CalMAN Setup Guide

Cine-tal DAVIO

Rev. 1.1

Introduction

CalMAN takes advantage of Davio's 3D LUT processor features, as well as the internal test pattern Profile Generator, to calibrate up to a 65x65x65 3D cube LUT. This quick start guide assists you in setting up the Davio for use with the CalMAN Color Cube workflow.

CalMAN Recommended Workflows

- CalMAN V5.1.1 or later
- SI Basic workflow to optimize panel or projector Picture controls.
- Color Cube workflow to create display calibration 3D LUT for Davio.

Davio Required Software

- Davio Control software, version 2.0, or later
- Davio 1040 or 1050 system software package

Davio Control Connection

• Ethernet straight through (standard) cable

Davio Hardware Setup

CalMAN V5.1.1 and later automatically configures the Davio as both the Profile Generator (Test Pattern Source) and the Display Processor (Display Control), without connecting an external jumper cable. The Monitor under Calibration can be connected to either SDI OUT (1) or HDMI OUT.

- 1. Connect both the Davio and the CalMAN computer to a DHCP-capable network router with standard Ethernet cables.
- 2. Connect the Davio and the display to be calibrated as follows:



Davio Initial Software Setup

To set up a Davio for 3D LUT color calibration:

- 1. Install the Davio Control application software on your computer.
- 2. Start the Davio Control software.

On the Davio Control software DAVIO(s) tab:

- 3. Click the *Discover* button to find all Davios on the network, and then click *Connect*.
- 4. Select either the 1040 or 1050 Davio package.
- 5. Record the unit's IP address.



Configure Davio Input Color Space

On the Davio Control Inputs tab:

- 1. Under *Color Space* for all Davio inputs, select *Full* range. (The Davio Inputs and Outputs need to be set for Full range during 3D LUT calibration, even if you are calibrating for SMPTE range operation, and must be left in Full range, even for operation in a SMPTE signal path.)
- 2. Under 1D LUT for all Davio inputs, select "Reset."

😔 Davio Control: 1	.92.168.3.14 [Edit 1] - Packa	ge: 1050 [Dual 3D Calib]		
DAVIO(s) In	puts Outputs Marke	rs 3D LUTs Generator	Presets Parameters Pa	ackages About
SDI IN 1				
Status	No Input Signal		Select Input tak	э.
Color Space	YCbCr Full		Select VChCr Fi	ull - input 182
1D LUT	Reset		Sciect reserve	
			The	
			1 / /	
SDI IN 2				
Status	No Input Signal			
Color Space	YCbCr Full	*		
1D LUT	Reset	•		
	Genlock Source			
HDMI IN				
Status	No Input Signal	//		
Color Space				
10.117	Dent			
IDLOI	Reset	•		
Input Setup				
Link Auto	Detect	•	Master Mode	SDI 2 Master 👻
OK				
UK				Refresh Exit

Or, from the Davio front panel



a. Right until LCD reads "SDI In 1"

- b. Down then right LCD Read "CSC Matrix"
- c. +/- until LCD Reads "CSC Matrix YCbCr Full"
- d. Right until LCD reads "1D LUT File"
- e. +/- until LCD Reads "1D LUT File Reset"
- f. (Repeat for SDI Input 2 and HDMI Input)

Configure Davio Output Color Space

On the Davio Control *Outputs* tab:

- 1. Under *Color Space* for all Davio outputs, select *Full* range. (The Davio Inputs and Outputs need to be set for Full range during 3D LUT calibration, even if you are calibrating for SMPTE range operation, and must be left in Full range, even for operation in a SMPTE signal path.)
- 2. Under 1D LUT for all Davio outputs, select "Reset."

