

HDRScope v7

User Guide



July 10, 2025

1 Copyrights and Trademark Notices.....	8
1.1 General.....	8
1.2 GNU LESSER GENERAL PUBLIC LICENSE.....	17
1.2.1.1 0. Additional Definitions.....	17
1.2.1.2 1. Exception to Section 3 of the GNU GPL.....	17
1.2.1.3 2. Conveying Modified Versions.....	17
3. Object Code Incorporating Material from Library Header Files.....	18
4. Combined Works.....	18
5. Combined Libraries.....	19
6. Revised Versions of the GNU Lesser General Public License.....	19
1.3 MPEG Disclaimers.....	20
1.3.1 MPEGLA MPEG2 Patent.....	20
1.3.2 MPEGLA MPEG4 VISUAL.....	20
1.3.3 MPEGLA AVC.....	20
1.3.4 MPEG4 SYSTEMS.....	20
1.4 Drastic Technologies Limited Warranty and Disclaimers.....	21
1.4.1 Warranty Remedies.....	21
1.4.2 Software Updates.....	21
1.4.3 Restrictions and Conditions of Limited Warranty.....	21
1.4.4 Limitations of Warranties.....	22
1.4.5 Damages.....	22
2 Introduction.....	23
2.1 Conventions.....	23
2.2 About HDRScope.....	24
2.3 System Requirements.....	26
2.3.1 Recommended Environment.....	26
3 Reference.....	27
3.1 Main Interface Overview.....	27
3.1.1 Audio Controls and Displays.....	28
3.1.1.1 Loudness Settings.....	28
3.1.1.2 Hold Peak/RMS.....	30
3.1.1.3 MaxFall/MaxCLL.....	31
3.1.2 Freeze Field/Frame.....	32
3.1.3 Line Select.....	33
3.1.4 Status Display.....	34
3.2 Scopes Layout and Setup.....	35
3.2.1 Layout Options.....	35
3.2.1.1 Single Scope Layout.....	36
3.2.1.2 Two Scopes Layout.....	37
3.2.1.3 Four Scopes Layout.....	38
3.2.1.4 Six Scopes Layout.....	39
3.2.2 Picture View.....	40
3.2.3 Vectorscope.....	43
3.2.3.1 Vectorscope Setup.....	43
3.2.3.2 Vectorscope Window.....	45
3.2.4 Waveform YCbCr.....	46
3.2.4.1 Waveform YCbCr Setup.....	46

3.2.4.1.1 Show Parade.....	47
3.2.4.1.2 Overlay.....	47
3.2.4.1.3 Only Luma.....	48
3.2.4.1.4 Scope White.....	49
3.2.4.1.5 Scale Type.....	50
3.2.4.1.6 Max HDR.....	51
3.2.4.1.7 High/Low.....	52
3.2.4.2 Waveform YCbCr Window.....	53
3.2.5 Waveform RGB.....	55
3.2.5.1 Waveform RGB Setup.....	55
3.2.5.1.1 Show Parade.....	56
3.2.5.1.2 Overlay.....	57
3.2.5.2 Waveform RGB Window.....	59
3.2.6 YCbCr Histogram.....	60
3.2.6.1 YCbCr Histogram Setup.....	60
3.2.6.2 YCbCr Histogram Window.....	62
3.2.7 RGB Histogram.....	63
3.2.7.1 RGB Histogram Setup.....	63
3.2.7.2 RGB Histogram Window.....	65
3.2.7.3 HSV Histogram Setup.....	66
3.2.7.4 HSV Histogram Window.....	68
3.2.8 Luma Histogram.....	69
3.2.8.1 Luma Histogram Setup.....	69
3.2.8.2 Luma Histogram Window.....	71
3.2.9 H/S Scope.....	72
3.2.9.1 H/S Scope Setup.....	72
3.2.9.2 H/S Scope Window.....	74
3.2.9.3 H/S Scope Example.....	75
3.2.10 Chromaticity.....	77
3.2.10.1 Chromaticity Setup.....	77
3.2.10.2 Chromaticity Window.....	79
3.2.11 Status Window.....	82
3.2.11.1 Status Setup.....	82
3.2.11.2 Status Window.....	83
3.2.12 Anc Monitor Window.....	85
3.2.12.1 Anc Monitor Setup.....	85
3.2.12.2 Anc Monitor Window.....	86
3.2.13 Audio Vector.....	88
3.2.13.1 Audio Vector Setup.....	88
3.2.13.2 Audio Vector Window.....	90
3.2.14 Audio Phase.....	93
3.2.14.1 Audio Phase Setup.....	93
3.2.14.2 Audio Phase Window.....	95
3.2.15 Audio Histogram.....	96

3.2.15.1 Audio Histogram Setup.....	96
3.2.15.2 Audio Histogram Window.....	98
3.2.16 Audio Wave.....	99
3.2.16.1 Audio Wave Setup.....	99
3.2.16.2 Audio Wave Window.....	101
3.2.17 Audio Meters.....	102
3.2.17.1 Audio Meters Setup.....	102
3.2.17.2 Audio Meters Window.....	105
3.2.18 Loudness Meter.....	106
3.2.18.1 Loudness Meter Setup.....	106
3.2.18.2 Loudness Meter Window.....	110
3.2.19 Surround Meter.....	111
3.2.19.1 Surround Meter Setup.....	111
3.2.19.2 5.1 Surround Sound Window.....	113
3.2.19.3 7.1 Surround Sound Window.....	114
3.3 System Configuration Window.....	115
3.3.1 IP Video Setup.....	117
3.3.2 Video Input.....	117
3.3.3 12G Type.....	117
3.3.4 Video Format.....	118
3.3.5 Color Format.....	118
3.3.6 Primaries.....	118
3.3.7 Transfer.....	119
3.3.8 Picture Mode.....	119
3.3.9 Down Convert.....	119
3.3.10 Output.....	120
3.3.11 Closed Caption.....	120
3.3.12 Audio Input.....	121
3.3.13 Audio Scale.....	121
3.3.14 Board Type.....	121
3.3.15 Board Select.....	122
3.3.16 Preferred Scan.....	123
3.3.17 Active Region.....	123
3.3.18 Auto Follow Input.....	123
3.3.19 Scope Vblank.....	123
3.3.20 Play Audio Computer Speakers.....	124
3.3.21 Audio Channels.....	124
3.3.22 Audio Pairs.....	124
3.3.23 Check for New Versions on Startup.....	124
3.3.24 Check For Updates.....	125
3.3.25 License.....	126
3.3.26 Done.....	127
3.4 IP Setup.....	128
3.5 Display Modes.....	129
3.5.1 Off.....	130
3.5.2 Luma Only.....	131
3.5.3 Red Only.....	132
3.5.4 Green Only.....	133
3.5.5 Blue Only.....	134

3.5.6 Zebra Luma.....	135
3.5.7 Zebra Chroma.....	136
3.5.8 Clipping.....	137
3.5.9 Edge Difference.....	138
3.5.10 Focus Assist.....	139
3.5.11 Calibrate.....	140
3.5.12 Flip Flop.....	141
3.5.13 Show Alpha.....	144
3.5.14 Opacity.....	145
3.5.15 Luma Key.....	146
3.5.16 Green Screen Key.....	147
3.5.17 Chroma Key Despill.....	148
3.5.18 Chroma Key Simple.....	149
3.5.19 False Colour.....	150
3.5.20 Display Modes Keyboard Controls.....	152
3.6 Manual.....	153
3.7 Capture Frame.....	153
3.8 Data View.....	155
3.8.1 Color Coded Values display.....	157
3.9 Web Page.....	162
3.10 HDRScope Web Interface.....	163
3.10.1 Select Scope.....	164
3.10.2 Configure.....	166
3.10.2.1 Picture.....	168
3.10.2.2 Vector.....	169
3.10.2.3 Waveform RGB.....	170
3.10.2.4 Waveform YCbCr.....	171
3.10.2.5 Histogram.....	172
3.10.2.6 Chromaticity.....	174
3.10.2.7 ANC Monitor.....	176
3.10.2.8 Status.....	177
3.10.2.9 Audio Vector Scope.....	177
3.10.2.10 Audio Phase Scope.....	178
3.10.2.11 Audio Histogram Scope.....	179
3.10.2.12 Audio Wave Scope.....	180
3.10.2.13 Audio Meters Scope.....	180
3.10.2.14 Surround Sound Scope.....	181
3.11 Event Log.....	183
3.11.1 Audio/Video Event Sensitivity.....	185
3.11.1.1 Vertical Line Repetition.....	185
3.11.1.2 Missing Lines.....	187
3.11.1.3 Missing Edges.....	188
3.11.1.4 Black and White.....	190
3.11.1.5 Still Frames.....	191
3.11.1.6 Broadcast Illegal.....	192
3.11.1.7 Oversaturation.....	193
3.11.1.8 Contrast Blacks.....	194

3.11.1.9 Gamut Over.....	195
3.11.1.10 Gamut Under.....	196
3.11.1.11 Loudness.....	197
3.11.1.12 Silence.....	198
3.11.1.13 Y Component.....	199
3.11.1.14 U Component.....	200
3.11.1.15 V Component.....	201
3.11.1.16 Single Color.....	202
3.11.2 Ancillary Data Streams Sensitivity.....	204
3.11.2.1 Supported Data Stream Types.....	205
3.12 Area Select.....	210
3.13 License.....	211
3.13.1 How Do I Remove the Watermarks?.....	212
3.13.2 How to license the system.....	213
3.14 Audio Routing.....	214
4 Setup.....	216
4.1 Install the Software.....	216
4.2 License the Software.....	216
4.3 Run the Software.....	217
4.3.1 Confirm Setup.....	217
4.4 Using Avid and Adobe ScopeDirect Plugins.....	218
4.4.1 Note on macOS ScopeDirect Plugins.....	218
4.4.2 Using ScopeDirect in Adobe.....	219
4.4.3 Using ScopeDirect in Avid.....	221
4.4.4 Using ScopeDirect in OpenFX.....	223
4.5 Color Space and HDR/HLG in HDRScope.....	226
4.5.1 Input Color - YCbCr (YUV) and RGB.....	226
4.5.2 Primaries.....	226
4.5.3 Transfer Characteristics.....	228
4.6 Turning Off Background Programs in Linux.....	229
4.6.1 Disable Hibernate, Sleep.....	229
4.6.2 Disable Kernel Updates.....	229
4.6.3 Set Default Kernel.....	229
5 Operations.....	230
5.1 Controlling HDRScope.....	230
5.1.1 Zoom and Pan.....	230
5.1.2 Mouse Control.....	230
5.1.3 Making Marks/Guides (cross, line and box).....	232
5.1.4 Frame Compare.....	232
5.1.5 Command Line Parameters.....	233
5.1.6 Set Layout.....	233
5.1.7 Capture Image.....	233
5.1.8 Other Features.....	234
5.2 HDRScope Front Panel Controller.....	235
5.2.1 Controls and Displays.....	235
5.2.2 Scope Selection.....	235
5.2.3 Change Settings For the Scope.....	235
5.2.4 Change the Scope.....	236
5.2.5 Audio Meters.....	236

5.2.6 The Scopes and Settings.....	236
5.2.7 Adding Picture Scope.....	239
5.2.8 Adding Vector Scope.....	239
5.2.9 Adding Waveform YCbCr Scope.....	239
5.2.10 Adding Waveform RGB Scope.....	240
5.2.11 Adding Histogram Scope.....	240
5.2.12 Adding Chromaticity Scope.....	240
5.2.13 Adding Status Scope.....	240
5.2.14 Adding Audio Phase Scope.....	241
5.2.15 Adding Audio Wave Scope.....	241
5.3 Configuring the Crystalfontz Front Panel Linux.....	242
5.3.1 Permission Commands.....	242
5.3.2 Disabling the Front Panel Controller.....	243
6 REST API Commands.....	244
6.1 Basic Command Structure.....	244
6.1.1 Number of Scopes.....	245
6.1.2 Set/Get Individual Scopes.....	246
6.1.3 Set/Get Audio Meters.....	247
6.1.4 Set/Get Scope Settings.....	248

1 Copyrights and Trademark Notices

1.1 General

Copyright 2025, Drastic Technologies Ltd. All rights reserved worldwide. No part of this publication may be reproduced, transmitted, transcribed, altered, or translated into any languages without the written permission of Drastic Technologies. Information and specifications in this document are subject to change without notice and do not represent a commitment on the part of Drastic Technologies.

A&E Television Networks - A&E Networks is a trademark of A&E Television Networks

Adobe, Inc. - Adobe, the Adobe logo, Adobe Premiere, Adobe After Effects, Creative Cloud, Frame.io, and Iridas are either registered trademarks or trademarks of Adobe in the United States and/or other countries.

Advanced Micro Devices, Inc. - AMD is a trademark of Advanced Micro Devices, Inc.

ADVANTECH CO., LTD - ADVANTECH and B&B are trademarks of ADVANTECH CO., LTD

AES Audio Engineering Society - AES and Audio Engineering Society are trademarks of the Audio Engineering Society

aescripts + aeplugins - ZXPIInstaller Copyright aescripts + aeplugins 2023

AIMS Alliance - The AIMS Alliance is a trademark of Alliance for IP Media Solutions (AIMS).

AJA Video Systems, Inc. - AJA® is a registered trademark of AJA Video Systems, Inc. AJA™ is a trademark of AJA Video Systems, Inc. Corvid Ultra®, KONA®, IO®, KUMO®, U-Tap®, and T-Tap® are registered trademarks of AJA Video Systems, Inc.

Amazon Web Services, Inc. - Amazon, AWS and Smile Logo, Powered by AWS Logo, AWS Co-Marketing Tools, the Partner Logo, the Program Marks, Amazon Web Services, AWS, AWS S3, and the names of AWS products, services, programs, and initiatives are trademarks or registered trademarks of Amazon Web Services, Inc.

Amberfin Limited - AMBERFIN is a trademark of Amberfin Limited.

AMERICAN BROADCASTING COMPANIES, INC - ABC is a trademark of AMERICAN BROADCASTING COMPANIES, INC

American Cinematographer - The ASC, American Cinematographer and Friends of the ASC are trademarks of the American Society of Cinematographers. (All rights reserved)

AMWA Advanced Media Workflow Association, Inc. - Copyright © 2025 AMWA – Advanced Media Workflow Association. All rights reserved.

Animation Magazine - © 2025 Animation Magazine. All Rights Reserved. The Business, Technology & Art Of Animation And VFX

Apple Inc. - Apple, the Apple logo, Final Cut, Final Cut Pro, Apple TV, iOS, iPad, iPhone, iPod touch, iTunes, Mac, Mac OS X, macOS, Shake, Final Cut Pro, ProRes, High Sierra, Mojave, Ventura, Sonoma, M1, M2, and QuickTime are trademarks of Apple Inc., registered in the U.S. and other countries. OpenCL and the OpenCL logo™ are trademarks owned by Apple Inc. and licensed to the Khronos Group.

ARRI AG – ARRI, Arri T-Link, and Alexa are registered trademarks of the ARRI Group

ASSIMILATE® Inc. - Assimilate SCRATCH and Assimilate SCRATCH Lab are either trademarks

or registered trademarks of ASSIMILATE® Inc. or its subsidiaries in the United States and/or other countries.

ATI TECHNOLOGIES ULC - ATI is a trademark of ATI TECHNOLOGIES ULC

ATSC: The Broadcast Standards Association - © 2025 ATSC Advanced Television Systems Committee, Inc.

Autodesk, Inc. - Autodesk, Discreet, Flame, Flare, Smoke, Lustre, Maya, and Moxion are either trademarks or registered trademarks of Autodesk, Inc. or its subsidiaries in the United States and/or other countries.

Avid Technology, Inc. - Avid Media Composer®, Avid MediaCentral®, Avid Interplay®, ProTools®, and Avid NewsCutter® are either trademarks or registered trademarks of Avid Technology, Inc. or its subsidiaries in the United States and/or other countries.

Axis Communications AB - Axis is a registered trademark of Axis Communications AB

Bell Media Inc. - Bell Media, BNN, CP24, CTV, CTV TWO, Much, MuchMusic and The Comedy Network, and all associated designs and logos are trademarks of Bell Media Inc.

Belle Nuit Montage - Matthias Bürcher August 2000-2016. All rights reserved. Written in Switzerland. Starting 2016 Belle Nuit Subtitler is released under the GNU Lesser General Public License

BirdDog Software Corporation - BIRDDOG is a trademark of BirdDog Software Corporation

Blackmagic Design Pty. Ltd. - DaVinci Resolve, DaVinci Fusion, UltraStudio, DeckLink, Intensity Pro 4K, UltraScope, and RED are either trademarks or registered trademarks of Blackmagic Design Pty. Ltd. or its subsidiaries in the United States and/or other countries.

Bluefish Technologies - Bluefish444, IngeSTore, Symmetry, Kronos, Epoch, Epoch:Neutron, Fury, Lust, Vengeance HD, Deepblue, Envy SD, and Epoch:SuperNova are trademarks of Bluefish Technologies

Boris FX, Inc. - Boris FX, Sapphire, and Silhouette are trademarks of Boris FX, Inc.

Bridge Digital, Inc. - Bridge Digital is a trademark of Bridge Digital, Inc..

Bridge Technologies Co AS - Bridge Technologies is a trademark of Bridge Technologies Co AS

Bright Technologies, Inc. - Bright and Bright Systems are trademarks of Bright Technologies, Inc.

British Broadcasting Corporation - BBC is a trademark of British Broadcasting Corporation

Broadcast Beat - © 2025 Relevant Media Properties, LLC. All Rights Reserved.

BT Group plc - BT is a trademark of BT Group plc

Cable News Network, Inc. - CNN is a trademark of Cable News Network, Inc.

Canadian Federal Institutions - Official symbols of federal institutions, including the Arms of Canada may not be reproduced, whether for commercial or non-commercial purposes, without prior written authorization.

CANON KABUSHIKI KAISHA - CANON is a trademark of CANON KABUSHIKI KAISHA

Catapult Group International Ltd - Catapult is a trademark owned by Catapult Group International Ltd

Changsha Kiloview Electronics Co., Ltd - KILOVIEW is a trademark of Changsha Kiloview Electronics Co., Ltd

Charter Communications Inc. - Charter Communications is a trademark of Charter

Communications Inc.

CineSys LLC – CineSys is a registered trademark of CineSys LLC.

Cisco Systems, Inc. - Cisco, and Webex are registered trademarks of Cisco Systems, Inc.

Cloudfirst Technology Solutions Inc. - Cloudfirst is a registered trademark of Cloudfirst Technology Solutions Inc.

Cobalt Digital - Cobalt Digital is a registered trademark of Cobalt Digital Inc.

Codex Corporation - CODEX and Action Cam are trademarks of Codex Corporation

Comcast Corporation - Sky UK Limited is a wholly owned subsidiary of Comcast Corporation

Control Corporation - Control is a registered trademark of Control Corporation

CoreCodec, Inc. - MATROSKA is a trademark of CoreCodec, Inc.

Corel Corporation - WinZip, the WinZip vise and file logo, and Pinnacle are registered trademarks of Corel Corporation

CORSAIR MEMORY, INC. - ELGATO is a trademark of CORSAIR MEMORY, INC.

Corus Entertainment Inc. - CORUS is a trademark of Corus Entertainment Inc.

Crayon Software Experts Spain SL - Crayon is a trademark of Crayon Software Experts Spain SL

CrypKey Inc (formerly Kenonics) - CrypKey is a registered trademark of CrypKey Inc.

Deadline - Deadline is a part of Penske Media Corporation. © 2025 Deadline Hollywood, LLC. All Rights Reserved.

Deltacast - © Copyright 2024 DELTACAST. All rights reserved

Deluxe Media Inc. - Deluxe is a trademark of Deluxe Media Inc.

Digital Formation, Inc. - Digital Formation is a Copyright of Digital Formation, Inc.

Digital Video Systems Ltd - DVS is a trademark of Digital Video Systems Ltd

DIGITNOW! - Digitnow is a trademark of DIGITNOW!

Docker Inc. - DOCKER is a trademark of Docker, Inc.

Dolby Laboratories – Dolby, Dolby Vision, the double-D symbol, and Millicast are registered trademarks of Dolby Laboratories.

DPP - The Digital Production Partnership - DPP is a registered trademark | Digital Production Partnership © 2025

Drastic Technologies, Ltd. – 2110Scope, 4KScope, ccConvert, Drastic Technologies, DrasticPreview, DrasticScope, FlowCaster, HDRScope, Media File Scanner, MediaNXS, MediaReactor, MediaReactor Workstation, MR Lite, ndiScope, Net-X-Code Channel, Net-X-Code Server, Net-X-Convert, Net-X-Proxy, Network Video Analyzer, NetXfer, NETXROUTER, NetXScope, QuickClip, sdiScope, SyncControl, TcCalc, TestPatternGenerator, videoQC Inspect, videoQC Pro, videoQC View, and videoQC Workstation are trademarks of Drastic Technologies Ltd.

DTS - DTS, the Symbol, and DTS and the Symbol together are registered trademarks of DTS, Inc.

Dublin Core™ Metadata Initiative - "Dublin Core" is a protected under common law trademark of the Dublin Core™ Metadata Initiative.

Eastman Kodak Company - Cineon™ is a trademark of Eastman Kodak Company

Eaton Corporation plc - Eaton, Tripp Lite, and PowerAlert are registered trademarks of Eaton Corporation plc

EBU - Copyright EBU 2025. All rights reserved.

Empress Media Asset Management (eMAM) – eMAM, and eMAMDirector are registered trademarks of Empress Media Asset Management (eMAM)

Entertainment and Sports Programming Network - ESPN is a trademark of Entertainment and Sports Programming Network

Epic Games, Inc. - UNREAL ENGINE is a trademark of Epic Games, Inc..

Epiphan - All Epiphan product names and logos are trademarks or registered trademarks of Epiphan

Evercast, LLC - EVERCAST is a trademark owned by Evercast, LLC

Evertz Technologies Limited - Evertz is a registered trademark of Evertz Technologies Limited

EVS Broadcast Equipment - EVS is a registered trademark of EVS Broadcast Equipment

Fabrice Bellard - FFmpeg is a trademark of Fabrice Bellard

Filestage GmbH - Filestage is a trademark of Filestage GmbH

FilmLight Ltd. - FilmLight and BaseLight are trademarks of FilmLight Ltd.

Filmworkz - Filmworkz is an operating brand of BlissTek Ltd. BlissTek Ltd. Filmworkz Nucoda is either a trademark or registered trademark of BlissTek Ltd. or its subsidiaries in England, Wales, and/or other countries.

For-A - For-A is a registered trademark of FOR-A COMPANY LIMITED, Copyright © FOR-A Company Limited.

France Télévisions - France.tv is a trademark of France Télévisions

Fraunhofer IIS and Thomson Multimedia - MPEG Layer-3 audio coding technology licensed from Fraunhofer IIS and Thomson Multimedia.

Fraunhofer-Gesellschaft zur Förderung deer angewandten Forschung e.V. - EASYDCP is a trademark and brand of Fraunhofer-Gesellschaft zur Förderung deer angewandten Forschung e.V..

Free Software Foundation (FSF) - Portions of this product are licensed under LGPL, governed by the GNU LESSER GENERAL PUBLIC LICENSE, published by the Free Software Foundation (FSF).

Ftrack AB - FTRACK is a trademark and brand of Ftrack AB

Gen Digital Inc. (formerly Symantec Corporation and NortonLifeLock) - Symantec, Symantec Endpoint Virtualization Suite, Sygate, Altiris, and Altiris Virtualization Agent are registered trademarks of Gen Digital Inc.

Google LLC – YouTube, Google, Google Cloud, Google.meet.com, and Android are registered trademarks of Google LLC

GoPro, Inc. - Cineform® is a trademark or registered trademark of GoPro, Inc.

Grass Valley USA, LLC - Grass Valley®, GV®, the Grass Valley logo, and EDIUS® are trademarks or registered trademarks of Grass Valley USA, LLC, or its affiliated companies in the United States and other jurisdictions.

HaiVision Systems, Inc. - Haivision is a registered trademark of HaiVision Systems, Inc.

Harmonic - Harmonic is a registered trademark of Harmonic Inc.

Harris Corporation - Harris, and Leitch Technology Corp. are registered trademarks of Harris Corporation

Hewlett Packard Enterprise Company – OpenGL and SGI are registered trademarks and the

OpenGL SC logo is a trademark of Hewlett Packard Enterprise Company

Hewlett Packard Group LLC - HP is a trademark of HP Hewlett Packard Group LLC.

i-scream - i-scream is a trademark of i-scream

IABM - © 2025 IABM IABM is company limited by guarantee. Registered in England No: 5262009. Registered Office: IABM, 5 Deansway, Worcester, WR1 2JG

IBC - IBC (International Broadcasting Convention) is owned and run by the IBC Partnership, comprising six industry bodies: IEEE, IET, IABM, SCTE, SMPTE, and RTS.

Ideal Systems Asia Pacific Ltd. - Ideal Systems is a registered trademark of Ideal Systems Asia Pacific Ltd.

IEEE - IEEE Broadcast Technology Society - The IEEE emblem is a trademark owned by the IEEE for the purpose of indicating membership in the IEEE.

Ikegami Electronics (USA) Inc. - EditCam is a registered trademark of Ikegami Electronics (USA) Inc.

Indiecam GmbH - IndieCam is a registered trademark of Indiecam GmbH

Infocomm - InfoComm, AVIXA and associated logos are a trademark or registered trademark of AVIXA

INOGENI Inc - INOGENI® is a Registered Trademark and TOGGLE is a Trademark of INOGENI Inc

Institute of Electrical and Electronics Engineers - IRE is a trademark of the Institute of Electrical and Electronics Engineers

INTEL CORPORATION - INTEL is a trademark of INTEL CORPORATION

International Business Machines Corporation (“IBM”) - IBM® is a trademark owned by International Business Machines Corporation (“IBM”) and might also be trademarked or a registered trademark in other countries

Interactive Effects, Inc. - Piranha is a registered trademark of Interactive Effects, Inc.

Intraware, Inc. – Intraware is a registered trademark of Intraware, Inc.

IO Industries Ltd. - IO Industries is a trademark of IO Industries Ltd.

Iteris, Inc. - Odetics is a registered trademark of Iteris, Inc.

JVC KENWOOD CORPORATION - JVC is a trademark of JVC KENWOOD CORPORATION

Kinefinity Inc. - KINEFINITY is a trademark of Kinefinity Inc.

L3Harris Technologies, Inc. - Louth is a trademark of L3Harris Technologies, Inc.

LeeLu Soft - Watch 4 Folder is a trademark of LeeLu Soft

LinkedIn Corporation - LinkedIn is a trademark of LinkedIn Corporation

Linus Torvalds - Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.

Logitech International SA - LOGITECH is a trademark of Logitech International SA

LogMeIn, Inc. - GoTo is a trademarks and service marks of LogMeIn, Inc., and may be registered in the U.S. Patent and Trademark Office and in other countries.

Louper.io Ltd - Louper.io is a trademark of Louper.io Ltd

Lynx Technik AG - LYNX TECHNIK AG is a trademark of LYNX TECHNIK AG.

Magic Lantern - Magic Lantern is a registered trademark of Magic Lantern

MAINCONCEPT GMBH - MAIN CONCEPT is a trademark of MAINCONCEPT GMBH

Marshall Electronics, Inc. - Marshall is a registered trademark of Marshall Electronics, Inc.

Mastercard International Incorporated - Mastercard is a trademark of Mastercard International Incorporated

Matrox Electronic Systems, Ltd - Matrox and Matrox product names are registered trademarks and/or trademarks of Matrox Electronic Systems, Ltd.

MediaArea.net SARL - MediaInfo - Copyright © 2002-2013 MediaArea.net SARL. All rights reserved.

Mellanox Technologies, Inc - Mellanox® and ConnectX® are registered trademarks of Mellanox Technologies, Inc

Meta Platforms, Inc - Facebook and Instagram are trademarks of Meta Platforms, Inc

Metro-Goldwyn-Mayer Studios, Inc. - Metro Goldwyn Mayer, and MGM, are trademarks of Metro-Goldwyn-Mayer Studios, Inc.

Microsoft Corporation – Microsoft: Windows®, Video For Windows (VFW), DirectShow, Microsoft, Skype, Microsoft Azure, Microsoft Teams, Wave Mapper, Microsoft, Windows NT|2000|XP|XP Professional|Server 2003|Server 2008 |Server 2012, Windows 7, Windows 8, Windows 10, Media Player, Media Encoder, Windows Defender, Microsoft Office, .Net, Internet Explorer, SQL Server 2005|2008|2012|2014, Windows Media Technologies and Internet Explorer are trademarks of Microsoft Corporation.

MPEG LA - MPEG LA licenses patent pools covering essential patents required for use of the MPEG-2, MPEG-4, IEEE 1394, VC-1, ATSC, MVC, MPEG-2 Systems, AVC/H.264 and HEVC standards.

Nanjing Magewell Electronics Co. - Magewell™, ULTRA STREAM® and (the MAGEWELL Logo) are trademarks or registered trademarks of Nanjing Magewell Electronics Co.

National Aeronautics and Space Administration - NASA is a registered trademark of The National Aeronautics and Space Administration

NAB - NABShow and NAB © 2025 National Association of Broadcasters

National Geographic Society - NATIONAL GEOGRAPHIC is a trademark of National Geographic Society

NBA Properties, Inc. - NBA and the NBA logo are trademarks of NBA Properties, Inc.

NBC UNIVERSAL MEDIA, LLC - NBC and NBC Universal are trademarks of NBC UNIVERSAL MEDIA, LLC

Netflix, Inc. - Netflix is a registered trademark of Netflix, Inc.

Nevion - copyright NEVION - All rights reserved. Nevion @ 2023

New Media Manitoba - Copyright © 2025 New Media Manitoba

NewTek, Inc. - NDI, TriCaster, 3Play, TalkShow, Video Toaster, LightWave 3D, and Broadcast Minds are registered trademarks of NewTek, Inc.

Nexidia Inc. - NEXIDIA is a trademark owned by Nexidia Inc.

NGC Corporation - NGC is a registered trademark of NGC Corporation

Nippon Hatsujiyo Kabushiki Kaisha - NHK is a trademark of Nippon Hatsujiyo Kabushiki Kaisha

Nokia Corporation - OSPREY is a trademark owned by Nokia Corporation

NVIDIA Corporation - NVIDIA, the NVIDIA logo, NVIDIA Quadro, Rivermax, BlueField2, PhysX, and NVIDIA RTX are trademarks and/or registered trademarks of NVIDIA Corporation in the U.S. and/or other countries

Object Matrix Limited - ObjectMatrix, and Object Matrix are registered trademarks of Object

Matrix Limited

Omneon Video Networks, Inc - Omneon is a trademark of Omneon Video Networks, Inc
ONVIF - the ONVIF primary trademark is the word, “ONVIF”. This trademark has been registered in the United States, European Union, China, Japan and other countries throughout the world.

OpenSSL Project Authors - OpenSSL is a trademark of OpenSSL Project Authors

Oracle Corporation - Oracle®, Java, Front Porch Digital, and MySQL are registered trademarks of Oracle Corporation and/or its affiliates.

Panasonic Holdings Co., Ltd - Panasonic, and Varicam are trademarks of Panasonic Holdings Co., Ltd

Pantone, Inc. - Pantone is a registered trademark of Pantone, Inc

PayPal, Inc. - PAYPAL is a trademark of PayPal, Inc.

PELOTON INTERACTIVE, INC. - PELOTON is a trademark of PELOTON INTERACTIVE, INC.

Pioneer Corporation - Pioneer is a registered trademark of Pioneer Corporation

Post Magazine - © Copyright 2024 Post Magazine. All Rights Reserved.

ProAV - PRO AV SYSTEMS is a trademark of Pro AV Systems, Inc

Production Weekly - Copyright © 2015-2025 Production Weekly

RE:Vision Effects, Inc. - RE:Vision Effects is a registered trademark of RE:Vision Effects, Inc.

Red Hat, Inc. - Red Hat, and the Red Hat logo are trademarks or registered trademarks of Red Hat, Inc. or its subsidiaries in the United States and other countries

Reddit - Reddit's trademarks and other brand assets are owned by Reddit.

Rogers Communications Inc. - Rogers and related marks are trademarks of Rogers Communications Inc. or an affiliate, used under licence.

