ⓘ Scan™ HD+

Addendum to the Product Guide

This addendum explains the enhanced features for software release 2.91 and corrections to the iScan HD+ Product Guide.

New Features:

- 480i/576i DVI Support
- Full Input Aspect Ratio Control
- Full Output Aspect Ratio Control with Image Shift
- Display Profiles
- Non-Volatile Memory Settings
- Increased Range on Frame Rate Conversion

DVDO

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Overview

This is an addendum to the <u>iScan HD+ High Resolution Video Scaling Engine Product Guide</u>. This addendum explains enhanced features for software release **2.91.**

The new software features are as follows:

- 480i/576i DVI Support
- Full Input Aspect (IAR) Ratio Control
- Full Output Aspect (OAR) Ratio Control with Image Shift
- Display Profiles
- Non-Volatile Memory Settings
- Increased Range on Frame Rate Conversion

The following sections explain these new features:

480i/576i DVI Support

The iScan HD+ supports DVI input signals that have RGB (4:4:4) colorspace. DVI input signals with YCbCr (4:2:2 and 4:4:4) colorspace are not supported by the iScan HD+. Because of this, they may be processed incorrectly.

DVI input signals that are processed are as follows:
- 480i (RGB 4:4:4)
- 480p (RGB 4:4:4)
- 576p (RGB 4:4:4)
- 720p (RGB 4:4:4)
- 1080i (RGB 4:4:4)

Table 1. shows how to access the DVI supported features.

Table 1. Menu Access to DVI Support

				FPD	Description
Input Adjust				IADJ	
	DVI Input			DVII	
		Mode		MODE	
			Auto	AUTO	Same functionality as the current software, with the addition of processing of 480i/576i signals
			Passthru	DPTH	Same functionality as the current software.
		Colorspace		COLR	
			RGB 4:4:4	RGB	RGB 4:4:4 Colorspace (DVI Standard)
			YCbCr 4:2:2	Y422	Not Supported
			YCbCr 4:4:4	Y444	Not Supported

This feature has been tested with the following 480i/576i sources:
- DirecTV HR10-250
- Sony DVP-NS975V
- LG LSS-3200A
- Arcam DV79
- Pioneer Elite DV-59AVi

Full Input Aspect Ratio Control

Video input signals are usually classified in the following two ways:
- Frame Aspect Ratio
- Active Input Aspect Ratio

Frame Aspect Ratio

Frame Aspect Ratio (FAR) consists of two possible ratios: 4:3 or 16:9. DVD discs encoded in a 16:9 frame are sometimes referred to as *anamorphic* or *enhanced for widescreen TV's*. For example, a non-anamorphic widescreen DVD has a FAR of 4:3.

Active Input Aspect Ratio

Active Input Aspect Radio (AIAR) is the aspect ratio of the image or content (movie). This content is typically stated on the back cover of DVD discs. Some common active input aspect ratios are as follows:

> 1.33:1 (4:3)
> 1.55:1
> 1.66:1
> 1.78:1 (16:9)
> 1.85:1
> 2.35:1

To use aspect ratio's in addition to these, the iScan HD+ provides the option to choose a custom aspect ratio called *User* with a range of 1.01:1-3.00:1.

iScan Image Mapping

The situation when the Frame Aspect Ratio (FAR) is the same as the Active Input Aspect Ratio (AIAR) is sometimes called Full Frame. This situation is illustrated below.

The iScan HD+ maps the AIAR to the Output Aspect Ratio (OAR) in the following three ways:

- When the AIAR is greater than OAR, the iScan HD+ puts up Borders at the top and bottom as shown below:

Borders   Active Input Area

- When the AIAR is less than the OAR, the iScan HD+ puts up Borders on the left and right as shown below:

Borders ———————   Active Input Area   ——————— **Borders**
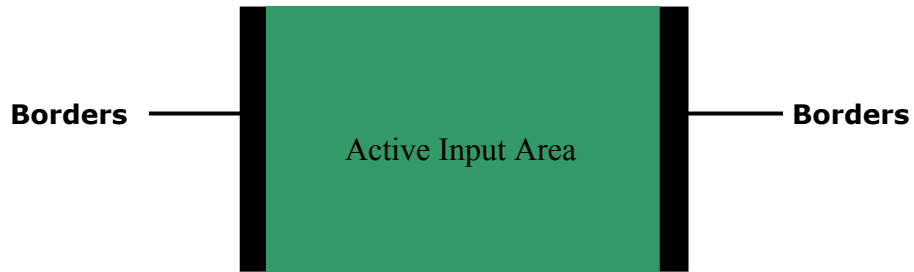
- When the AIAR is equal to the OAR (Output Aspect Ratio) , the iScan HD+ supplies no border as shown below:

