DVDO iScan Duo
Owner's Manual Supplement

<u>Firmware Version 2.20 (Build 067a)</u>

This document provides additional information for the DVDO iScan Duo configured with the latest firmware. It is a supplement to the iScan Duo Owner's Manual.

This release includes improvements/bug fixes in Releases 2.00 B51, 2.10 B62n.
The Owner's Manual Supplement for Versions 2.00 B51, 2.10 B62n are included in this document.

NOTE: This release will force a Factory Default

NEW FEATURES

1. Color Management System

This section describes the new features in iScan Duo's CMS

1.1 Secondary Color Gamut Controls (Cyan, Magenta, Yellow)

Secondary Color Adjustments (x,y,Y) are enabled in the Color Gamut menu. For example:

> Main Menu > Output Setup > Color Gamut > Cyan-x

1.2 Luminance Control for Color Gamut

Color Gamut adjustments now come with luminance control 'Y'.

The primary colors (Red, Green, Blue) and White each comes with a new luminance 'Y' control. For example, Red controls now feature Red-x, Red-y and Red-Y. For example:

> Main Menu > Output Setup > Color Gamut > Red-Y

1.3 White-point controls for Gray Scale

Gray Scale controls now also include white-point adjustments as an alternative to using primaries (Red,Green,Blue).

At each IRE setting, in addition to Red, Green and Blue, the on-screen menu includes White-x, White-y, White-Y adjustments.

> Main Menu > Output Setup > Gray Scale > White-x
> Main Menu > Output Setup > Gray Scale > White-y
> Main Menu > Output Setup > Gray Scale > White-Y

2. Output HDCP Mode can be turned Off

Some applications do not required HDCP content protection. For these applications, the ability to turn off HDCP on the outputimproves the iScan Duo's response time when providing a signal to a display.

IMPROVEMENTS

- Updated the automation interface to support new features in this release as well as Firmware update (0xAD) and system restart command (0xAE).
- All solid color test patterns are now at 75 IRE.
- Avoid front panel LED flashing when both A/V HDMI outputs aren't connected.
- Added support to changing output settings without a display.

BUG FIXES

- Test Pattern on-screen indicator did not show correct test patterns when using remote short-cut buttons.
- Serial automation command for Zoom (0x46) only accepted integer values.
- Front panel menu text and back light remained on when exiting main menu.
- At 1080p output, lower part of gamut selection menu remained at bottom of screen when opening edit control.
- Changing the output resolution from SXGA to VGA and cancelling the operation would cause the system to be unresponsive.
- CEC pass-through did not work.
- Info screen page rolled over on front panel display but not on the OSD.

KNOWN BUGS

- If 100 IRE Gray Scale adjustment is selected, moving to Color Gamut adjustments and back to 100 IRE Gray Scale will cause the iScan Duo to output wrong gray scale level. Selecting 90 IRE and back to 100 IRE levels fixes the problem.

DVDO iScan Duo
Owner's Manual Supplement

<u>Firmware Version 2.10 (Build 062n)</u>

This document provides additional information for the DVDO iScan Duo configured with the latest firmware. It is a supplement to the iScan Duo Owner's Manual.

This release includes improvements/bug fixes in Release 2.00 B51.
The Owner's Manual Supplement for Version 2.00 B51 is included in this document.

NOTE: This release will force a Factory Default

1. Color Management System improvements

This section describes improvements made to the iScan Duo's CMS.

1.1 User Chromaticity

The iScan Duo now features a User setting under the Chromaticity menu.

> Main Menu > Output Setup > Chromaticity > User

This feature allows the user to obtain the display's chromaticity values manually if a) the value obtained from the display EDID (Auto) or b) the preset values provided in the Chromaticity menu do not accurately reflect the actual display's performance.

Here are the steps to obtain the display chromaticity values directly

1. Obtain a good color meter
2. Turn on the iScan Duo's test pattern generator (TPG) using the following methods
   a) Use the menu system
      > Main Menu > Output Setup > Test Patterns > On
   b) Use the Test Pattern On/Off button on the remote control.

3. Set all Color Gamut Offset and Gray Scale offset values to zero.
   Alternatively, turn on CMS Bypass (see below)

4. Go to the User menu and select the first item, Red-x
   > Main Menu > Output Setup > User > Red-x

The TPG automatically generates only the Red primary (75IRE).