Ross Video - ©2022 Ross Video Limited, Ross®, MiniME™, and any related marks are trademarks or registered trademarks of Ross Video Limited

Shenzhen Yunlang Technology Co., Ltd. - MOKOSE is a trademark of Shenzhen Yunlang Technology Co., Ltd.

Sigma Design Company, LLC - Sigma Design is a registered trademark of Sigma Design Company, LLC

Sinclair Broadcast Group, Inc. - Sinclair Broadcast Group is a trademark of Sinclair Broadcast Group, Inc.

Snell & Wilcox Limited - SNELL & WILCOX, and Quantel are trademarks owned by Snell & Wilcox Limited

Society of Broadcast Engineers - Copyright, Society of Broadcast Engineers Chapter One, all rights reserved. The SBE logo is used by permission of the Society of Broadcast Engineers.

Society of Cable Telecommunications Engineers (SCTE) - ©2025 Society of Cable Telecommunications Engineers, Inc. is a subsidiary of CableLabs. All rights reserved.

Society of Motion Picture and Television Engineers - Motion Imaging Journal and SMPTE are trademarks of Society of Motion Picture and Television Engineers.

SoftNI Corporation – SoftNI is a trademark of SoftNI Corporation

Sony Corporation – Sony, Sony DVD Architect, DVD, Catalyst, and Vegas are trademarks of Sony Corporation and/or its affiliates.

Sound On Sound - copyright © SOS Publications Group and/or its licensors, 1985-2025. All rights reserved.

SRI International - SARNOFF CORPORATION is a trademark of SRI INTERNATIONAL.

SRT (Secure Reliable Transport) - SRT, developed by Haivision, is a royalty free, open source protocol

Streambox Inc. - Streambox is a trademark of Streambox Inc.

Streaming Media - Copyright © 2009 - 2025 Streaming Media Magazine

STREAMWELL LLC – Streamwell is a trademark of STREAMWELL LLC

Technicolor Creative Studios SA - Technicolor is a trademark of Technicolor Creative Studios SA

TechSmith Corporation - CAMTASIA STUDIO is a trademark of TechSmith Corporation

Tektronix, Inc. - Tektronix® and all identified Tektronix trademarks and logos are the property of Tektronix, Inc. or its wholly-owned subsidiaries

Telestream, LLC - Telestream, is a registered trademark, and MacCaption and CaptionMaker are trademarks of Telestream, LLC

The Apache Software Foundation (ASF) - Apache is a registered trademark of The Apache Software Foundation

The Foundry Visionmongers Ltd. - Nuke™ is a trademark of The Foundry Visionmongers Ltd.

The Perl Foundation - Perl and the Perl logo are trademarks of The Perl Foundation

The Qt Company Ltd - The Qt Company Ltd and its subsidiaries (“The Qt Company”) is the owner of Qt trademarks (“Qt trademarks”) worldwide, and “froglogic”, “Squish” and “Coco” are trademarks of the Qt Company Ltd.

THE UNIVISION NETWORK LIMITED PARTNERSHIP - UNIVISION is a trademark of THE UNIVISION NETWORK LIMITED PARTNERSHIP

The Walt Disney Company - Disney, and The Walt Disney Company are trademarks of The Walt Disney Company. LucasFilm is a wholly owned subsidiary of The Walt Disney Company

Toolfarm.com Inc. - Toolfarm is a registered trademark of Toolfarm.com Inc.

Trend Micro Inc. - TrendMicro, and TrendMicro System Protection and registered trademarks of Trend Micro Inc.

Truevision, Inc - TARGA is a registered trademark of Truevision, Inc

TV Asahi Corporation - TV Asahi is a trademark of TV Asahi Corporation

TV Technology - TV Tech is part of Future US Inc, an international media group and leading digital publisher. © Future US, Inc. Full 7th Floor, 130 West 42nd Street, New York, NY 10036.

Twitch Interactive, Inc - TWITCH, the TWITCH Logo, the Glitch Logo, and/or TWITCHTV are trademarks of Twitch Interactive, Inc. or its affiliates.

Twitter, Inc. - Twitter is a wholly owned subsidiary of X Holdings Corp.

Tyler Perry Studios, LLC - Tyler Perry Studios is a trademark of Tyler Perry Studios, LLC

Vefxi Corporation - VEFXi DiamondBlade is a registered trademark of Vefxi Corporation

ViaLA - Via Licensing®, ViaSecure® and the Via logo are registered service marks, and any other Via Licensing names, titles or logos are trademarks or service marks, in each case, of Via Licensing Corporation, and are protected by law.

Video Clarity, Inc. - Video Clarity and ClearView are trademarks of Video Clarity, Inc.

Video Services Forum - ©2024 Video Services Forum

VideoLAN Non-profit Organization - VideoLAN, VLC, VLC media player and x264 are trademarks internationally registered by the VideoLAN non-profit organization

Videomaker - © Videomaker Inc., 1986 - 2025

Visa International - Visa is a registered trademark of Visa International

Vision Research, Inc - PHANTOM is a trademark of Vision Research, Inc

VITEC - Names and logos identifying products of VITEC are registered trademarks or trademarks of VITEC respectively

Vizrt - VIZRT is a trademark of VIZRT AG.

Warner Bros. Discovery – Discovery, Turner, and Home Box Office, Inc. (HBO), are trademarks of Warner Bros. Discovery

Weisscam GmbH - Weisscam is a trademark and brand of Weisscam GmbH

Wheatstone - ® Wheatstone, Audioarts, and VoxPro are registered trademarks and Wheatstone Layers is a trademark of Wheatstone Corporation

Wizards of OBS, LLC – UNIX, OBS, Open Broadcast Software, the OBS logo, and OBS Studio are trademarks of Wizards of OBS, LLC (The Company)

World Animation Summit - © 2025 Animation Magazine. All Rights Reserved.

World Wrestling Entertainment, Inc. - WWE is a trademark of World Wrestling Entertainment, Inc.

Wowza Media Systems, LLC - Wowza is a trademark of Wowza Media Systems, LLC

wxWidgets - wxWidgets is a trademark of wxWidgets

Xceed Software Inc. - Xceed DataGrid for JavaScript, Xceed Ultimate ListBox for Silverlight, Xceed DataGrid for Silverlight, Xceed DataGrid for WPF, Xceed Grid for .NET, Xceed Zip for .NET, Xceed Real-Time Zip for Silverlight, Xceed Upload for Silverlight, Xceed Zip Compression Library, Xceed FTP for .NET, Xceed Chart for .NET, Xceed Chart for ASP.NET, Xceed SmartUI for .NET, Xceed SmartUI, Xceed Encryption Library, Xceed Binary Encoding Library, Xceed Streaming Compression Library, Xceed Streaming Compression for .NET, Xceed Zip for .NET Compact Framework, Xceed Ultimate Suite, Xceed Data Manipulation Suite, Xceed Absolute Packager are trademarks of Xceed Software Inc.

Xena Networks - Xena is a trademark of Xena Networks

Zapex Technologies - Zapex is a registered trademark of Zapex Technologies

Zhang Haijun - RYBOZEN is a trademark of Zhang Haijun

Ziflow Limited - Ziflow is a trademark of Ziflow Limited

Zixi - Zixi Software and any logos or icons identifying Zixi and the Zixi Software are trademarks of Zixi.

ZLIB - The ZLIB Compressed Data Format Specification is Copyright (C) 1995-2013 Jean-Loup Gailly and Mark Adler.

Zoom Video Communications, Inc. - Zoom and the Zoom logo are trademarks of Zoom Video Communications, Inc.

LGPL: Portions of this product are licensed under LGPL, governed by the following license:

1.2 GNU LESSER GENERAL PUBLIC LICENSE

Version 3, 29 June 2007

Copyright © 2007 Free Software Foundation, Inc. <<https://fsf.org/>>

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

This version of the GNU Lesser General Public License incorporates the terms and conditions of version 3 of the GNU General Public License, supplemented by the additional permissions listed below.

1.2.1.1 0. *Additional Definitions.*

As used herein, “this License” refers to version 3 of the GNU Lesser General Public License, and the “GNU GPL” refers to version 3 of the GNU General Public License.

“The Library” refers to a covered work governed by this License, other than an Application or a Combined Work as defined below.

An “Application” is any work that makes use of an interface provided by the Library, but which is not otherwise based on the Library. Defining a subclass of a class defined by the Library is deemed a mode of using an interface provided by the Library.

A “Combined Work” is a work produced by combining or linking an Application with the Library. The particular version of the Library with which the Combined Work was made is also called the “Linked Version”.

The “Minimal Corresponding Source” for a Combined Work means the Corresponding Source for the Combined Work, excluding any source code for portions of the Combined Work that, considered in isolation, are based on the Application, and not on the Linked Version.

The “Corresponding Application Code” for a Combined Work means the object code and/or source code for the Application, including any data and utility programs needed for reproducing the Combined Work from the Application, but excluding the System Libraries of the Combined Work.

1.2.1.2 1. *Exception to Section 3 of the GNU GPL.*

You may convey a covered work under sections 3 and 4 of this License without being bound by section 3 of the GNU GPL.

1.2.1.3 2. *Conveying Modified Versions.*

If you modify a copy of the Library, and, in your modifications, a facility refers to a function or data to

be supplied by an Application that uses the facility (other than as an argument passed when the facility is invoked), then you may convey a copy of the modified version:

- a) under this License, provided that you make a good faith effort to ensure that, in the event an Application does not supply the function or data, the facility still operates, and performs whatever part of its purpose remains meaningful, or
- b) under the GNU GPL, with none of the additional permissions of this License applicable to that copy.

3. Object Code Incorporating Material from Library Header Files.

The object code form of an Application may incorporate material from a header file that is part of the Library. You may convey such object code under terms of your choice, provided that, if the incorporated material is not limited to numerical parameters, data structure layouts and accessors, or small macros, inline functions and templates (ten or fewer lines in length), you do both of the following:

- a) Give prominent notice with each copy of the object code that the Library is used in it and that the Library and its use are covered by this License.
- b) Accompany the object code with a copy of the GNU GPL and this license document.

4. Combined Works.

You may convey a Combined Work under terms of your choice that, taken together, effectively do not restrict modification of the portions of the Library contained in the Combined Work and reverse engineering for debugging such modifications, if you also do each of the following:

- a) Give prominent notice with each copy of the Combined Work that the Library is used in it and that the Library and its use are covered by this License.
- b) Accompany the Combined Work with a copy of the GNU GPL and this license document.
- c) For a Combined Work that displays copyright notices during execution, include the copyright notice for the Library among these notices, as well as a reference directing the user to the copies of the GNU GPL and this license document.
- d) Do one of the following:
 - 0) Convey the Minimal Corresponding Source under the terms of this License, and the Corresponding Application Code in a form suitable for, and under terms that permit, the user to recombine or relink the Application with a modified version of the Linked Version to produce a modified Combined Work, in the manner specified by section 6 of the GNU GPL for conveying Corresponding Source.
 - 1) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (a) uses at run time a copy of the Library already present on the user's computer system, and (b) will operate properly with a modified version of the Library that is interface-compatible with the Linked Version.

- e) Provide Installation Information, but only if you would otherwise be required to provide such information under section 6 of the GNU GPL, and only to the extent that such information is necessary to install and execute a modified version of the Combined Work produced by recombining or relinking the Application with a modified version of the Linked Version. (If you use option 4d0, the Installation Information must accompany the Minimal Corresponding Source and Corresponding Application Code. If you use option 4d1, you must provide the Installation Information in the manner specified by section 6 of the GNU GPL for conveying Corresponding Source.)

5. Combined Libraries.

You may place library facilities that are a work based on the Library side by side in a single library together with other library facilities that are not Applications and are not covered by this License, and convey such a combined library under terms of your choice, if you do both of the following:

- a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities, conveyed under the terms of this License.
- b) Give prominent notice with the combined library that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

6. Revised Versions of the GNU Lesser General Public License.

The Free Software Foundation may publish revised and/or new versions of the GNU Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library as you received it specifies that a certain numbered version of the GNU Lesser General Public License “or any later version” applies to it, you have the option of following the terms and conditions either of that published version or of any later version published by the Free Software Foundation. If the Library as you received it does not specify a version number of the GNU Lesser General Public License, you may choose any version of the GNU Lesser General Public License ever published by the Free Software Foundation.

If the Library as you received it specifies that a proxy can decide whether future versions of the GNU Lesser General Public License shall apply, that proxy's public statement of acceptance of any version is permanent authorization for you to choose that version for the Library.

Other brands, product names, and company names are trademarks of their respective holders, and are used for identification purpose only.

1.3 MPEG Disclaimers

1.3.1 MPEGLA MPEG2 Patent

ANY USE OF THIS PRODUCT IN ANY MANNER OTHER THAN PERSONAL USE THAT COMPLIES WITH THE MPEG-2 STANDARD FOR ENCODING VIDEO INFORMATION FOR PACKAGED MEDIA IS EXPRESSLY PROHIBITED WITHOUT A LICENSE UNDER APPLICABLE PATENTS IN THE MPEG-2 PATENT PORTFOLIO, WHICH LICENSE IS AVAILABLE FROM MPEG LA, LLC, 4600 S. Ulster Street, Suite 400, Denver, Colorado 80237 U.S.A.

1.3.2 MPEGLA MPEG4 VISUAL

THIS PRODUCT IS LICENSED UNDER THE MPEG-4 VISUAL PATENT PORTFOLIO LICENSE FOR THE PERSONAL AND NON-COMMERCIAL USE OF A CONSUMER FOR (i) ENCODING VIDEO IN COMPLIANCE WITH THE MPEG-4 VISUAL STANDARD ("MPEG-4 VIDEO") AND/OR (ii) DECODING MPEG-4 VIDEO THAT WAS ENCODED BY A CONSUMER ENGAGED IN A PERSONAL AND NON-COMMERCIAL ACTIVITY AND/OR WAS OBTAINED FROM A VIDEO PROVIDER LICENSE IS GRANTED OR SHALL BE IMPLIED FOR ANY OTHER USE. ADDITIONAL INFORMATION INCLUDING THAT RELATING TO PROMOTIONAL, INTERNAL AND COMMERCIAL USES AND LICENSING MAY BE OBTAINED FROM MPEG LA, LLC. SEE [HTTP://WWW.MPEGLA.COM](http://www.mpegla.com).

1.3.3 MPEGLA AVC

THIS PRODUCT IS LICENSED UNDER THE AVC PATENT PORTFOLIO LICENSE FOR THE PERSONAL USE OF A CONSUMER OR OTHER USES IN WHICH IT DOES NOT RECEIVE REMUNERATION TO (i) ENCODE VIDEO IN COMPLIANCE WITH THE AVC STANDARD ("AVC VIDEO") AND/OR (ii) DECODE AVC VIDEO THAT WAS ENCODED BY A CONSUMER ENGAGED IN A PERSONAL ACTIVITY AND/OR WAS OBTAINED FROM A VIDEO PROVIDER LICENSED TO PROVIDE AVC VIDEO. NO LICENSE IS GRANTED OR SHALL BE IMPLIED FOR ANY OTHER USE. ADDITIONAL INFORMATION MAY BE OBTAINED FROM MPEG LA, L.L.C. SEE [HTTP://WWW.MPEGLA.COM](http://www.mpegla.com).

1.3.4 MPEG4 SYSTEMS

THIS PRODUCT IS LICENSED UNDER THE MPEG-4 SYSTEMS PATENT PORTFOLIO LICENSE FOR ENCODING IN COMPLIANCE WITH THE MPEG-4 SYSTEMS STANDARD, EXCEPT THAT AN ADDITIONAL LICENSE AND PAYMENT OF ROYALTIES ARE NECESSARY FOR ENCODING IN CONNECTION WITH (i) DATA STORED OR REPLICATED IN PHYSICAL MEDIA WHICH IS PAID FOR ON A TITLE BY TITLE BASIS AND/OR (ii) DATA WHICH IS PAID FOR ON A TITLE BY TITLE BASIS AND IS TRANSMITTED TO AN END USER FOR PERMANENT STORAGE AND/OR USE.

SUCH ADDITIONAL LICENSE MAY BE OBTAINED FROM MPEG LA, LLC. SEE [HTTP://WWW.MPEGLA.COM](http://www.mpegla.com) FOR ADDITIONAL DETAILS.

1.4 Drastic Technologies Limited Warranty and Disclaimers

Drastic Technologies Ltd (the Company) warrants to the original registered end user that the product will perform as stated below for a period of ninety (90) days from the date of licensing or; in the case of hardware, for a period matching the warranty period offered by the original manufacturer of said equipment.

Hardware and Media—The Product hardware components, if any, including equipment supplied but not manufactured by the Company but NOT including any third party equipment that has been substituted by the Distributor or customer for such equipment (the “Hardware”), will be free from defects in materials and workmanship under normal operating conditions and use.

1.4.1 Warranty Remedies

Your sole remedies under this limited warranty are as follows:

Hardware and Media—The Company will either repair or replace (at its option) any defective Hardware component or part, or Software Media, with new or like new Hardware components or Software Media. Components may not be necessarily the same, but will be of equivalent operation and quality.

1.4.2 Software Updates

Except as may be provided in a separate agreement between Drastic Technologies and You, if any, Drastic Technologies is under no obligation to maintain or support the Software and Drastic Technologies has no obligation to furnish you with any further assistance, technical support, documentation, software, update, upgrades, or information of any nature or kind.

1.4.3 Restrictions and Conditions of Limited Warranty

This Limited Warranty will be void and of no force and effect if (i) Product Hardware or Software Media, or any part thereof, is damaged due to abuse, misuse, alteration, neglect, or shipping, or as a result of service or modification by a party other than the Company, or (ii) Software is modified without the written consent of the Company.

1.4.4 Limitations of Warranties

THE EXPRESS WARRANTIES SET FORTH IN THIS AGREEMENT ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. No oral or written information or advice given by the Company, its distributors, dealers or agents, shall increase the scope of this Limited Warranty or create any new warranties.

Geographical Limitation of Warranty—This limited warranty is valid only within the country in which the Product is purchased/licensed.

Limitations on Remedies—YOUR EXCLUSIVE REMEDIES, AND THE ENTIRE LIABILITY OF Drastic Technologies Ltd WITH RESPECT TO THE PRODUCT, SHALL BE AS STATED IN THIS LIMITED WARRANTY. Your sole and exclusive remedy for any and all breaches of any Limited Warranty by the Company shall be the recovery of reasonable damages which, in the aggregate, shall not exceed the total amount of the combined license fee and purchase price paid by you for the Product.

1.4.5 Damages

Drastic Technologies Ltd SHALL NOT BE LIABLE TO YOU FOR ANY DAMAGES, INCLUDING ANY LOST PROFITS, LOST SAVINGS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF YOUR USE OR INABILITY TO USE THE PRODUCT, OR THE BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, EVEN IF THE COMPANY HAS BEEN ADVISED OF THE POSSIBILITY OF THOSE DAMAGES, OR ANY REMEDY PROVIDED FAILS OF ITS ESSENTIAL PURPOSE.

Further information regarding this limited warranty may be obtained by writing:

Drastic Technologies Ltd
523 The Queensway, Suite 201
Toronto, ON, M8V 1J7
Telephone: (416) 255-5636

2 Introduction

This manual is for HDRScope 7.x software from Drastic Technologies, Ltd.

2.1 Conventions

This manual assumes the following:

That the user knows how to operate a mouse and keyboard and perform the basic functions of Microsoft Windows, macOS or Linux operating system.

That the user is familiar with the creative software in use.

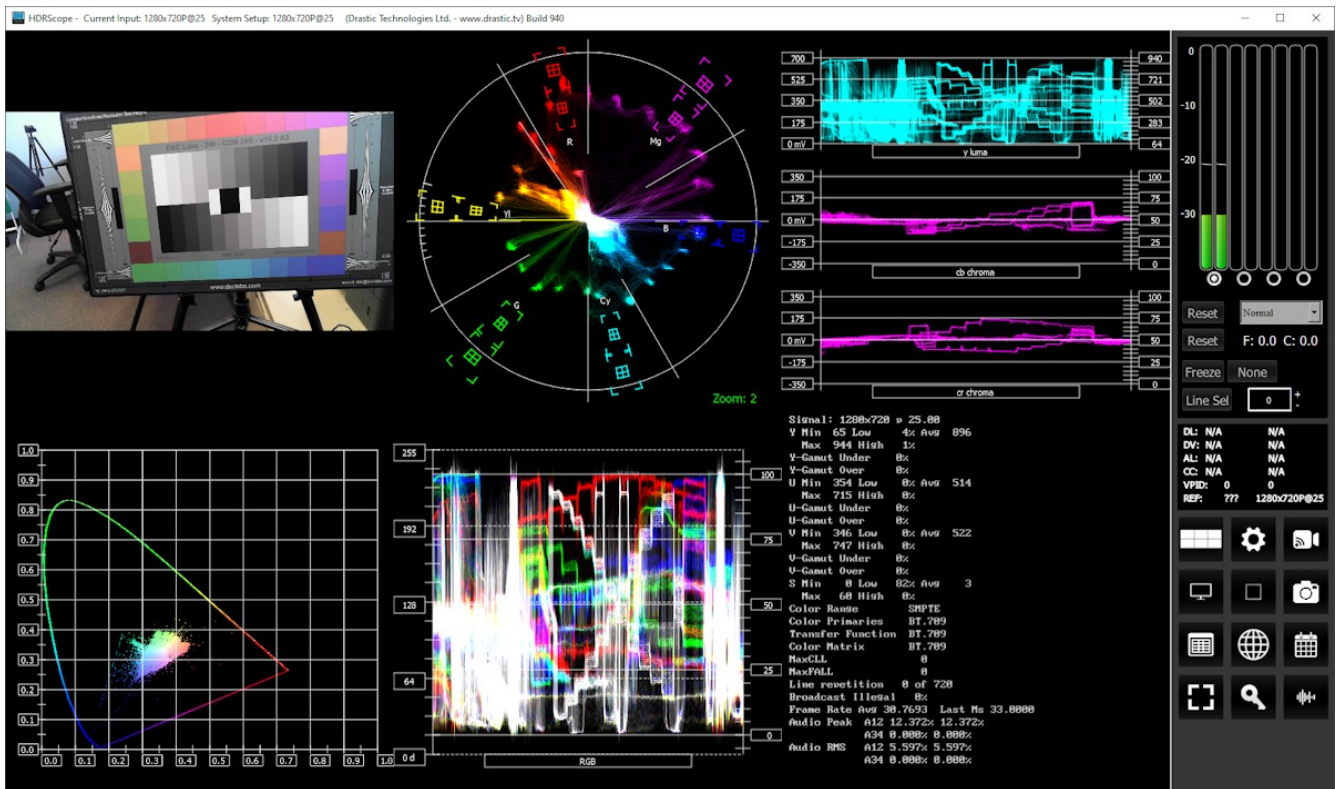
That the user has access to technicians capable of placing the device on the network and setting up any SAN systems if necessary.

The name of a control or display present on the interface will be displayed in **bold** text.

Where a portion of the manual is referred to the name of section mentioned will be displayed in *italics*.

Certain images in this document may have been grayed out where it is useful or necessary to place indicator marks to show specific controls or displays above a darker background.

2.2 About HDRScope



HDRScope is the world's most powerful 8K through SD software signal monitoring tool.

Designed to take advantage of BlueFish444, AJA, Matrox or Blackmagic's Quad HD, 2SI and 4K/8K capture modes in both Rec.709 or BT.2020, HDRScope provides the most cost effective SD/HD/4K/8K signal monitoring solution available. Available for Windows 10 or greater, CentOS/Red Hat 7.4-7.8, or macOS 13 Ventura - macOS 15 Sequoia. Blackmagic DeckLink/Intensity/UltraStudio cards are also supported. It provides the following signal analysis tools:

- Picture, with zoom and pan
- Closed caption detection, decode and display
- Multiple time code display
- Data View
- Vectorscope
- YCbCr Waveform Monitor (stacked, parade, or luma only)
- RGB Waveform Monitor (stacked, parade, or overlay)
- Histograms:
 - YCbCr
 - RGB

- HSV
- Luma
- H/S Scope
- Chromaticity
- Status, including MaxCLL and MaxFALL
- Audio Vectorscope (Lissajousxy, Lissajous, Polar)
- Audio Phase
- Audio Histogram (logarithmic or linear)
- Audio Waveform
- Audio Meters scope
- Audio Loudness scope
- Audio Surround Meter
- Audio Metering (Loudness, RMS and Peak)
- Freeze and compare
- Save signal and scopes to image
- Standard desktop software with remote access

2.3 System Requirements

2.3.1 Recommended Environment

HDRScope software must be installed on a system at least as powerful as the configurations listed below.

For 8K/SUHD

- [AJA](#): KONA 5G

Check with AJA for the current recommended hardware environment.

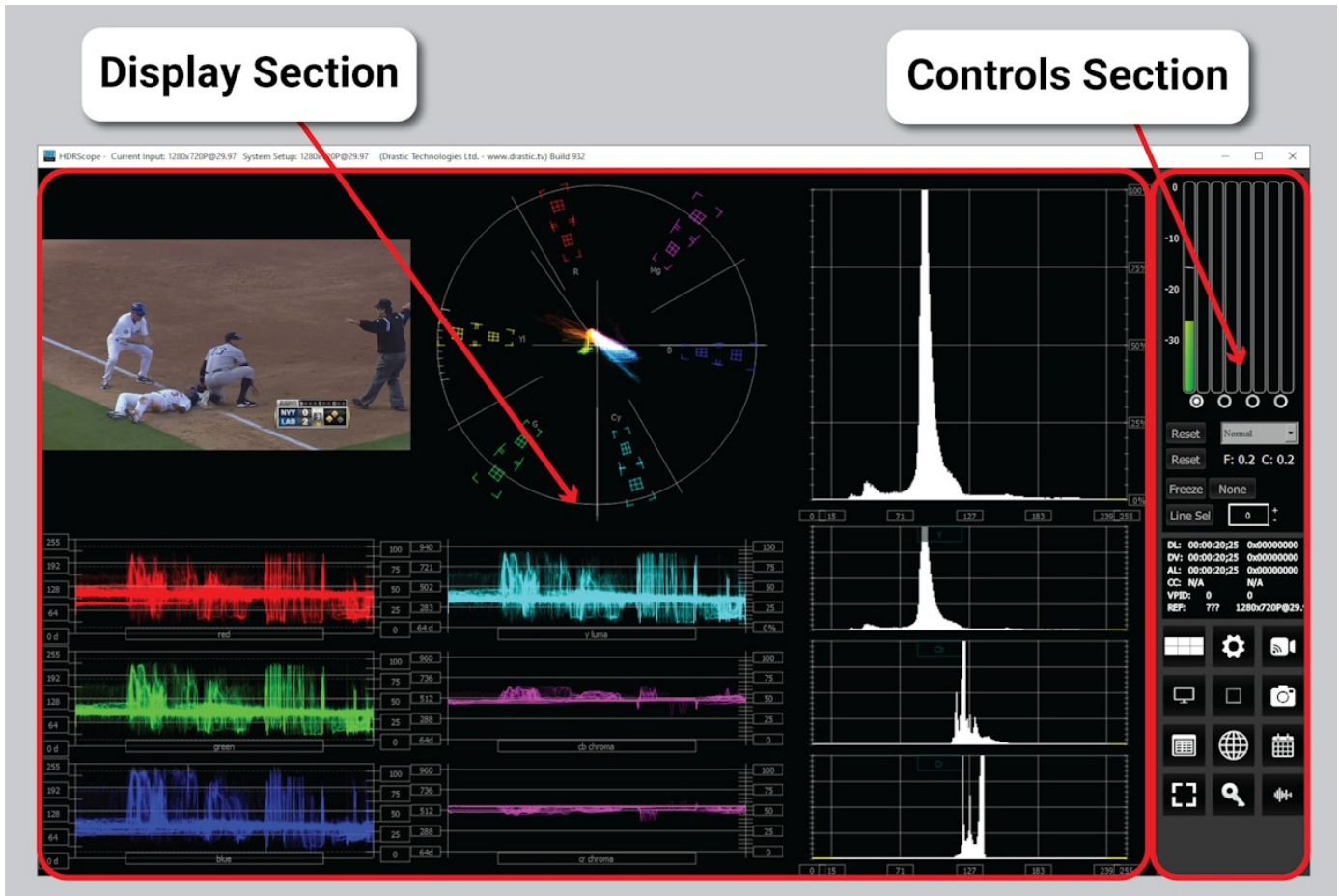
If you do not require 8K support, there are a number of other boards or devices we support. You can check out the details at the following link:

<https://www.drastic.tv/support-59/supporttipstechnical/81-supported-audio-video-hardware>

3 Reference

The reference section provides a detailed look at each of the elements in the **HDRScope** graphical user interface.

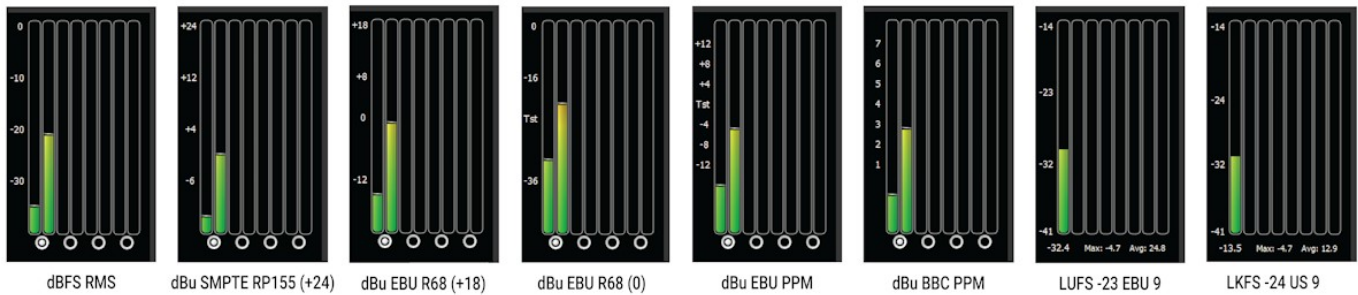
3.1 Main Interface Overview



Display section – to the left of the controls (the main portion of the GUI) is the screen where the various scopes, meters, or data will be displayed. HDRScope features four different layouts: single, side by side, four quadrants, and six up (three across, two down). These can be selected in the Scope Config window. The Data View can be selected by clicking the Data View button in the Controls section.

Controls section – The panel on the right with the audio controls, status display, and access buttons is the Controls section. Following are details for the Controls section.

3.1.1 Audio Controls and Displays

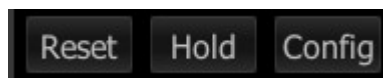


Audio display and pair selectors – At the top of the Controls section there are either 8 or 16 audio meters for loudness or Peak/RMS (Root Mean Square) display. The buttons just below the meters allow the user to select between audio pairs for monitoring. Various types of audio meters may be selected using the Audio Scale pulldown in the Configuration Settings window.

In the above spread, the types are all shown (L-R):

- dBFS RMS - decibels relative to Full Scale, root mean squared
- dBu SMPTE RP155 (+24) – decibel units, SMPTE RP155
- dBu EBU R68 (+18) - decibel units, EBU R68
- dBu EBU R68 (0) - decibel units, EBU R68
- dBu EBU PPM - decibel units, EBU peak programme meter
- dBu BBC PPM - decibel units, BBC peak programme meter
- LUFS -23 EBU 9 - Loudness Units relative to full scale, -23 EBU 9
- LKFS -24 US 9 - Loudness, K-weighted, relative to full scale, -24 US 9

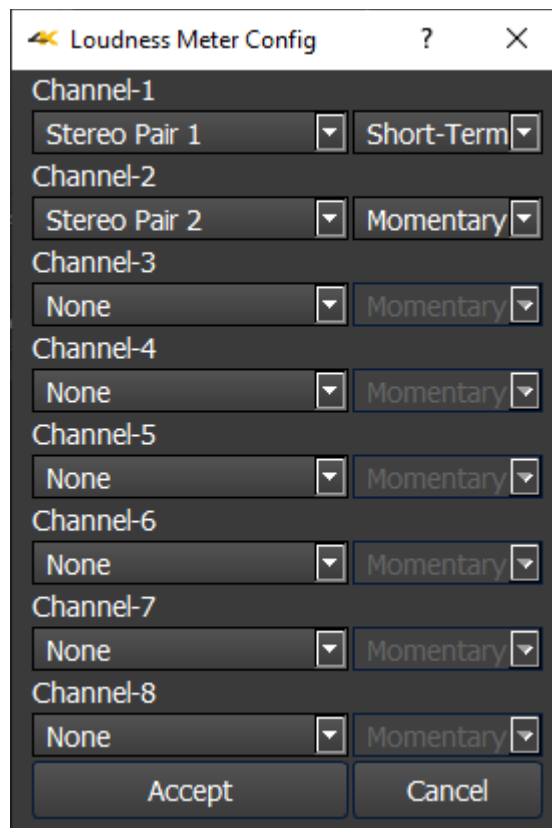
3.1.1.1 Loudness Settings



When the audio scale is set to one of the available loudness settings, the Hold Peak/RMS pulldown is replaced with a Hold/Continue button, and the loudness Config button.