Davio Control: 1	92.168.3.14	[Edit 1]	- Package:	1050 [Dual 3	D Calib]					×
DAVIO(s) In	puts Out	puts	Markers	3D LUTs	Generator	Presets	Parameters	Packages	About	
SDI OUT 1										
Source	SDI Input 1	L			•					
Color Space	YCbCr Full				•		\searrow	Select O	utputs tab.	
1D LUT	Reset				•		-			
								Select Y	CbCr Full - out 1	.&2
301 001 2										
Source	SDI Input 2	2			-					
Color Space	YCbCr Full				•					
1D LUT	Reset				•					
HDMI OUT						//				
Source	HDMI Inpu	t	Color I	Depth 8-bit						
Color Space	DL RGB Fu	II			•					
1D LUT	Reset				•					
Output Sotu	n									
Link Same	As Input		•							
	erride									
	ennue									
OK									and the second	
UK								Refr	esn Exit	

Or, from the Davio front panel



- a. Right until LCD reads "SDI Out 1"
- b. Down then right LCD reads "CSC Matrix"
- c. +/- until LCD reads "CSC Matrix YCbCr Full"
- d. Right until LCD reads "1D LUT File"
- e. +/- until LCD reads "1D LUT File Reset"
- f. (Repeat for SDI Output 2 and HDMI Output)

Bypass Davio 3D LUT

On the Davio Control 3D LUTs tab:

- 1. Under *3D LUT Source*, select the Profile Generator.
- 2. Select the desired 3D LUT slot and set it either to a unity LUT or to Unloaded.

💽 Davio Control: 192.168.3.14 [Edit 1] - Package: 1050 [Dual 3D Calib]	
DAVIO(s) Inputs Outputs Markers 3D LUTs Generator	Presets Parameters Packages About
3D LUT 1 3D LUT Source Profile Generator	Quad Split
Select 3D LUT Slot 1 Olunity.clt (Olunity) Slot 2 UNLOADED SLOT 1 Slot 3 UNLOADED SLOT 2 Slot 4 UNLOADED SLOT 3 Quad Split Load LUT to Current Slot	Set 3D LUT Source to Profile Gen.
3D LUT 2 3D LUT Source SDI Input 2	Quad Split
Slot 1 Olunity.clt (01unity) Slot 2 UNLOADED SLOT 1 Slot 3 UNLOADED SLOT 2 Slot 4 UNLOADED SLOT 3	Quad Split Enable
Quad Split	

Or, from the Davio front panel



- a. Right until LCD reads "3D LUT 1"
- b. Down LCD reads "Select 3D LUT"
- c. +/- until LCD reads "Unity LUT filename "
- d. Right until LCD reads "3D LUT 1 Source"
- e. +/- until LCD reads "Profile Generator"

Configure Davio Output Source

1. On the Davio Control *Outputs* tab, for either *SDI Out* or *HDMI Out* (whichever is connected to the monitor) set the *Source* to *3D LUT 1*.

😔 Davio Control: 🛛	192.168.3.14 [Edit 1] - Package:	1050 [Dual 3D) Calib]				_ _ ×
DAVIO(s) In	outputs	Markers	3D LUTs	Generator	Presets	Parameters	Packages	About
-SDI OUT 1-								
Source	3D LUT 1			▼.				
Color Space	YCbCr Full							
1D LUT	Reset			•				
					Set the	e Source for S	DI Out or H	DMI
SDI OUT 2				(Out to	3D LUT		
Sourco								
Color Space								
				-				
ID LUI	Reset							
-HDMI OUT-								
Source	3D LUT 1	✓ Color [Depth 8-bit	•				
Color Space	DL RGB Full			•				
1D LUT	Reset			•				
Output Setu	up							
Link Same	e As Input	•						
VPID Ov	verride							
ОК							Refr	esh Exit

Or, from the Davio front panel



- a. Right until LCD reads "SDI Out 1"
- b. Down LCD reads "SDI Out 1 Source"

- c. +/- until LCD reads "3D LUT 1"
- d. Right until LCD reads "HDMI Out"
- e. Down LCD reads "HDMI Out Source"
- f. +/- until LCD reads "3D LUT 1"

Verify Davio Setup

Verify your Davio signal routing.