Active Input Area
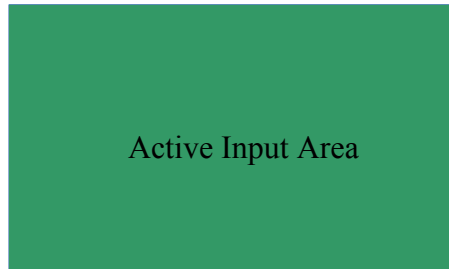
Front Panel and On-Screen Displays for IAR

The On-Screen Display (OSD) and the Front Panel Display (FPD) allow you to set the Input Aspect Ratio as shown in Table 2.

Table 2. OSD and FPD for Input Aspect Radio

				FPD	Description
Input Asp. Ratio				I_AR	
	Frame AR			FAR	
		4:3		4/3	
		16:9		16/9	
	Active Input			AIAR	
		1.33:1 (4:3)		1.33	
		1.55:1 (14:9)		1.55	
		1.66:1 (15:9)		1.66	
		1.78:1 (16:9)		1.78	
		1.85:1		1.85	
		2.35:1		2.35	
		User	X.XX:1*	USER	
	Zoom			ZOOM	Same functionality as the current software.
		Horizontal	XX*	HOR	
		Vertical	XX*	VERT	
	Pan			PAN	Same functionality as the current software.
		Horizontal	XX*	HOR	
		Vertical	XX*	VERT	
	Borders			BORD	Same functionality as the current software
		Horizontal	XXX*	HOR	
		Vertical	XXX*	VERT	
	Preset			PRES	
		4:3 F. Frame		4/3	Same as the remote control button "4:3" FAR = 4:3, AIAR = 4:3
		Letterbox		LBX	Same as the remote control button "LBX" FAR = 4:3, AIAR = 16:9
		16:9 F. Frame		16/9	Same as the remote control button "16:9" FAR = 16:9, AIAR = 16:9
		Preset 1		PRS1	User defined preset
		Preset 2		PRS2	User defined preset
		Preset 3		PRS3	User defined preset
		Preset 4		PRS4	User defined preset
		User		USER	User defined preset
	Save			SAVE	
		Preset 1		PRS1	
			No	NO	
			Yes	YES	
		Preset 2		PRS2	
			No	NO	
			Yes	YES	
		Preset 3		PRS3	
			No	NO	
			Yes	YES	
		Preset 4		PRS4	
			No	NO	
			Yes	YES	
*Selections vary					

Modifying the Input Aspect Ratio

You can specify the Input Aspect Ratio by using the **Presets** or **Manually**.

Using Presets

You can use Presets with the OSD or Remote Control preset buttons. Refer to the Preset sub-menu in the Input AR menu above for the OSD. The remote control operation is described below.

The following remote control buttons have not changed.

- **4:3**   Selects 4:3 Full Frame without OSD.
- **LBX**   Selects Letterbox without OSD.
- **16:9**   Selects 16:9 Full Frame without OSD.

The PRESET button functionality has changed from software version 2.32. Pushing the PRESET button now repeatedly selects Preset 1 through Preset 4 and User in sequence without using the On-Screen Display (OSD).

The four user-defined preset value selections (Preset 1 - 4) are stored in non-volatile memory and always available.

Each of these presets consists of the following:
- Frame Aspect Ratio
- Active Input Aspect Ratio
- Zoom parameter
- Pan parameter
- Borders

The User preset selection is also stored in non-volatile memory. However the User selection is always updated after you modify any pre-defined aspect ratio setting.   In order to permanently keep a custom aspect ratio setting, you must save it to one of the four preset selections.

Setting the Input Aspect Ratio Manually

You can set the following parameters manually:

- Frame Aspect Ratio
- Active Input Aspect Ratio
- Zoom factor
- Pan parameter
- Borders (horizontal and vertical)

NOTE: Typically you only need to select the Frame Aspect Ratio and Active Input Aspect Ratio to get an acceptable picture.

The Active Input Aspect Ratio menu item lists the most common movie aspect ratios (1.33:1, 1.85:1 and 2.35:1). You can also customize the Input Aspect Ratio using the **Up** and **Down** buttons.

You should save several commonly-used custom aspect ratios to one of the four available presets.

Zoom, **Pan** and **Borders** work in the same manner as the current HD+ software (Version 2.32).

- **Zoom** enlarges the image within the Active Output Area without affecting borders.

- **Pan** pans the input image within the Active Output Area.