5. Enter the measured Red-x value. *Note the indicators reflect only the output of the Test Pattern Generator.*

6. Select Red-y and enter the measured Red-y value

7. Repeat step 4,5 and 6 with Green-x and Green-y
   The TPG automatically generates only Green primary (75IRE).

8. Repeat step 4,5 and 6 with Blue-x and Blue-y
   The TPG automatically generates only Blue primary (75IRE).

9. Repeat step 4,5 and 6 with White-x and White-y
   The TPG automatically generates only White primary (75IRE).

10. Output chromaticity should now match your display's actual chroma response. If necessary, the chroma and luma can now be fine-tuned using the Color Gamut and Gray Scale controls.

1.2 CMS Bypass

In some cases, it is helpful to bypass the CMS when calibrating a display (see User Chromaticity Control above). The CMS Bypass control is available in the Output Setup menu.

Main Menu > Output Setup > CMS Bypass

On	Signals coming into the iScan Duo bypasses the Color Management System.
Off (default)	The Color Management System is enabled.

2. Per input per format saved settings

Input settings are now saved per format supported by the input. Different inputs support different formats. For example, Video (composite), S-Video inputs support NTSC (480i 60Hz), PAL (576i 50Hz), 240p 60Hz and 288p 50Hz, while Component video and HDMI inputs can support other formats including HD and PC formats.

The iScan Duo will save input settings for each format (if supported by the input) below.

480i/240p (treated as one format)
576i/288p (treated as one format)
480p
576p
720p50
720p60
1080i50
1080i60
1080p24
1080p25
1080p30
1080p50
1080p60
VGA
SVGA
XGA
SXGA

The input settings that are saved include

Picture Controls
Deinterlacer Modes
Game Mode
Picture Aspect Ratio
Active Aspect Ratio
Panorama
H/V-Zoom
H/V-Pan
Input Chromaticity
Input color space
Input colorimetry
Audio delay

3. New Picture Controls

Several new picture control adjustments have been added

3.1 Y/C Delay

The Y/C Delay control shifts the phase of the luminance (Y) with respect to chrominance (C) in the video signal to correct for delay between Y and C, which causes color smearing in the image. The default setting is 0.

This control is available in the Picture Controls menu.

  Main Menu > Picture Controls > YC Delay

3.2 Chroma Upsampling Error Correction

This feature removes chroma upsampling errors (CUE) caused by some MPEG video decoders.

This new control is available in the Picture Controls menu.

  Main Menu > Picture Controls > CUE Correction

Off	No chroma filtering. Use this setting if the source does not have a CUE problem.
On	Chroma filtering is always on. Use this setting if the source is known to have a CUE problem.
Auto (default)	Automatic chroma error detection and correction (AutoCUE-C™). This is a unique VRS technology that automatically detects chroma errors and removes them.

4. New Input Adjust controls

Several commands were added to provide more flexibility and compatibility when connecting video sources to the iScan Duo.

4.1 Input Color Space

This control is for HDMI inputs only. The iScan Duo will override the color space information that is obtained from the HDMI source (from the HDMI link) and use the color space specified by the user instead.

This new control is available in the Input Adjust menu.

Main Menu > Input Adjust > Input Color Space

The menu selection is as follows

> Auto (default)
> RGB
> YCbCr 422
> YCbCr 444

4.2 Input Colorimetry

This control is for HDMI inputs only. The iScan Duo will override the colorimetry information that is obtained from the HDMI source (from the HDMI link) and use the colorimetry specified by the user instead.

This new control is available in the Input Adjust menu.

> Main Menu > Input Adjust > Input Colorimetry

The menu selection is as follows

> Auto (default)
> ITU BT.601
> ITU BT.709

4.3 Input HDCP

HDMI sources (such as HDMI splitters, distributors) work differently with different HDCP implementations. The input HDCP Mode control is added to accommodate the large number of HDMI devices that connect to the iScan Duo's inputs.

This control is available in the Input Adjust menu.

> Main Menu > Input Adjust > HDCP Mode

> On (default)   The iScan Duo sets its input as HDCP capable. Sources can send content protected audio/video signals to the input.

Off	The iScan Duo turns off HDCP on its input. This feature speeds up the iScan Duo's ability to lock onto an input signal when HDCP is not needed.

5. New Configuration control

A menu item was added to allow users to control the OSD display.

5.1 Menu Timeout

The OSD menu timeout determines the time (in seconds) it takes for the iScan Duo to close the OSD menu after no action has been performed. The user can now control the duration of the timeout.

This control is available in the Configuration menu.

