

# HDG-10

Portable HD-Video Test Generator

## User's Manual

**Version 1.24**  
(06/2005)



Doremi Labs, Inc.  
306 E. Alameda Ave  
Burbank, CA 91502  
U.S.A.

## TABLE OF CONTENTS

1	Menu Structure .....	6
2	How to use the HDG-10.....	7
3	MENU ITEMS .....	7
3.1	Format Menu.....	7
3.2	Frame Rate Menu.....	7
3.3	Output Menu .....	7
3.4	Pattern Menu .....	8
3.5	Motion Menu .....	9
3.6	Time Code Menu .....	9
3.7	Closed Caption Menu .....	10
3.8	Audio Menu .....	10
3.9	Audio Group Menu.....	10
3.10	Audio Level Menu .....	10
3.11	Audio Mask Menu .....	10
3.12	Title Menu.....	11
3.13	Motion Speed Menu.....	11
3.14	Video Filter Menu.....	11
3.15	Save settings Menu .....	11
3.16	Firmware Menu.....	12
3.16.1	Firmware Upgrade Instructions: .....	12
4	Appendix A: Closed Captioning .....	13
5	Appendix B: Time Code .....	14
6	Appendix C: Audio .....	14
7	Appendix D: SMPTE Standards .....	14

# WARRANTY

Doremi's warranty obligations are limited to the terms set forth below:

Doremi Labs, Inc. ("Doremi") warrants this hardware product against defects in materials and workmanship for a period of ONE (1) YEAR from the date of original retail purchase.

If you discover a defect, Doremi will, at its option, repair, replace, or refund the purchase price of this product at no charge to you, provided you return it during the warranty period, with transportation charges prepaid, to your nearest Doremi Labs repair facility. To each product returned for warranty service, please attach your name, address, telephone number, and a copy of the bill of sale bearing the appropriate Doremi serial numbers as proof of date of the original retail purchase. You will also need to contact Doremi Labs technical support to receive a return authorization number (RMA).

This warranty applies only to hardware products manufactured by or for Doremi that can be identified by the "Doremi Labs" trademark, trade name, or logo affixed on them. Doremi software is warranted pursuant to a separate written statement packed with the software. Doremi does not warrant any products that are not Doremi products. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication; if the product has been modified without the written permission of Doremi; or if any Doremi serial number has been removed or defaced.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. DOREMI SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No Doremi distributor, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

DOREMI IS NOT RESPONSIBLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY, OR UNDER ANY OTHER LEGAL THEORY, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DOWNTIME, GOODWILL, DAMAGE TO OR REPLACEMENT OF EQUIPMENT AND PROPERTY, AND ANY COSTS OF RECOVERING, REPROGRAMMING, OR REPRODUCING ANY PROGRAM OR DATA STORED IN OR USED WITH DOREMI PRODUCTS.

# Software License Agreement

THIS SOFTWARE LICENSE AGREEMENT is provided by Doremi Labs, Inc. ("Licensor"). PLEASE READ ITS TERMS CAREFULLY, AS YOUR USE OF THE SOFTWARE WILL CONSTITUTE YOUR ACCEPTANCE OF THE TERMS OF THIS AGREEMENT.

**1. License.** Licensor grants to the customer a non-transferable and non-exclusive license to use the software and associated documentation being provided with the Doremi Labs equipment being acquired by the Customer (respectively, the "Software" and the "Documentation"). Title in, ownership of, and all right associated with the Software shall remain vested in the Licensor. THE CUSTOMER SHALL HAVE NO RIGHT TO MODIFY, DE-COMPILE, REVERSE ENGINEER OR TRANSLATE THE SOFTWARE OR THE DOCUMENTATION OR DISTRIBUTE COPIES THEREOF TO ANY OTHER PERSON OR ENTITY. Licensor reserves all rights not expressly granted to you.

**2. Confidentiality of the Software.** The Customer acknowledges and agrees that the Software and the Documentation constitute valuable proprietary products and trade secrets of the Licensor embodying substantial creative efforts and confidential information, ideas and expressions. The Customer agrees to maintain in all respects the confidentiality of the Software including, without limitation, agreeing not to disclose or otherwise make available to any other person or entity, in any manner, the Software in any form whatsoever, except that such disclosure or availability shall be permitted to an employee of the Customer whose duties and responsibilities require access to the Software in the course of his or her employment or to agents or independent contractors of the Customer performing maintenance or support services requiring access to the Software. The Customer further agrees not to alter or remove any copyright or other proprietary rights notice or identification which indicates the Licensor's ownership from any part of the Software.

