34 Parker | Irvine, CA 92618 | 949.206.7900 | Red.com

HD-SDI HANC METADATA INFORMATION

REVISION HISTORY

REV.	ECO NO.	DATE	DESCRIPTION
A	007492	10/31/13	Formal document release.
B	007562	11/26/13	Added clarifications on interpretation of metadata fields. Included RED One. Added VF flag operation.
C	010732	03/30/16	Removed DSMC exception in VF section.

TABLE OF CONTENTS

OBJECTIVE

The purpose of this document is to describe the location and meaning of metadata bits in the Horizontal Ancillary (HANC) data of the HD-SDI output signal of the RED One and DSMC family of products.

SCOPE

This information only applies to the data embedded in the HD-SDI output signal of the RED One, DSMC and DSMC^2 camera families.

HANC METADATA CONTENTS

The HANC data comprises a 64 bit block of metadata output on every frame of HD-SDI video. It is embedded in two locations, but both data are identical. The first location is in LTC line 10 and the second is VITC-2 line 571. The content of the metadata alternates between two formats on successive frames. The HANC metadata includes:

- Timecode
- Clip Filename
- Camera Position
- Record State Flag
- Valid Frame Flag
- Metadata Block Type Indicator

TIMECODE FORMAT

The camera's primary timecode is embedded as HH:MM:SS:FF distributed over 8 fields in the metadata to represent the tens and ones portions of each value, where:

- HH: Hours
- MM: Minutes
- SS: Seconds
- FF: Frames

The primary timecode is the one selected to display in the UI. The timecode can be either time-of-day or edge code. The timecode count is based on the selected project frame rate of the camera. If the HD-SDI refresh is different than the project frame rate, the FF value may be seen to duplicate or omit values. See Timecode Pull-down section for more information.

RECORDED CLIP FILENAME FORMAT

For each recording, the camera generates a unique filename that is embedded in the HANC data. The format is A003_C012_0502A6, where:

- A003: Camera identification letter (A), followed by the reel number (003).
- C012: Clip Number (012) being recorded to the current reel.
- 0502: Local time zone date, in month (05) and day (02) format (for example, May 2).
- A6: A two-character auto-generated alphanumeric wildcard used to prevent duplicate file names.

HANC BIT FIELDS

The HANC data words conform to SMPTE 12M-2 specification using packets with DID/SDID = 0x60/0x60. Binary data groups 1 through 8 and the 6 flags have been defined to hold RED specific data as shown below. Timecode data is located as per SMPTE 12M-2.

METADATA BLOCK 0

METADATA BLOCK 0

METADATA FOR MI FLAG = 0

Bits	31 28	27 24	23 20	19 16	15 12	11 8	7	6	5	4	3 0
Data	REEL 100's	SEC 10's	REEL 10's	SEC 1's	REEL 1's	FRM 10's	RS	VF	-	-	FRM 1's
Bits	63 60	59 56	55 52	51 48	47 44	43 40	39	38	37	36	35 32
Data	CAML	HRS 10's	DAYN	HRS 1's	MON	MIN 10's	CL	DN	-	MI	MIN 1's

METADATA BLOCK 1

METADATA BLOCK 1

METADATA FOR MI FLAG = 1

Bits	31 28	27 24	23 20	19 16	15 12	11 8	7	6	5	4	3 0
Data	CLIP 100's	SEC 10's	CLIP 10's	SEC 1's	CLIP 1's	FRM 10's	RS	VF	-	-	FRM 1's
Bits	63 60	59 56	55 52	51 48	47 46	45 44	43 40	39 38	37	36	35 32
Data	WLD1	HRS 10's	WLD2	HRS 1's	AW1	AW2	MIN 10's	LR	-	MI	MIN 1's

METADATA ON EVERY FRAME

The following metadata values are present in all frames of HANC metadata:

- MI: Metadata Indicator (0 = first block, 1 = second block)
- RS: Record State Flag (0 = record off, 1 = record on)
- VF: Valid Frame Flag, See VF Flag Operation section below
- SEC: 2 nibbles to encode timecode seconds number (SS); tens and ones digits separately
  That is, convert each 4 bit group to decimal number and then assemble to two digit decimal value as value = (SEC 10's x 10) + SEC 1's.
- FRM: 2 nibbles to encode timecode frames number (FF); tens and ones digits separately
- HRS: 2 nibbles to encode timecode hours number (HH); tens and ones digits separately
- MIN: 2 nibbles to encode timecode minutes number (MM); tens and ones digits separately

METADATA WHEN MI=0

- REEL: 3 nibbles to encode reel number of clip name; hundreds, tens, and ones digits separately.
- CAML: 4 lower bits to encode camera letter of clip name; used with CL, which provides 5th, most significant bit for camera letter encoding. All 5 bits taken together represent values in the range 0 to 25 for the letters A through Z.
- DAY: 4 lower bits to encode day number of clip name; used with DN, which provides 5th, most significant bit for day of the month encoding. All 5 bits taken together represent values in the range 1 to 31.
- MON: 4 bits to encode month number in the range 1 through 12.

METADATA WHEN MI = 1

- CLIP: 3 nibbles to encode clip number of clip name – hundreds, tens and ones digits separately.
- WLD1: 4 lower bits for 1st wildcard letter; used with AW1, which provides 5th and 6th most significant bits to encode 10 numbers + 26 letters. All six bits taken together represent values in the range 0 through 35. Numbers are first with 0 through 9 followed by A through Z starting at 10. Z is 35.
- WLD2: 4 lower bits for 2nd wildcard letter; used with AW2, which provides 5th and 6th most significant bits to encode 10 numbers + 26 letters in the same fashion as WLD1.
- LR: 2 bits to encode camera position; 00 = Center, 01 = Left, 10 = Right, 11- reserved.

TIMECODE COUNTING

The pattern the time code follows depends on the project frame rate setting. For project frame rates of 29.97 and below, the frame count will go from 0 to n-1, where n is the rounded frame rate value. For example, with a project frame rate of 23.98 or 24.00, the frames will count :00, :01, :02....:22, :23 and then repeat. For project frame rates of 47.95 and above, the pattern is to repeat frame numbers, counting to (n/2) – 1. For example, at 47.95 project rate the pattern will be :00, :00, :01, :01, ... :22, :22, :23, :23 and then repeat. In REDCINEX these repeated frame times would be shown as .00, :00, .01, :01, but the '.' versus ':' can not be represented in the HANC metadata.

TIMECODE PULL-DOWN

When the capture frame rate of the sensor is less than the HD-SDI refresh rate, a "pull-down" algorithm is used to create "repeat frames" from the video monitor frame store. For example, when capturing 24 frames per second, to create a 60 frame per second output a 2:3 pull-down is needed. In such a clip, the captured frames A B C D become output frames A A B B B C C D D D.

The pull-down algorithm also repeats timecode values. For example, when capturing at 24 frames per second the captured A B C D frames may have timecode values ending in :22 :23 :00 :01 and the HD-SDI outputted frames A A B B B C C D D D would have timecode values of :22 :22 :23 :23 :23 :00 :00 :01 :01 :01 rather than the expected .22 :22 .23 :23 .24 :24 .25 :25 .26 :26.

VF FLAG OPERATION

To assist downstream capture cards in removing the repeat frames, the VF flag indicates the transition from a repeat frame to a non-repeat or "new" frame. For 24 fps to 60 fps, the VF flag sequence would be 1 1 0 0 0 1 1 0 0 0 i.e. each 0 to 1 or 1 to 0 transition indicates the data is "new" and should be retained. By using the VF flag to throw away repeated frames, the image capture card can automatically generate a 24 frame sequence A B C D with timecode values ending in :22 :23 :00 :01. However, if a 60 fps video sequence with 2:3 pull-down and conventional 30-frame base timecode is desired, the capture card should simply restripe timecode using the first frame of the clip's timecode value as reference.