The **Hold/Continue** button toggles between hold (freeze the current loudness values) or continue (let the loudness values run freely).

Pressing the **Config** button will open the **Loudness Meter Config** dialog.



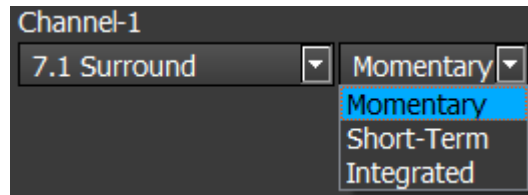
In this dialog there are a number of presets for monitoring differing audio input types. Presently these include:

- None
- 5.1 Surround
- 5.1-Protocols - L C R Ls Rs Lfe
- 5.1 Smpte - L R C Lfe Ls Rs
- 5.1-AAC - C L R Ls Rs Lfe
- 5.1-DTS - L R Ls Rs C Lfe
- Stereo Pair 1
- 7.1 Surround
- 7.1-Protocols - L C R Lss Rss Lsr Rsr Lfe
- 7.1-Smpte - L R C Lfe Lss Rss Lsr Rsr
- 7.1-EXT - L R C Lfe Lss Rss Lsr Rsr
- 7.1-Dolby - L C R Ls Rs Lfe Bsl Bsr
- Stereo Pair 2

The descriptions for the channels (abbreviated above) are as follows:

- L - Left
- R = Right
- C = Center
- Ls = Left Surround
- Rs = Right Surround
- Lfe = Low Frequency Effects
- Lss = Left Side Surround
- Rss = Right Side Surround
- Lsr = Left Rear Surround
- Rsr = Right Rear Surround
- Bsl = Back Surround Left
- Bsr = Back Surround Right

Each channel can be set up separately. Once an input type has been selected, the user can select between measurement options.



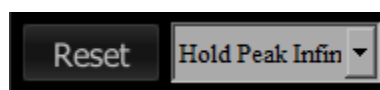
These include:

- **Momentary Loudness** - measures the loudness of the past 400 Milliseconds
- **Short-Term Loudness** - measures the loudness of the past 3 Seconds
- **Integrated Loudness** - (Also called Programme Loudness) indicates how loud the programme is on average, and is measured over entire duration of material

At the bottom of the Loudness Meter Config dialog, there is an **Accept** button to enable any changes you have made, and there is a **Cancel** button to exit the dialog without making any changes to the settings.

3.1.1.2 Hold Peak/RMS

Hold Peak/RMS – Just under the audio pair selector buttons there is a reset button and a pulldown menu for options to hold the peak audio level.

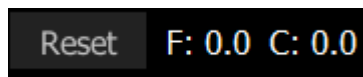


The following options are available:

- **Normal** – allow Peak and RMS to range freely with no hold
- **Hold Peak 4 sec** – hold the peak (the little white line in the audio level, typically near the top) for 4 seconds
- **Hold RMS 4 sec** – hold the RMS (the main audio level, green near the bottom and red at the top if the signal is too high) for 4 seconds
- **Hold Peak Infinite** – hold the Peak at its highest level and leave it there
- **Hold RMS Infinite** - hold the RMS at its highest level and leave it there

These values can be held for either 4 seconds, or frozen (Infinite Hold), or not held. A Reset button exists to clear any Peak/RMS values to refresh the display for a new measurement.

3.1.1.3 MaxFall/MaxCLL



MaxFall/MaxCLL section – below the Peak/RMS is the MaxFall/MaxCLL section.

When working in HDR, MaxFall and MaxCLL values become available. MaxFALL/MaxCLL is metadata required for HDR10 content.

MaxFALL (Maximum Frame Average Light Level) indicates the maximum value of the frame average light level (in cd/m2 or nits) of the entire playback sequence. MaxFALL is calculated by averaging the decoded luminance values of all the pixels within a frame. MaxFALL is usually much lower than MaxCLL.

MaxCLL (Maximum Content Light Level) indicates the maximum light level of any single pixel (in cd/m2 or nits) of the entire playback sequence. MaxCLL is usually measured off the final delivered content after mastering.

The **F** field displays the MaxFall.

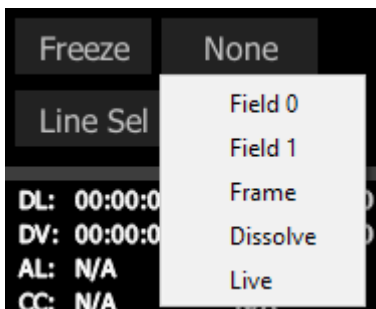
The **C** field displays the MaxCLL.

A **Reset** button clears the measurement to view a new signal, or refresh the display for another look at the same signal.

3.1.2 Freeze Field/Frame



Freeze section – the Freeze button saves an image of the current frame of video for closer inspection or comparison. The button to the right offers a popup menu for the type of image that is created.



Field/Frame/Live drop down – selects how a frozen frame will be displayed against the live video

Field 0 – show field 0 frozen, field 1 live

Field 1 – show field 1 frozen, field 0 live

Frame – show the frozen frame

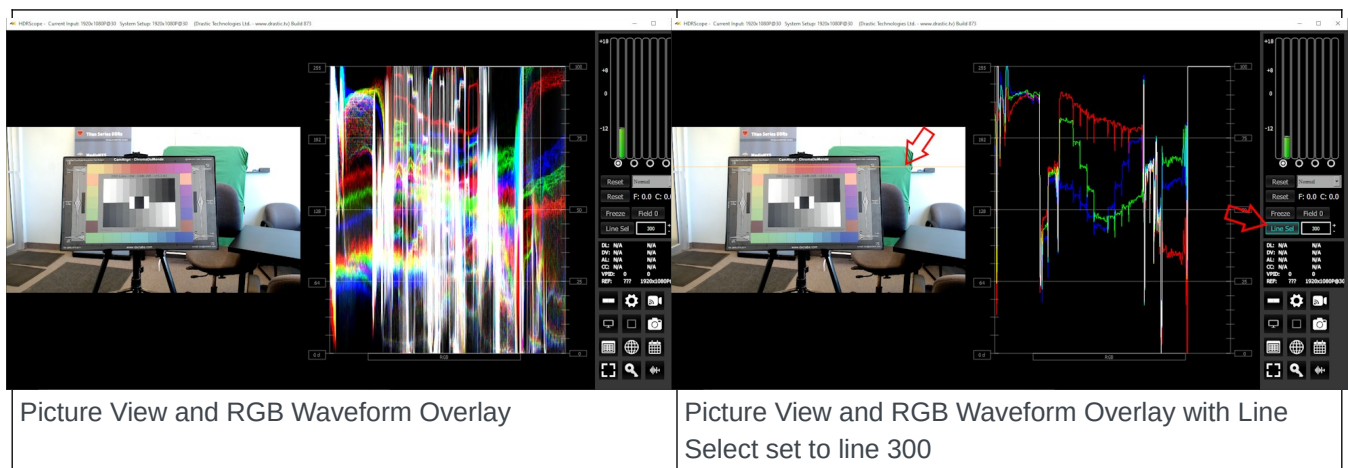
Dissolve – show 50% of the frozen frame and 50% of the live frame

Live – show the live video (frozen frame is still saved)

3.1.3 Line Select



Line Select – when clicked, all the video scopes will analyze only the video line in the line selection box next to the button. This line will be highlighted on the in app video display. Clicking the plus and minus buttons will increment the line up or down. Pressing the **Line Sel** button sets that line as the line to monitor. Note that vertical blanking lines (0 - 41) are not selectable since they are outside the image area. So, in HD for example, lines below line 42, and lines above line 1121 are not selectable.



Example above: on the left, the RGB Waveform Overlay analyzes the entire image. On the right, the Line Select has been set to line 300, and the RGB Waveform Overlay is limited to that line. An inconspicuous yellow line (1st red arrow) is added to the Picture View to confirm the exact line that is being analyzed.

3.1.4 Status Display



```
DL: 12:37:44:01 0x00002500
DV: 12:37:44:01 0x00002500
AL: 12:37:44:01 0x00002500
CC: N/A        N/A
VPID: FFFFFFFF FFFFFFFF
REF:  SDI  1920x1080i@25
```

Status Display – the Status display shows time code and user bits (where present) for:

- RP-188 L SDI inputs
- RP-188 V SDI inputs
- Analog SMPTE time code input
- Closed captions presence and type
- VPID (Video Payload Identifier)
- Reference input presence and type

3.2 Scopes Layout and Setup



Scope Setup button – The Scope Setup button in the Controls section opens the Scope Config window, which allows the user to configure how many scopes are displayed, to switch between scopes, and to set up each particular scope.

3.2.1 Layout Options

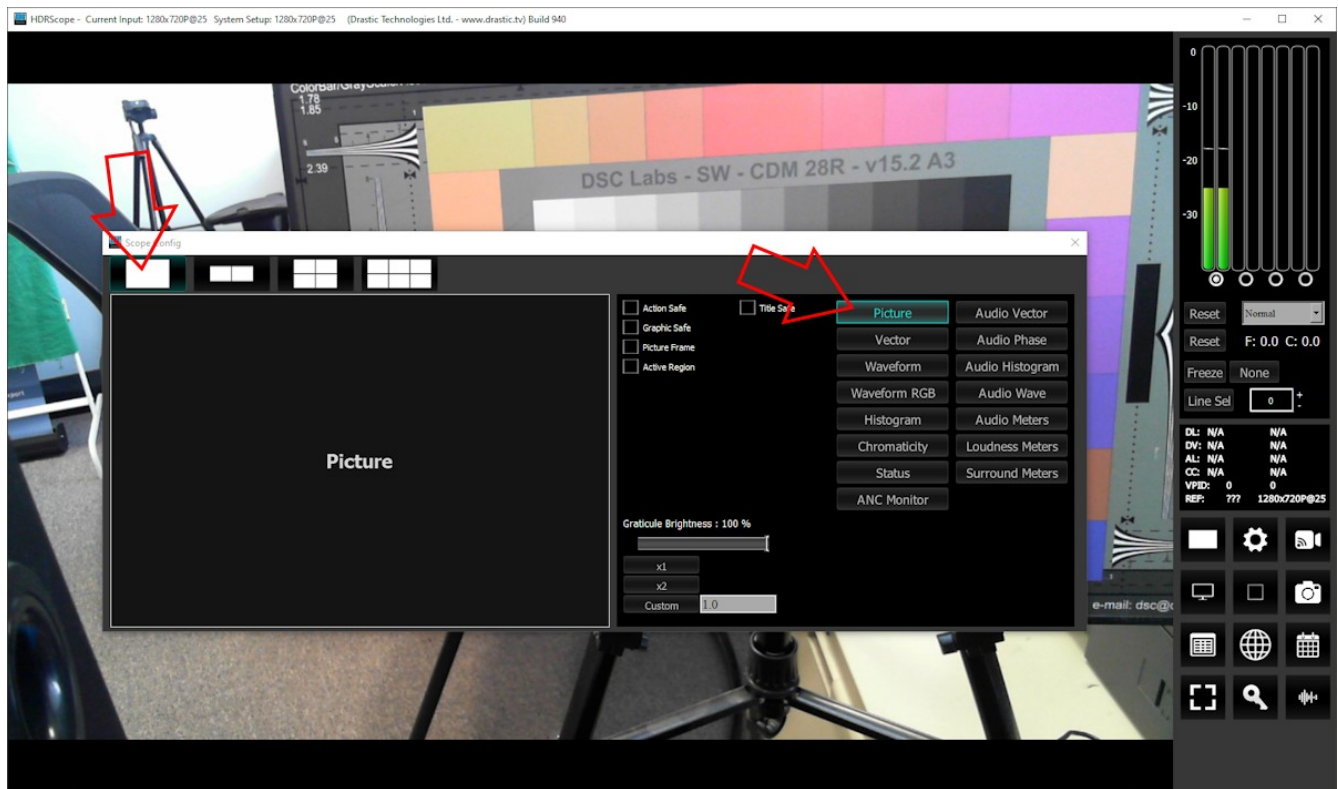
Press the Setup button, and select the layout that suits your workflow:



From left to right, the choices are: 1 scope (single), 2 scopes (side by side), 4 scopes (2 x 2 grid), or 6 scopes (two rows of three scopes).

3.2.1.1 Single Scope Layout

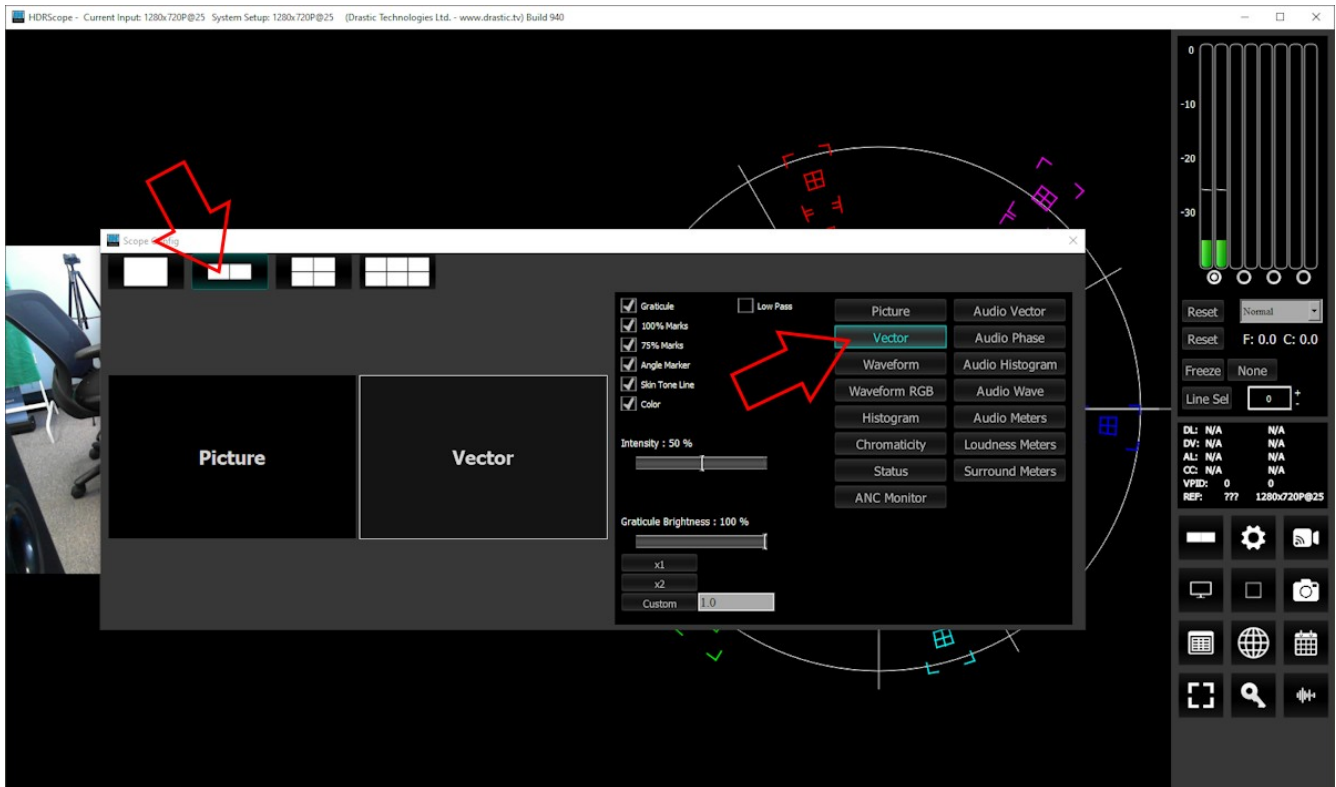
A single scope layout has been selected.



The arrow on the left shows the button used to select the single scope layout. The example shown displays the selection of the picture view. The arrow on the right shows the button used to select the picture view.

3.2.1.2 Two Scopes Layout

The two scopes layout has been selected.

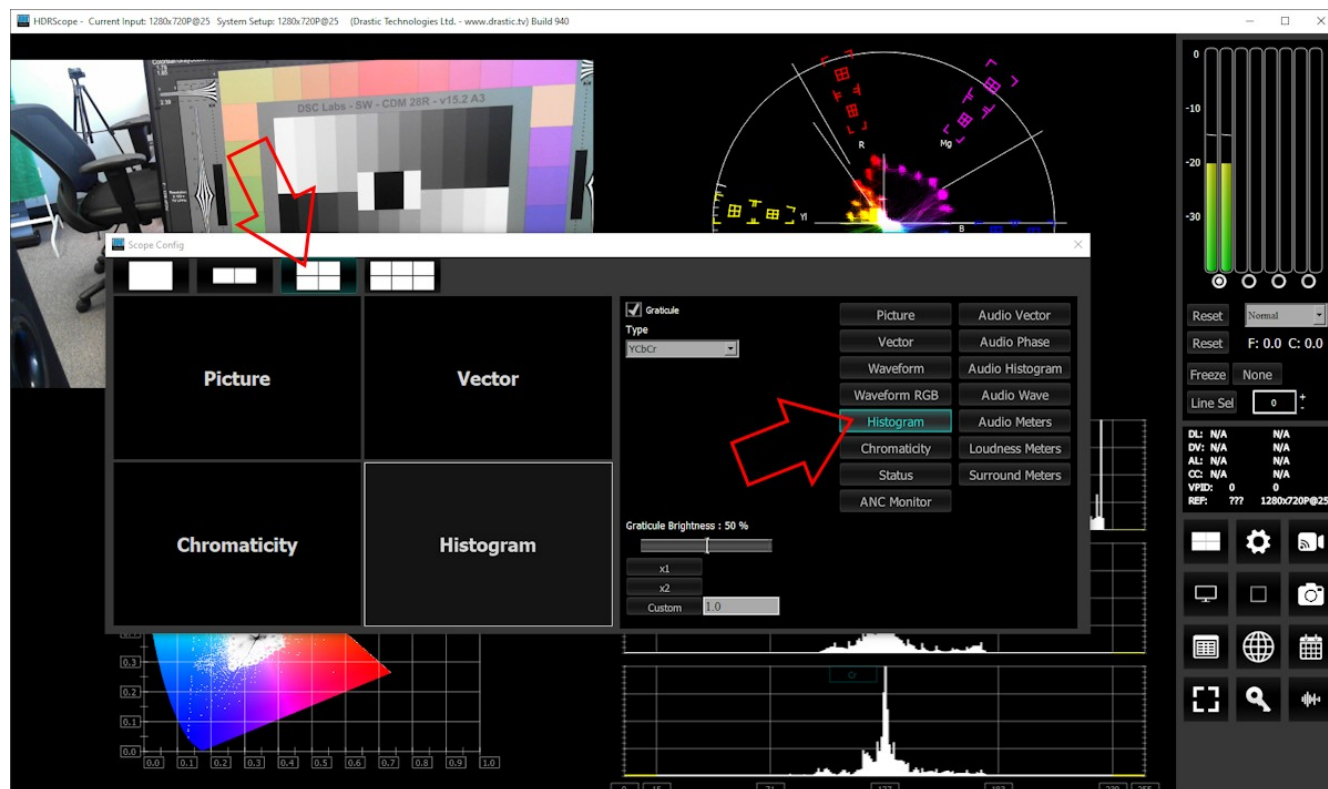


The arrow on the left shows the button used to select the two scopes layout. The example shown features the picture view and the vectorscope. The arrow on the right shows the button used to select the vectorscope.

To change which scope appears in a panel, click on it and use the selection buttons on the right to choose the scope. For example if you would like a waveform monitor on the left panel, you would click on the left panel, and click on the appropriate waveform button.

3.2.1.3 Four Scopes Layout

The four scopes layout has been selected.

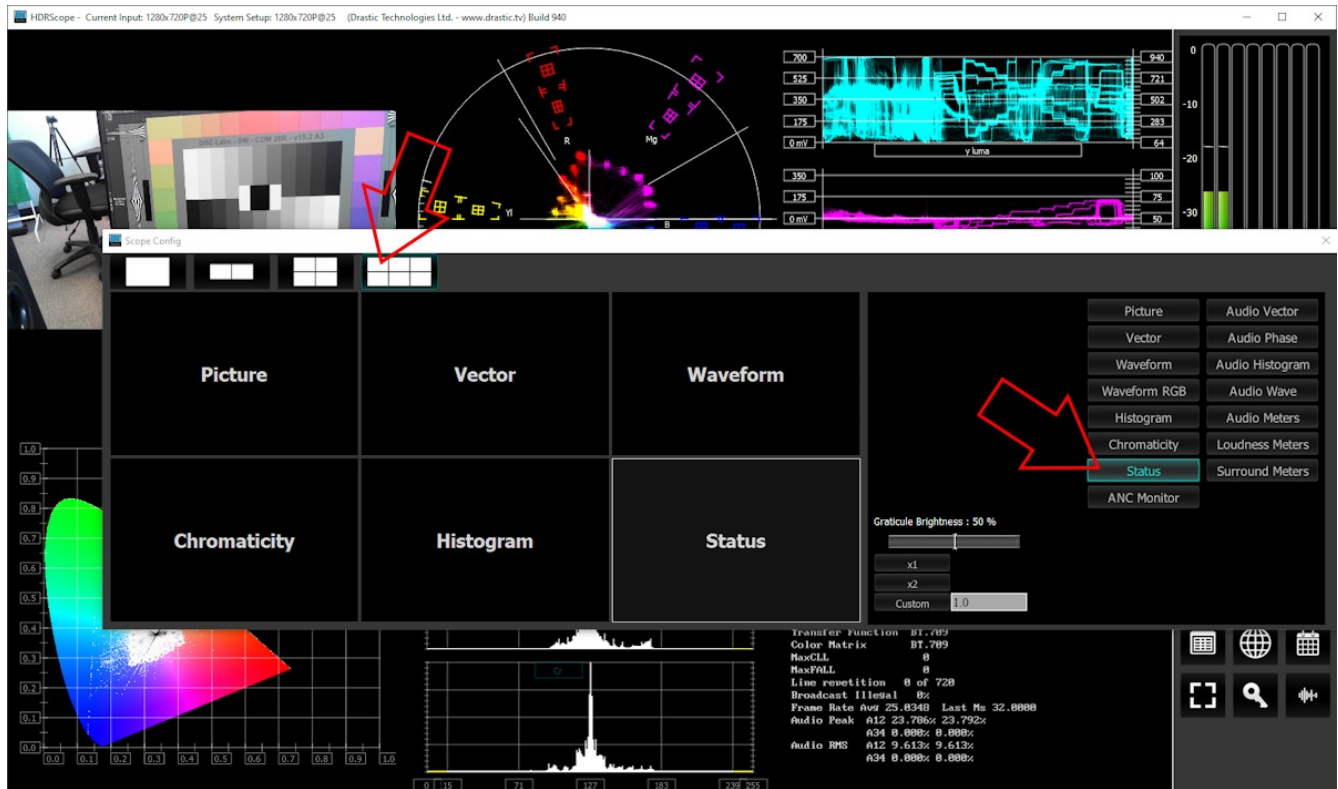


The arrow on the left shows the button used to select the four scopes layout. The example shown features the picture view, the vectorscope, the chromaticity, and the histogram. The arrow on the right shows the button being used to select the histogram.

To change which scope appears in a panel, click on it and use the selection buttons on the right to choose the scope. For example if you would like a waveform monitor on the lower left panel, you would click on the left panel, and click on the appropriate waveform button.

3.2.1.4 Six Scopes Layout

The six scopes layout has been selected.



The arrow on the left shows the button used to select the six scopes layout. The example shown features the picture view, the vectorscope, the waveform, the chromaticity, the histogram, and the status display. The arrow on the right shows the button being used to select the status view.

To change which scope appears in a panel, click on it and use the selection buttons on the right to choose the scope. For example if you would like an audio waveform display on the lower left panel, you would click on the left panel, and click on the appropriate waveform button.

3.2.2 Picture View

To set up the Picture view, press the **Scope Config** button. This opens the Scope Config window. Click on the **Picture** button on the right. There are a number of options to set up the picture view:



Action Safe checkbox - when selected, the Action Safe graticule is displayed over the video output.

Title Safe checkbox - when selected, the Title Safe graticule is displayed over the video output.

Graphic Safe checkbox - when selected, the Graphic Safe graticule is displayed over the video output.

Picture Frame checkbox - when selected, the Picture Frame graticule is displayed over the video output.

Active Region checkbox - when selected, the Active region graticule is displayed over the video output.

Graticule Brightness slider - Moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

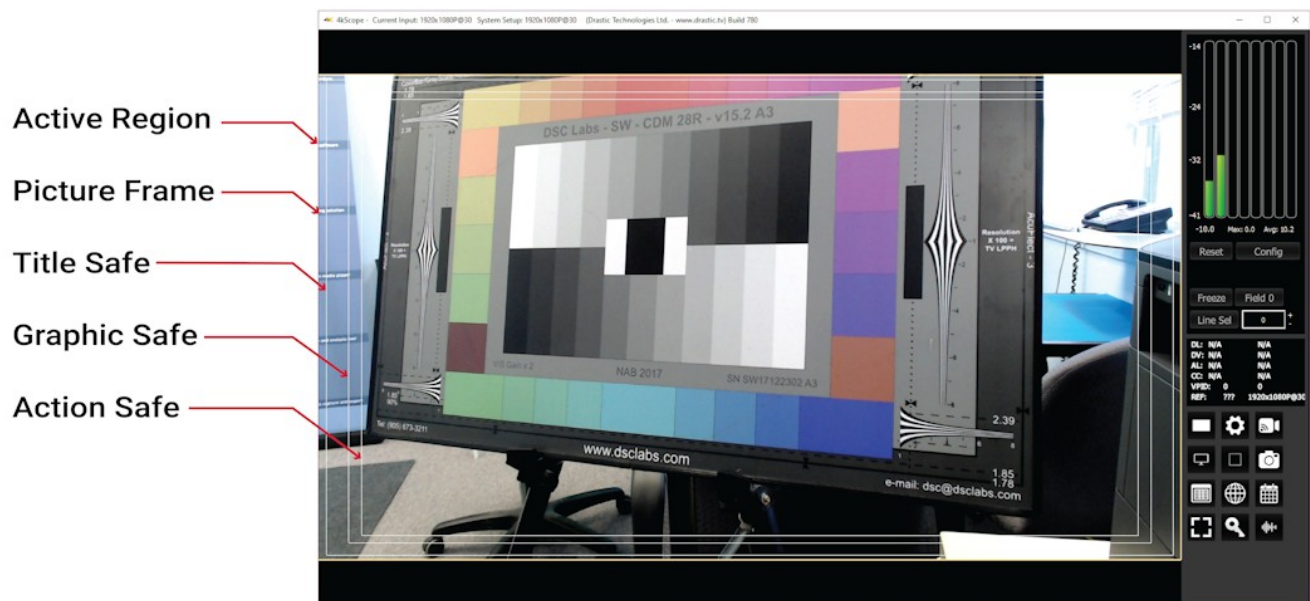
Pressing the x in the upper right corner will close the Scope Config window.

Here is the Picture view.



The Picture view shows the video signal, to confirm the source is correct.

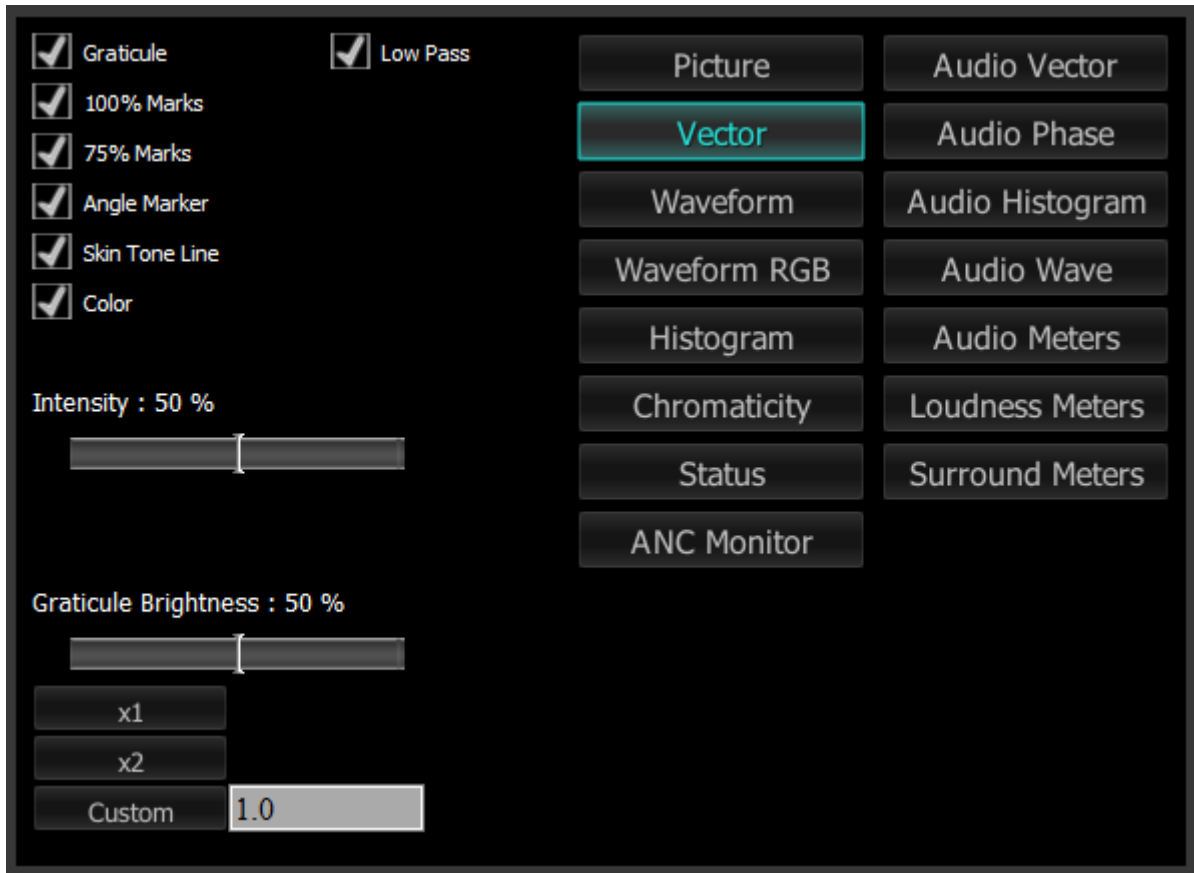
Action Safe, Title Safe, Graphic Safe, Picture Safe, and Active Region graticules may be optionally overlaid.



3.2.3 Vectorscope

3.2.3.1 Vectorscope Setup

To set up the vectorscope, press the **Scope Config** button. This opens the Scope Config window. Click on the **Vector** button on the right. There are a number of options to set up the vectorscope:



Graticule checkbox – when selected, the graticule is laid over the Vectorscope. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

Low Pass checkbox – when selected, smooth the scope with a 1/3 filter to remove single pixel anomalies.

100% Marks checkbox – when selected, the 100% Marks are displayed over the Vectorscope

75% Marks checkbox - when selected, the 75% Marks are displayed over the Vectorscope

Angle Marker checkbox - when selected, the Angle Marker is displayed over the Vectorscope

Skin Tone Line checkbox - when selected, the Skin Tone Line is displayed over the Vectorscope

Color checkbox – when selected, the lines, regions, and points of the signal in the vectorscope are drawn in their respective colors.

Intensity slider – Moving the Intensity slider brightens or dims the display of the video signal through the Vectorscope. The current setting is displayed above the slider, as a percentage, 0% providing no display and 100% being maximum intensity.