**3. License Non-Transferable.** Neither the license granted by this Agreement nor any copies of the software, the documentation, or any other materials delivered by the Licensor to the Customer pursuant to this Agreement may, in whole or in part, be assigned, sublicensed, loaned out, distributed, or otherwise transferred by the Customer to any other person or entity without the prior written consent of the Licensor. Any attempt to so assign, sublicense, loan, distribute or otherwise transfer such materials shall be deemed null and void. If the Customer desires to transfer the license in connection with a sale of the Doremi Labs equipment being purchased by another Customer, the Licensor hereby consents to the assignment of the license provided (a) such sale otherwise complies with the terms of this agreement and applicable law and (b) the transferee reads and agrees to accept the terms and conditions of the agreement.

**4. Export by Law Assurances.** The Customer agrees and certifies that neither the Software and documentation nor any direct products thereof is being or will be downloaded, shipped, transferred, exported, or re-exported, directly or indirectly, into any country to which export is prohibited by the laws and regulations of the United States.

**5. Government End Users.** If acquiring the Software on behalf of any unit or agent of the United States government, the Customer agrees that: (a) the Software is "Commercial Computer Software" as the term is defined in paragraph 27.401 of the DoD Supplement to the Federal Acquisition Regulations (the "Supplement") or is within the equivalent classification of any other federal agencies' regulations; (b) the Software was developed at private expense, and no part of it was developed with government funds; (c) the government's use of the Software is subject to "Restricted Rights" as that term is defined in clause 52.227-7013 (b) (3) (ii) of the supplement or in the equivalent clause of any other federal agencies' regulations; (d) the Software is a "trade secret" of the licensor for all purposes of the Freedom of Information Act; and (e) each copy of the Software will contain the Following Restricted Rights Legend:

## "Restricted Rights Legend"

Use, duplication, or disclosure is subject to restriction as set forth in the subdivision (b) (3) (ii) of the Rights in the Technical Data and Computer Software clause at FAR 52.227-7013. Manufacturer: Doremi Labs, Inc., 306 E. Alameda Ave., Burbank, CA 91502.

The Customer agrees to indemnify Licensor for any liability, loss, costs and expense (including court cost and reasonable attorney's fees) arising out of any breach of the provisions of this Agreement relating to use by the government.

**6. Terms.** The license is effective until terminated. Customers may terminate it at any time by destroying the Software together with all copies. The license will also terminate upon conditions set forth elsewhere in this Agreement. The Customer agrees upon such termination to destroy all copies of the Software.

## 7. Disclaimer of Warranty.

THE SOFTWARE IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO ITS MERCHANTABILITY OR ITS FITNESS FOR ANY PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE SOFTWARE IS WITH THE CUSTOMER. SHOULD THE SOFTWARE PROVE DEFECTIVE, THE CUSTOMER (AND NOT LICENSOR OR A LICENSOR AUTHORIZED DISTRIBUTOR) ASSUMES THE ENTIRE COST OF ALL NECESSARY SERVICING, REPAIRING, OR CORRECTION.

LICENSOR DOES NOT WARRANT THAT THE FUNCTIONS CONTAINED IN THE SOFTWARE WILL MEET THE CUSTOMER'S REQUIREMENT OR THAT THE OPERATION OF THE SOFTWARE WILL BE UNINTERRUPTED OR ERROR FREE OR THAT DEFECTS IN THE SOFTWARE WILL BE CORRECTED. IF ANY MODEL OR SAMPLE WAS SHOWN TO THE CUSTOMER, SUCH A MODEL OR SAMPLE WAS USED MERELY TO ILLUSTRATE THE GENERAL TYPE AND QUALITY OF THE SOFTWARE AND NOT TO REPRESENT THAT THE SOFTWARE WOULD NECESSARILY CONFORM TO SUCH A MODEL OR SAMPLE.

Some states do not allow the exclusion of implied warranties, so the above exclusion may not apply to the Customer.