On the Davio Control Generator tab:

1. Select different Patch Sizes and Patch Colors on the *Generator* tab and confirm the changes on the connected display to be calibrated.



CalMAN 3D LUT Display Calibration – Hardware LUT Load

CalMAN can calibrate the 3D LUT in the Davio either by automatically loading a LUT directly into the Davio with a hardware connection or by creating a software 3D LUT file and then using the Davio Control software to manually load the LUT file into the Davio.

- To create a software LUT file, skip to the *Software LUT File* section, below.
- To use a direct hardware connection to produce an optimized 3D LUT calibration file and automatically load it into a Davio:
- 1. In CalMAN, load the "Color Cube (3D LUT)" workflow.
- 2. On the CalMAN Settings tab (gear icon), under Workflow Basic Options, select either *Video (16-235)* [SMPTE legal] or *PC (0-255)* [Full] to match the intended signal levels to be sent to the display.
- 3. Proceed through each step of the workflow in the normal fashion, using the following notes for guidance on the indicated workflow pages.
- 4. On the *LUT Device Setup* page, Click the *Find Processor/Display* button, and then select " Cine-tal Davio (Ethernet)."
- 5. On the *Dynamic Range* page, adjust the display's black level/Brightness control to the black level of the signal content that will be processed through the Davio (16 for video or 0 for PC/full range).
- 6. On the *RGB Adjust* page, under the *Two Point Levels* selection, select "2 Point 30, 100%." Click *Read* Continuous and adjust the display's RGB Gain controls for RGB balance at 100%. Adjust the display's RGB Offset/Bias controls (if provided) for RGB balance at 30%.
- 7. Skip the *Calibrate RGB Balance* page (a 1D LUT does not need to be created).
- 8. On the *Calibrate 3D Cube LUT* page, click the *AutoCal* (rotating arrows) button at the right end of the meter action buttons. The *AutoCal Setup* dialog then appears (see below).

AutoCal Setup	
Hardware Properties	
Video Hardware: Active Grayscale Points CMS Control: Hardware 3D LUT Size: VirtualLUT:	Cube Generator 14 - Video (16-235) None 65 Points 8 Bits
Cube Generator Output	
File Format	CineTal - Davio (.clt) 🔻
Output Cube Size	65 Points 🔹
Bit Depth	10 -
File Path	3D LUT 201411201645
Pattern Delay	
Delay	0.5 Optimize
Reads Average	1.27 seconds per read
Cube 3D LUT Settings	
Calibration Type:	IR Profile (time based)
Profile Time	67 Minutes (2000 reads est.)
Video Range:	SMPTE (16-235) 🔹
Profile Path	Profile 201411201645.cpfx
	OK Cancel

- 9. Under *File Path*, select the desired directory path and provide a name for the LUT file that CalMAN will create (e.g. monitor ID and date).
- 10. Under *Calibration Type*, select the desired type of 3D LUT calibration process.
 - IR Profile (time based): Creates the best quality display calibration 3D LUT possible in the selected period of time. You select how much display quality you have time for, from 30 minutes to maximum display quality (6,000 points max). Uses Intelligent Resolution Profiling to search out the most nonlinear color space areas and correct those first.
 - IR Profile (point based): Creates the best quality display calibration 3D LUT possible with the selected number of measurement points (1,000 10,000 points). Uses Intelligent Resolution Profiling to search out the most nonlinear color space areas and correct those first.
 - Lightning LUT: Creates a display calibration 3D LUT in five minutes or less. Produces a very high quality result on professional displays with moderate linearity. Displays with significant nonlinearity may produce marginal results.
- 11. Under Video Range, select "SMPTE (16-235)" if you are calibrating a video display that clips or compresses signals above reference white, as tested on the CalMAN Dynamic Range page.
- 12. Click OK.

