2. Isochronous packet format

Every video format, mode and frame rate has different video data format.

2.1 Isochronous packet format for Format_0, Format_1 and Format_2

2.1.1 Video isochronous packet structure

The following table shows the format of the first quadlet in the data field of each isochronous data block.

0-7	8-15	16-23		24-31	
data_length		tg	channel	tCode	sy
header_CRC					
Video data payload					
data_CRC					

Isochronous Data Block Packet Format

Where the following fields are defined in the IEEE 1394 standard:

data_length : number of bytes in the data field

tg : (tag field) shall be set to zero

channel : isochronous channel number, as programmed in the iso_channel field of the cam_sta_ctrl register

tCode : (transaction code) shall be set to the isochronous data block packet tCode

sy : (synchronization value) shall be set to 0001h on the first isochronous data block of a frame, and shall be set to zero on all other isochronous data blocks

Video data payload : shall contain the digital video information, as defined in the following sections

2.1.2 Video mode comparison chart

Every component Y,U,V,R,G,B has 8 bit data.

Format_0

Mode	Video Format	60fps	30fps	15fps	7.5fps	3.75fps
Mode_0	160x120 YUV(4:4:4) 24bit/pixel		1/2H 80p 60q	1/4H 40p 30q	1/8H 20p 15q	
Mode_1	320x240 YUV(4:2:2) 16bit/pixel		1H 320p 160q	1/2H 160p 80q	1/4H 80p 40q	1/8H 40p 20q
Mode_2	640x480 YUV(4:1:1) 12bit/pixel		2) 2H 1280p 480q	1H 640p 240q	1/2H 320p 120q	1/4H 160p 60q
Mode_3	640x480 YUV(4:2:2) 16bit/pixel		4) 2H 1280p 640q	2) 1H 640p 320q	1/2H 320p 160q	1/4H 160p 80q
Mode_4	640x480 RGB 24bit/pixel		4) 2H 1280p 960q	2) 1H 640p 480q	1/2H 320p 240q	1/4H 160p 120q
Mode_5	640x480 Y (Mono) 8bit/pixel	4) 4H 2560p 640q	2) 2H 1280p 320q	1H 640p 160q	1/2H 320p 80q	1/4H 160p 40q
Mode_6	Reserved					
Mode_7	Reserved					

Format_1

Mode	Video Format	60fps	30fps	15fps	7.5fps	3.75fps	1.875fps
Mode_0	800x600 YUV(4:2:2) 16bit/pixel		4) 5/2H 2000p 1000q	2) 5/4H 1000p 500q	5/8H 500p 250q	5/16H 250p 125q	
Mode_1	800x600 RGB 24bit/pixel			4) 5/4H 1000p 750q	2) 5/8H 500p 375q		
Mode_2	800x600 Y (Mono) 8bit/pixel	4) 5H 4000p 1000p	2) 5/2H 2000p 500q	5/4H 1000p 250q	5/8H 500p 125q		
Mode_3	1024x768 YUV(4:2:2) 16bit/pixel			4) 3/2H 1536p 768q	2) 3/4H 768p 384q	3/8H 384p 192q	3/16H 192p 96q
Mode_4	1024x768 RGB 24bit/pixel				4) 3/4H 768p 576q	2) 3/8H 384p 288q	3/16H 192p 144q
Mode_5	1024x768 Y (Mono) 8bit/pixel		4) 3H 3072p 768q	2) 3/2H 1536p 384q	3/4H 768p 192q	3/8H 384p 96q	3/16H 192p 48q
Mode_6	Reserved						
Mode_7	Reserved						

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Format_2

Mode	Video Format	60fps	30fps	15fps	7.5fps	3.75fps	1.875fps
Mode_0	1280x960 YUV(4:2:2) 16bit/pixel				4) 1H 1280p 640q	2) 1/2H 640p 320q	1/4H 320p 160q
Mode_1	1280x960 RGB 24bit/pixel				4) 1H 1280p 960q	2) 1/2H 640p 480q	1/4H 320p 240q
Mode_2	1280x960 Y (Mono) 8bit/pixel			4) 2H 2560p 640q	2) 1H 1280p 320q	1/2H 640p 160q	1/4H 320p 80q
Mode_3	1600x1200 YUV(4:2:2) 16bit/pixel				4) 5/4H 2000p 1000q	2) 5/8H 1000p 500q	5/16H 500p 250q
Mode_4	1600x1200 RGB 24bit/pixel					4) 5/8H 1000p 750q	2) 5/16H 500p 375q
Mode_5	1600x1200 Y (Mono) 8bit/pixel			4) 5/2H 4000p 1000q	2) 5/4H 2000p 500q	5/8H 1000p 250q	5/16H 500p 125q
Mode_6	Reserved						
Mode_7	Reserved						

