2)                    |

**If 5.1 Audio Is Unavailable:**

| Channel #  | Channel Assignment                |
|------------|-----------------------------------|
| Channel 1: | LT +12dB (PL2)                    |
| Channel 2: | RT + 12dB (PL2)                   |
| Channel 3: | M&E LT +12dB (PL2) (Fully Filled) |
| Channel 4: | M&E RT +12dB (PL2) (Fully Filled) |
| Channel 5: | LT +20dB (PL2)                    |
| Channel 6: | RT +20dB (PL2)                    |
| Channel 7: | M&E LT +20dB (PL2) (Fully Filled) |
| Channel 8: | M&E RT +20dB (PL2) (Fully Filled) |

**If Monaural with Separate M&E:**

| Channel #  | Channel Assignment                        |
|------------|-------------------------------------------|
| Channel 1: | "Limited" Mono Mix (+12dB)                |
| Channel 2: | "Limited" Mono Mix (+12dB)                |
| Channel 3: | "Limited" Mono M&E (+12dB) (Fully Filled) |
| Channel 4: | "Limited" Mono M&E (+12dB) (Fully Filled) |
| Channel 5: | "Wide" Mono Mix (+20dB)                   |
| Channel 6: | "Wide" Mono Mix (+20dB)                   |
| Channel 7: | "Wide" Mono M&E (+20dB) (Fully Filled)    |
| Channel 8: | "Wide" Mono M&E (+20dB) (Fully Filled)    |

**If Monaural without Mu/Fx:**

| Channel #  | Channel Assignment         |
|------------|----------------------------|
| Channel 1: | "Limited" Mono Mix (+12dB) |
| Channel 2: | "Limited" Mono Mix (+12dB) |
| Channel 3: | "Wide" Mono Mix (+20dB)    |
| Channel 4: | "Wide" Mono Mix (+20dB)    |

## 1.9 AUDIO CONFIGURATION

Audio should be configured with channel identification. This information should be available when using media info and can be added to a file in a variety of ways. An example of audio channel identification for a 12-channel file is below.

**Please identify channels appropriately as example below:**

| Track | Name     | File        | Channels    | Format | Language | Availability | Mute                     |
|-------|----------|-------------|-------------|--------|----------|--------------|--------------------------|
| A     | Track 1  | Test....mov | Left        | PCM    | English  | AVAILABLE    | <input type="checkbox"/> |
| B     | Track 2  | Test....mov | Right       | PCM    | English  | AVAILABLE    | <input type="checkbox"/> |
| C     | Track 3  | Test....mov | Center      | PCM    | English  | AVAILABLE    | <input type="checkbox"/> |
| D     | Track 4  | Test....mov | LFE         | PCM    | English  | AVAILABLE    | <input type="checkbox"/> |
| E     | Track 5  | Test....mov | Left Back   | PCM    | English  | AVAILABLE    | <input type="checkbox"/> |
| F     | Track 6  | Test....mov | Right Back  | PCM    | English  | AVAILABLE    | <input type="checkbox"/> |
| G     | Track 7  | Test....mov | Left Total  | PCM    | English  | AVAILABLE    | <input type="checkbox"/> |
| H     | Track 8  | Test....mov | Right Total | PCM    | English  | AVAILABLE    | <input type="checkbox"/> |
| I     | Track 9  | Test....mov | Left Total  | PCM    | English  | AVAILABLE    | <input type="checkbox"/> |
| J     | Track 10 | Test....mov | Right Total | PCM    | English  | AVAILABLE    | <input type="checkbox"/> |
| K     | Track 11 | Test....mov | Left Total  | PCM    | English  | AVAILABLE    | <input type="checkbox"/> |
| L     | Track 12 | Test....mov | Right Total | PCM    | English  | AVAILABLE    | <input type="checkbox"/> |

## 1.10 SLATE & LABEL INFORMATION

### UNIVERSAL CONTENT MANAGEMENT

#### ARCHIVAL MASTER FILE – UHD/HDR 1000 nit 4444 PQ / 23.98 P

TITLE:

PROD #:

VERSION:

FORMAT: (e.g., 4x3 P/S, 16x9 Letterbox – 2.35)

DAISY ID #

MASTERING FACILITY/DATE

SOUND INFO

TEXTLESS AT TAIL

RUN TIME\_\*\*(see below)\_

\*Please note that aspect ratios should be labeled as they are. Ex. 1.35, 1.37, 2.39, 2.40. No rounding on aspect ratios, please.

\*\*For Run Time Calculations – Please round up for all run times. Please use the end of the picture or audio, whichever extends longer, as the out frame of the content.

Ex – end of picture is 02:15:16:04 – TRT would be **75:17**

## **1.11 QUALITY CONTROL**

Vendors are expected to apply the same level of quality control to file deliverables that they would to an archival master tape deliverable.