**8. Limitation of Remedies.** The Licensor shall not, under any circumstances, be liable to the Customers for any indirect, consequential or incidental damages arising out of the use, or results of use of, the software and documentation or otherwise relating to the functioning thereof or arising out of any breach of this agreement by the Licensor, even if the licensor has been advised of the possibility of such damages. Licensor's liability to the Customer for actual damages for any cause whatsoever, and regardless of the form of the action, will be limited to the greater of \$300 or the money paid for the Software that caused the damages or that is the subject matter of, or is directly related to, the cause of action. Some states do not allow the limitation or exclusion of liability for incidental or consequential damages so the above limitation or exclusion may not apply to customer.

**9. General.**

(a) The terms of this Agreement are intended as a final expression of the parties' agreement with respect to such terms as are included in this Agreement and may not be contradicted by evidence of any prior or contemporaneous agreement. This Agreement constitutes the complete and exclusive statement of its terms and no extrinsic evidence whatsoever may be introduced in any judicial proceeding, if any, involving this Agreement.

(b) This Agreement shall be construed and enforced in accordance with the laws of the State of California applicable to contracts made and to be performed entirely in the State of California.

(c) If any portion of any provision of this Agreement is ruled invalid or unenforceable under any applicable law, that provision will be enforced to the maximum extent permissible, and the remainder of this Agreement shall continue in full force and effect.

# 1 Menu Structure

The diagram below illustrates the HDG-10's menu structure.  
 Use the up down arrow keys to navigate the different options  
 Use the Toggle key to change the current settings. Changes are immediate.

Menu Number/Name	Selection Number/Name
<b>01 Format</b>	00 NTSC   01 PAL   02 720p   03 1080i   04 1080p   05 2K-sf   06 2K-p
<b>02 Frame Rate</b>	00 23.98 fps   01 24 fps   02 25 fps   03 29.97 fps   04 30 fps
<b>03 Output Mode</b>	00 A = B   01 Dual YPbPr   02 Dual RGB
<b>04 Pattern</b>	00 SMPTE Bars   01 100% Bars   02 Checkfield   03 Cross Hatch
	04 Border Lines   05 Gradient   06 Gray Level   07 Green Level
	08 Blue Level   09 Red Level   10 100% White   11 25% Gray
	12 Black   13 Noise   14 Circle   15 V Lines
	16 H Lines   17 Random
<b>05 Motion</b>	00 No Motion   01 Square 1   02 Square 2   03 2 Squares
	04 Squares Inv.   05 Full Motion   06 Snow
<b>06 Time Code</b>	00 Off   01 On – No Drop   02 On - Drop
<b>07 C. Caption</b>	00 Off   01 On
<b>08 Audio</b>	00 Off   01 On
<b>09 Audio Group</b>	01 Group 1   02 Group 2   03 Group 3   04 Group 4
<b>10 Audio Level</b>	00 –48 dB   01 –42 dB   02 –36 dB   03 –30dB   04 –24dB
	05 –18 dB   06 –12 dB   07 –06 dB   08 random
<b>11 Audio Mask</b>	00 Ch 1   01 Ch 2   02 Ch 3   03 Ch 4
	04 Ch 1 + 2   05 Ch 3 + 4   04 Ch 1+2+3+4
<b>12 Title</b>	00 Off   01 On (White)   02 On (Black)
<b>13 Motion Speed</b>	01 Speed 1   02 Speed 2   03 Speed 3   04 Speed 4
	05 Speed 5   06 Speed 6   07 Speed 7
<b>14 Video Filter</b>	00 Off   01 On
<b>15 Save Settings</b>	00 Save?   01 Yes (done)
<b>Firmware</b>	HDG-10 v 1.18

## 2 How to use the HDG-10

On power up the HDG-10 displays the firmware version number for 2 seconds, then displays the current video format with the current pattern.

**Changing HDG-10 settings** Press the “Menu” button to navigate inside the different operation menus. Select the parameter you want to set by pressing the “Up” and “Down” buttons. Then, to change the selected setting press the toggle button. Once you have completed your settings you can leave the menus by pressing the “Menu” button. The HDG-10 will then display the current format, frame rate, and pattern.

**Signal Outputs** Out A and Out B output the same signal, except in 2K mode (Link A + Link B).

## 3 MENU ITEMS

### 3.1 *Format Menu*

6 Video formats are available:

- NTSC
- PAL
- 720 progressive
- 1080 interlaced
- 1080 progressive
- 2K segmented frames
- 2K progressive

### 3.2 *Frame Rate Menu*

HDG-10 displays the different frame rates available for this format.