[---H : Line / Packet]
2) : required S200 data rate [---p : Pixel / Packet]
4) : required S400 data rate [---q : Quadlet / Packet]

2.1.3 Video data payload structure

Pn : Pixel number / packet

K : $Pn \times n$ (n = 0..N-1)

($Pn \times N$ = Total pixel number / frame.)

<YUV (4: 4: 4) format >

U-(K+0)	Y-(K+0)	V-(K+0)	U-(K+1)
Y-(K+1)	V-(K+1)	U-(K+2)	Y-(K+2)
V-(K+2)	U-(K+3)	Y-(K+3)	V-(K+3)
U-(K+Pn-4)	Y-(K+Pn-4)	V-(K+Pn-4)	U-(K+Pn-3)
Y-(K+Pn-3)	V-(K+Pn-3)	U-(K+Pn-2)	Y-(K+Pn-2)
V-(K+Pn-2)	U-(K+Pn-1)	Y-(K+Pn-1)	V-(K+Pn-1)

<YUV (4: 2: 2)format >

U-(K+0)	Y-(K+0)	V-(K+0)	Y-(K+1)
U-(K+2)	Y-(K+2)	V-(K+2)	Y-(K+3)
U-(K+4)	Y-(K+4)	V-(K+4)	Y-(K+5)
U-(K+Pn-6)	Y-(K+Pn-6)	V-(K+Pn-6)	Y-(K+Pn-5)
U-(K+Pn-4)	Y-(K+Pn-4)	V-(K+Pn-4)	Y-(K+Pn-3)
U-(K+Pn-2)	Y-(K+Pn-2)	V-(K+Pn-2)	Y-(K+Pn-1)

<YUV (4: 1: 1)format >

U-(K+0)	Y-(K+0)	Y-(K+1)	V-(K+0)
Y-(K+2)	Y-(K+3)	U-(K+4)	Y-(K+4)
Y-(K+5)	V-(K+4)	Y-(K+6)	Y-(K+7)
U-(K+Pn-8)	Y-(K+Pn-8)	Y-(K+Pn-7)	V-(K+Pn-8)
Y-(K+Pn-6)	Y-(K+Pn-5)	U-(K+Pn-4)	Y-(K+Pn-4)
Y-(K+Pn-3)	V-(K+Pn-4)	Y-(K+Pn-2)	Y-(K+Pn-1)

<RGB format >

R-(K+0)	G-(K+0)	B-(K+0)	R-(K+1)
G-(K+1)	B-(K+1)	R-(K+2)	G-(K+2)
B-(K+2)	R-(K+3)	G-(K+3)	B-(K+3)
R-(K+Pn-4)	G-(K+Pn-4)	B-(K+Pn-4)	R-(K+Pn-3)
G-(K+Pn-3)	B-(K+Pn-3)	R-(K+Pn-2)	G-(K+Pn-2)
B-(K+Pn-2)	R-(K+Pn-1)	G-(K+Pn-1)	B-(K+Pn-1)

<Y (Mono)format >

Y-(K+0)	Y-(K+1)	Y-(K+2)	Y-(K+3)
Y-(K+4)	Y-(K+5)	Y-(K+6)	Y-(K+7)
Y-(K+Pn-8)	Y-(K+Pn-7)	Y-(K+Pn-6)	Y-(K+Pn-5)
Y-(K+Pn-4)	Y-(K+Pn-3)	Y-(K+Pn-2)	Y-(K+Pn-1)

2.1.4 Data structure

<Y, R, G, B>

Each component has 8bit data. Data type is ‘Unsigned Char”.

	Signal level (Decimal)	Data (Hexadecimal)
Highest	255	0xFF
	254	0xFE
	:	:
	1	0x01
Lowest	0	0x00

<U, V>

Each component has 8bit data. Data type is “Straight Binary”.

	Signal level (Decimal)	Data (Hexadecimal)
Highest(+)	127	0xFF
	126	0xFE
	:	:
	1	0x81
Lowest	0	0x80
	-1	0x7F
	:	:
	-127	0x01
Highest(-)	-128	0x00