All deliverables must be checked for errors or defects, as well as to ensure compliance with the specifications above, before being delivered to NBCU.

A QC report is required in both an electronic format (e.g. PDF, Word, Text, Excel), and as a hard copy, with each deliverable.

NBCU will randomly QC vendor files to ensure ongoing compliance with the standards and specifications of NBCU. In the event that a file package fails this random QC, NBCU reserves the right to charge the vendor for QC of any or all files from the vendor whose quality may be reasonably and fairly called into question.

## **1.12 APPROVED UHD/HDR 1000 nit ProRes4444 PQ DIGITAL FILE VENDORS**

### **Approved Vendors**

In order to maintain quality and interoperability, NBCU has developed a list of vendors who have demonstrated conformance to Apple's ProRes specification, the NBCU specification, and the quality levels that NBCU requires when creating a 1000 nit ProRes4444 Rec 2020 PQ Archival master file.

The current approved vendors and products are:

- R&S Clipster version 6.8 and above
- MTI Cortex version 3.1.3 – b11457 and above
- Colorfront Release Version 47652 and above
- Black Magic Design DaVinci Resolve 17 and above
- Filmlight - Baselight 5.x and beyond
- Autodesk Flame 2021 and beyond

### **Vendor Certification**



Since NBCU recognizes that not all Suppliers will want to use the same vendor(s), an NBCU UHD/HDR 1000 nit ProRes 4444 Rec 2020 PQ Vendor Certification Test Plan is available. Suppliers or manufacturers who would like to have other equipment certified for the creation of NBCU UHD/HDR 1000 nit ProRes4444 Rec 2020 PQ master files will need to complete the Certification Test Plan and submit the results to NBCU for verification. New vendors will be added to the approved list as they are certified, and the list will be published periodically or available upon request at any time.

To request the NBCU UHD/HDR 1000 nit ProRes4444 Rec 2020 PQ Vendor Certification Test Plan, please contact:

- Name: Harvey Landy
- Telephone: (818) 777-2858
- E-Mail: [Harvey.Landy@nbcuni.com](mailto:Harvey.Landy@nbcuni.com)

### 1.13 NBCU UHD/HDR 1000 nit ProRes4444 Rec 2020 PQ LABELING SCHEMA

The NBCU ProRes4444 Labeling Schema includes the following information, which is generated by our PO system:

Sample file name:

#### **EXAMPLE 1 Feature**

**JasonBourne\_DA000823353\_02465\_FTR\_Theatrical\_2398\_16x9LB\_240\_ENG\_UHDHDR\_ProRes4444\_1000nit\_700M.mov**

#### **EXAMPLE 2 Episodic**

**PathThe\_DA000768310\_H7002\_EPS\_TelevisionTexted\_ENG\_16x9FF\_178\_ENG\_UHDHDR\_ProRes4444\_1000nit\_700M.mov**

## 2.0 DELIVERY INSTRUCTIONS

The preferred delivery method for **all** content is digital delivery. To be onboarded, please contact your NBCU Content Management Representative. Hard drives are only accepted by first speaking with your NBCU Content Management Representative and obtaining authorization.

### 2.1 DELIVERY NOTIFICATION

The NBCU purchase order creator will need to be emailed when the vendor has fulfilled a ProRes file order and has been shipped. This notification should include the following:

- PO Number
- ProRes Filename(s)

- Hard Drive Barcode (if applicable)

## 2.2 PACKING SLIP

A packing slip is required for the delivery of each external hard drive. The packing slip will need to include the following:

- PO Number
- ProRes Filename(s)
- Hard Drive or LTO tape Barcodes

\*\*\*\*Reminder: the preferred delivery method for all content is digital delivery. To be onboarded, please contact your NBCU Content Management Representative. Hard drives are only accepted by first speaking with your NBCU Content Management Representative and obtaining authorization.\*\*\*\*

## 2.3 APPROVED EXTERNAL HARD DRIVES FOR MEDIA TRANSPORT

All vendors are expected to provide their own external hard drives to transport the digital files outlined in this document. (**Exception:** Content is pre-release / pre-theatrical / pre-DVD, in which case NBCU will provide a secure drive – contact your Content Management representative for specifics)

NBCU has the following requirements for the external hard drives:

- The drives should be free from any viruses, malware, spyware, Trojans, or any other malicious code that could damage, destroy, or compromise the integrity of NBCU equipment.
- The drives should be provided in a hard plastic case suitable to protect them from the normal wear and tear of transportation.
- Appropriate interface cables (e.g., USB, eSATA) and power cables should be included with the drive.
- Due to the large file sizes of the content in question, NBCU requires that all external hard drives used for media transport have a USB 3.x, USB 2.x, or eSATA interface for backwards compatibility. Please note that content delivered on a device without a USB or eSATA interface may be rejected and returned to the vendor.