### 3.3 *Output Menu*

HDG-10 can output a duplicate SDI stream (A=B)  
or a 4:4:4 dual link signal, compliant with SMPTE 372 and SMPTE 352 standards.

### 3.4 Pattern Menu

18 patterns are available:

Pattern Number	Pattern Description
00	<b>SMPTE bars</b>
01	<b>100 % color bars</b>
02	<b>Checkfield:</b> This pattern tests the clock recovery, and maximizes the DC component on the SDI signal
03	<b>Cross Hatch:</b> White cross hatch on black background
04	<b>Border lines:</b> This pattern is useful to center the video on a screen
05	<b>Gradient:</b> 10 bits gradient, from black to white
06	<b>Gray levels:</b> 16 bars of gray, from black to white
07	<b>Green levels:</b> 16 bars of Green, from black to Green
08	<b>Blue levels:</b> 16 bars of Blue, from black to Blue
09	<b>Red levels:</b> 16 bars of Red, from black to Red
10	<b>100% White:</b> 100% IRE White flat pattern
11	<b>25%Gray:</b> 25% IRE Gray flat pattern
12	<b>Black:</b> 100% black video frame
13	<b>Noise:</b> This is a white noise used, for example, to test video compression
14	<b>Circle:</b> Moire pattern
15	<b>V lines:</b> vertical lines of 1 pixel, black and white
16	<b>H lines:</b> horizontal lines of 1 pixel, black and white (1 field white, 1 field black in interlaced mode)
17	<b>Random:</b> activates the pattern change randomly from pattern 0 to pattern 16

### 3.5 Motion Menu

7 motion modes are available:

Motion Number	Motion Description
00	<b>No motion</b>
01	<b>Square 1:</b> 1 square with a changing size is moving around the picture. Each time the square touch a side of the frame, the color switches to the next color (white, yellow, cyan, green, magenta, red, blue, black)
02	<b>Square 2:</b> 1 blue square (with fixed size) moves on the screen
03	<b>2 Squares:</b> Square 1 + Square 2
04	<b>Squares Inv.:</b> The squares are inverted, and display the pattern inside the squares with a black background
05	<b>Full motion:</b> a full motion effect is applied on the pattern
06	<b>Snow:</b> a small moving white noise is displayed on the top of the pattern

### 3.6 Time Code Menu

When activated, an ancillary time code is sent on the SDI signal, and a burn-in window displays the time code.

If the format supports drop frame timecode, the user can choose to activate drop frame mode or not. The format of the time code is LTC (SMPTE RP 188).

### **3.7 Closed Caption Menu**

When on, closed captions are sent as ancillary data (VANC) on line 12 (EIA 608 / SMPTE 334).

The message sent by the HDG-10 is a pop-up captioning on service 1, writing “Doremi” (underlined), and “HDG10”.

**\*\*Note:** The close caption message can be changed to reflect your company's name etc. Please contact Doremi Labs' Sales Dept. there is a one-time fee for this service.

### **3.8 Audio Menu**

When on, a 1 KHz sine wave is embedded on the SDI stream. HDG-10 generates 2 pairs of embedded audio (1 group).

### **3.9 Audio Group Menu**

Select the audio group, from 1 to 4.

If Group 1 is selected, audio is sent on channel 1 to 4.

If Group 2 is selected, audio is sent on channel 5 to 8.

If Group 3 is selected, audio is sent on channel 9 to 12.

If Group 4 is selected, audio is sent on channel 13 to 16.

### **3.10 Audio Level Menu**

Audio level can be set from -48 db to -06db.

In random mode, the volume of embedded audio changes each time motion square 1 touches a border of the picture. This helps detect video to audio delays.

### **3.11 Audio Mask Menu**

Selects which audio channels are not silent within a group. Possible selections are

Audio Mask Number	Audio Mask Description
00	<b>Ch 1:</b> Only channel 1 has the sinewave, channels 2,3,4 have silence
01	<b>Ch 2:</b> Only channel 2 has the sinewave, channels 1,3,4 have silence
02	<b>Ch 3:</b> Only channel 3 has the sinewave, channels 1,2,4 have silence
03	<b>Ch 4:</b> Only channel 4 has the sinewave, channels 1,2,3 have silence
04	<b>Ch 1 + 2:</b> Only channels 1,2 have the sinewave, channels 3,4 have silence
05	<b>Ch 3 + 4:</b> Only channels 3,4 have the sinewave, channels 1,2 have silence
06	<b>Ch 1+2+3+4:</b> All 4 channels have the sinewave (default)

### ***3.12 Title Menu***

If the Title is “On”, The HDG-10 displays a text message on the screen moving from the bottom to the top of the picture. The motion is 2 pixels per frame.

