HDVI-20s

User's Manual

Version 1.48

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Doremi Labs, Inc.
Burbank, California

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- EN 55022 "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment."

A "Declaration of Conformity" in accordance with the above standard has been made and is on file at Doremi Labs, Europe, Valbonne, France.

2 Description

Doremi Labs' HDVI-20s is a universal DVI-D converter / switcher. It converts SDI, HD-SDI, DVI-D and DVI-A (analog RGB) to DVI-D (digital RGB). It automatically detects the input scan rate and supports a wide variety of video formats including PAL, NTSC, 720p, 1080p, 1080i. It also automatically detects the resolution of the connected DVI-D monitor using EDID messages and supports a wide variety of progressive scan displays including computer LCD monitors, HDTV Televisions with 720p, 1080i and 1080p support, video projectors and displays (Plasma, DLP, D-ILA etc.).

The HDVI-20s is an easy to use plug-and-play box that allows the use of much lower priced DVI monitoring for SD and HD pictures. Set-up and operation are easy, as they should be. But to ensure that the images look good always, Doremi has focused attention on the technical detail of the many facets of the conversion process.

- Accurate spatial interpolation for clear sharp rendition of static images
- Advanced de-interlace processing for clear, accurate output of moving images
- Image output is automatically matched to the size of the monitor display to give optimum results and avoid further processing
- Temporal processing for smoother frame rate conversion
- Small size, low power consumption

2.1 HDVI-20s vs. the older HDVI-20

There are two differences between the HDVI-20s and the older HDVI-20:
- The 1080i output mode
  - o HDVI-20s: The 1080i output timing is CEA-861-B compliant and is compatible with all TV sets.
  - o HDVI-20: The 1080i output timing is NOT CEA-861-B compliant. It's compatible with most monitors, but some TV sets will only accept CEA-861-B timing and might not work properly when the HDVI-20 is set to 1080i.
- The HDVI-20s has a single SD/HD SDI input with a loop through output, while the HDVI-20 has 1 SD/HD SDI input and another SD-SDI input. So on the HDVI-20s, there will be 4 input selections, while there will be 5 input selections for the older HDVI-20.

3 HDVI-20s Operation

On power up, the HDVI-20s will automatically detect the input format of the selected input and will send a message to the monitor connected via DVI requesting its EDID parameters. The EDID parameters of the connected monitor will be used by the HDVI-20 to determine its output resolution.

The HDVI-20s DVI-D output has 2 major controls: Resolution and Frequency.
Resolution:
Can be set to Auto (default) or forced to 1280x720, 1280x1024, 1920x1080, 1920x1200, 1080i
Frequency:
Can be set to 48Hz, 50Hz, 60Hz (default) or forced to Frame Sync.

3.1 Resolution

The output resolution can be set to Auto, 1280x720, 1280x1024, 1920x1080, 1920x1200 or 1080i using the On Screen Display (OSD). In Auto mode, the output resolution will be set to match the monitor up to 1920x1200.

- If the EDID response of the monitor is not recognized or is higher than 1920x1200, the HDVI-20s will default to 1280x1024. In the case where this same monitor does not support 1280x1024, the output resolution can bet forced using the infrared remote control and without the OSD interface by using the TV/Video + Number combination according to the following table:
    - o TV/Video + 0 => Auto Mode
    - o TV/Video + 1 => 1024x768
    - o TV/Video + 2 => 1280x720
    - o TV/Video + 3 => 1280x768
    - o TV/Video + 4 => 1280x1024
    - o TV/Video + 5 => 1366x768
    - o TV/Video + 6 => 1400x1050
    - o TV/Video + 7 => 1920x1080
    - o TV/Video + 8 => 1920x1200
    - o TV/Video + 9 => 1080i
- In case of a TV set that reports 1080i, the HDVI-20s will output a compliant 1080i signal and the TV will display it properly. However, the older HDVI-20 will output a non-compliant 1080i signal that might not be displayed properly on your TV set (it depends on TV manufacturers). In that case and if your TV supports 720p, switch the HDVI-20 to 1280x720 which is a compliant signal and is supported by all TV sets that list 720p as a supported mode.