- **Borders** are automatically added by the system when the Active Input Aspect Ratio is not the same as the Output Aspect Ratio as explained earlier in this addendum. However you can add more borders using the Borders menu.

You can save User-defined presets as follows:

- Customize the aspect ratio manually (refer to **Setting the Input Aspect Ratio Manually** above).
- Selects one of the presets from the **Save** menu. Confirm the action by selecting **Yes**.

Note: Be careful, because saving to a preset deletes the previous preset.

If you have not customized the aspect ratio, and the current aspect ratio settings are the same as a system defined preset, then the system will not allow you to save the preset setting.

Full Output Aspect Ratio Control

There are four controls for Output Aspect Ratio (OAR):
- Display Aspect Ratio
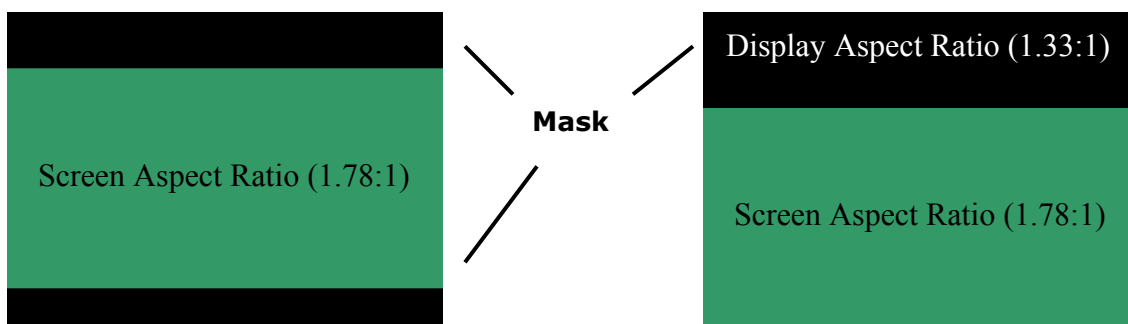- Screen Aspect Ratio
- Image Shift
- Underscan

The Display Aspect Ratio is the full aspect ratio of the display, normally specified in the display manual. Common display aspect ratios are 4:3 and 16:9. Less common ones are 5:4, 2.35:1 and others. The example below shows a 4:3 projector with a 16:9 screen.
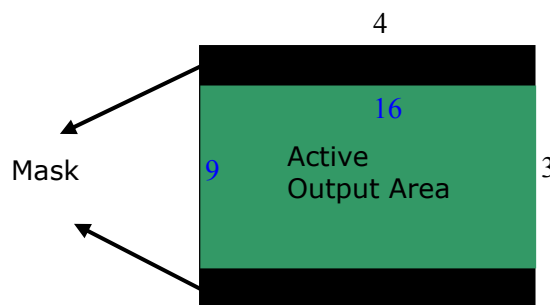
The region outside the Active Output area (called the *mask*) is inactive, and only important for creating video timing signals for the display. Input video data is never mapped to this region.

When the Display Aspect Ratio is not the same as Active Output Aspect Ratio, the mask is set to blanking levels and always centers the position of the active area over the display. area.

Image shift allows you to adjust the location of the image on your screen both horizontally and vertically when the 'Screen' aspect ratio is not equal to the 'Display' aspect ratio. The example below shows 4:3 projector (1.33:1) and a 16:9 screen (1.78:1), you can shift the image to match the exact location of your screen, in this situation the image is shifted down putting all of the mask at the top of the projected image.

Underscan represents the visible display area, a sub-set of the Active Output Area. Underscan is like a negative zoom which preserves the aspect ratio of the active area.
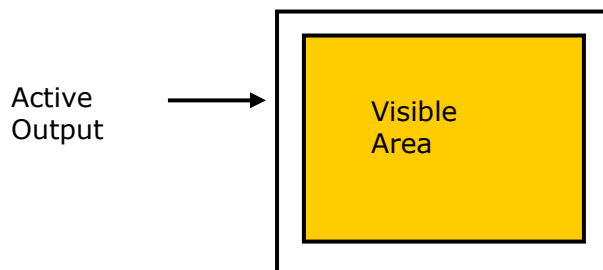
Front Panel and On-Screen Displays for OAR

The On-Screen Display (OSD) and the Front Panel Display (FPD) allow you to set the Output Aspect Ratio as shown in Table 3.