Graticule Brightness slider - Moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

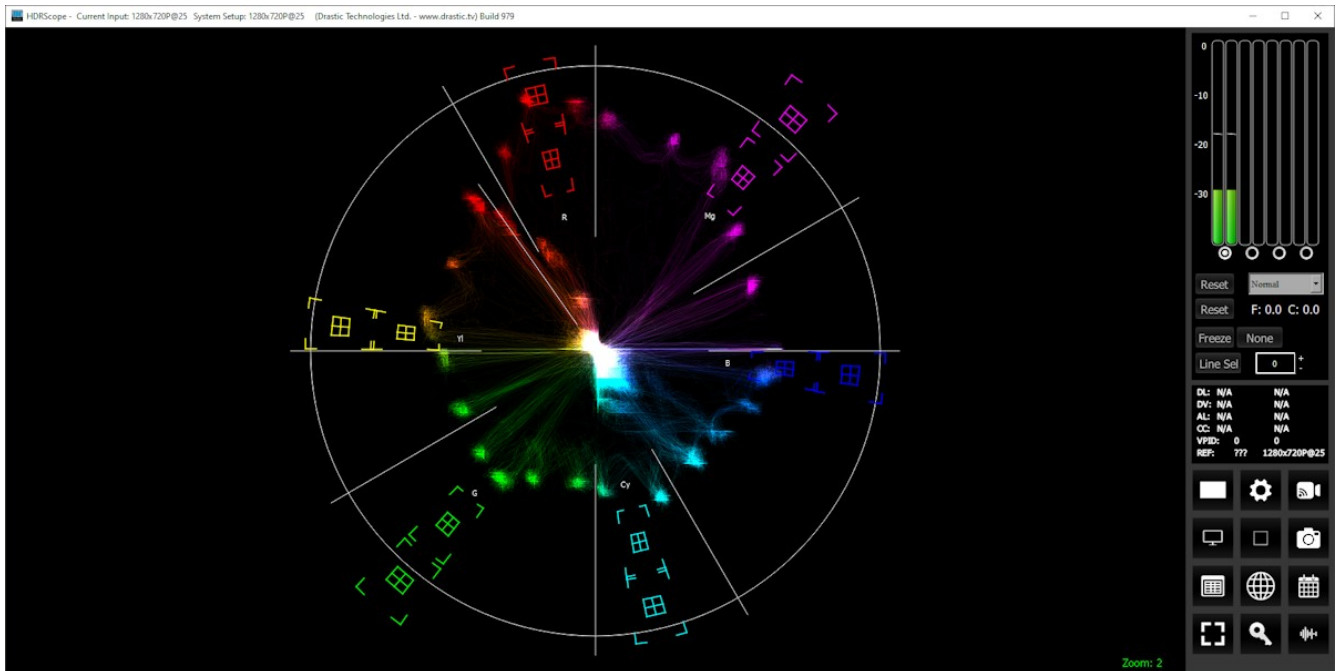
Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.3.2 Vectorscope Window

Here is the Vectorscope.



The **Vectorscope** displays a traditional Cb by Cr X-Y display with overlaid reference graticule.

Color accurate graticules automatically switch between SD and HD color spaces. The markers include color points (for standard bar checks) at 75% and 100% saturation. All the standard points are boxed; red, magenta, blue, cyan, green and yellow. A skin tone/flesh line is provided to allow for easy hue adjustment as well as standard diagonals.

At all times a minimum and maximum value for each of the channels (Y, Cr and Cb) is displayed in 10 bit mode (0-1023). The color of the text for each channel indicates the following: in range (green), out of range but legal (yellow) and illegal/sync values (red).

For single link 8 and 10 bit YCbCr signals, there is no color processing involved. For dual link 4:4:4 RGB signals, the equivalent Cb and Cr are calculated to create the display.

3.2.4 Waveform YCbCr

3.2.4.1 Waveform YCbCr Setup

To set up the Waveform YCbCr, press the **Scope Config** button. This opens the Scope Config window. Click on the **Waveform** button on the right. There are a number of options to set up the waveform:

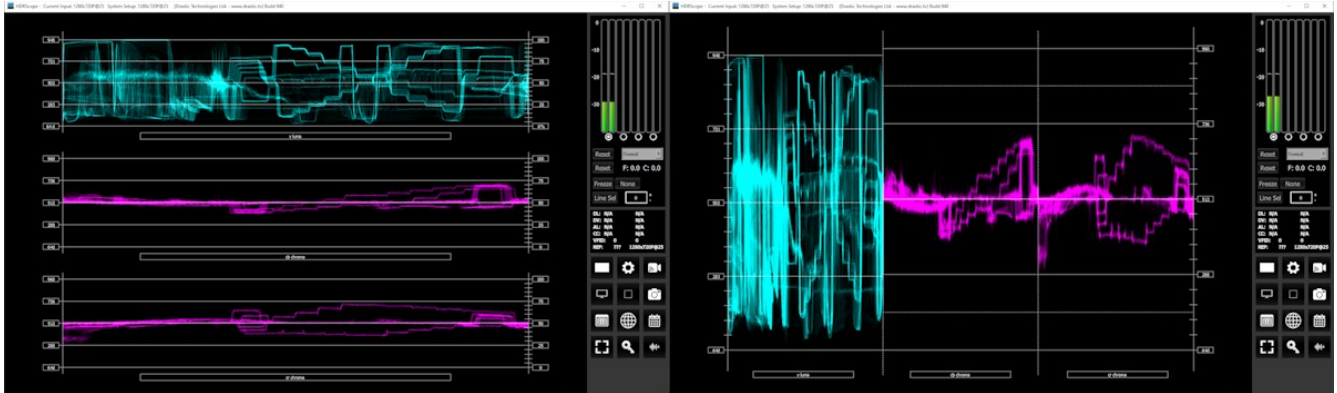


Graticule checkbox – when selected, the graticule is laid over the Waveform YCbCr display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

Low Pass checkbox – when selected, smooth the scope with a 1/3 filter to remove single pixel anomalies.

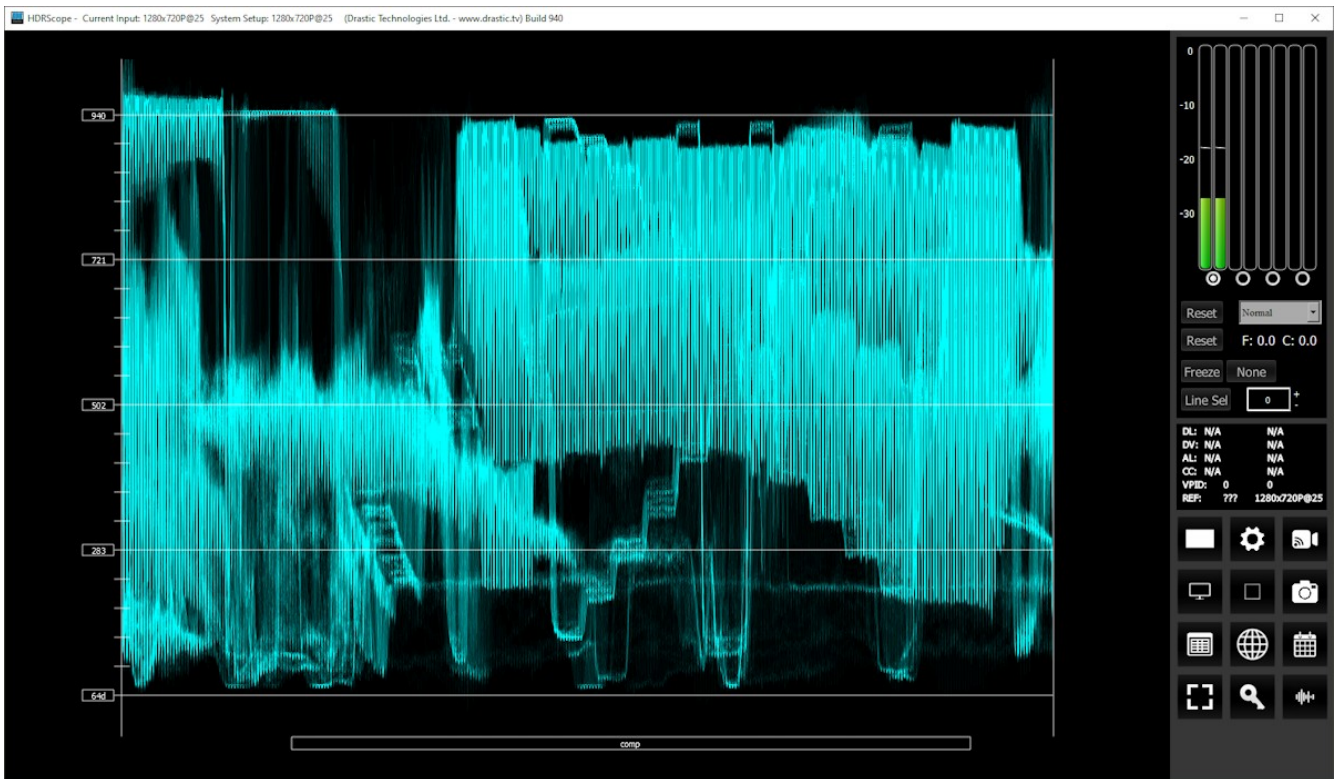
3.2.4.1.1 Show Parade

Show Parade checkbox – when selected, the display is from left to right. When not selected, the display is stacked top to bottom.



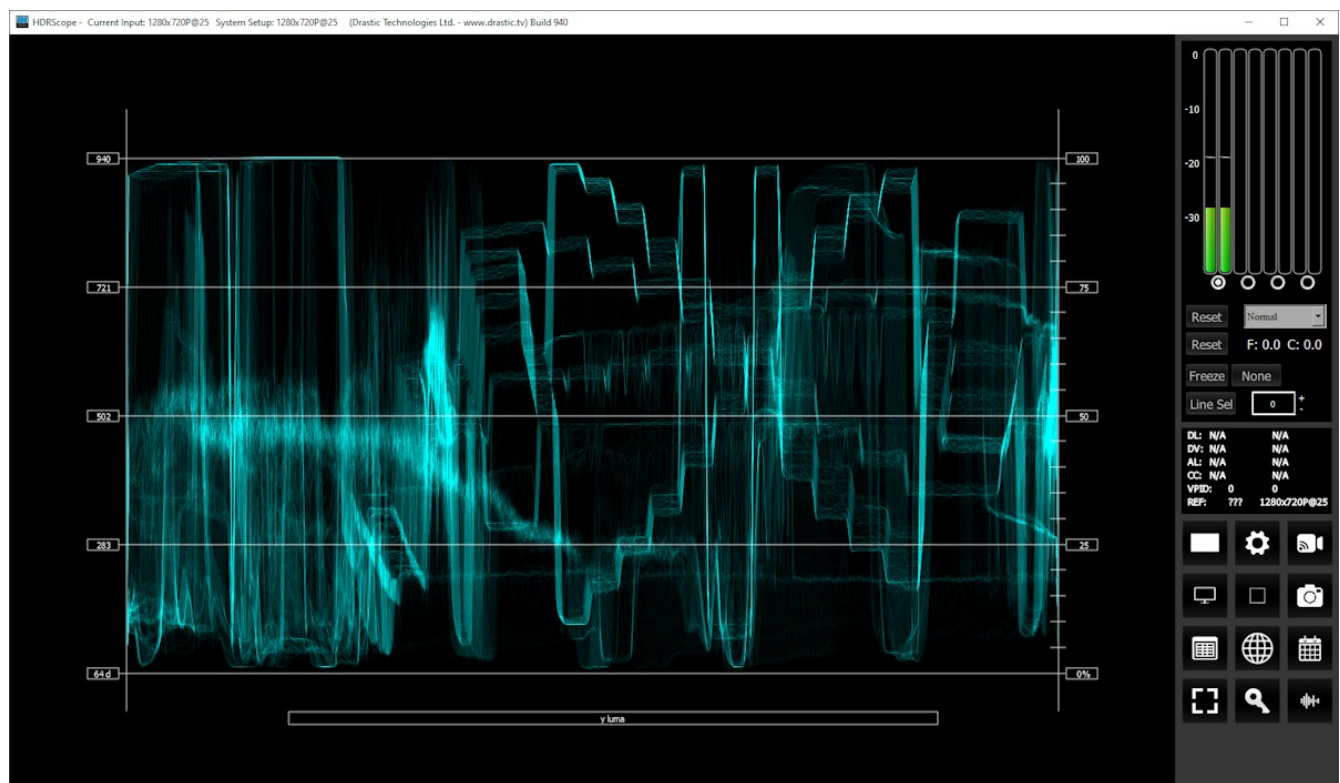
3.2.4.1.2 Overlay

Overlay checkbox – display the signal the three channels in the signal overlaid as a composite image.



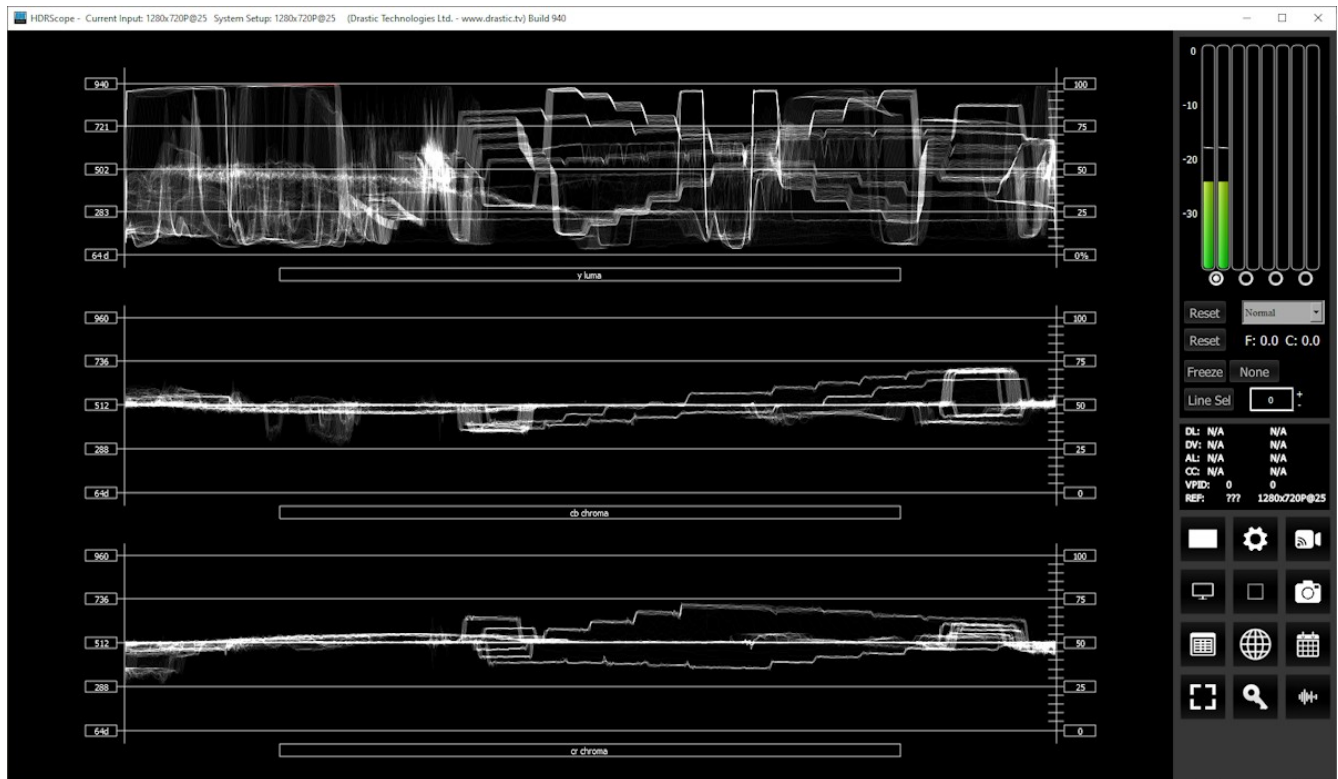
3.2.4.1.3 Only Luma

Only Luma checkbox – when selected, displays only the luminance of the signal.



3.2.4.1.4 Scope White

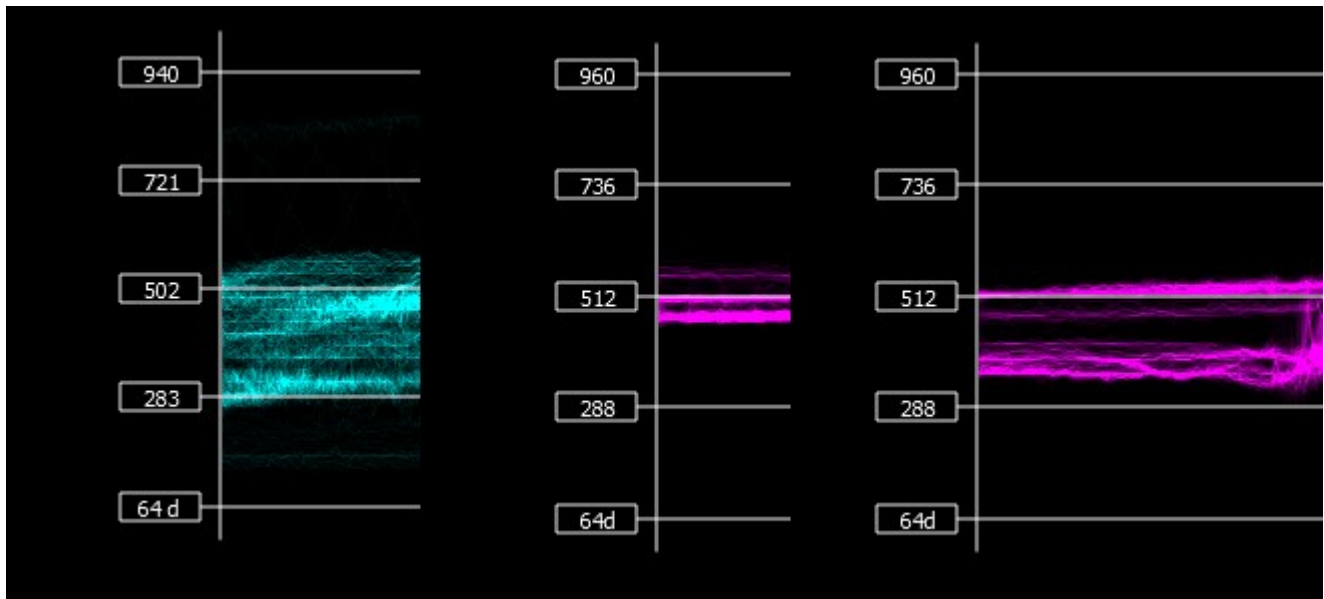
Scope White checkbox – turns the trace white.



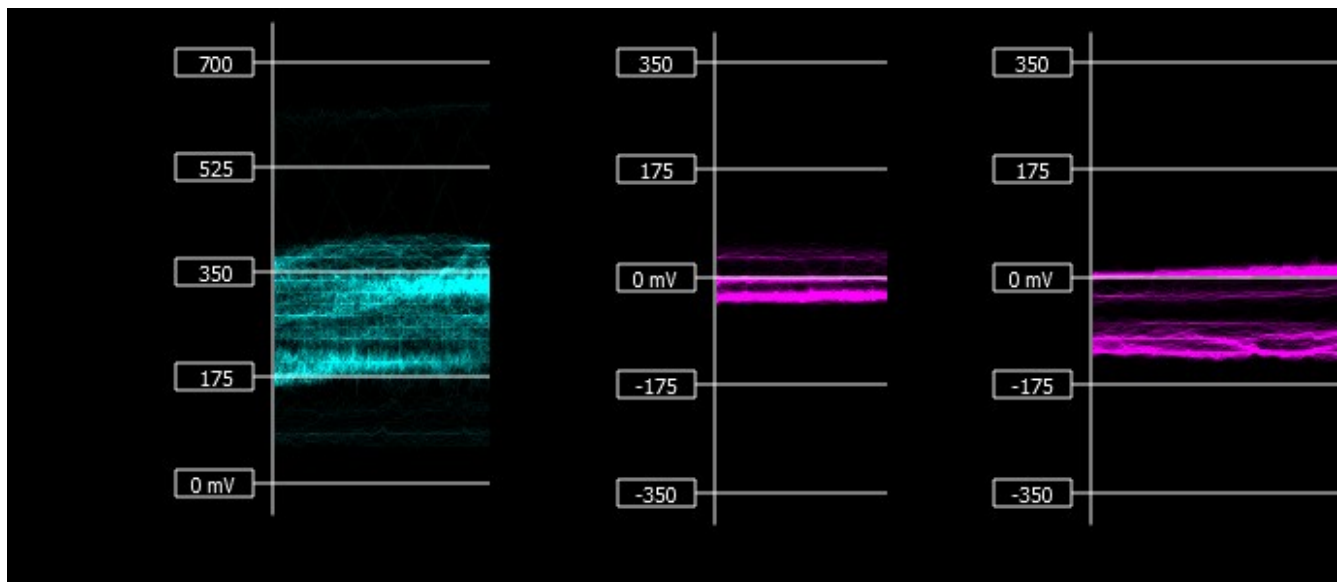
3.2.4.1.5 Scale Type

Scale Type pulldown – set the type of scale used to draw the waveform. Choices include:

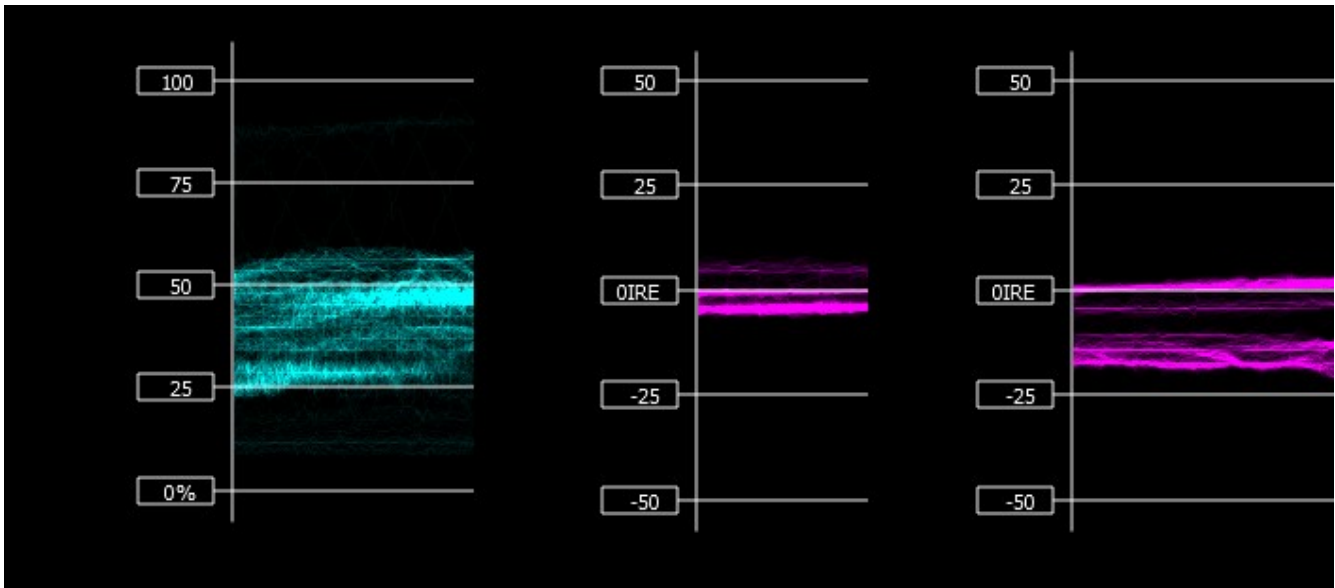
- **Digital** - the actual 0..255, 0..1023, or 0..4095 numeric values of the signal. In parade mode, the Cb and Cr graticule are not displayed.



- **MV** - the equivalent millivolts value of the signal if it was converted to analog. In parade mode, the Cb and Cr graticule are not displayed.



- **IRE** – Institute of Radio Engineers units, spanning 0..100. In parade mode, the Cb and Cr graticule are not displayed.



3.2.4.1.6 Max HDR

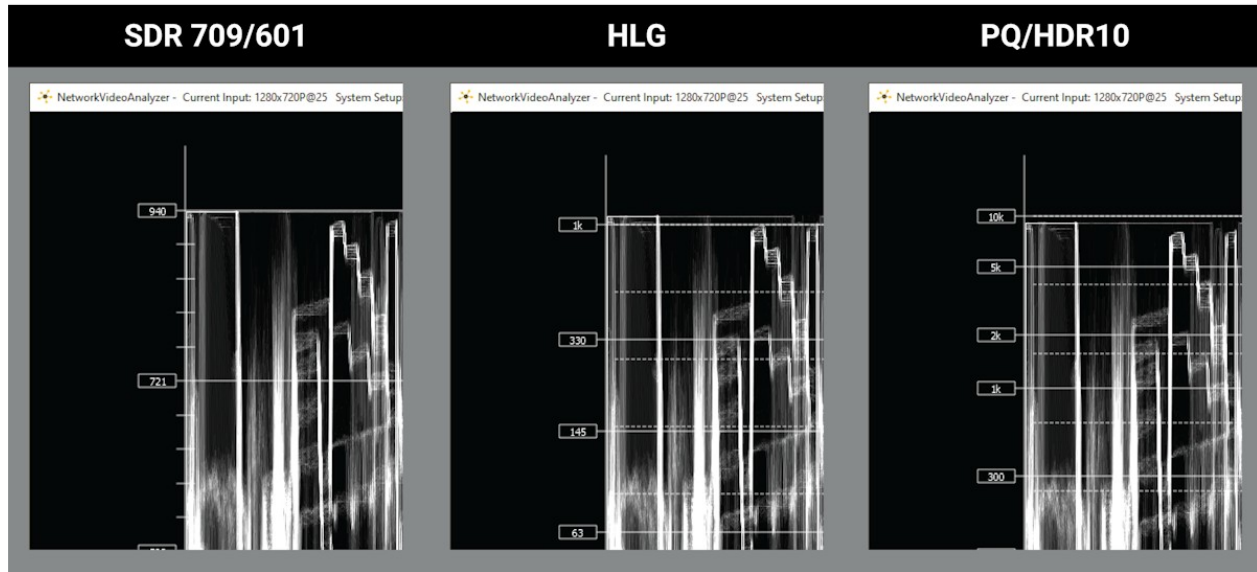
Max HDR checkbox – lets the user select between NITS settings for HDR work. When set to PQ/HDR10, up to 10k nits becomes available. When set to HLG, this range is set to 1k

PQ/HDR10 Options include:

- 10K NITS Max
- 5K NITS Max
- 4K NITS Max
- 3K NITS Max
- 2K NITS Max
- 1K NITS Max
- 200K NITS Max

3.2.4.1.7 High/Low

NITS settings for HDR workflows



High/Low pulldown – Show only the high and low portions of the signal, cutting out the middle.

Choices include: Normal (off), 2x zoom, 3x zoom.

Intensity slider – Moving the Intensity slider brightens or dims the display of the video signal through the Vectorscope. The current setting is displayed above the slider, as a percentage, 0% providing no display and 100% being maximum intensity.

Graticule Brightness slider - Moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

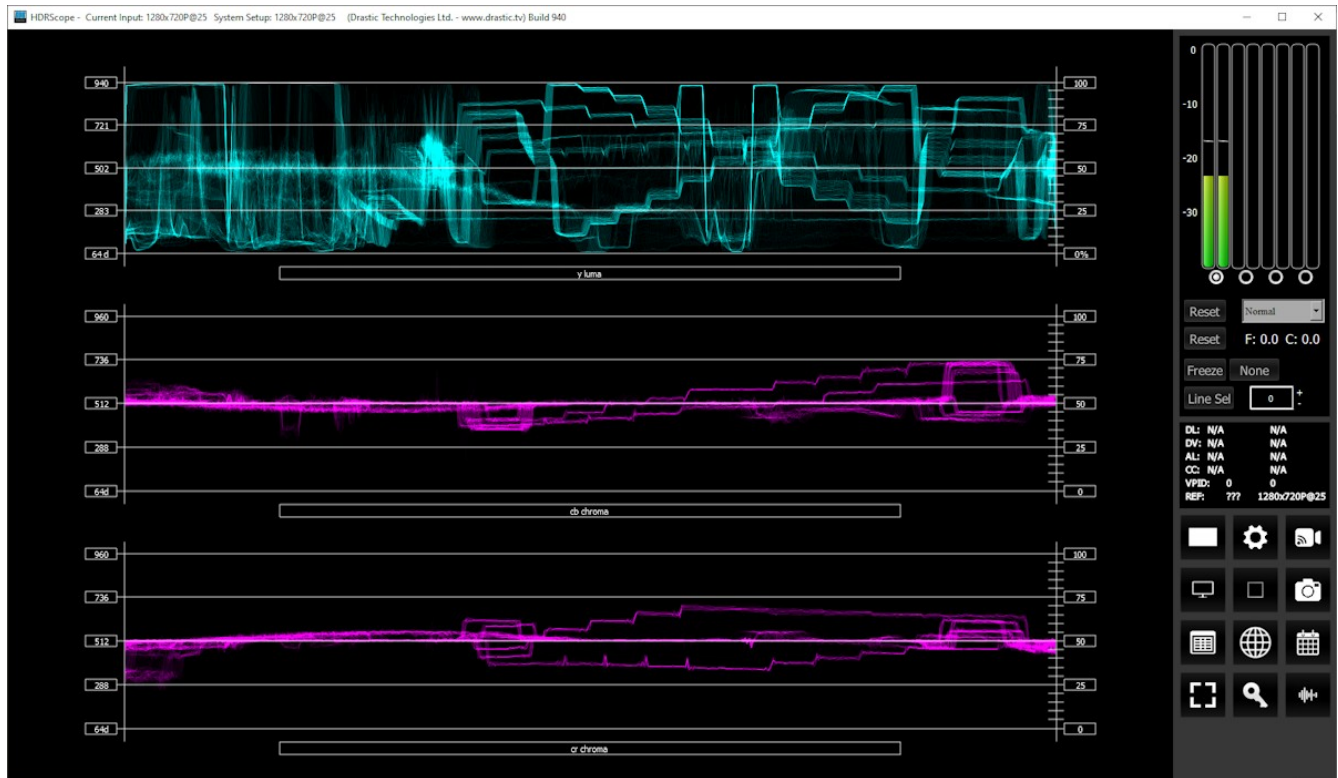
Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.4.2 Waveform YCbCr Window

Here is the Waveform YCbCr.



The **YCbCr Waveform Monitor** displays the levels of the Y, Cb and Cr from the left of the picture to the right of the picture with all the lines summed into one graph. The Y, or luma/luminance, graph provides accurate white and black level information, as well as the range in between. The Cb and Cr display the +/- 512 levels of chroma of both types. This provides a visual representation of the chroma range of the signal.

IRE (percentage) to Digital Equivalence		
0	64d	0x40
25	283d	0x11b
50	502d	0x1F6
75	721d	0x2D1
100	940d	0x3AC

Critical for downstream color correction is the need to ensure proper luminance levels at the stage of initial capture, so any corrections will not muddy or wash out the signal information.

At all times a minimum and maximum value for each of the channels (Y, Cr and Cb) is displayed in 10 bit mode (0-1023). The color of the text for each channel indicates the following: in range (green), out of range but legal (yellow) and illegal/sync values (red).

3.2.5 Waveform RGB

3.2.5.1 Waveform RGB Setup

To set up the Waveform RGB press the **Scope Config** button. This opens the Scope Config window. Click on the **Waveform RGB** button on the right. There are a number of options to set up the Waveform RGB:

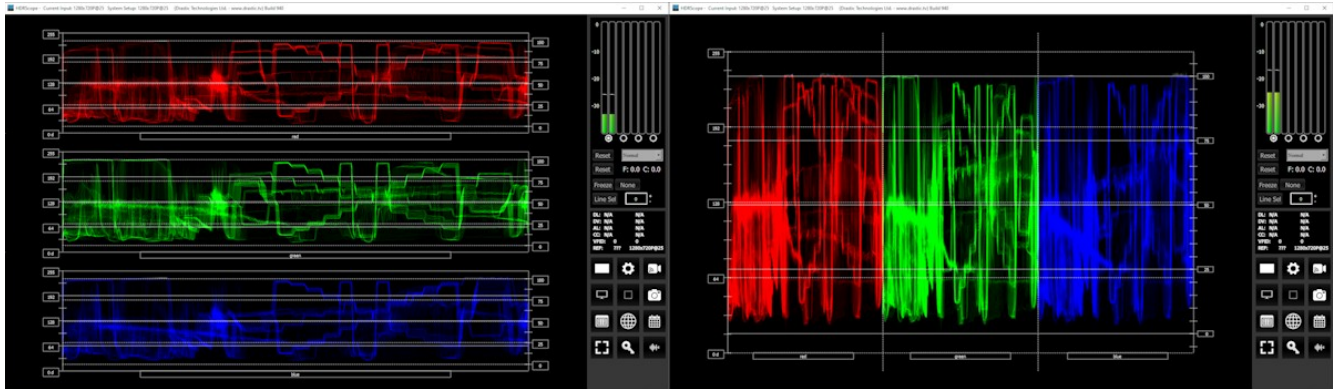


Graticule checkbox – when selected, the graticule is laid over the Waveform RGB display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

Low Pass checkbox - Smooth the scope with a 1/3 filter to remove single pixel anomalies.