3.2 *Frequency*

The default frequency is 60Hz because it works with all displays. If your display supports lower
frequencies and if your input source is running at 24/48, 25/50 Frames/Fields per second, you can
avoid motion artifacts by forcing the output frequency to Frame Sync.

4   Supported Output Resolutions

The HDVI-20s supports all progressive scan resolutions up to 1920x1200; it also outputs 1080i for
TV sets.

5   Supported Input Resolutions

Input	Resolution
HD-SDI	All HD formats, NTSC, PAL, 2K-psf, 2K-p and 720p-50
SD-SDI	NTSC, PAL
DVI-D	All DVI-D interlaced and progressive scan formats up to 1920x1200
DVI-A	All DVI-A RGB analog formats up to 1920x1200 YPbPr not supported on this input

5.1 *DVI-A Special Instructions*

Analog input sources can be noisy and jittery. We strongly recommend using the digital inputs
whenever possible. If you have to use the analog input, make sure your timing is compliant with the
CEA-861-B standard, especially for 1920x1080p @ 60 Hz.

6 OSD and Remote Control functions

By default, the HDVI-20s infrared (IR) controls are unlocked. To lock, press "MUTING" for 4 seconds. The same process can be used to unlock the IR controls. The lock state of the HDVI-20s is saved even if the unit is turned off.

To access the OSD menu, press "RECALL". The OSD will display six icons:

From left to right, these Icons represent:
Input Source Selection | Picture Settings | OSD Settings | Input Settings | DVI Output Settings | Miscellaneous

To navigate through the menus, use the 2,8,4,6 button on your remote as Up, Down, Left, Right. The table below explains all remote functions in both cases: On-screen display (OSD) ON or OFF.

HDVI-20s Remote Control	Key	Function
OSD OFF		
Input Select	CH +	Switch between HD-SDI, SDI, DVI-D, DVI-A
Toggle IR lock	Press and hold MUTING for 4 seconds	Lock/Unlock IR.
Restore I/O settings	**POWER**: See paragraph 6.1	Restore I/O settings
Force Flash Mode	Press and hold TV/VIDEO for 4 seconds	Displays a red screen to indicate that the unit is in flash mode and ready to be upgraded
Menu Access	RECALL	Access the menu system
Force Output Mode	**TV/Video + 0-9** **TV/Video + 0** **TV/Video + 1** **TV/Video + 2** **TV/Video + 3** **TV/Video + 4** **TV/Video + 5** **TV/Video + 6** **TV/Video + 7** **TV/Video + 8** **TV/Video + 9**	Force the DVI-D output to: Auto Mode 1024x768 1280x720 1280x768 1280x1024 1366x768 1400x1050 1920x1080 1920x1200 1080i
OSD ON		
Up	2	Navigate up

Down	8	Navigate down
Left	4	Navigate left
Right	6	Navigate Right
Exit	0	Exit submenu and menu
Select	ENTER or 5	Activate the selection

6.1 Restore I/O settings

This mode is very important should you lose track of the I/O settings of the HDVI-20s. When the I/O settings are restored, the HDVI-20 output will be set to 1280x720-59.94. The input will be set to Pattern and the unit will output color bars.

To Restore I/O settings, turn the unit OFF, Hold the POWER button down and turn the unit back ON while keeping the POWER button down for at least 20 seconds then release the POWER button and recycle power to the unit.

6.2 Input Source Selection

When OSD is on, select IN and use the 2,4,6,8 keys to select the desired input, then hit 5 or ENTER. When OSD is off, you can use the CH + key to change the input source.

6.3 Picture Settings

DISPLAY	Access to: Brightness, Contrast, Hue, Saturation and Flesh Tone settings
IMAGE	Access to Scaling, Adaptive De-interlacing, Noise Reduction, Auto-Filtering, Film Mode Detect and Sharpness settings
POSITION	Access Input Horizontal and Vertical Frame Offset and Horizontal and Vertical Flip Control
COLOR	Access to sRGB, Gamma Correction, Color Temperature, Red, Green and Blue settings

6.4 OSD Settings

Sets the on-screen display's Horizontal and Vertical positions, Blend, Timeout and Zoom.