Upon completion of the AutoCal 3D hardware LUT calibration process, CalMAN automatically loads the optimized 65x65x65 LUT calibration data into the Davio.

DONE – Davio 3D LUT calibration and setup is complete.

CalMAN 3D LUT Display Calibration – Software LUT File

To produce an optimized software 3D LUT calibration file, ready to be manually loaded into a Davio:

- 1. In CalMAN, load the "Color Cube (3D LUT)" workflow.
- 2. On the CalMAN Settings tab (gear icon), under Workflow Basic Options, select either *Video (16-235)* [SMPTE legal] or *PC (0-255)* [Full] to match the intended signal levels to be sent to the display.
- 3. Proceed through each step of the workflow in the normal fashion, using the following notes for guidance on the indicated workflow pages.
- 4. On the *Session Setup* workflow page, under *Find Source*, select "Cine-tal Davio (Ethernet)." Enter the Davio IP address in the edit box, and then click *Connect*.

Source	
Manufacturer:	Cine-tal
Model:	Cine-tal - Davio (Ethernet)
Socket Connec	tion
IP Address	Port 0
000.000.000.00	10
	Connect

- 5. On the *Session Setup* page, under *Find Display*, select "SpectraCal Cube Generator (3D LUT)."
- 6. On the *Dynamic Range* page, adjust the display's black level/Brightness control to the black level of the signal content that will be processed through the Davio (16 for video or 0 for PC/full range).
- On the RGB Adjust page, under the RGB Adjust Levels selection, select "2 Point 30, 100%." Click Read Continuous and adjust the display's RGB Gain controls for RGB balance at 100%. Adjust the display's RGB Offset/Bias controls (if provided) for RGB balance at 30%
- 8. Skip the 1D Ramp LUT page (a 1D LUT does not need to be created).
- On the 3D Cube LUT page, click the AutoCal action button in the lower right. On the popup AutoCal Setup dialog (shown below), under File Format, select "CLT – Cine-tal Davio" (CalMAN creates a 65x65x65 point 10-bit 3D LUT file).

AutoCal Setup	
Hardware Properties	
Video Hardware: Active Grayscale Points CMS Control: Hardware 3D LUT Size: VirtualLUT:	Cube Generator 14 - Video (16-235) None 65 Points 8 Bits
Cube Generator Output	
File Format	CineTal - Davio (.clt) 🔻
Output Cube Size	65 Points 🔹
Bit Depth	10 -
File Path	3D LUT 201411201645
Pattern Delay	
Delay	0.5 Optimize
Reads Average	1.27 seconds per read
Cube 3D LUT Settings	
Calibration Type:	IR Profile (time based)
Profile Time	67 Minutes (2000 reads est.)
Video Range:	SMPTE (16-235) 👻
Profile Path	Profile 201411201645.cpfx
	OK Cancel

 Also on the AutoCal Setup dialog, under File Path, click the [...] button to select a convenient location for the LUT file that CalMAN will create. Name the .clt file to identify the monitor and the date.

Upon completion of the AutoCal 3D software LUT calibration process, CalMAN automatically writes the optimized LUT calibration data to a Davio .clt format 65x65x65 LUT file in the selected drive location.

Davio Final Setup

When CalMAN completes its automatic 3D LUT calibration, the created software LUT file is ready to be loaded into the Davio. On the Davio Control *3D LUTs* tab:

- 1. Under 3D LUT Source, select your source input.
- 2. Under *Select 3D LUT*, select the desired LUT slot.
- 3. Click the *Load LUT to Current Slot* button, navigate to the saved LUT file, and load the LUT.