Hard Drives should be shipped to:

West Coast Quality Control

100 Universal City Plaza, Building 1440 - 17<sup>th</sup> Floor, Universal City, CA 91608

ATTN: Nathen Coyle or Jason LaMotte

\*\*\*\*Please confirm ATTN with your Content Management Coordinator before sending

Once NBCU staff removes the content from the drive, it will be erased and returned to the vendor within a reasonable period of time for the delivery of subsequent deliverables.

### 3.0 DOCUMENT HISTORY

| Version # | Date       | Revised by     | Reason for Change                                                                                                  |
|-----------|------------|----------------|--------------------------------------------------------------------------------------------------------------------|
| 3.0       | 10/02/2025 | Henry Thompson | Migrated to Confluence                                                                                             |
| 2.2       | 11/12/2024 | Harvey Landy   | Added Fall / CLL calculation range and corrected luminance min in sample values                                    |
| 2.1       | 09/22/2022 | Harvey Landy   | Removed audio tagging/replaced with audio config. Clarified 1 min. of black after conclusion if no textless exists |
| 2.0       | 04/12/2022 | Harvey Landy   | Version 2.0 document creation                                                                                      |
| 1.24      | 12/18/2021 | Harvey Landy   | Added Cortex to Max Fall/CII<br>Modified Gamut Tolerance in Colorfront Max Fall/CII settings                       |
| 1.23      | 06/28/2021 | Harvey Landy   | Added BT2111 HDR Bars to the head format and Precision Gamut to the CF settings                                    |
| 1.22      | 04/28/2021 | Harvey Landy   | Added TRT rounding information to the slate section                                                                |
| 1.21      | 03/28/2021 | Harvey Landy   | Removed tail pop, missing references.                                                                              |
| 1.20      | 01/28/2021 | Harvey Landy   | Added DaVinci Resolve as an approved vendor.                                                                       |
|           |            |                |                                                                                                                    |

|      |            |              |                                                                                                                                       |
|------|------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1.19 | 01/25/2021 | Harvey Landy | Removed line count specific numbers and changed to reference spec CM-001C. Added P3 Gamut warning settings in the Colorfront section. |
| 1.18 | 09/17/2020 | Harvey Landy | Added verbiage regarding any EAS signals need to be brought to the attention of Staff                                                 |
| 1.17 | 09/11/2020 | Harvey Landy | Added Gamut Warning Tolerance value in CF Max Fall/CLL settings                                                                       |
| 1.16 | 06/05/2020 | Harvey Landy | Added NCLC Color Tagging information. Added Clipster 6.8 PR 4444 settings.                                                            |
| 1.15 | 02/10/2020 | Harvey Landy | Added Hard Drive Delivery location/attn information.                                                                                  |
| 1.14 | 11/16/2019 | Harvey Landy | Added digital delivery as the preferred method. Added pulled black/Episodic logo information.                                         |
| 1.13 | 10/18/2019 | Harvey Landy | Corrected stereo-only audio channels from 6 to 8                                                                                      |
| 1.12 | 09/22/2019 | Harvey Landy | Added YCbCr encoded/decode info. And added 2-pop back                                                                                 |
| 1.11 | 02/15/2018 | Harvey Landy | Added additional aspect ratio line counts and corrected others                                                                        |
| 1.10 | 02/06/2019 | Harvey Landy | Corrected typo of Legal range and modified line counts in section 1.2                                                                 |
| 1.9  | 01/10/2019 | Harvey Landy | Added Omnitek UHD Aspect ratio line counts                                                                                            |
| 1.8  | 10/10/2018 | Harvey Landy | Added URL removal language                                                                                                            |
| 1.7  | 10/03/2018 | Harvey Landy | Modified Line counts in section 1.2                                                                                                   |
|      |            |              |                                                                                                                                       |

|     |            |                  |                                                                                                                                                                                                                |
|-----|------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.6 | 9/18/2018  | Harvey Landy     | Made this spec specific to HDR-10 by adding a description specific to/for HDR-10. Added what source files should be used for PR creation.                                                                      |
| 1.5 | 9/10/2018  | Harvey Landy     | Made the spec specific to PR4444 UHD/HDR; Added Colorfront to Max Fall/CLL; removed head/tail pop in remaining locations; fixed tagging; removed HQ error in approved vendors; fixed formatting and hyperlinks |
| 1.4 | 07/10/2018 | Gabrielle Gasser | Removed 2 pop requirement, added information about Colorfront                                                                                                                                                  |
| 1.3 | 06/29/2018 | Gabrielle Gasser | Edited textless sections (1.12) and added graphic.                                                                                                                                                             |
| 1.2 | 05/10/2018 | Megan McMicking  | Changed spec number from TS-002K to CM-019P                                                                                                                                                                    |
| 1.1 | 02/07/2018 | Megan McMicking  | Document formatting                                                                                                                                                                                            |
| 1.0 | 07/5/17    | Harvey Landy     | Old format                                                                                                                                                                                                     |