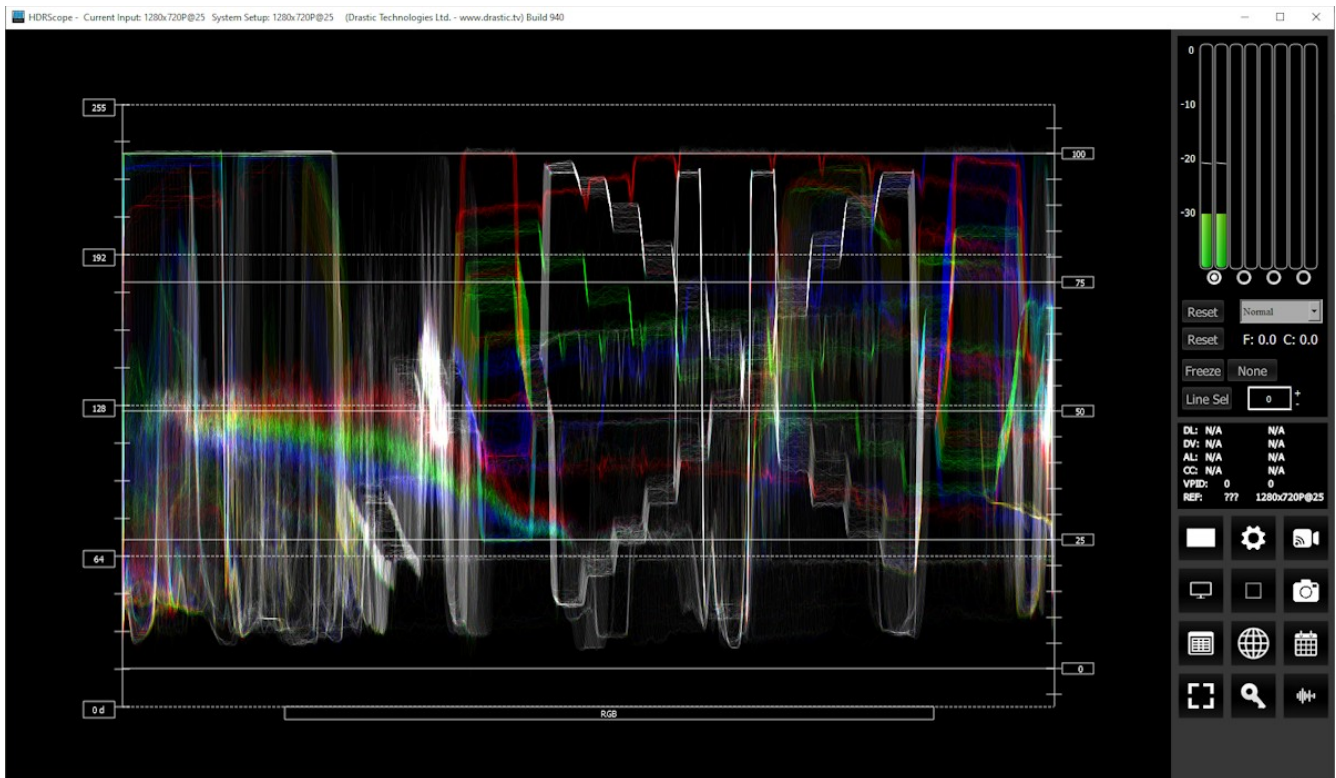
3.2.5.1.1 Show Parade

Show Parade checkbox – when selected, the display is from left to right. When not selected, the display is stacked top to bottom.



3.2.5.1.2 Overlay

Overlay checkbox – show Red, Green, and Blue overlaid on top of each other, to directly compare the relative strength of the channels.



Overlay (Composite) RGB Waveform Monitor

Full Scale checkbox – RGB, by default, will be sRGB. The range of each color will be from 16 to 240 (in 8 bit), so the scale will place white at 240 and black at 16 in normal scale. If in full scale, white will be placed at 255 and black at 0.

Scope White checkbox – turns the display white.

Intensity slider – Moving the Intensity slider brightens or dims the display of the video signal.

The current setting is displayed above the slider, as a percentage, 0% providing no display and 100% being maximum intensity.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

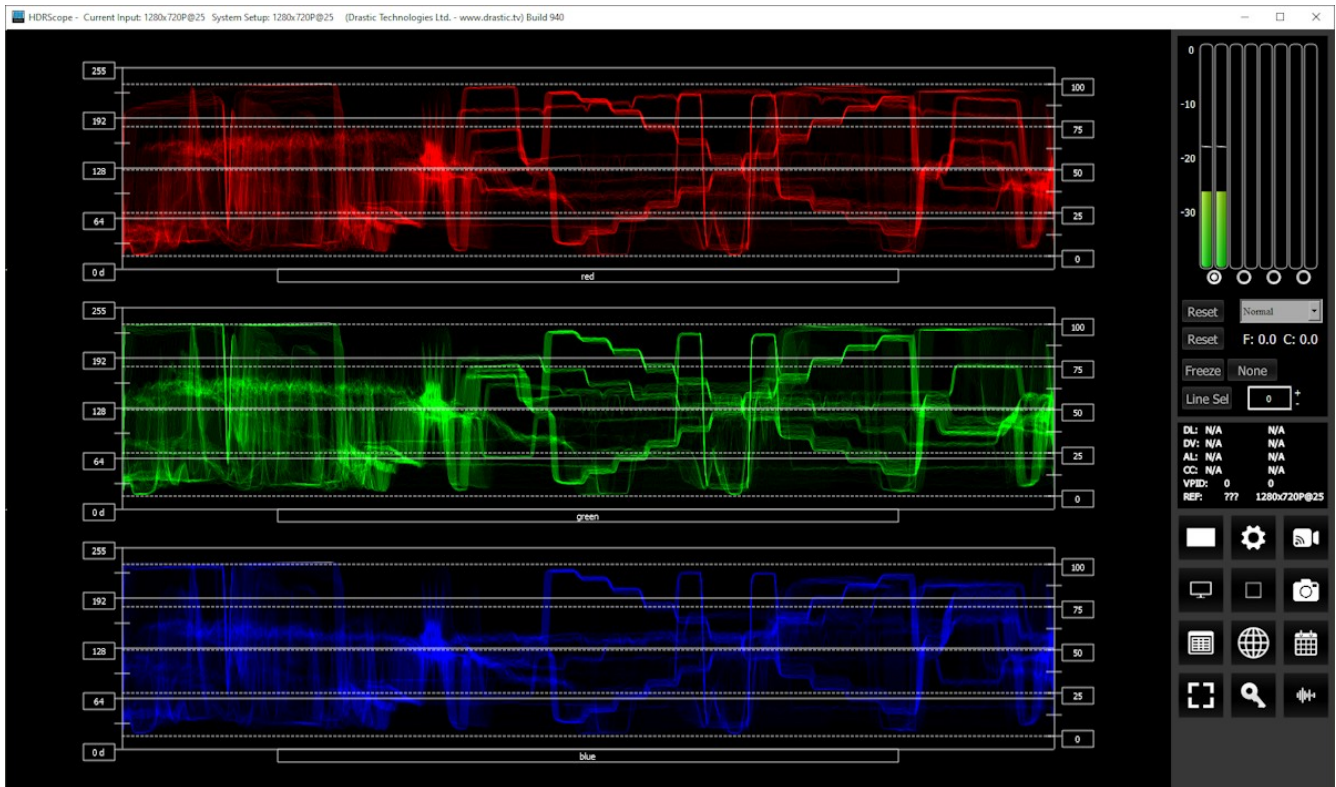
Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.5.2 Waveform RGB Window

Here is the Waveform RGB.



The **RGB Waveform Monitor** shows each of the red, green and blue signals as independent graphs, displaying the RGB, or chrominance/color values associated with the signal.

IRE (percentage) to Digital Equivalence		
0	0	0x0
25	256	0x100
50	512	0x200
75	768	0x300
100	1023	0x3FF

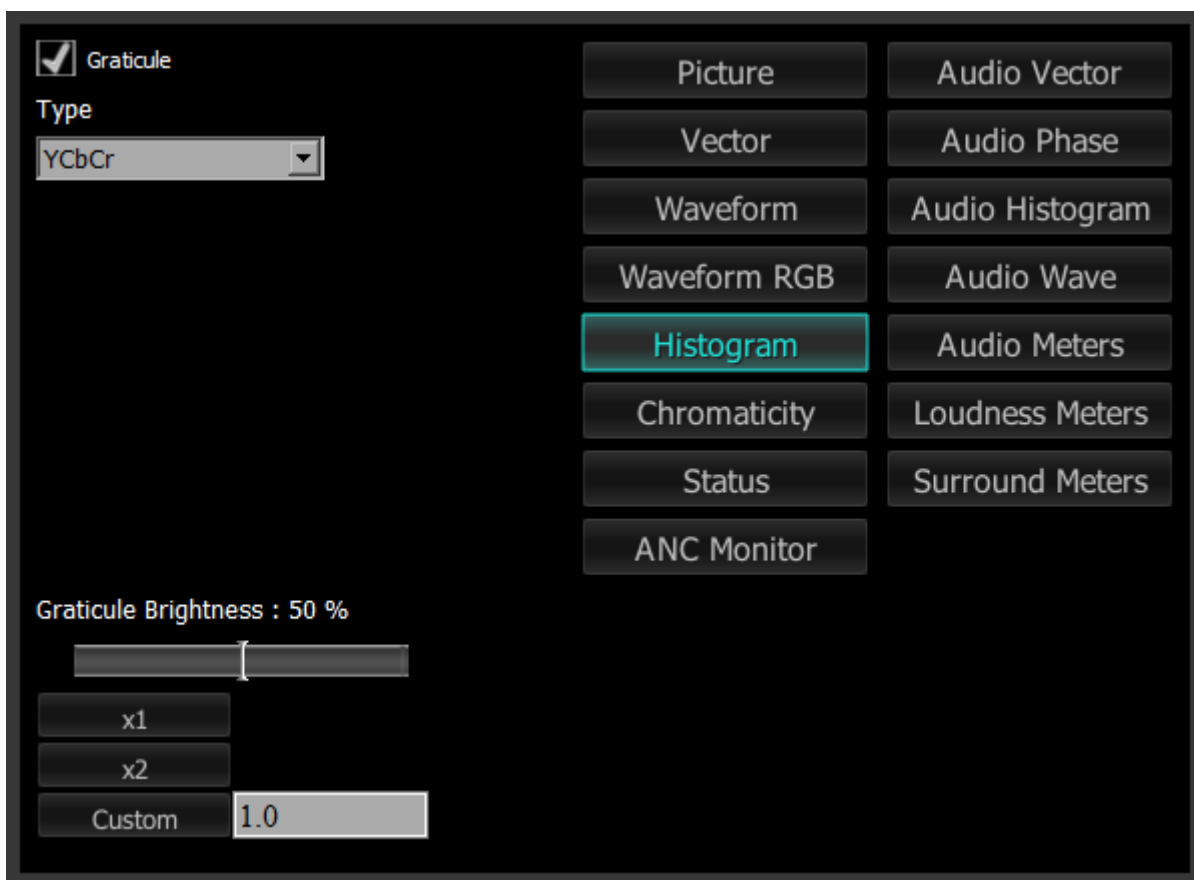
For dual link RGB signals, the original RGB 10 bit values are used unprocessed. For single link YCbCr signals, they are first converted to RGB before being analyzed and displayed.

3.2.6 YCbCr Histogram

3.2.6.1 YCbCr Histogram Setup

There are five Histograms available in the histogram panel: the YCbCr Histogram, RGB Histogram, HSV Histogram, Luma Histogram, and the H/S Scope.

To set up the YCbCr Histogram, press the **Scope Config** button. This opens the Scope Config window. Click on the **Histogram** button on the right. Then use the pulldown menu to select YCbCr. There are a number of options to set up the YCbCr Histogram:



Graticule checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

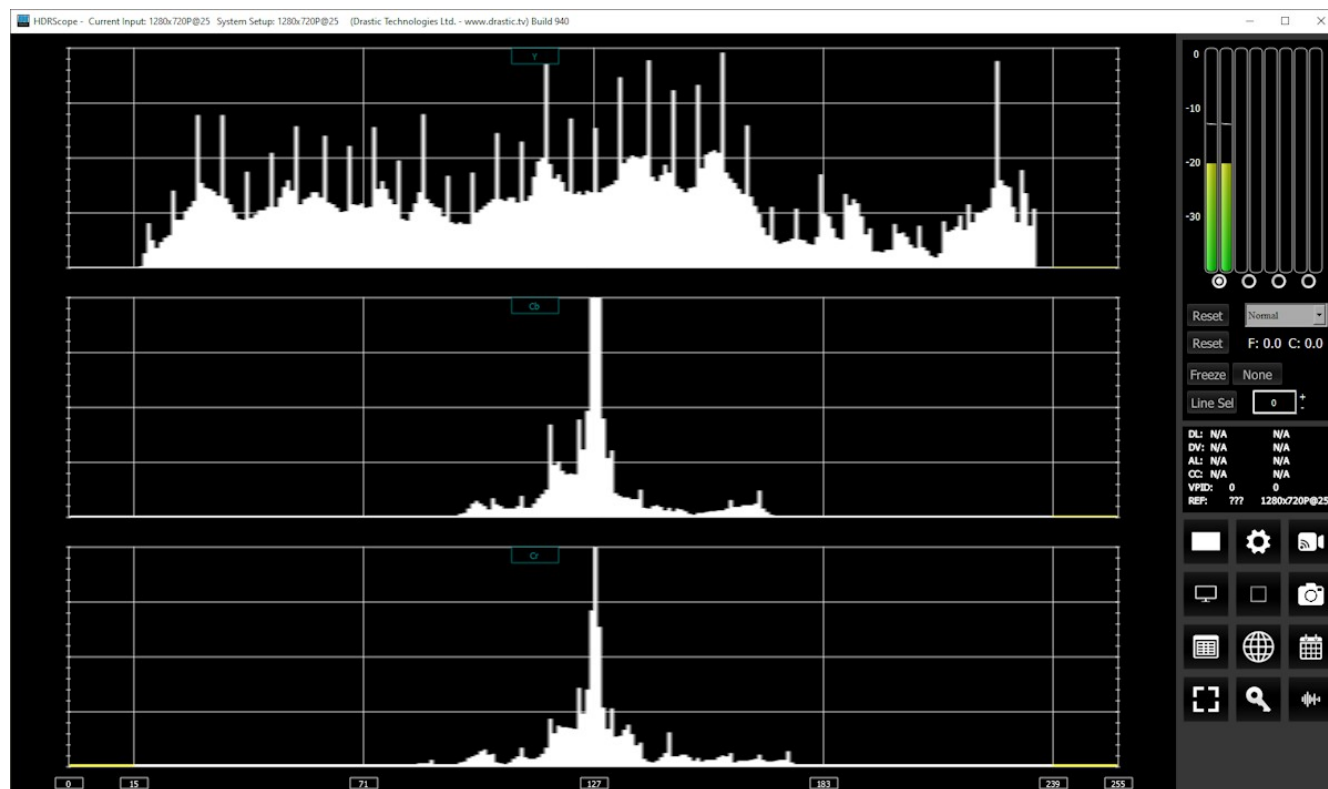
Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.6.2 YCbCr Histogram Window

Here is the YCbCr Histogram:



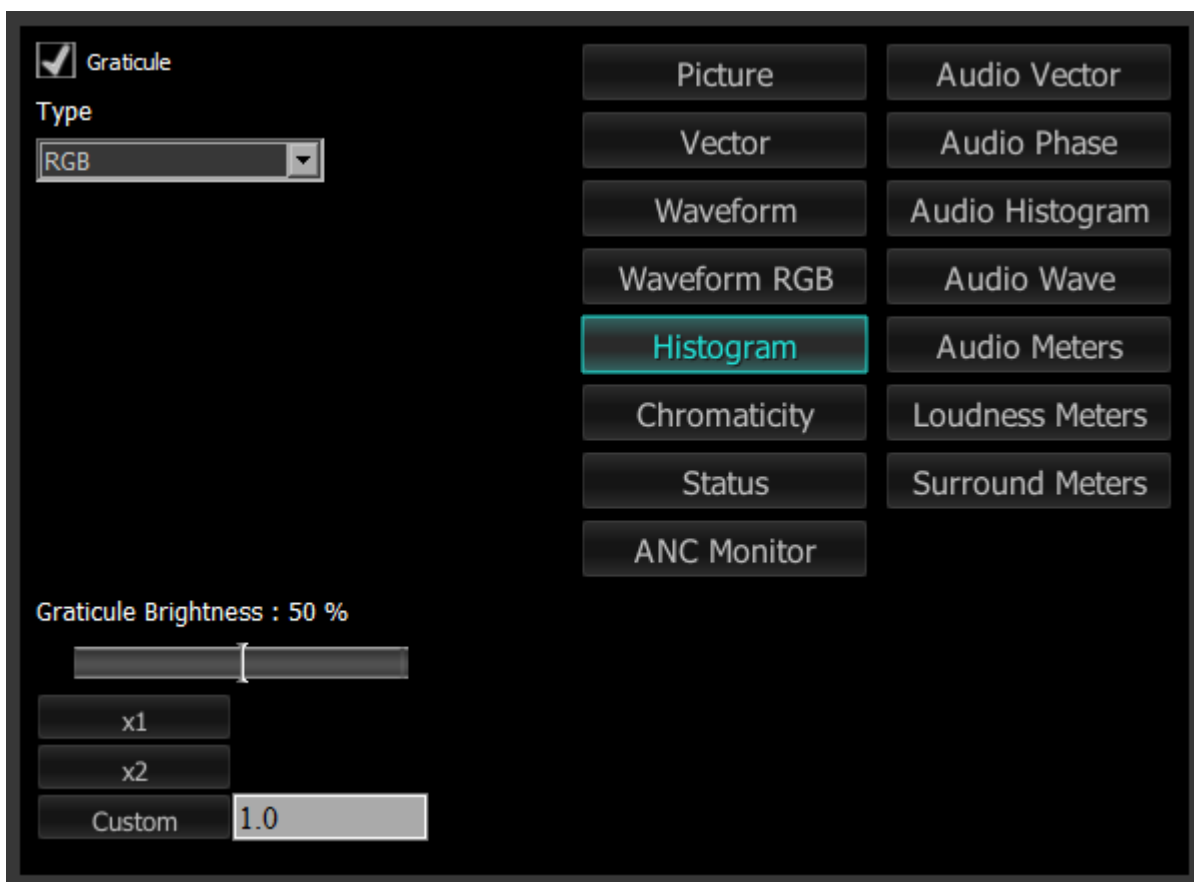
YCbCr Histogram - displays a YCbCr range. This histogram breaks up the signal into luma and chroma components. The top histogram represents the luma (Y) power of the various levels in the signal. The Cb (blue difference) and Cr (red difference) histograms that follow show the power distribution for those two components.

3.2.7 RGB Histogram

3.2.7.1 RGB Histogram Setup

There are five Histograms available in the histogram panel: the YCbCr Histogram, RGB Histogram, HSV Histogram, Luma Histogram, and the H/S Scope.

To set up the RGB Histogram press the **Scope Config** button. This opens the Scope Config window. Click on the **Histogram** button on the right. Then use the pulldown menu to select **RGB**. There are a number of options to set up the RGB Histogram:



Graticule checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the Graticule Brightness slider described below.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

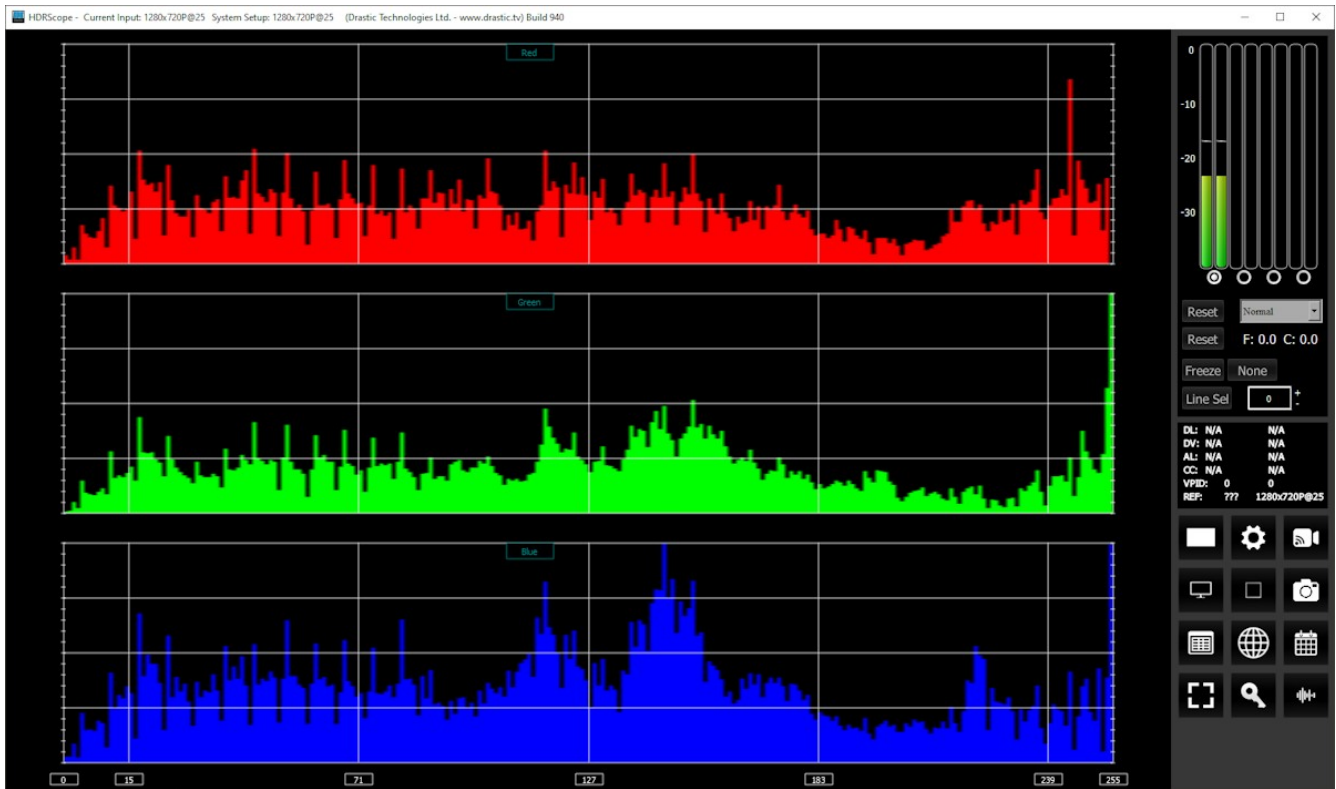
Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.7.2 RGB Histogram Window

Here is the RGB Histogram:



RGB Histogram – display an RGB range. Shows the distribution of red/green/blue within the signal as a series of discrete bars that make a continuous graph for each color. This display provides an overview of the tonal range of each color in the picture. Each bar is the count of the number of pixels for one of the 256/1024/4096 possible bins.

3.2.7.3 HSV Histogram Setup

There are five Histograms available in the histogram panel: the YCbCr Histogram, RGB Histogram, HSV Histogram, Luma Histogram, and the H/S Scope.

To set up the HSV Histogram press the **Scope Config** button. This opens the Scope Config window. Click on the **Histogram** button on the right. Then use the pulldown menu to select **HSV**. There are a number of options to set up the Histogram HSV:



Graticule checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the Graticule Brightness slider described below.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display. Pressing the x1 button sets the display back to normal.

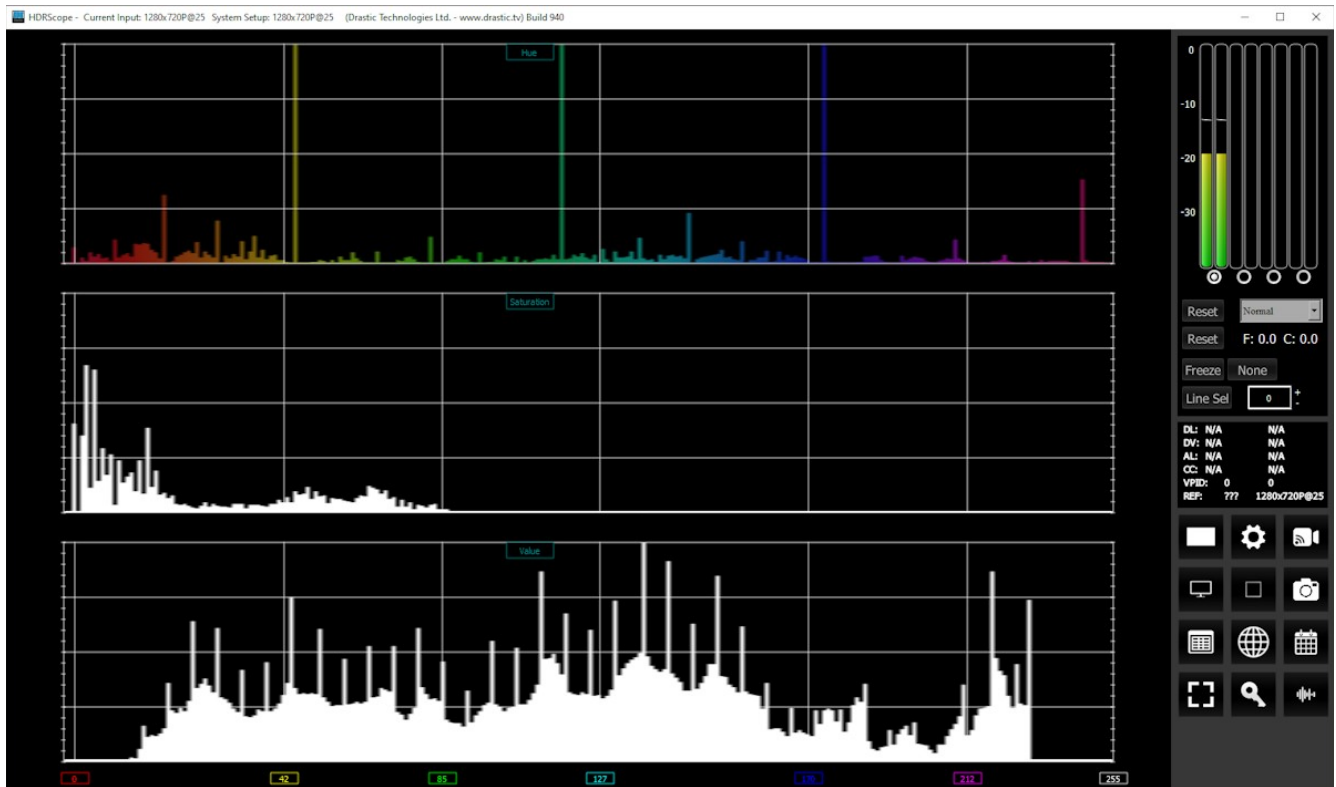
Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets

the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.7.4 HSV Histogram Window

Here is the HSV Histogram:



HSV Histogram – display Hue, Saturation, and Value levels. The top range shows the strength of each hue, the middle section displays the saturation levels of the hues, and the lower section displays the value, or darkness/lightness levels.

3.2.8 Luma Histogram

3.2.8.1 Luma Histogram Setup

There are five Histograms available in the histogram panel: the YCbCr Histogram, RGB Histogram, HSV Histogram, Luma Histogram, and the H/S Scope.

To set up the Luma Histogram press the **Scope Config** button. This opens the Scope Config window. Click on the **Histogram** button on the right. Then use the pulldown menu to select **Luma**. There are a number of options to set up the Luma Histogram:



Graticule checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the Graticule Brightness slider described below.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

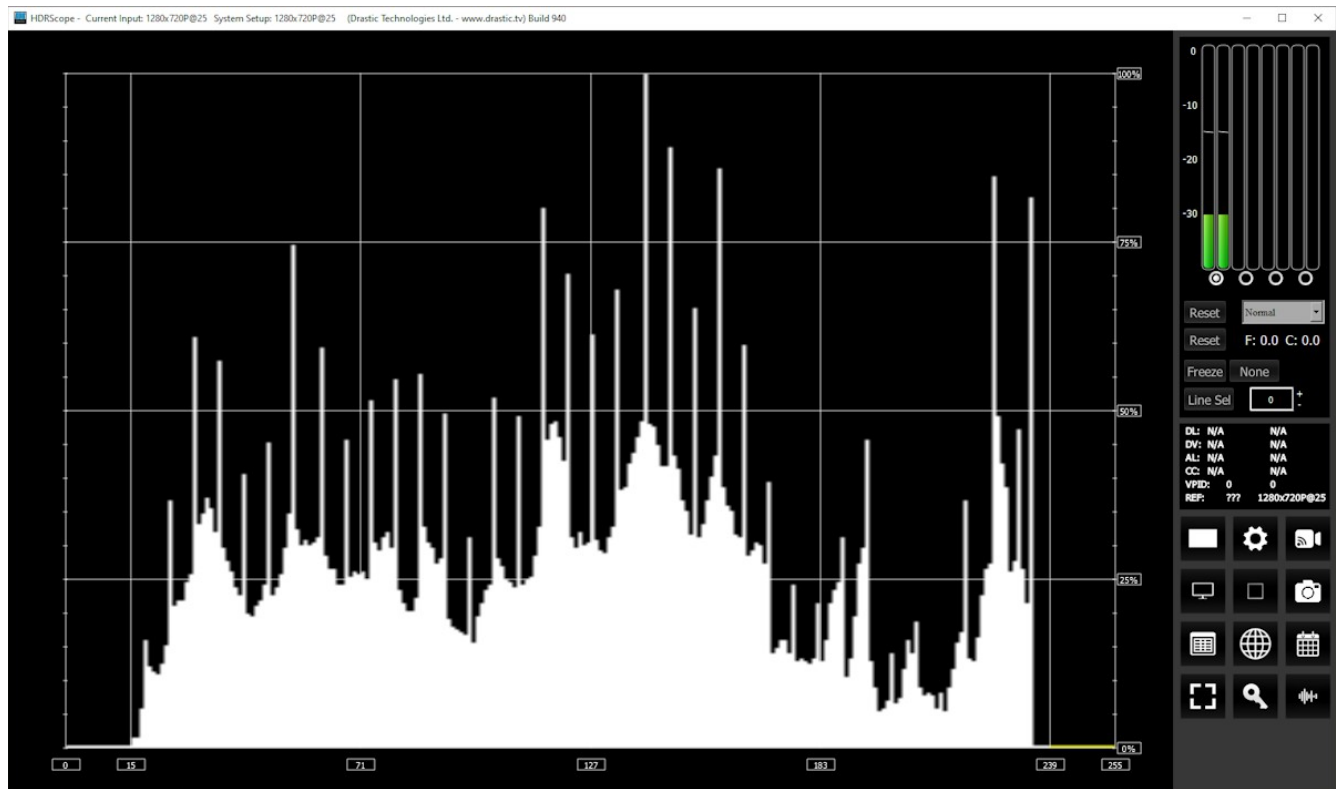
Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.8.2 Luma Histogram Window

Here is the Luma Histogram:



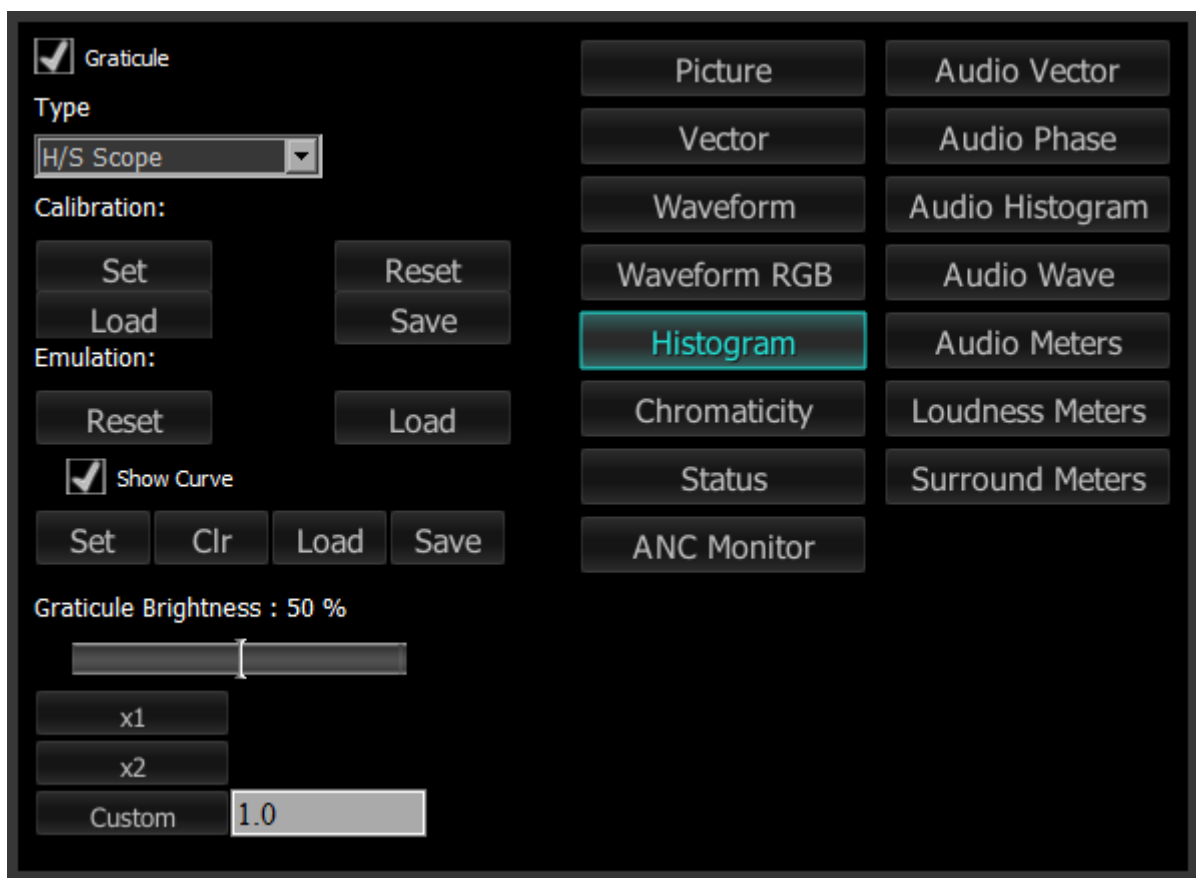
Luma Histogram – display only the luma in the signal.