6.5 SDI Settings

SDI Input Settings: Selects RGB, XYZ' or YPbPr (default) for the HD-SDI input.

6.6 Output Settings

DVI Resolution	-Auto (default): Use with all monitors up to 1920x1200. If the monitor reports a bad or unsupported resolution, the HDVI-20s will default to 1280x1024. In the case where this same monitor does not support 1280x1024, the output resolution can be forced using the infrared remote control and without the OSD interface by using the TV/Video + Number combination (see paragraph 3.1) -1024x768, 1280x720, 1280x768, 1280x1024, 1366x768, 1400x1050, 1920x1080, 1920x1200 and 1080i
DVI Frequency	-48Hz: Forces the DVI output to 48Hz -50Hz: Forces the DVI output to 50Hz -60Hz: This is the default mode, it should work with all displays 1920x1200 or below -Frame Sync: Eliminate motion artifacts by forcing the DVI output signal frequency to the same or double the SDI input frequency. All 24 and 48 FPS formats will be displayed at 48Hz All 25 and 50 FPS formats will be displayed at 50Hz All 29.97 (30) and 59.94 (60) FPS formats will be displayed at 59.94Hz (60Hz)
Pattern Mode	This menu has been removed in version 1.38 and higher. When input is set to pattern, the only available pattern is Color Bars.
H Sync Width	This setting is normally detected from the EDID message. If for any reason the EDID is wrong, these settings can be manually adjusted. Pressing ENTER twice will restore the default value
V Sync Width	Same note as for H Sync Width
H Back Porch	Same note as for H Sync Width
V Back Porch	Same note as for H Sync Width

6.7 Miscellaneous Menu

This menu can be used to reset the factory default settings of the unit. It also displays the monitor's native resolution, the current DVI output resolution, the current DVI output frequency, the infrared remote control status, the current input and the firmware version. After you reset the factory defaults, you MUST recycle power on the unit.
The reset function in this menu is different from the Reset I/O settings described earlier.

7 Troubleshooting

If the XDVI-20s does not output video to your monitor, refer to paragraph 6.1 to learn how to perform a **Reset I/O settings**.
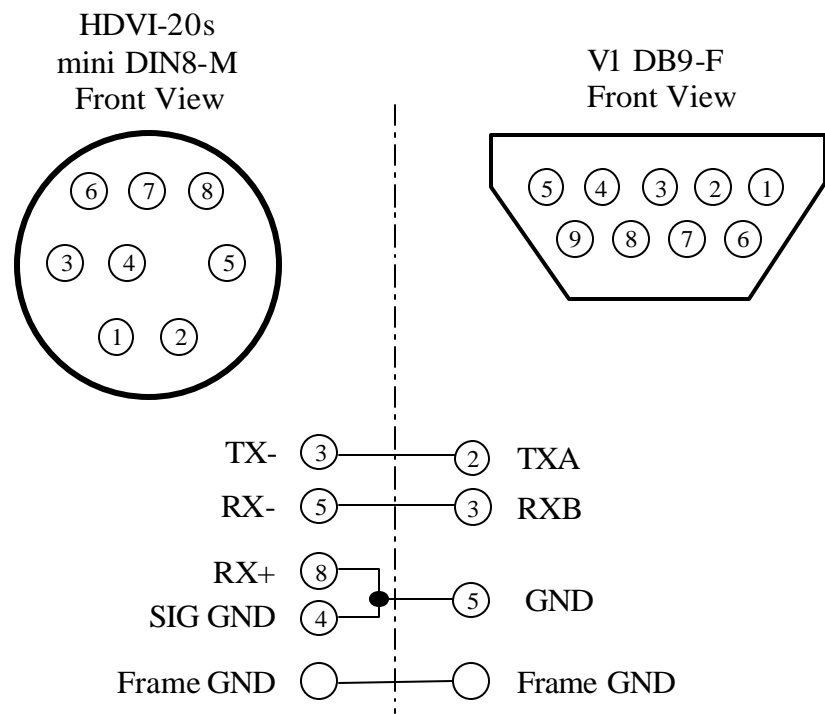Try to force the input and output modes using:
- **CH+** to force the input to Pattern, SDI, DVI-D, 3: DVI-A
- **TV/Video** + **0-9** to force the DVI-D output mode (see previous sections for listing)