Table 3. OSD and FPD for Output Aspect Radio

					FPD	Description
Output Setup					OSET	
	Aspect Ratio				O_AR	
		Display			DISP	
			4:3		4/3	
			5:4		5/4	
			16:9		16/9	
			2.35:1		2.35	
			User	X.XX:1	X.XX	Default 1.78:1 (16:9) Enter a custom display AR by increasing or decreasing the current value with the **Up** or **Down** arrow on the remote control or Front Panel.
		Active			ACTV	
			4:3		4/3	
			16:9		16/9	
			2.35:1		2.35	
			User	X.XX:1	X.XX	Default 1.78:1 (16:9). Enter a custom active AR by increasing or decreasing from the current value using the **Up** arrow or **Down** arrow on the remote control or Front Panel.
		Shift				
			Horizontal	XX*	HOR	
			Vertical	XX*	VERT	
		Underscan			USCN	
				Slider Bar	XXX	Default 0. As you increase underscan, the smaller portion of the active display area appears while preserving the aspect ratio of the active display area.

Display Profiles

A display profile is a group of display parameters you can save and easily recall in the future. A display profile consists of a set of display parameter selected from the Output Setup menu. This includes the following:

- Output Type (Analog, DVI-Video, DVI-PC)
- Format (Resolution and all video output timing information)
- Output Aspect Ratio
- Color Space (YPbPr or RGB)
- Sync Type
- Frame Rate Conversion information

You can save up to four display profiles (Profile 1 through 4).

A current custom display profile (called User) is also stored in non-volatile memory. However it will be overridden when you make any modifications to the display profile. You should always save the current display profile to Profile 1 - Profile 4 to prevent the custom profile from being lost.

The **Display Profile** feature is only enabled when you set the User Mode to Advanced, just like the full control of output timing parameters in the Format menu. Table 4. shows the Display Profile OSD and FPD.

Factory default values for the four display profiles and User are as follows:

- Output Type   Analog
- Format   480p
- Output Aspect Ratio 16:9
- Active Output AR   16:9
- Color Space   YUV
- Sync Type   Bi-level
- Frame Rate   50Hz input, unlocked to 59.94, 60Hz input – locked.

Table 4. OSD and FPD for Display Profiles

				FPD	Description
Output Setup					
	Display Profile				
		Select			Select display profile
			Profile 1	PRO1	
			Profile 2	PRO2	
			Profile 3	PRO3	
			Profile 4	PRO4	
			User	USER	
		Save			Save a profile. Confirm with 'Enter'
			Profile 1	PRO1	
			Profile 2	PRO2	
			Profile 3	PRO3	
			Profile 4	PRO4	
		Auto			
			Off	OFF	
			On	ON	

Selecting and Saving a Display Profile

Use the following procedure to select and save a display profile:

a. Set up the profile by making changes to the output setup menu items. If you make custom settings (such as output timing parameters), they are saved to User.

b. Save the settings to a profile by selecting Profile 1 through 4 in the Save menu and pressing Enter.

c. Once the Profile is saved, the Save menu is grayed out until you make changes to the profile again.

Auto Linking of Input and Display Profiles

The **Auto** feature links a specific input to a display profile. To enable this feature, use **Output Setup -> Display Profile -> Auto**. When you select an input/format, the display profile used (Profile 1 through 4 or User) is saved in the saved input settings. When you turn Auto On, the system uses a display profile based on the selected input.

For example, suppose you choose Display Profile 1 using Video 1 input and Display Profile 2 using S-Video 1 input.
- With Auto set to On, when Video 1 is the active input, the system automatically uses Display Profile 1.
- When S-Video 1 is the active input, Display Profile 2 is used.

When **Auto** is Off, the selected display profile is used independently of the active input.

Non-Volatile Memory Settings

The iScan HD+ stores a variety of user settings in non-volatile memory. Non-volatile memory retains its contents when power is lost. There is one group of system settings and one group of user settings.

System Settings

Table 5. shows System settings.

Table 5. System Settings

Setting	Description
Display Profile	One of four display profiles or User
Auto Display Profile	If enabled, selects a display profile based on input selection
Active Input	One of many HD+ inputs or Auto Active Input
Auto StandBy	Off or On
Video Priority	Priority list of inputs when Auto Active Input is on
User Mode	Normal or Advanced
Border Level	Blank to quarter gray
DVI Input	Input mode is Automatic or Pass through
Power LED	On, Off or Auto.
Test Pattern Generator	Current selected test pattern
SDI Line Offset	One for 50Hz input and one for 60Hz input
Serial Port Bit Rate	Select an available baud rates.
HDCP Mode	Auto or On

Input/Format Settings

The iScan HD+ supports an independent set of saved settings based on input and format as shown in Table 6.