3.2.9 H/S Scope

3.2.9.1 H/S Scope Setup

There are five Histograms available in the histogram panel: the YCbCr Histogram, RGB Histogram, HSV Histogram, Luma Histogram, and the H/S Scope.

To set up the H/S Scope press the **Scope Config** button. This opens the Scope Config window. Click on the **Histogram** button on the right. Then use the pulldown menu to select **H/S Scope**. There are a number of options to set up the H/S Scope:



Graticule checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the Graticule Brightness slider described below.

Calibration section – choices include:

- **Set** – with your signal being from a camera, pointed at a properly lit DSC ChromaDuMonde color chart, click to calibrate the input so the hue and saturation levels are even across the

spectrum. Creates a calibration settings file that may be saved into memory.

- **Load** – opens a browser which allows the user to browse to and load a saved calibration file.
- **Reset** – remove any calibration and display the signal unaltered, to show what the camera or device is seeing.
- **Save** – opens a save as window which allows the user to select a location and save the current calibration settings as a file.

Emulation section – choices include:

- **Reset** – reset the emulation values back to default.
- **Load** – load a calibration file, for a new camera to emulate the camera used to create the calibration file.

Show Curve section – choices include:

- **Set** – click to set the current curve into memory. With Show Curve selected, displays the curve as a white line at the top of the signal, for levels comparison. With the curve set, the user can then test other lights to see how the peaks and valleys of the curve line up with the signal.
- **Clear** – clear the current curve and return to default settings.
- **Load** – opens a browser which allows the user to browse for and select a saved curve file to display in the H/S Scope.
- **Save** - opens a save as window which allows the user to select a location and save the current curve settings as a file.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

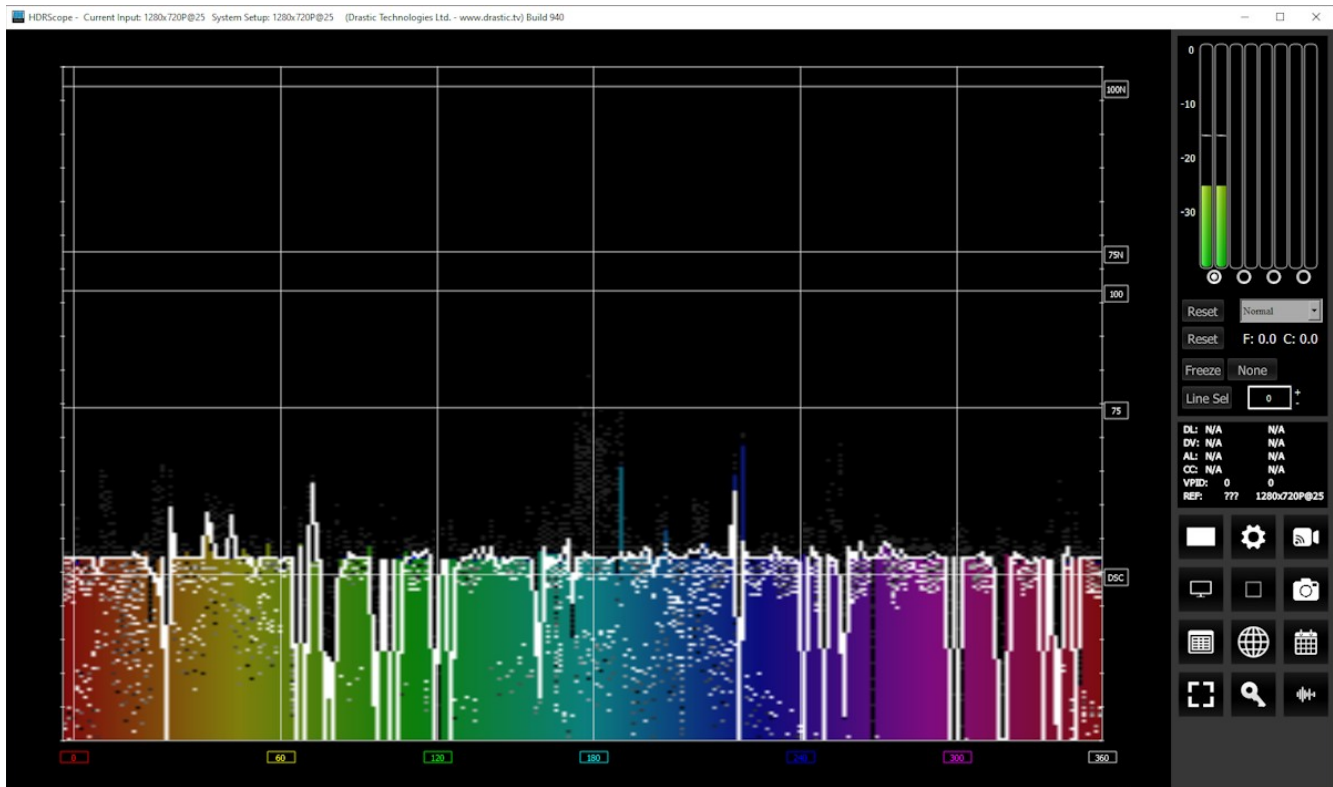
Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.9.2 H/S Scope Window

Here is the H/S Scope:



H/S Scope Histogram – Designed for calibration of lighting or camera to a standard DSC ChromaDumonde chart. The target color level or saturation is calibrated to a single horizontal line in the chart. The color hue component is mapped horizontally, with standard 601, 709 or 2020 targets as vertical lines.

The Histogram view shows the distribution of red, green and blue within the signal as a series of discrete bars that make a continuous graph for each color. This display provides an overview of the tonal range of each color in the picture. Each bar is the count of the number of pixels for one of the 1024 possible colors. These totals are then auto ranged to fit within the graticule and represent the relationship between the shades of each color and between each other.

Each color has its own graph. The color's levels are represented from left to right, with the absolute left being 0 and the absolute right being 1024. The scale is presented as a percentage to allow for extremely bright or dark pictures to be analyzed without truncating.

The H/S (Hue/Saturation) Scope is designed to assist in calibrating lighting between cameras, or between different lighting setups. There is an instructional video located here:

<https://www.youtube.com/watch?v=or835LLqVU>

and a similar one here:

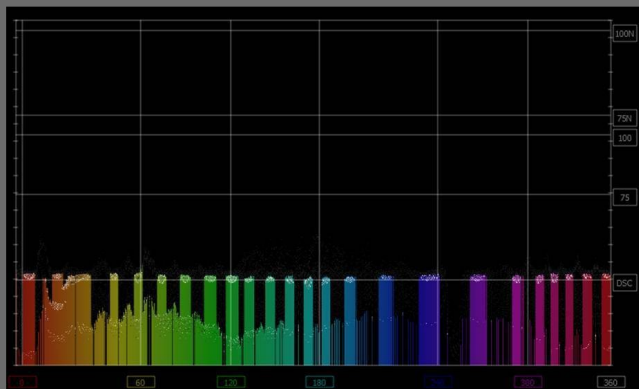
https://www.youtube.com/watch?v=nHg-_yCxo0U

3.2.9.3 H/S Scope Example

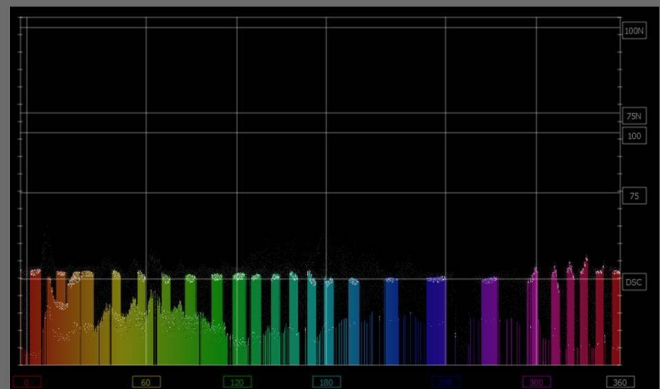
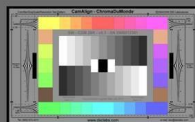
Here is an example where the H/S Scope reads the chroma signal response from a camera, to evaluate the Rosco DMG MIX LED fixture.

ARRI Alexa Mini preset to 3200K

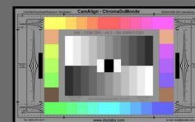
- Tungsten 3200K / DMG MIX 3200CCT / HS SCOPE readout



ARRI 3200K Preset / 3200K Light



ARRI 3200K Preset / 3200 CCT DMG MIX



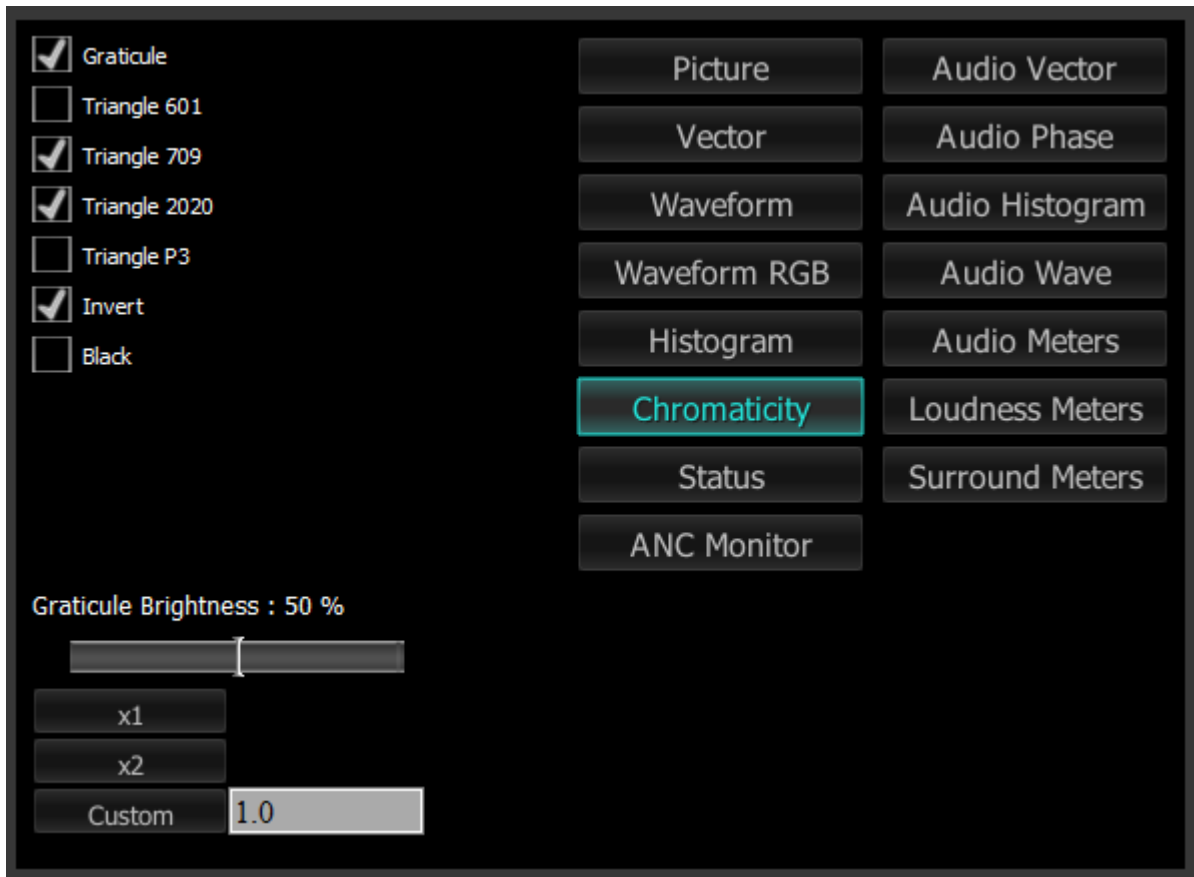
We used an ARRI and RED camera, preset to 3200K rec 709, for our tests, shooting a DSC ChromaDuMonde 24 + 4R chart. A Tungsten light source was the target reference for the Rosco DMG MIX to match on camera. This allowed the team to quantify their calibration work on the MIX. The results were encouraging as both on the RED and ARRI the on-camera chroma differences between the actual tungsten source and the MIX were very slight, based on the multiple points of the DSC chart. The H/S Scope is a good tool for evaluation and calibration for an LED source for on-camera use. Should adjustments to the spectrum be needed they can be adjusted in real time using the H/S Scope reference, thus getting camera accurate results.

Each color has its own graph. The color's levels are represented from left to right, with the absolute left being 0 and the absolute right being 1024. The scale is presented as a percentage to allow for extremely bright or dark pictures to be analyzed without truncating.

3.2.10 Chromaticity

3.2.10.1 Chromaticity Setup

To set up the Chromaticity press the **Scope Config** button. This opens the Scope Config window. Click on the **Chromaticity** button on the right. There are a number of options to set up the Chromaticity display:



Graticule checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

Triangle 601 checkbox – when selected, displays the CCIR-601 (Rec. 601 or BT.601) triangle.

Triangle 709 checkbox – when selected, displays the Rec.709 (BT.709 or ITU 709) triangle.

Triangle 2020 checkbox – when selected, displays the BT.2020 (or Rec. 2020) triangle.

Triangle P3 checkbox – when selected, displays the P3 (DCI-P3 or DCI/P3) triangle.

Invert checkbox – when selected, displays the video signal over a black background instead of the Chromaticity hues background.

Black checkbox – when selected, displays the video as black. If unselected, the video will be

displayed as white.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

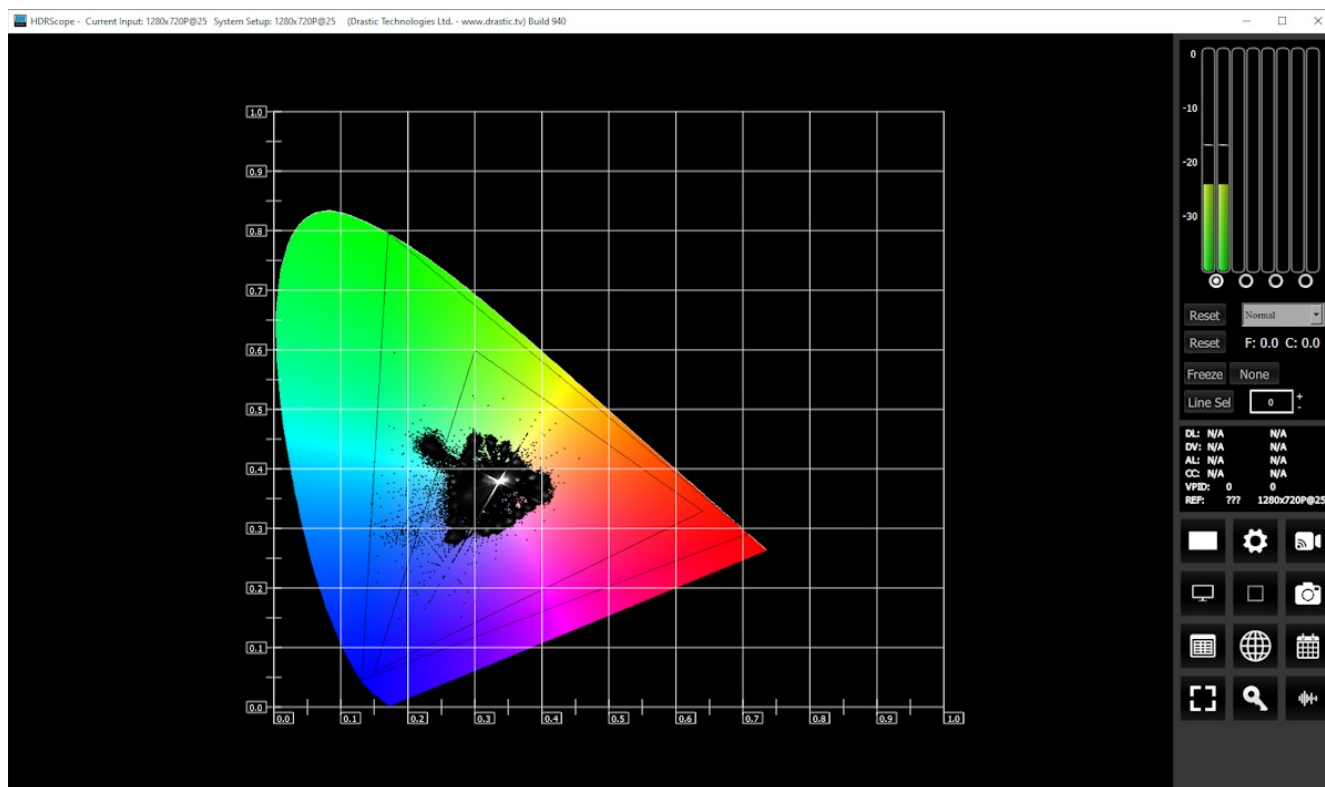
Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

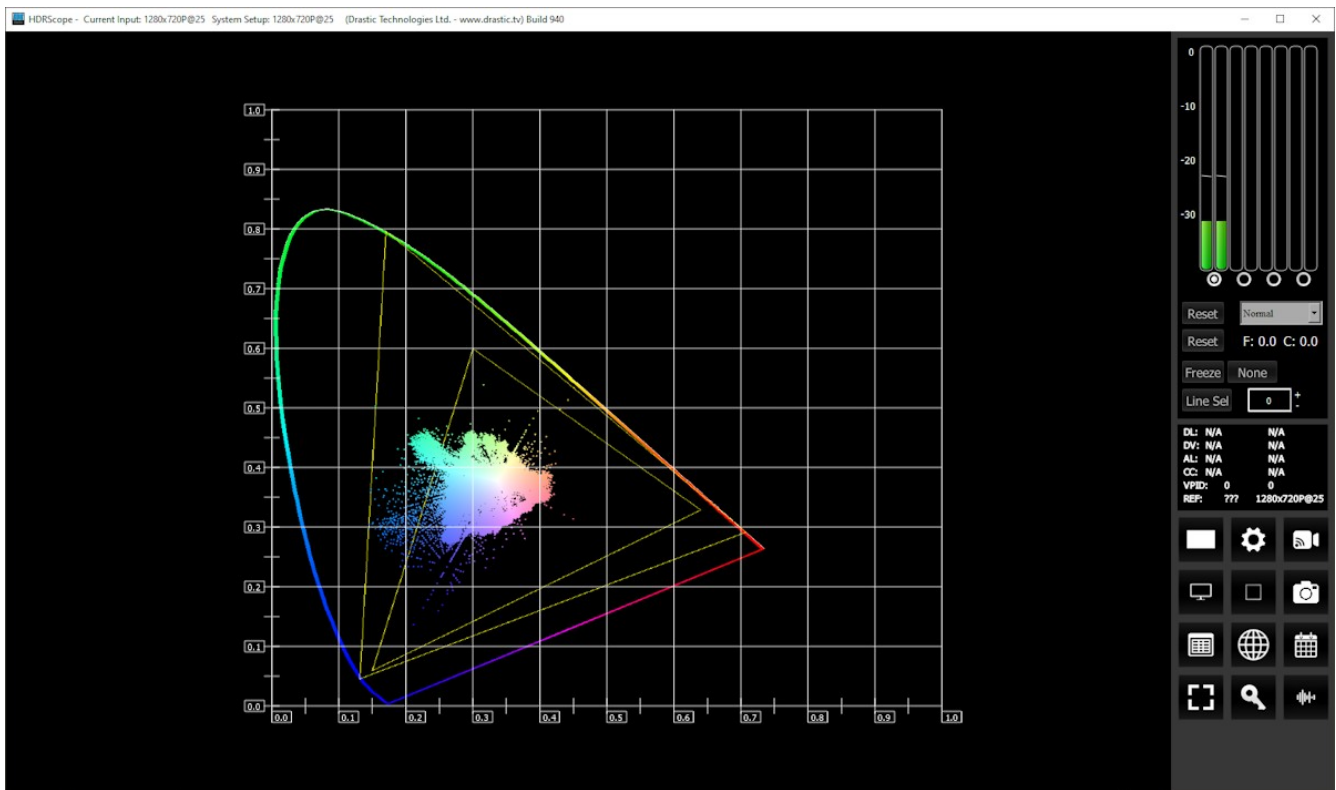
Pressing the x in the upper right corner will close the Scope Config window.

3.2.10.2 Chromaticity Window

Here is the Chromaticity window.

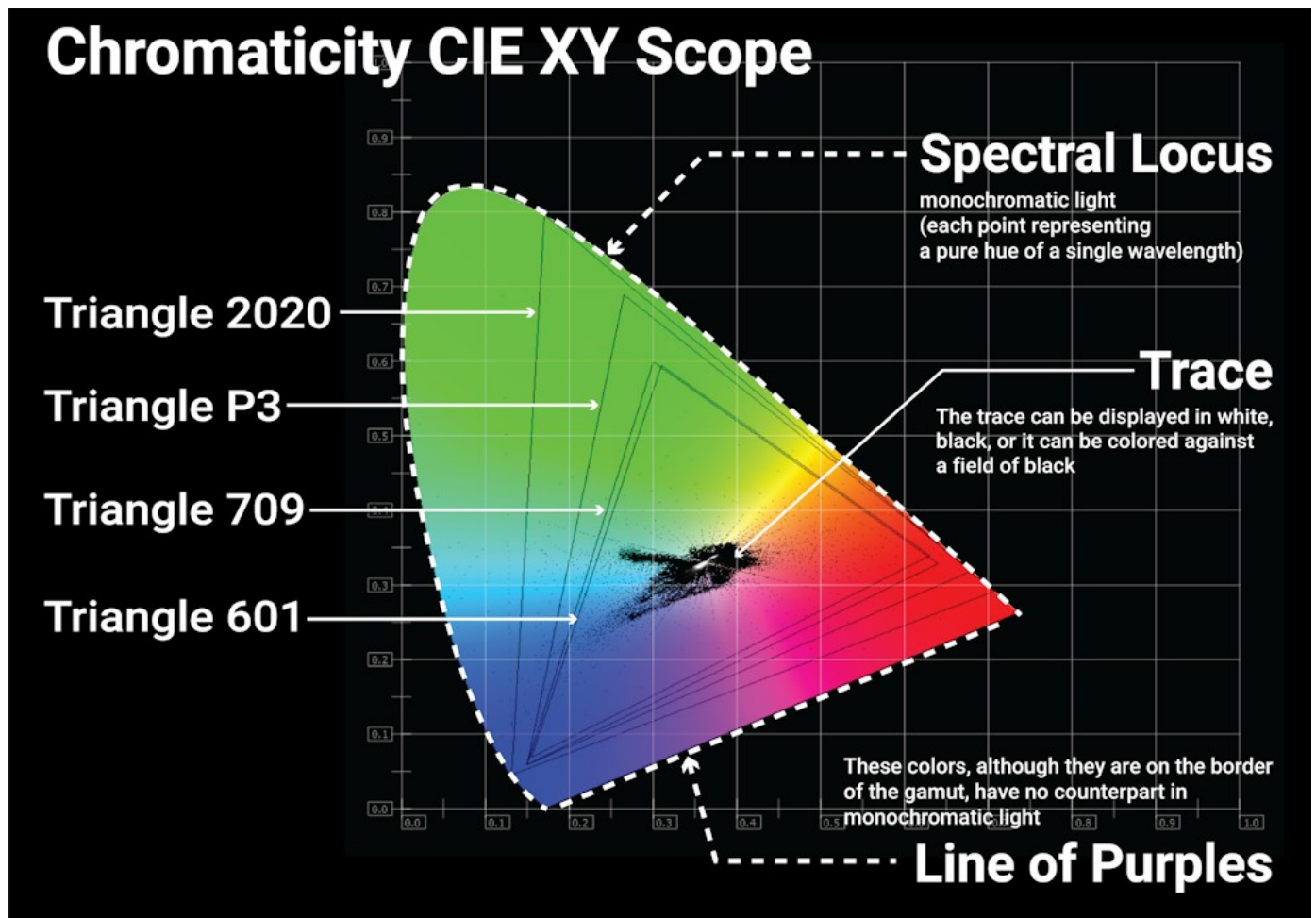


The **Chromaticity** scope provides a visual representation of the color in a video across all the colors of visible light. For a particular YCbCr range (BT.2020, P3, Rec.709, CCIR-601) a triangle can be superimposed. This will delineate the colors that fall within the acceptable range and those that are outside it. The color of the video within the CIE 1931 color display can be white, black, or the chromaticity hues background.



The display can also be inverted to use black as the background, and the colors to show the trace.

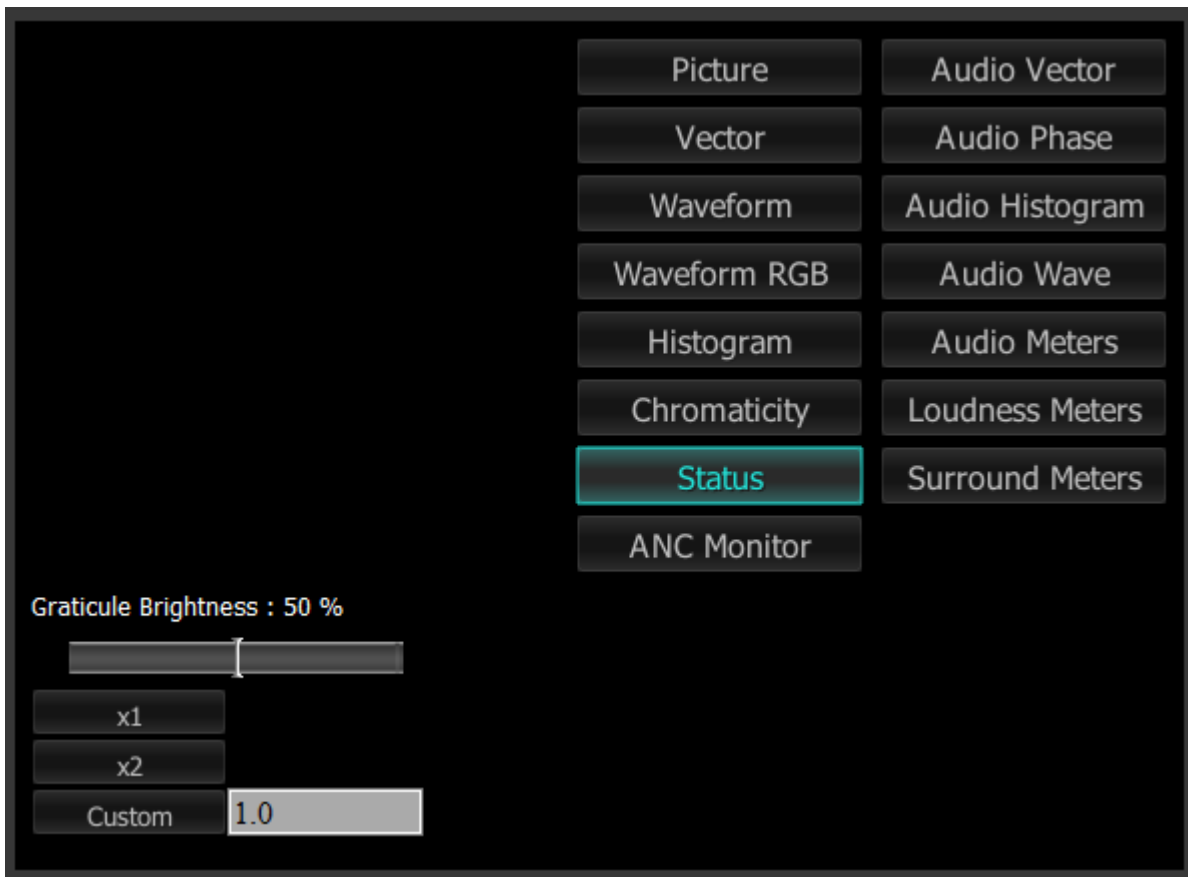
Here are some details regarding the Chromaticity Scope, including the available gamut triangles that can be overlaid:



3.2.11 Status Window

3.2.11.1 Status Setup

To set up the Status press the **Scope Config** button. This opens the Scope Config window. Click on the **Status** button on the right. There are a number of options to set up the Status display:



Graticule Brightness slider – this slider is present in all of the scopes. In the Status window there is no graticule, so this slider has no effect.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

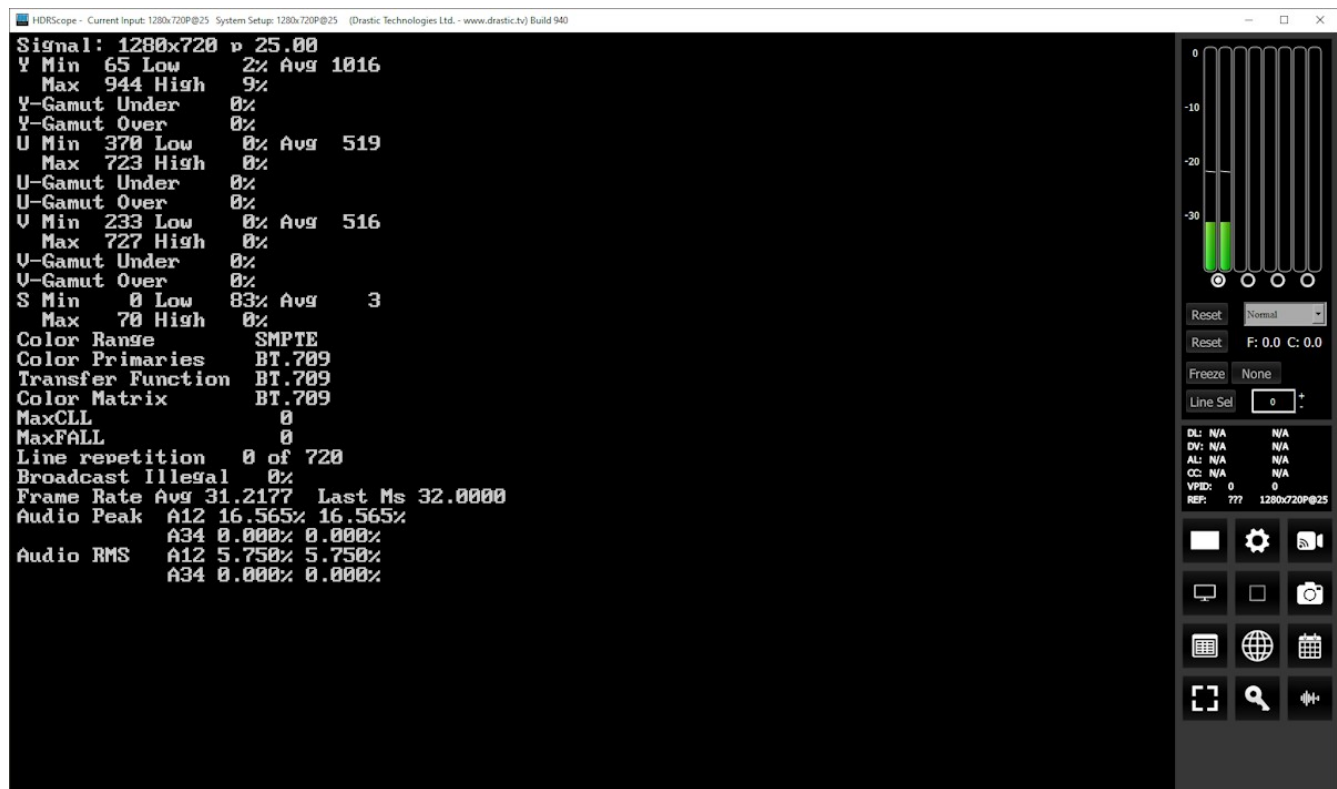
Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.11.2 Status Window

Here is the Status window.