**\*\*Note:** The title message can be changed to reflect your company’s name etc. Please contact Doremi Labs’ Sales Dept. there is a one-time fee for this service.

### ***3.13 Motion Speed Menu***

The user can choose one of the 7 available speeds.

The motion is field based in interlaced mode, and frame based in progressive.

### ***3.14 Video Filter Menu***

When video filter is OFF, color transitions are sharpe and the change of color occurs on the next pixel.

When video filter is ON, color transitions are smooth and it takes few pixels until the change of color occurs.

### ***3.15 Save settings Menu***

The user can save all the current settings in memory by toggling this menu.

### 3.16 Firmware Menu

This menu displays the firmware version number.

#### 3.16.1 Firmware Upgrade Instructions:

To upgrade the firmware on your HDG-10, you would need to get the new firmware package that would be named HDG\_118.zip or a similar name. In this package you should find 4 different files:

1. HDG10\_manual\_118.pdf: This manual
2. HDG\_118.bin: The new firmware
3. hdg\_flash.exe: The command prompt flash utility (do not double click or run, use the batch file instead)
4. HDG\_update.bat: A batch file with the proper commands to upgrade the HDG-10

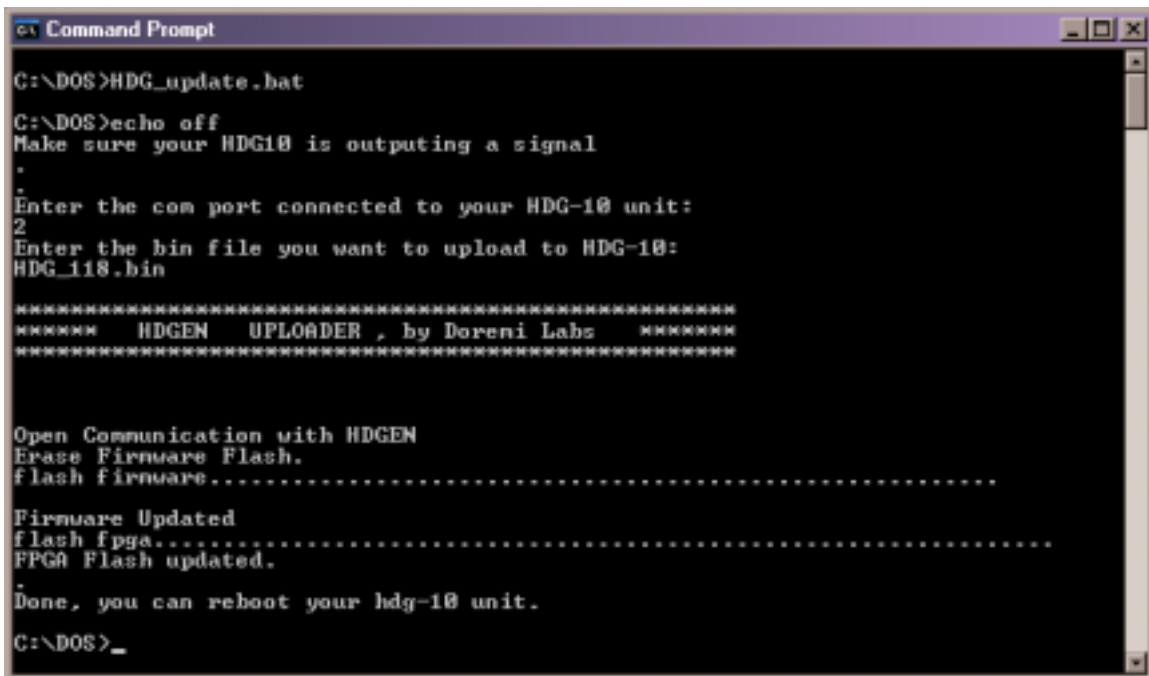
Place all 4 files in the default command prompt folder. This is the folder that Windows goes to when you run the Command Prompt application and:

Enter HDG\_update.bat

You will be prompted to enter the COM port number connected to the HDG-10 device, Enter 1 for COM-1 and 2 for COM-2