Table 6. Input/Format Settings

Settings	Input	Format
1	Composite 1	NTSC
2	Composite 2	PAL/SECAM
3	S-Video 1	NTSC
4	S-Video 2	PAL/SECAM
5	Component / RGBS 1	NTSC
6	Component / RGBS 1	PAL/SECAM
7	Component / RGBS 1	480p
8	Component / RGBS 1	576p
9	Component / RGBS 1	Pass-through [Note 1]
9	Component / RGBS 2	NTSC
10	Component / RGBS 2	PAL/SECAM
11	Component / RGBS 2	480p
12	Component / RGBS 2	576p
9	Component / RGBS 2	Pass-through [Note 1]
13	Analog Pass-through VGA	any [Note 1]
14	SDI	480i
15	SDI	576i
16	DVI	480p
17	DVI	576p
18	DVI	720p-50
19	DVI	720p-60
20	DVI	1080i-50
21	DVI	1080i-60
22	DVI	Pass-through [Note 1]

Note 1: Pass-through only stores audio selection and audio delay settings.

There is a separate set of settings not just for each input but for each format as well. This provides a lot of flexibility but is complex. For example, you can make settings for an input with an NTSC source, but when the source is changed to PAL, you must specify new settings.

Each input/format settings contains the information shown in Table 7.

Table 7. Format Settings

Setting		Description
Picture Control		
	Brightness	
	Contrast	
	Saturation	
	Hue	
	Sharpness	
	Chroma Error Correction	
	Y/C Delay	
Display Profile		Profile 1 - 4 or User
Audio Select		Audio 1 - 4
Audio Delay		
Overscan		
VCR Mode		
Film Mode		
Input AR Preset		Preset 1 - 4 or User Preset [Note 1]
User Preset	Frame AR	
	Active Input AR	Pre-defined or User AR
	User AR	
	Hor. Zoom	Hor. Zoom
	Vert. Zoom	Vert. Zoom
	Hor. Pan	Hor. Pan
	Vert. Pan	Vert. Pan
	Hor. Borders	Hor. Borders
	Vert. Borders	Vert. Borders

Note 1: There is only one set of presets (Preset 1 through Preset 4) for the whole system. However the User Preset is per input and per format.

Increased Range on Framerate Conversion

The range on the iScan HD+'s framerate conversion is no longer limited by the software. It is limited by the hardware. These ranges are shown in Table 8.

Table 8. Range on Framerate Conversion

Output Resolution	Analog Output Range	Digital Output Range
1280X960	25.00Hz -96.00Hz	25.00Hz – 111.00Hz
1440X960	25.00Hz – 72.00Hz	25.00Hz – 83.00Hz
1440X1152	25.00Hz – 60.00Hz	25.00Hz – 69.00Hz

RS232 Codes for New Features

TBD

Corrections to the iScan HD+ Product Guide (2.30)

The table on page 9 in the iScan HD+ Product Guide should read as follows.

Preset Formats and Characteristics for Analog Video Output

Horizontal Resolution	Vertical Resolution	Scan Type*	FPD shows	Sync Signal Line(s)	Sync Signal Type	Color-space
720	480	P	480P	Y	Bi-level	YPbPr
1920	540	P	540P	Y	Tri-level	YPbPr
720	576	P	576P	Y	Bi-level	YPbPr
1280	720	P	72P5	Y	Tri-level	YPbPr
1280	720	P	72P6	Y	Tri-level	YPbPr
1920	1080	I	18I5	Y	Tri-level	YPbPr
1920	1080	I	18I6	Y	Tri-level	YPbPr
1920	1080	P	18P5	Y	Tri-level	YPbPr
1920	1080	P	18P6	Y	Tri-level	YPbPr
640	480	P	VGA	H-V-	-	RGB
800	600	P	SVGA	H+V+	-	RGB
1024	768	P	XGA	H-V-	-	RGB
1280	1024	P	SXGA	H-V-	-	RGB
852	480	P	PLA1	H-V-	-	RGB
852	576	P	PLA2	H-V-	-	RGB
1366	768	P	PLA3	H-V-	-	RGB
1280	768	P	PLA4	H-V-	-	RGB
1024	1024	P	PLA5	H-V-	-	RGB
1024	852	P	PLA6	H-V-	-	RGB
1024	576	P	DLP1	H-V-	-	RGB
848	600	P	DLP2	H-V-	-	RGB
1365	1024	P	DIL1	H-V-	-	RGB
1400	1050	P	DIL2	H-V-	-	RGB
1400	788	P	DIL3	H-V-	-	RGB
960	540	P	LCD1	H-V-	-	RGB
1280	960	P	QUA1	H-V-	-	RGB
1440	960	P	QUA2	H-V-	-	RGB
1440	1152	P	QUA3	H-V-	-	RGB

*   P = progressive;   I = interlace