The Status window displays:

Signal: displays the current signal type, in: width x height, scan type, and frame rate format.

Y: The Y component. Displays Minimum and Maximum, Low and High, Average, Gamut Under, and Gamut Over values

U: The U component. Displays Minimum and Maximum, Low and High, Average, Gamut Under, and Gamut Over values

V: The V component. Displays Minimum and Maximum, Low and High, Average, Gamut Under, and Gamut Over values

S: Saturation. Displays Minimum and Maximum, Low and High, Average, Gamut Under, and Gamut Over values

Color Range: Full or SMPTE (Limited)

Color Primaries: BT 709 (HD), BT 470BG (PAL), SMPTE 170M (NTSC), BT 2020 (WCG)

Transfer Function: BT 709 (HD), SMPTE 170M (PAL/NTSC), SMPTE 2084 (HDR10/PQ), ARIB B67 (HLG)

Color Matrix: BT 709 (HD), BT 479BG (PAL), BT 601 (NTSC), BT 2020 (WCG)

MaxCLL: In HDR10 mode, Maximum Content Light Level

MaxFALL: In HDR10 mode, Maximum Frame – Average Light Level

Line repetition in number of lines over total possible lines

Broadcast illegal in percentage

Frame Rate: Displays Average, and Last Ms.

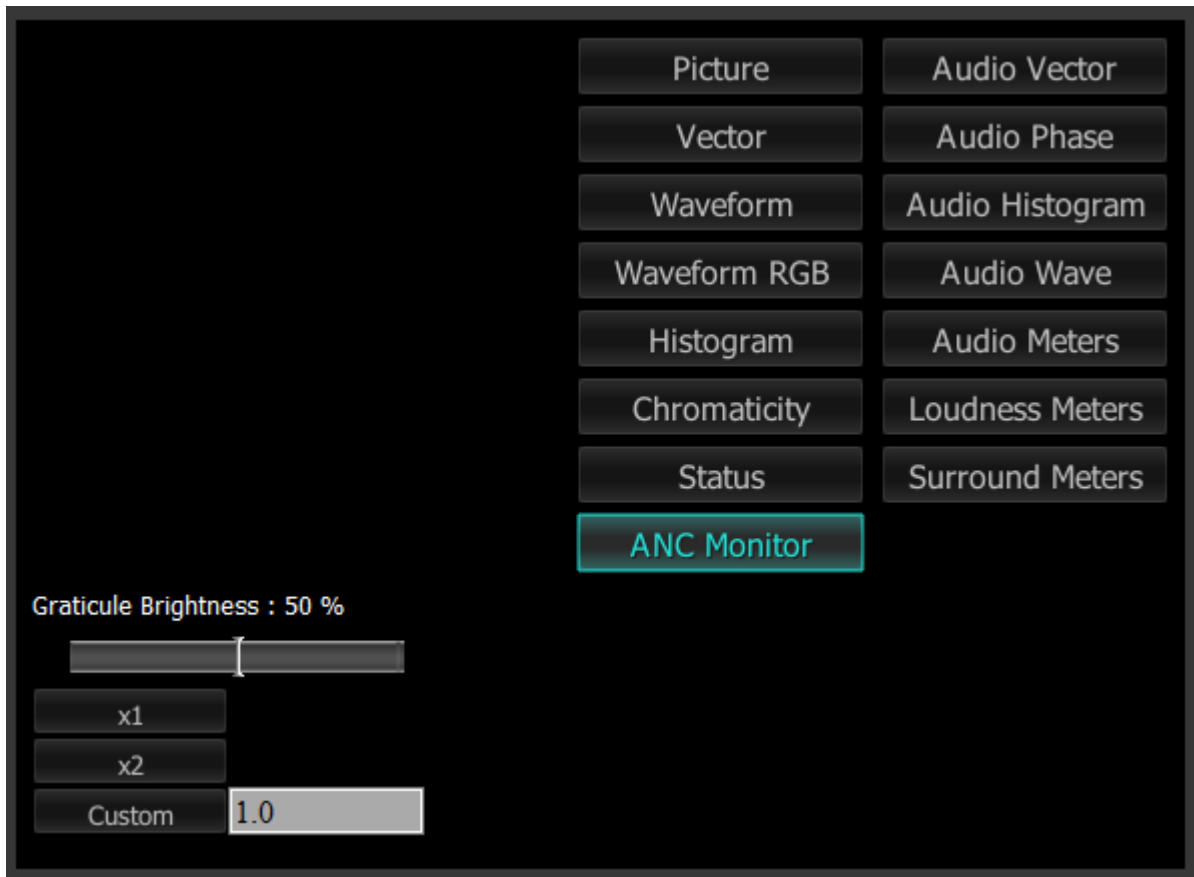
Audio Peak per channel pair

Audio RMS per channel pair

3.2.12 Anc Monitor Window

3.2.12.1 Anc Monitor Setup

To set up the Anc Monitor press the **Scope Config** button. This opens the Scope Config window. Click on the **Anc Monitor** button on the right. There are a number of options to set up the Anc Monitor display:



Graticule Brightness slider – this slider is present in all of the scopes. In the Anc Monitor window there is no graticule, so this slider has no effect.

x1 button – clicking this button sets the display to standard size

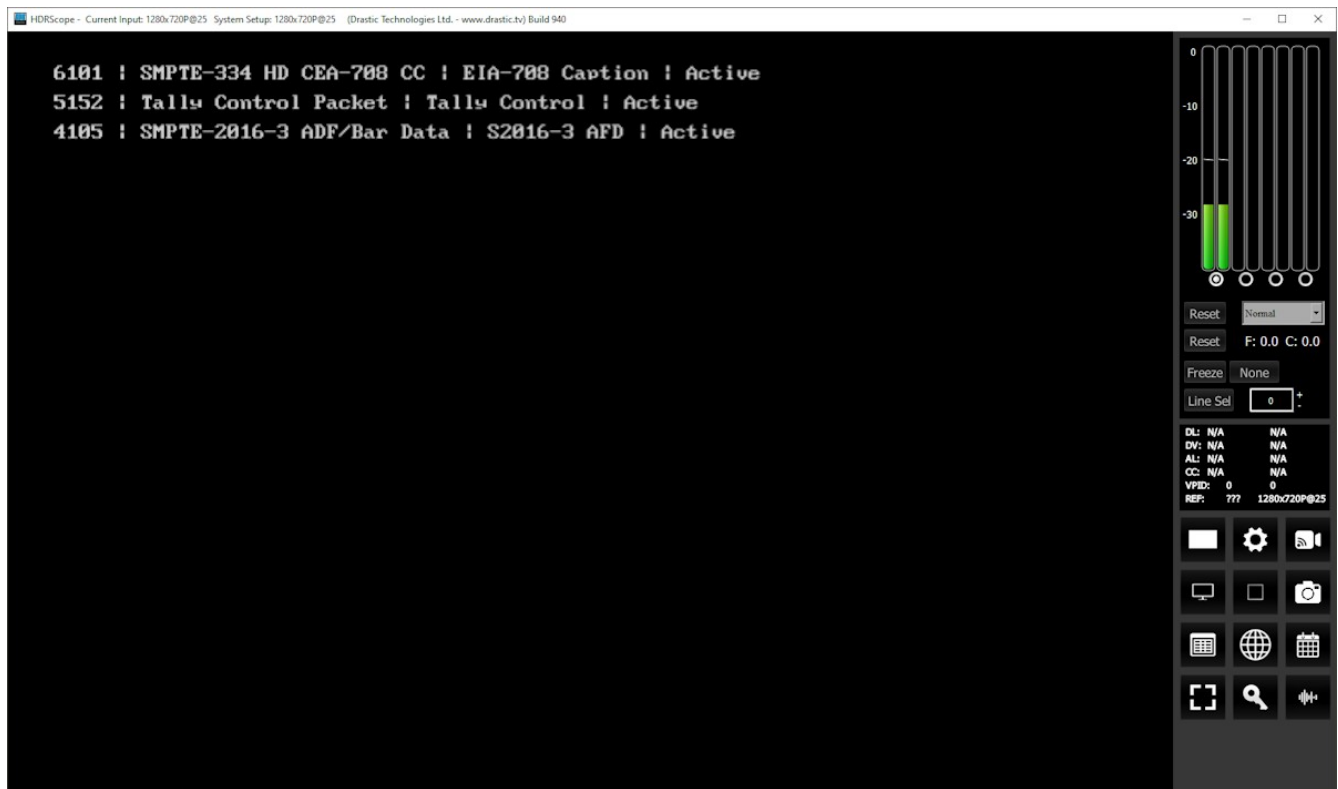
x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display. Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

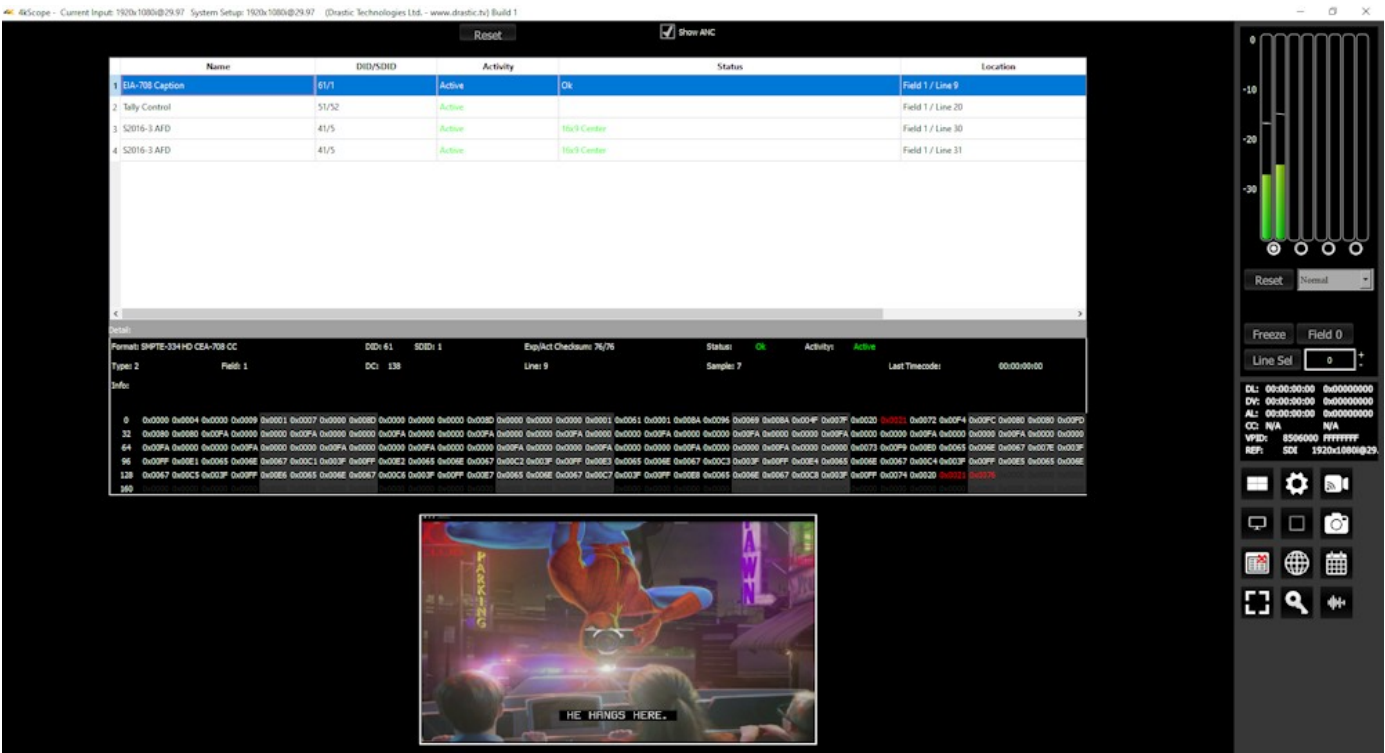
3.2.12.2 *Anc Monitor Window*

Here is the Anc Monitor window.



The **Anc Monitor** page displays incoming streams of ancillary data as line items. Each line item has a data stream numerical identifier, a detailed description of the type of ancillary data, and whether the stream is active.

For the above streams, the Raw Data page shows:



Note that on the raw data page (above), there are 2 streams of AFD, whereas the Anc Monitor screen has them combined.

3.2.13 Audio Vector

3.2.13.1 Audio Vector Setup

To set up the Audio Vectorscope press the **Scope Config** button. This opens the Scope Config window. Click on the **Audio Vector** button on the right. There are a number of options to set up the Audio Vectorscope display:



Graticule checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

Modes:

Lissajousxy checkbox – when selected, displays the relative phase of the selected audio pair in Lissajous XY mode.

Lissajous checkbox – when selected, displays the relative phase of the selected audio pair in Lissajous mode.

Polar checkbox – when selected, displays the relative phase of the selected audio

pair in Polar mode.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

Pressing the x1 button sets the display back to normal.

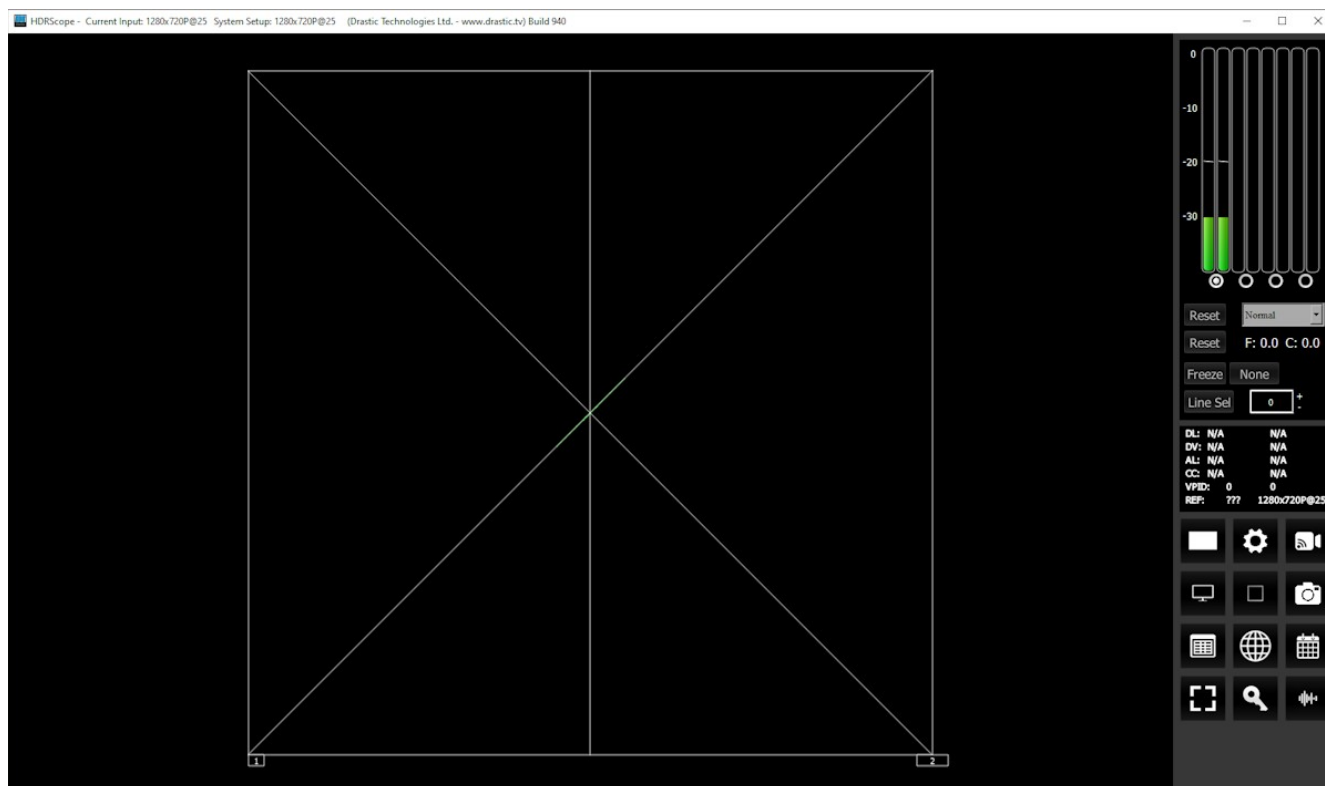
Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.13.2 Audio Vector Window

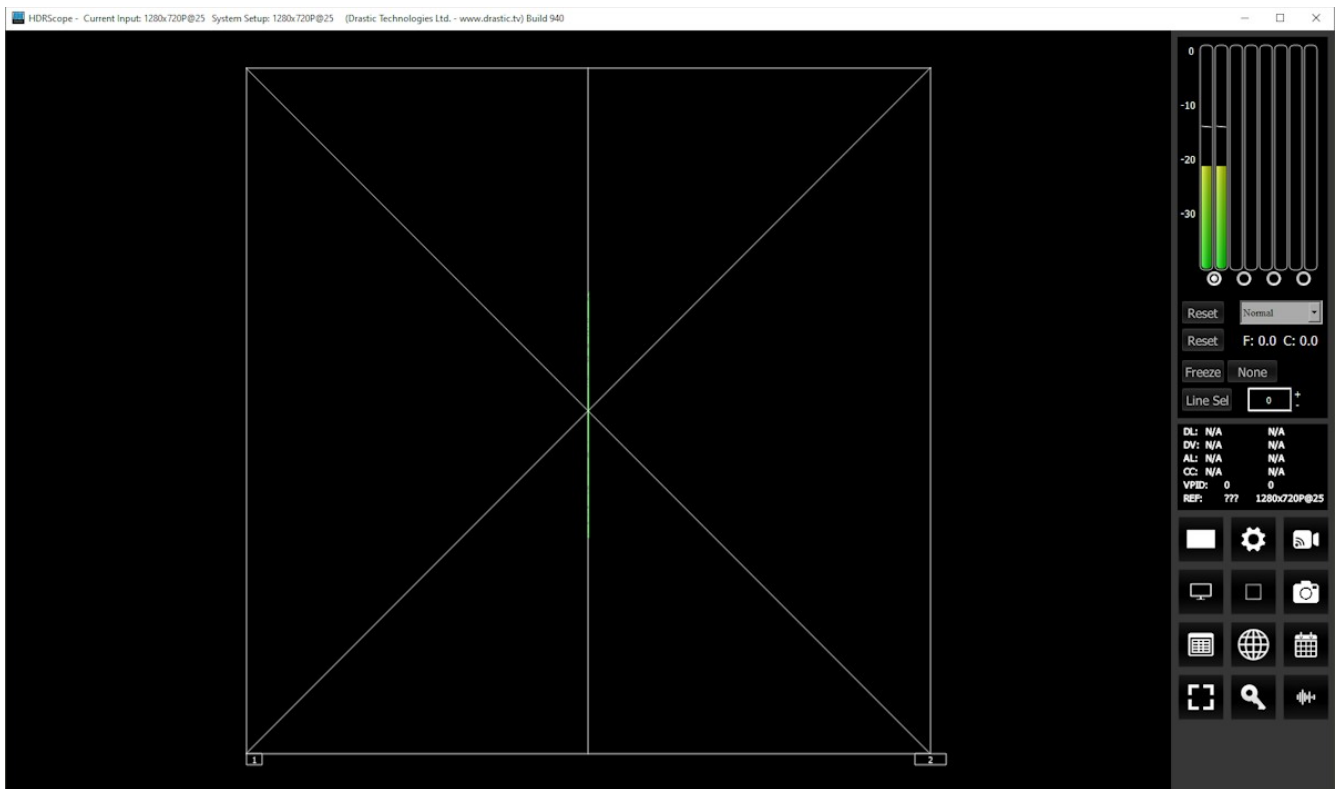
There are 3 types of audio vectorscope displays available.

Lissajous XY mode



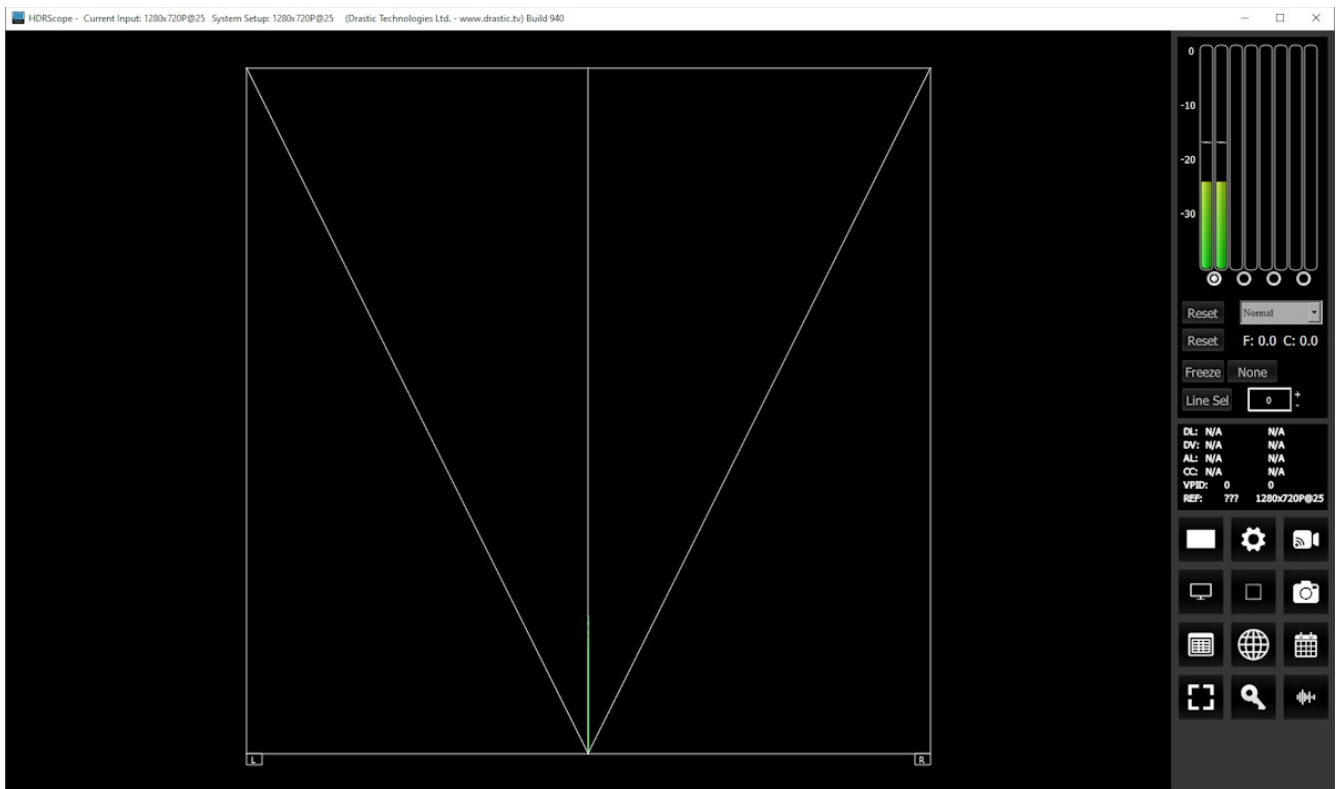
Lissajous XY mode centers the two audio channels along the X-Y axis (from the lower left corner to the upper right corner), and shows any difference between the channels as moving closer to vertical (left channel has more signal) or closer to horizontal (right channel has more signal).

Lissajous mode



Lissajous mode centers the two audio channels along the vertical axis, and shows any difference between the channels as either angled to the left (left channel has more signal) or angled to the right (right channel has more signal).

Polar mode



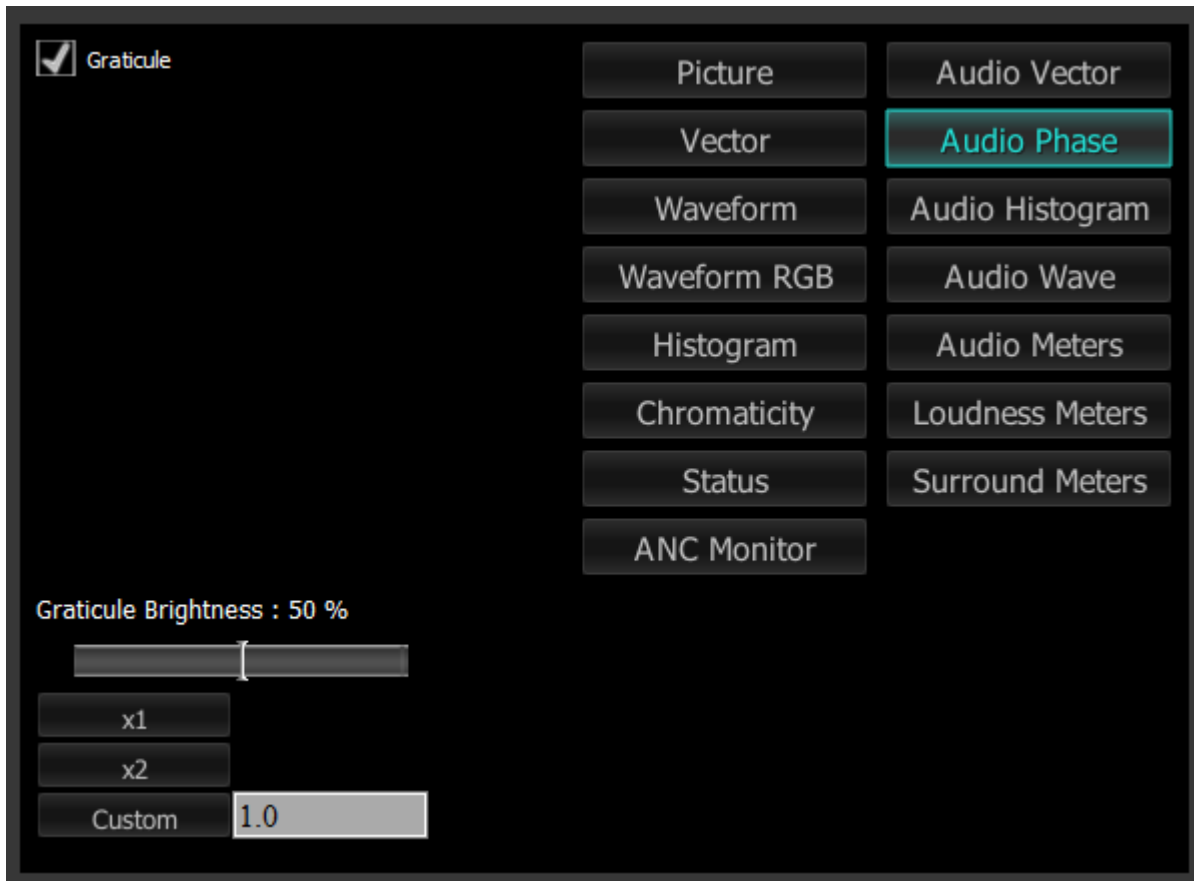
Polar mode centers the two audio channels along the vertical axis starting at the bottom center, and shows any difference between the channels as either angled to the left (left channel has more signal) or angled to the right (right channel has more signal).

The Audio Vectorscope measures the difference between channels of a stereo pair. One channel drives the horizontal and the other the vertical deflection. This will show the relative phase of the two channels. The pair being monitored can be changed using the radio buttons under the audio meters at the top right.

3.2.14 Audio Phase

3.2.14.1 Audio Phase Setup

To set up the Audio Phase press the **Scope Config** button. This opens the Scope Config window. Click on the **Audio Phase** button on the right. There are a number of options to set up the Audio Phase display:



Graticule checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display. Pressing the x1 button sets the display back to normal.

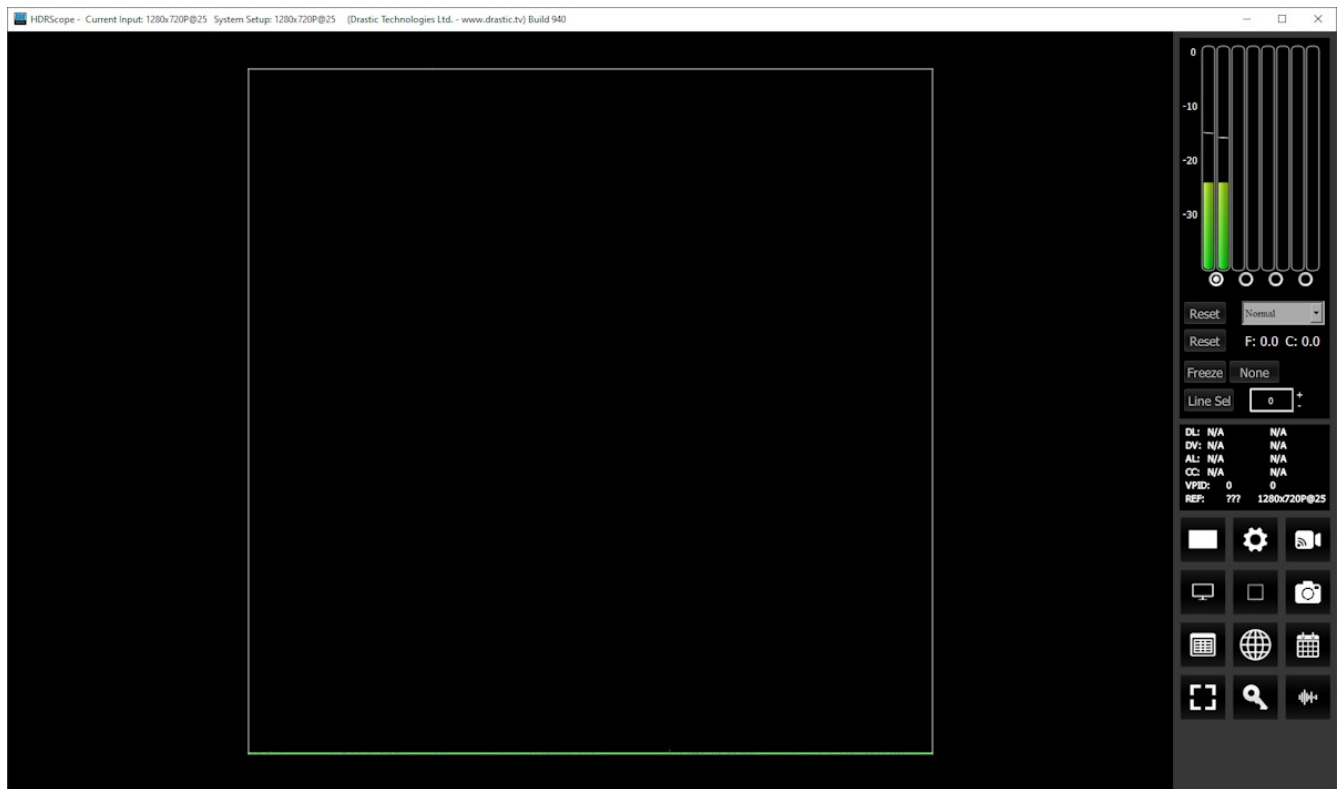
Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets

the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.14.2 Audio Phase Window

Here is the Audio Phase window.