> Main Menu > Configuration > Menu Timeout

40 sec (default)	On-screen menu times out after 40 seconds
160 sec.	On-screen menu times out after 160 seconds
Off	On-screen menu never times out.

6. New Output Setup controls

Several menu items were added to improve compatibility and display of border and mask levels.

6.1 Border Level

A border is created when the active aspect ratio of the input does not match the display aspect ratio. For example, if the active aspect ratio is 4:3 and the display aspect ratio is 16:9 the iScan Duo creates a left and right border on the resulting image. The border level can now be adjusted from 0 IRE (black) to 100 IRE (white) with a slider bar control. The default setting is 0 IRE.

This control is available in the Output Setup menu.

> Main Menu > Output Setup > Border Level

6.2 Mask Level

A mask is created when Underscan feature which reduces the output image size to less than the maximum display size. Typically Underscan is used if the image goes beyond the display.

The mask level can be adjusted from 0 IRE (black) to 100 IRE (white) with a slider bar control. The default setting is 0 IRE.

This control is available in the Output Setup menu.

> Main Menu > Output Setup > Mask Level

6.3 Output HDCP

HDMI displays or other devices (such as HDMI splitters, AV Receivers) may have different HDCP implementations. The output HDCP Mode control is added to accommodate the large number of HDMI devices that connect to the iScan Duo's outputs.

This control is available in the Output Setup menu.

> Main Menu > Output Setup > HDCP Mode

Auto	HDCP content protection is applied to the iScan Duo output only if the input signal is protected
On	HDCP content protection is always applied to the iScan Duo output if the Duo detects a display with HDCP even if the input signal is unprotected

7. Updated Serial Automation commands

New commands are added to support CMS and other new features including

- CMS commands
  - Input and Output Chromaticity controls
  - Color Gamut controls
  - Gray Scale controls
- Product Name and Version Number queries
- Y/C Delay, CUE Correction, Border and Mask Levels

- Input and Output HDCP modes
- Input Colorimetry
- Menu Timeout
- Menu Navigation
- More consistent factory default commands

See Updated Serial Automation command document for more details

8. Other Improvements

- Added 1080p30 pre-defined output format.
- Front Panel displays firmware version when Info Screen – About is selected.
- Zooming range is increased to 16x the input image size.
- Improved input switching by reducing flashing and flickering.
- Improved analog video performance by reducing noise levels.
- Info Screen provides more timing information.
- Added Hardware handshaking support for serial automation.

9. Bug Fixes

- The new method of applying HDCP on the iScan Duo's output introduced a bug that caused some displays to not show video.
- OSD indicator sometimes remained on the screen indefinitely.
- Gamut settings did not get saved when in Standby.
- OSD corruption occurred when selecting inputs.
- RGBS2 input did not work.
- wrong Hsync/Vsync Polarity for 480p/576p output formats.

DVDO iScan Duo
Owner's Manual Supplement

Date: 2/15/10

Firmware Version: 2.00 Build 051

This document provides additional information for the DVDO iScan Duo configured with the latest firmware. It is a supplement to the iScan Duo user manual.

1. Color Management System

This iScan Duo release incorporates several new features that can be loosely categorized as Color Management System. These features include Color Gamut Controls, Chromaticity Controls and Gray Scale Controls. The CMS features make the iScan Duo a useful tool for calibrating displays.

DVDO strongly recommends the use of a good colorimeter for display calibration.

The following sections describe new features.

Input Chromaticity

For accurate calibration of the display and the rest of the signal chain, it is important to correctly set the input chromaticity for the iScan Duo. Chromaticity in this case includes the color and white point values along the CIE (1931) color chart.

This new control is available in the Input Adjust menu.

> Main Menu > Input Adjust > Chromaticity

By default the Chromaticity is set to 'Auto', which sets the chromaticity based on the input format. For example, if the input format is 1080p (HD), the chromaticity is based on BT.709.

The chromaticity can also be manually set from this menu, which contains standard profiles including RGBs/709, NTSC, PAL/SECAM, SMPTE-C, CIE1931, AppleRGB and Adobe 1998.

When the Chromaticity is selected, the 'hint' area of the on-screen display shows corresponding color and white point x, y values (red (x_r, y_r), blue (x_b, y_b), green (x_g, y_g) and white (x_w, y_w)).

Note: This control is currently not updating the chromaticity values in our input EDID

Output Chromaticity

Similarly, there are the Output Chromaticity controls which are required for accurate calibration.

This control is typically not required since the Color Gamut control can correct for incorrect chromaticity values provided by the display EDID. Users can think of this control as a coarse color control, which may be useful when a meter is not available.