Enter the firmware filename, i.e HDG\_118.bin

The window below shows an example on how to upgrade to version 1.18 using COM-2.



```
C:\DOS>HDG_update.bat
C:\DOS>echo off
Make sure your HDG10 is outputting a signal
~
Enter the com port connected to your HDG-10 unit:
2
Enter the bin file you want to upload to HDG-10:
HDG_118.bin

*****
*****  HDGEN  UPLOADER , by Doreni Labs  *****
*****

Open Communication with HDGEN
Erase Firmware Flash.
flash firmware.....

Firmware Updated
flash fpga.....
FPGA Flash updated.
~
Done, you can reboot your hdg-10 unit.
C:\DOS>_
```

## 4 Appendix A: Closed Captioning

The CEA 608 Closed captioning sent on SDI stream is SMPTE 334 compliant. Two bytes are sent each frame in ancillary data, with a cycle of 251 frames:

frame 0	: 0x94, 0xae => Clear Buffer
frame 1	: 0x94, 0xae => Clear Buffer
frame 2	: 0x94, 0x20 => start pop up
frame 3	: 0x94, 0x20 => start pop up
frame 4	: 0x94, 0x7a => move cursor to row 15 column 20
frame 5	: 0x94, 0x7a => move cursor to row 15 column 20
frame 6	: 0x94, 0xa2 => move over 2 more columns
frame 7	: 0x94, 0xa2 => move over 2 more columns
frame 8	: 0xC4, 0xC8 => Write "H" , Write "D"
frame 9	: 0xC9, 0x20 => Write "G" , Write " "
frame 10	: 0x31, 0xB0 => Write "1" , Write "0"
frame 11	: 0x94, 0x2c => Clear current Caption
frame 12	: 0x94, 0x2c => Clear current Caption
frame 13	: 0x80, 0x80 => No operation
frame 14	: 0x80, 0x80 => No operation
frame 15	: 0x94, 0x2f => Display Caption
frame 16	: 0x94, 0x2f => Display Caption
frame 17 – 119	: 0x80, 0x80 => No operation
frame 120	: 0x94, 0xae => Clear Buffer
frame 121	: 0x94, 0xae => Clear Buffer
frame 122	: 0x94, 0x20 => start pop up
frame 123	: 0x94, 0x20 => start pop up
frame 124	: 0x94, 0xf7 => move cursor to row 15 column 12, and write underlined
frame 125	: 0x94, 0xf7 => move cursor to row 15 column 12, and write underlined
frame 126	: 0x94, 0xa2 => move over 2 more columns
frame 127	: 0x94, 0xa2 => move over 2 more columns
frame 128	: 0xC4, 0xC8 => Write "D" , Write "o"
frame 129	: 0xC9, 0x20 => Write "r" , Write "e"
frame 130	: 0x31, 0xB0 => Write "m" , Write "i"
frame 131	: 0x94, 0x2c => Clear current Caption
frame 132	: 0x94, 0x2c => Clear current Caption
frame 133	: 0x80, 0x80 => No operation
frame 134	: 0x80, 0x80 => No operation
frame 135	: 0x94, 0x2f => Display Caption
frame 136	: 0x94, 0x2f => Display Caption
frame 137 – 250	: 0x80, 0x80 => No operation

Each control code is transmitted twice, as requested in EIA 608 specifications.

## 5 Appendix B: Time Code

Ancillary time code is a linear time code (LTC). The time code is incremented each frame, and is reset to 0 after 24 hours.

LTC is transmitted on line 10, except for PAL (line 6). (SMPTE RP188)

## 6 Appendix C: Audio

In SD (PAL or NTSC), 2 pairs are embedded on the SDI stream with 6 or 8 packets per line (SMPTE 272M).

In HD, 2 pairs are embedded on the HDSDI stream (SMPTE 299M).

## 7 Appendix D: SMPTE Standards

### **Video Output**

SMPTE 125M

SMPTE 296M

SMPTE 274M

SMPTE 372M

SMPET 352M

### **Closed Caption**

EIA 608 / SMPTE 334

### **Time Code (LTC)**

SMPTE RP 188

### **Audio (embedded on SDI / HD-SDI)**

SMPTE 272M

SMPTE 299M

Note: In 2K, ancillary data is output only on Link A to match SMPTE 372M specifications.