8 Firmware Upgrade

To upgrade the firmware of the HDVI-20s, you need to have the HDVI-20s RS422-PC cable. You also need to have the 3 files HDVI20.exe, HDVI-20_Uploader.bat and the HDVI-20 bin file in your DOS directory. The DOS directory is the default directory when you launch the Command Prompt application under Windows.

1. Connect the HDVI-20s RS422-PC cable to a COM port on your PC
2. Connect the HDVI-20s to a DVI monitor
3. Force the HDVI-20s in flash mode by pressing and holding the TV/Video on your infrared remote until the picture becomes red.
4. Double click on the HDVI20_Uploader.bat icon and enter the serial port connected to the HDVI-20s and hit ENTER
5. Enter the binary file name of the HDVI-20 bin file and hit ENTER
6. The screen will start showing you progress and it will quit after the upgrade is over.
7. Recycle power on the HDVI-20s and go to the last menu and make sure the new firmware is installed.

8.1 Wiring of the HDVI-20s RS422-PC cable

HDVI-20s
mini DIN8-M
Front View

Vl DB9-F
Front View

TX-   (3) ──────── (2)   TXA

RX-   (5) ──────── (3)   RXB

RX+   (8)
                              (5)   GND
SIG GND   (4)

Frame GND   ○──────── ○   Frame GND

9   Recommended LCD Monitors

All LCD monitors that support the resolutions listed in this document would work properly with the HDVI-20s.

For best motion performance in 720p application (most demanding), we recommend using displays with a response time of 16ms or less.

Doremi highly recommends the BenQ FP231W (1920x1200) to use with the XDVI-20 products. It can scan at all frame rates and has the best motion performance we have seen on an LCD panel.

9.1   Note about the Viewsonic VP2290b

Because the VP2290b is a 3840x2400 monitor, the HDVI-20s output must be forced to 1920x1200. This monitor supports Frame Sync and can be operated at frequencies as low as 24Hz. In addition, this monitor is pre-adjusted according to ITU-709 to be used as a high def. reference monitor. The combination of the HDVI-20s with the VP2290b creates a low cost reference monitor that competes with CRT reference monitors that are priced over $30,000 US Dollars.

9.2   Note about the Apple Cinema Displays

All Apple cinema displays are supported by the HDVI-20s except for the 30". The Apple displays support 60Hz frequency only. Frame Sync Mode should not be set with these monitors; the HDVI-20s will display all input resolutions at 60Hz. Note that Apple Cinema displays with the ADC connector will need a DVI to ADC converter.

10 Specifications

INPUT

SMPTE 259M-C (270Mbps) and SMPTE 292M (1.485, 1.485/1.001 Gbps)
NTSC, PAL,
720p @ 60, 59.94 and 50Hz
1080p @ 30, 29.97, 25, 24 & 23.98Hz,
1080i @ 60, 59.94, 50, 48 & 47.95Hz
2K-p & 2K-psf @ 23.98 & 24Hz (2048x1080)

OUTPUT

DVI (Digital RGB) and DVI-HDTV (Digital RGB with HDTV resolution/frame rate) up to 1920x1200 progressive scan and 1080i formats.
Connector: DVI-D, Female, compliant to DVI 1.0

SUPPORTED MONITORS

Depending on your DVI monitor's resolution, the HDVI will either scale the video to fit your screen or output the video without scaling.

GENERAL

Size: Approx. 1 1/8th x 3 ¾ x 5 ½ (28mm x 95mm x 14mm)
Power: External Power Adapter with a locking power connector