This new control is available in the Output Setup menu.

Main Menu > Output Setup > Chromaticity

By default the Chromaticity is set to 'Auto', which sets the chromaticity based on the chromaticity information in the display's EDID.

The chromaticity can also be manually set from this menu, which contains standard profiles including RGBs/709, NTSC, PAL/SECAM, SMPTE-C, CIE1931, AppleRGB and Adobe 1998.

When the Chromaticity is selected, the 'hint' area of the on-screen display shows corresponding color and white point x, y values (red (x_r, y_r), blue (x_b, y_b), green (x_g, y_g) and white (x_w, y_w)).

Color Gamut

The Color Gamut control allows adjustment of Red, Green, Blue primary colors and white point on the CIE colorimetry chart.   The Gamut adjustments are relative to the selected output chromaticity.

This new control is available in the Output Setup menu.

Main Menu > Output Setup > Color Gamut

There are two ways to use this control.

a) Using the iScan Duo's test pattern generator as a reference color source
b) Using an external video source to generate the reference test patterns

Using iScan Duo's Test Pattern Generator

1. Enable test pattern generator by pressing the 'Test Pattern On/Off' button on the Duo's remote or using the on-screen menu Output Setup > Test Patterns > On.
2. Adjust primaries and white point using the on-screen menu.

   The RGB indicator on the left side of the screen shows the input RGB signal going into the CMS processor. The RGB indicator on the right side shows the output RGB signal from the CMS processor. The units for these indicators as well as the adjustment values are in percentage of full range gamma-corrected RGB.

3. There are 8 chromaticity offset controls
   a. Red-x
   b. Red-y
   c. Green-x
   d. Green-y
   e. Blue-x
   f. Blue-y
   g. White-x
   h. White-y

4. When Red is being adjusted, the Duo automatically generates a red test pattern. Similarly, when Green, Blue and white are being adjusted, the green, blue and red signals are generated by the Duo.

Using a reference signal connected to iScan Duo's input

The Duo's test pattern generator should be turned off in this mode. Provide the reference primary and white signal that needs to be measured and adjusted and use the on-screen menu as described in the previous section.

Gray Scale Control

The Gray Scale control allows gray scale adjustment in 11 steps from 0 IRE to 100 IRE in 10 IRE increments.

This new control is available in the Output Setup menu.

Main Menu > Output Setup > Gray Scale

There are 2 ways to use this control.

 a) Using the iScan Duo's test pattern generator as a reference source
 b) Using an external video source to generate the reference test patterns

Using iScan Duo's Test Pattern Generator

1. Enable test pattern generator by pressing the 'Test Pattern On/Off' button on the Duo's remote or using the on-screen menu

  Output Setup > Test Patterns > On

2. There are 11 levels of control under Gray Scale
   0 IRE
   10 IRE
   20 IRE
   30 IRE
   40 IRE
   50 IRE
   60 IRE
   70 IRE
   80 IRE
   90 IRE
   100 IRE

3. The Duo automatically generates the relevant windowed test pattern for each control above. For example when 50 IRE is selected, the Duo automatically generates a 50 IRE signal.
4. Adjust Red, Green, Blue component to achieve to correct gray level.

  The indicators on the on-screen menu has the same units as that of the Color Gamut control (percentage of full range gamma corrected RGB)

Using a reference signal connected to iScan Duo's input

The Duo's test pattern generator should be turned off in this mode. Provide the reference gray scale that needs to be calibrated and use the on-screen menu as described in the previous section.

2. *Support for Audio only optical and coax sources*

This feature is for users who have digital audio only (coax and optical) source (i.e. no video source) and want to use it with Duo. Previously this feature is not available because the Duo goes into standby mode when there is no video input (auto standby-on).

The Duo now detects the presence of digital audio (coax and optical) inputs in addition to video inputs.

To use this feature
- a) Select an unused video input
- b) Assign the audio input that is connected to the audio only source using the on-screen menu below.

    Main Menu > Input Adjust > Audio Input
- c) Selecting the unused video input effectively selects the audio input.

This feature is independent of the output and will work with all four of the Duo's audio outputs (HDMI A/V 1, HDMI A/V 2, HDMI Audio and Digital coax/digital).

3. *HDCP is enabled on the output only if input is encrypted.*

The previous Duo software enables HDCP (encryption) if it detects an HDCP based display even if the input signal is unprotected.   The current version enables HDCP only if the input signal is HDCP encrypted.