				_	Ou	ad Split		
3D LUT So	SDI Input 1		▼,		4.	de opne		
	Select	3D LUT			Set 3D L	UT Source.		
Slot 1 🔘	1_416504.clt		\sim	7				
Slot 2 🔘	1_416504.CLT							
Slot 3 🔘	UNLOADED SLOT 2							
Slot 4 🔘	UNLOADED SLOT 3						- 1 -	
0.0)uad Split	Load UIT to C	Surrent Slot					
0	and ohin		unent slot					
D LUT 2								
D LUT 2 3D LUT Sc	ource SDI Input 2		•		Qu	ad Split		
D LUT 2 3D LUT Sc	ource SDI Input 2	: 3D LUT	•		Qu	ad Split	50	
D LUT 2 3D LUT So Slot 1 @	SDI Input 2 Select	: 3D LUT	•		Qu	a d Split	50	
D LUT 2 3D LUT So Slot 1 (0) Slot 2 (0)	SDI Input 2 Select 1_416504.clt 1 416504.CLT	: 3D LUT	· ·		Qu	a d Split Enable	50	
D LUT 2 3D LUT So Slot 1 @ Slot 2 ©	SDI Input 2 Select 1_416504.clt 1_416504.CLT	: 3D LUT	•		Qu Quad Split	a d Split Enable	50	
D LUT 2 3D LUT So Slot 1 (a) Slot 2 (b) Slot 3 (c) Slot 4 (c)	SDI Input 2 Select 1_416504.clt 1_416504.CLT UNLOADED SLOT 2	: 3D LUT			Quad Split	a d Split Enable	50	
D LUT 2 3D LUT So Slot 1 @ Slot 2 © Slot 3 © Slot 4 ©	DURCE SDI Input 2 Select 1_416504.clt 1_416504.CLT UNLOADED SLOT 2 UNLOADED SLOT 3	: 3D LUT	· · · · · · · · · · · · · · · · · · ·		Quad Split	ad Split		
D LUT 2 3D LUT So Slot 1 (a) Slot 2 (b) Slot 3 (c) Slot 4 (c) (c)	SDI Input 2 Select 1_416504.clt 1_416504.CLT UNLOADED SLOT 2 UNLOADED SLOT 3 Quad Split	: 3D LUT	· · · · · · · · · · · · · · · · · · ·		Quad Split	a d Split Enable	50	

With your normal video source signal connected to the Davio input and with a Davio output connected to your monitor, select proper routing of the Davio 3D LUT to the monitor output. On the Davio Control *Outputs* tab:

- 1. Under *Source*, select the desired 3D LUT.
- 2. Under *Color Space*, select Full range. (The Davio Inputs and Outputs need to be set for Full range during 3D LUT calibration, even if you are

calibrating for SMPTE range operation, and must be left in Full range, even for operation in a SMPTE signal path.)

3.	Under	1D	LUT.	select	"Reset."
	onaci	10	201,	201000	neset.

Davio Control: 192.168.3.14 [Edit 1] - Package: 1050 [Dual 3D Calib]	
DAVIO(s) Inputs Outputs Markers 3D LUTs Generator Presets Parameters	Packages About
SDI OUT 1	
Source 3D LUT 1	
Color Space YCbCr Full	
1D LUT Reset	Source to 3D LUT.
Set Color Sp	pace to Full.
SDI OUT 2	
Source 3D LUT 1	
Color Space YCbCr Full	
1D LUT Reset	
HDMI OUT	
Source 3D LUT 1 Color Depth 8-bit	
Color Space DL RGB Full	
1D LUT Reset	
Autout Satun	
Link Same As Input	
VPID Override	
OK	Defeate Date

DONE – Davio 3D LUT calibration and setup is complete.

About / Contact

About Portrait Displays

Portrait Displays, Inc., since 1993, is a leading application software provider (ASP) for PC, smartphone, and tablet displays. The Portrait Displays team now includes **SpectraCal**, the world's leading provider of video display calibration software. The combined companies offer value-added, feature-rich solutions to both OEM display manufacturers and end users seeking improved accuracy and manageability of their displays.

Portrait Displays, an Intel Capital Portfolio company, is a private corporation with headquarters in Pleasanton, California, USA with representatives in Europe, Taiwan, China, Japan, and Korea.

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