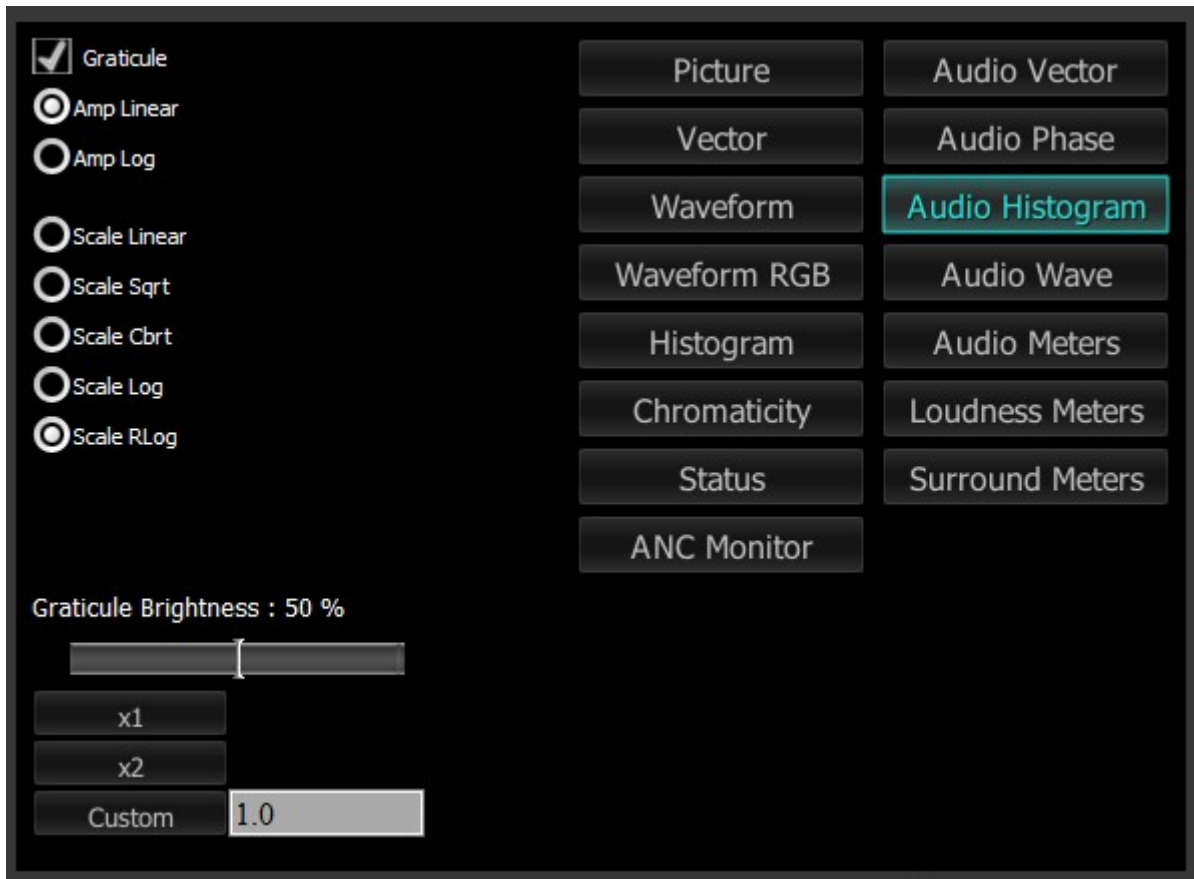


The **Audio Phase** display shows the relative density of two audio channels and the relative loudness as a line moving towards the louder channel.

3.2.15 Audio Histogram

3.2.15.1 Audio Histogram Setup

To set up the Audio Histogram press the **Scope Config** button. This opens the Scope Config window. Click on the **Audio Histogram** button on the right. There are a number of options to set up the Audio Histogram display:



Graticule checkbox – when selected, the graticule is laid over the Audio Histogram display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

Amp Type

Amp Linear selector – clicking in the Amp Linear checkbox sets the Amp to linear

Amp Log selector – clicking in the Amp Log checkbox sets the Amp to logarithmic

Scale Type

Scale Linear – clicking in the Scale Linear checkbox sets the scale to linear.

Scale Sqrt – clicking in the Scale Sqrt checkbox sets the scale to sqrt (square root).

Scale Cbrt – clicking in the Scale Cbrt checkbox sets the scale to cbrt (cubed root).

Scale Log – clicking in the Scale Log checkbox sets the scale to logarithmic.

Scale RLog – clicking in the Scale Rlog checkbox sets the scale to R logarithmic (reverse logarithmic).

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

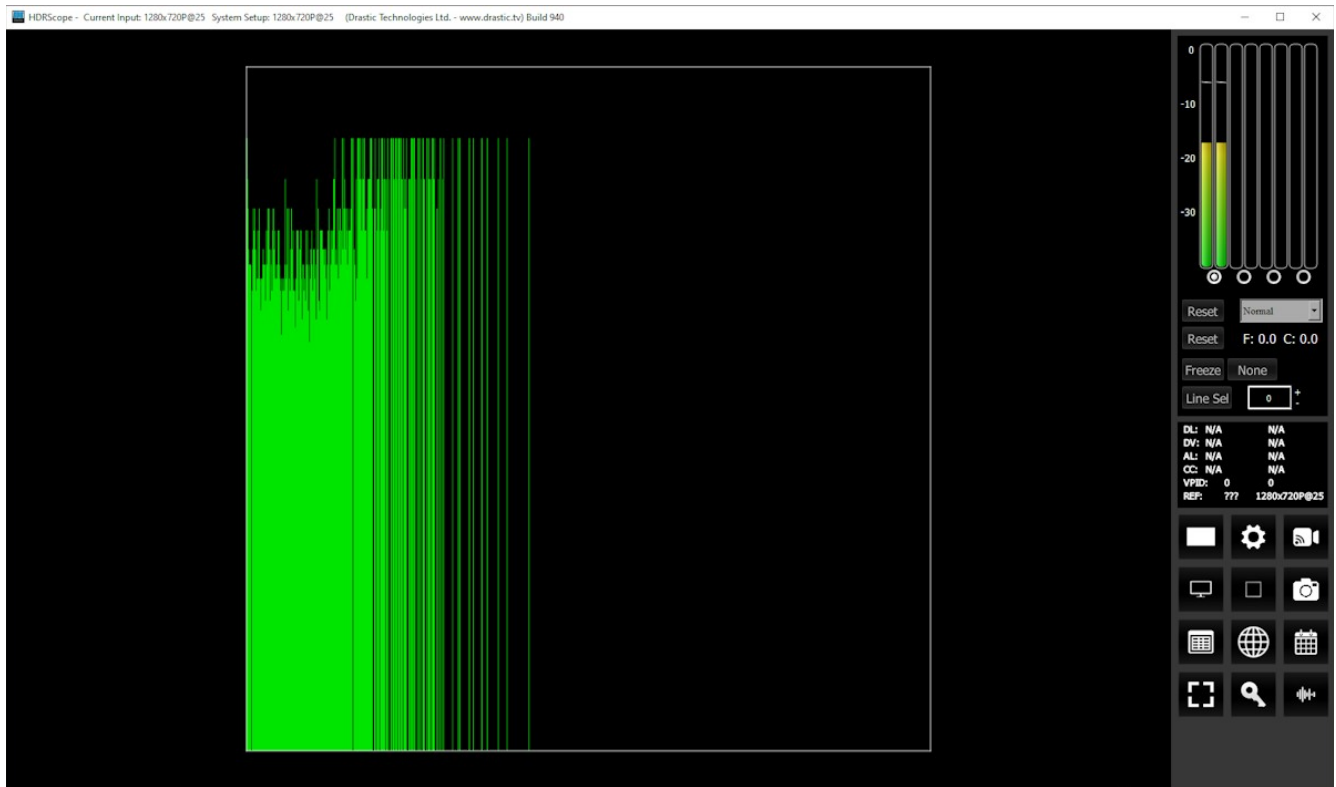
x2 button – clicking this display zooms in to set the display at 200%, or 2x normal displ. Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.15.2 Audio Histogram Window

Here is the Audio Histogram window.



The **Audio Histogram** display shows a bar chart of the levels of the components of an audio signal. This can be displayed as linear or logarithmic. The scale can be set as linear, square root, cubed root, log or reverse log.

3.2.16 Audio Wave

3.2.16.1 Audio Wave Setup

To set up the Audio Wave press the **Scope Config** button. This opens the Scope Config window. Click on the **Audio Wave** button on the right. There are a number of options to set up the Audio Wave display:



Graticule checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display. Pressing the x1 button sets the display back to normal.

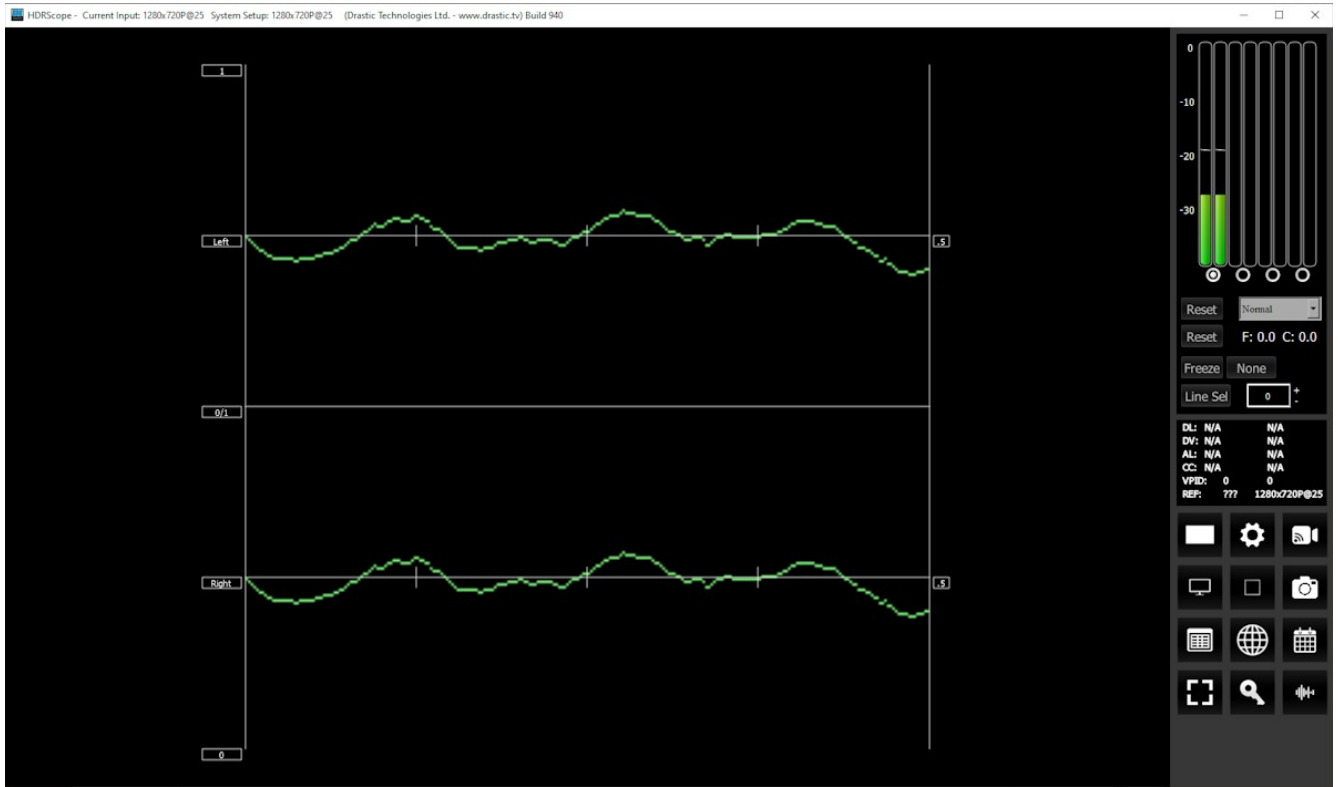
Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets

the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.16.2 Audio Wave Window

Here is the Audio Wave window.

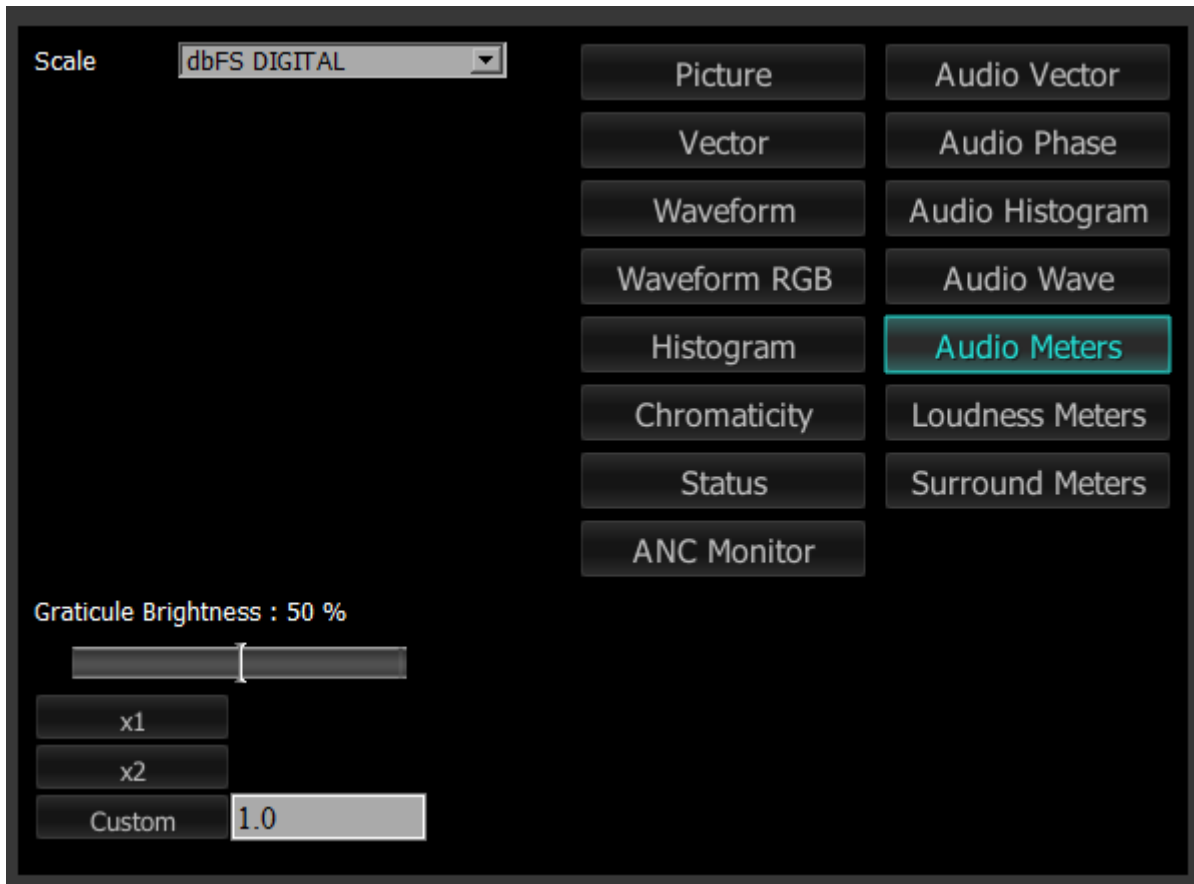


The **Audio Waveform** of the selected pair of channels is displayed.

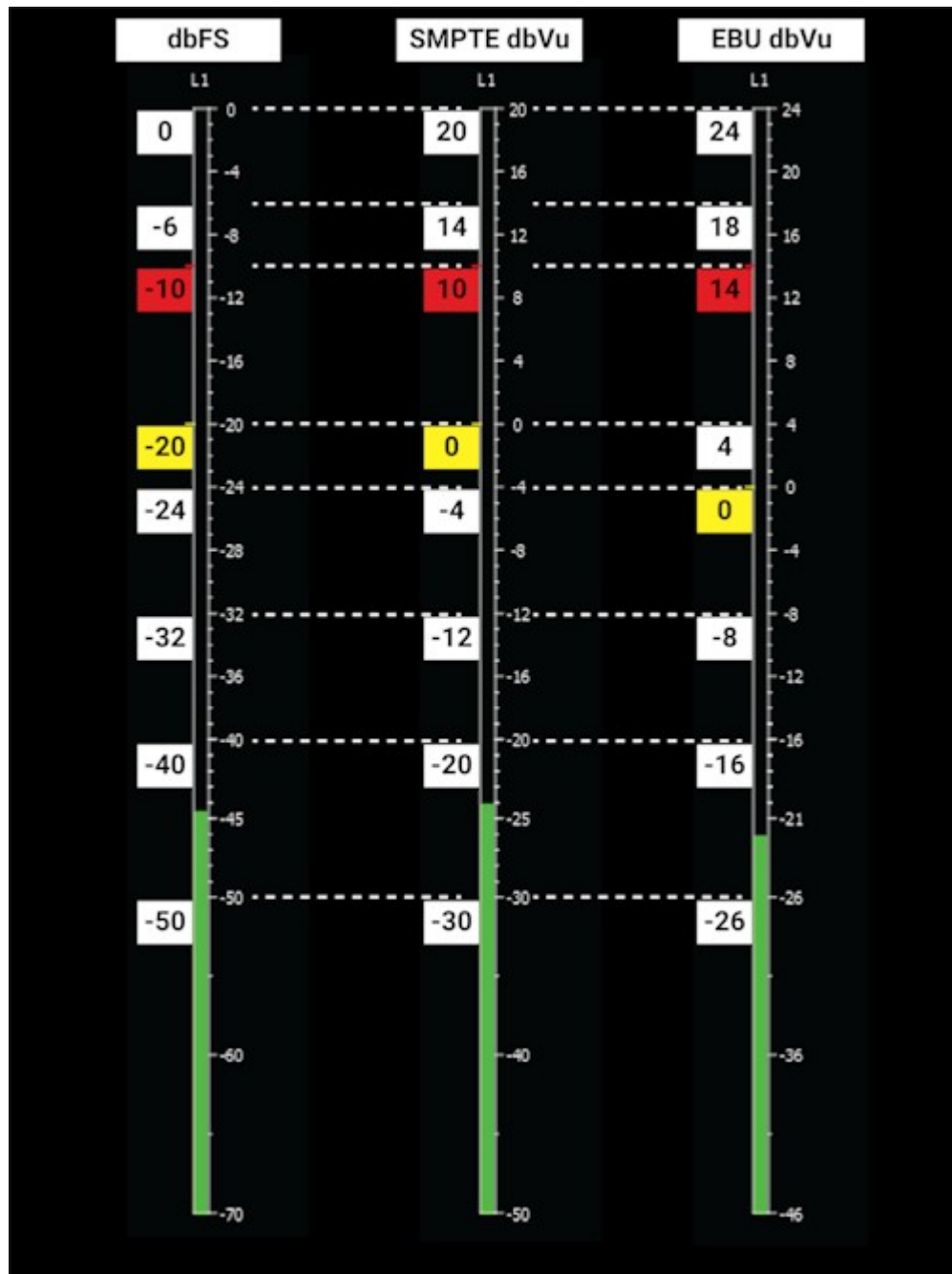
3.2.17 Audio Meters

3.2.17.1 Audio Meters Setup

To set up the Audio Meters press the **Scope Config** button. This opens the Scope Config window. Click on the **Audio Meters** button on the right. There are a number of options to set up the Audio Meters display:



Scale pulldown menu – sets the scale for the meters. Options include: dbFS DIGITAL, SMPTE dbVU, and EBU dbVU. Here is a chart with the correspondences:



Graticule checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

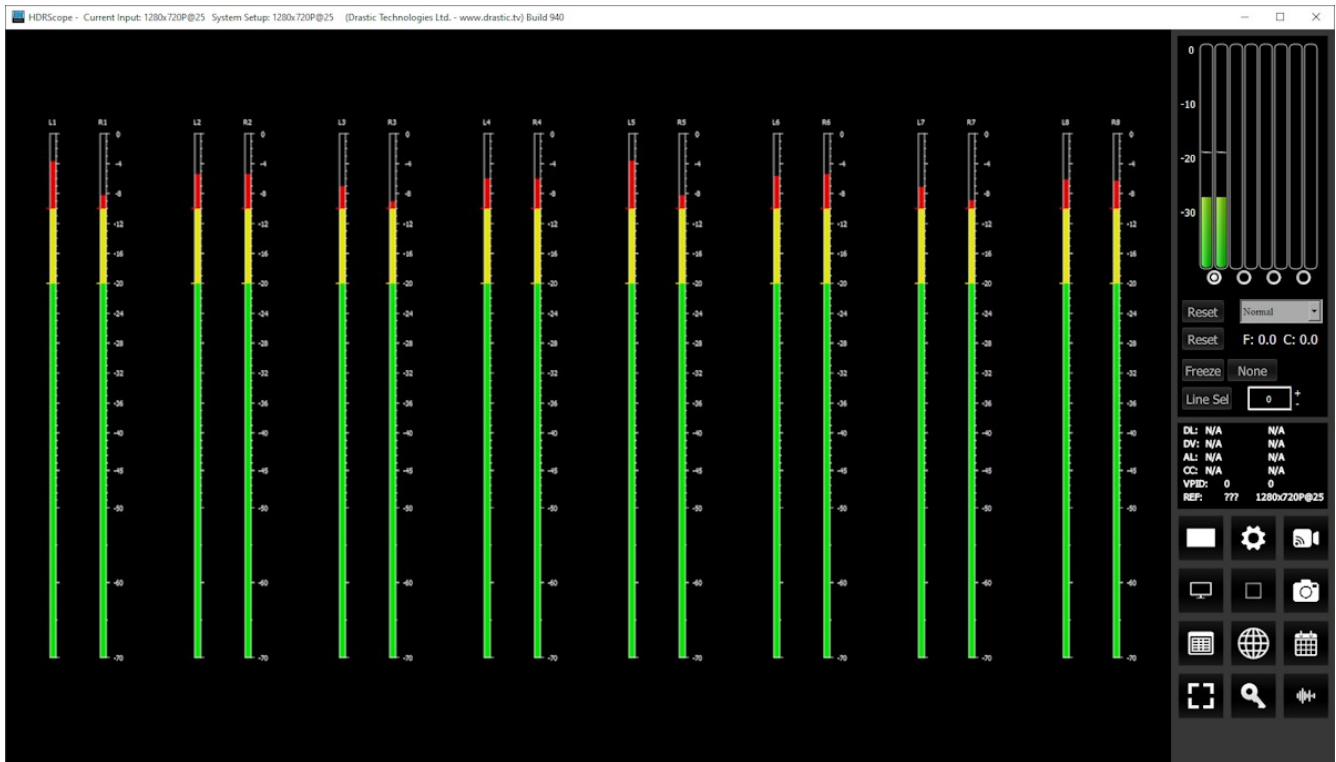
Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button or right clicking on the scope sets the display back to normal. Also, a mouse scroll wheel can be used to zoom in and out.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.17.2 Audio Meters Window

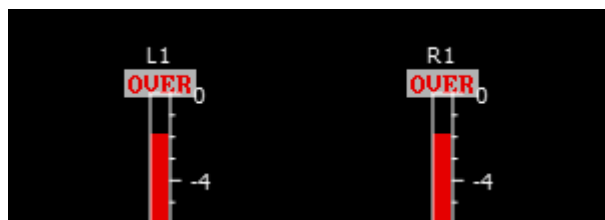
Here is the Audio Meters window.



Audio Meters – a set of 8 or 16 audio meters are displayed, depending on the capabilities of the system. Channels not being used are shown as muted. Channels that are set up for the system but do not have an input are shown with a “MUTE” label.



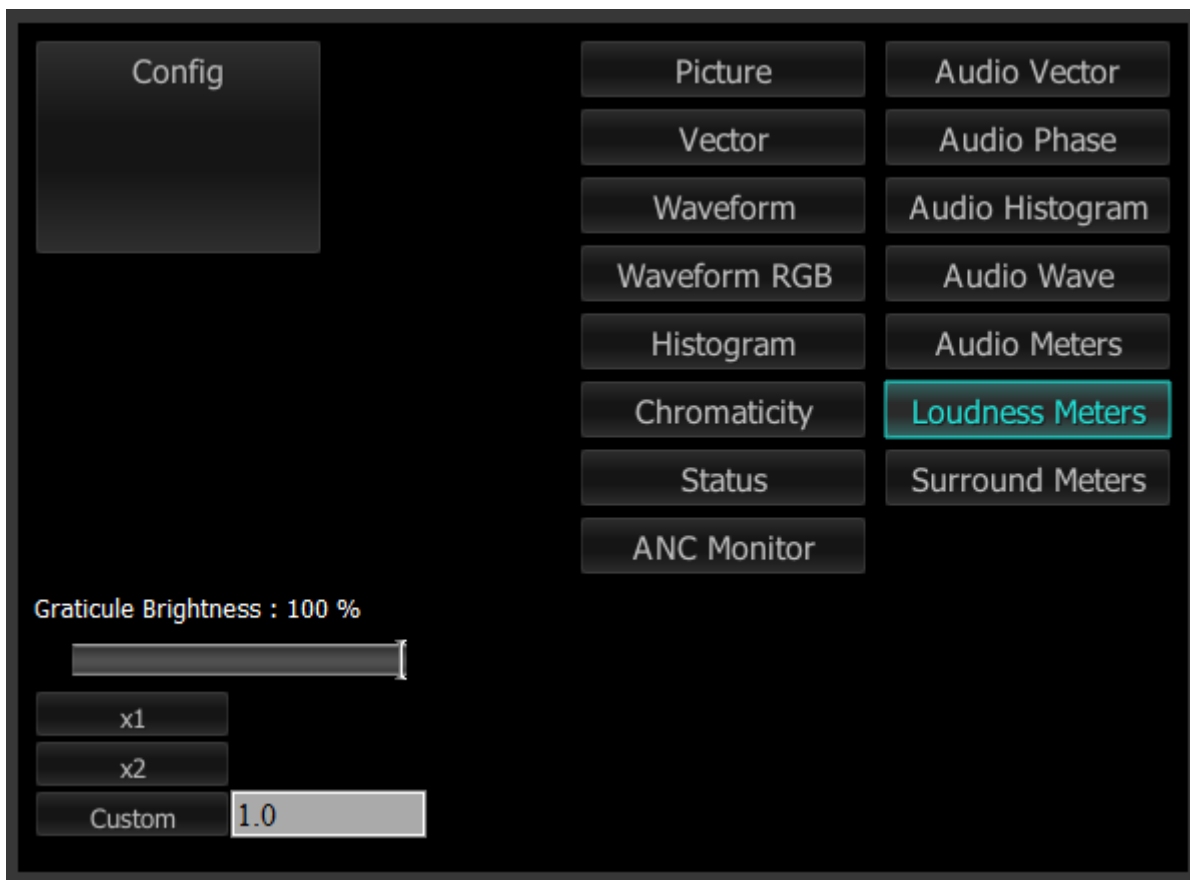
Where levels are too high, a red “OVER” warning is displayed for a couple seconds, to provide a visual cue for an operator or QC personnel.



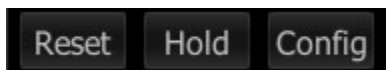
3.2.18 Loudness Meter

3.2.18.1 Loudness Meter Setup

To set up the Loudness Meter press the **Scope Config** button. This opens the Scope Config window. Click on the **Loudness Meter** button on the right. There are a number of options to set up the Loudness Meter display:

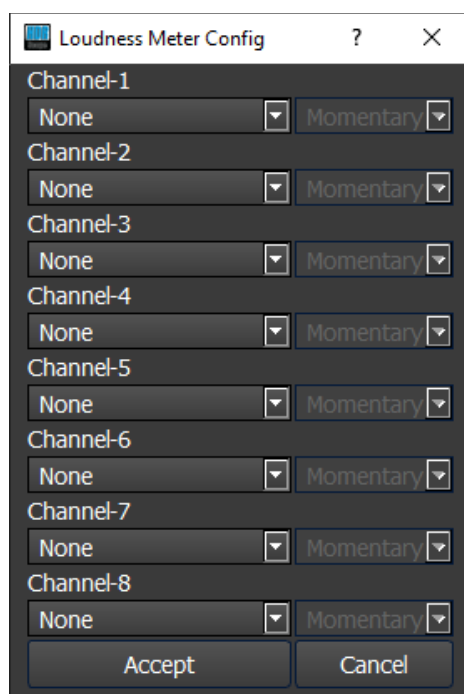


With either of the loudness scales set, the Hold Peak/RMS pulldown menu is replaced with a **Hold/Cont.** Button, and a **Config** button for loudness configuration.

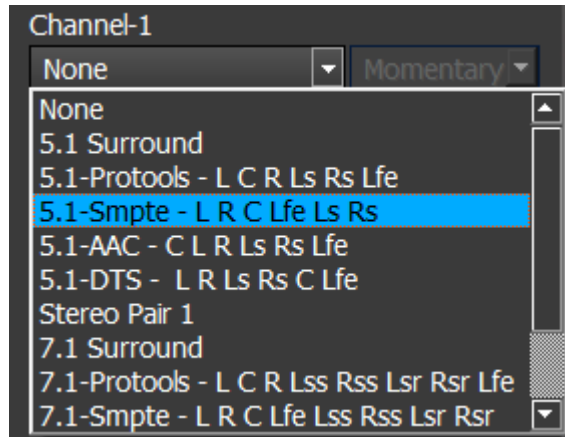


The **Hold/Cont.** Button toggles between “hold” (hold the current peak levels) and “cont.” (continue to process signal levels).

The **Config** button opens the **Loudness Meter Config** dialog.



In this dialog there are a number of presets for monitoring differing audio input types.



Presently these include:

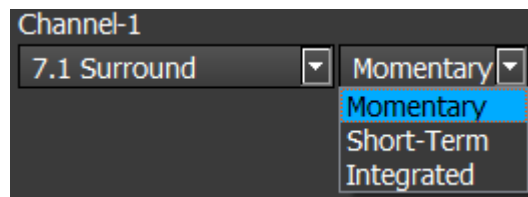
- None
- 5.1 Surround
- 5.1-Protools - L C R Ls Rs Lfe
- 5.1 Smpte - L R C Lfe Ls Rs
- 5.1-AAC - C L R Ls Rs Lfe
- 5.1-DTS - L R Ls Rs C Lfe

- Stereo Pair 1
- 7.1 Surround
- 7.1-Protocols - L C R Lss Rss Lsr Rsr Lfe
- 7.1-Smppte - L R C Lfe Lss Rss Lsr Rsr
- 7.1-EXT - L R C Lfe Lss Rss Lsr Rsr
- 7.1-Dolby - L C R Ls Rs Lfes Bsl Bsr
- Stereo Pair 2

The descriptions for the channels (abbreviated above) are as follows:

- L = Left
- R = Right
- C = Center
- Ls = Left Surround
- Rs = Right Surround
- Lfe = Low Frequency Effects
- Lss = Left Side Surround
- Rss = Right Side Surround
- Lsr = Left Rear Surround
- Rsr = Right Rear Surround
- Lfes = Low Frequency Effects
- Bsl = Back Surround Left
- Bsr = Back Surround Right

Each channel can be set up separately. Once an input type has been selected, the user can select between measurement options.



These include:

- **Momentary Loudness** – measures the loudness of the past 400 Milliseconds
- **Short-Term Loudness** – measures the loudness of the past 3 Seconds
- **Integrated Loudness** – (Also called Programme Loudness) indicates how loud the programme is on average, and is measured over entire duration of material

At the bottom of the Loudness Meter Config dialog, there is an **Accept** button to enable any changes you have made, and there is a **Cancel** button to exit the dialog without making any changes to the settings.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button or right clicking on the scope sets the display back to normal. Also, a mouse scroll wheel can be used to zoom in and out.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.18.2 Loudness Meter Window

Here is the Loudness Meter window.

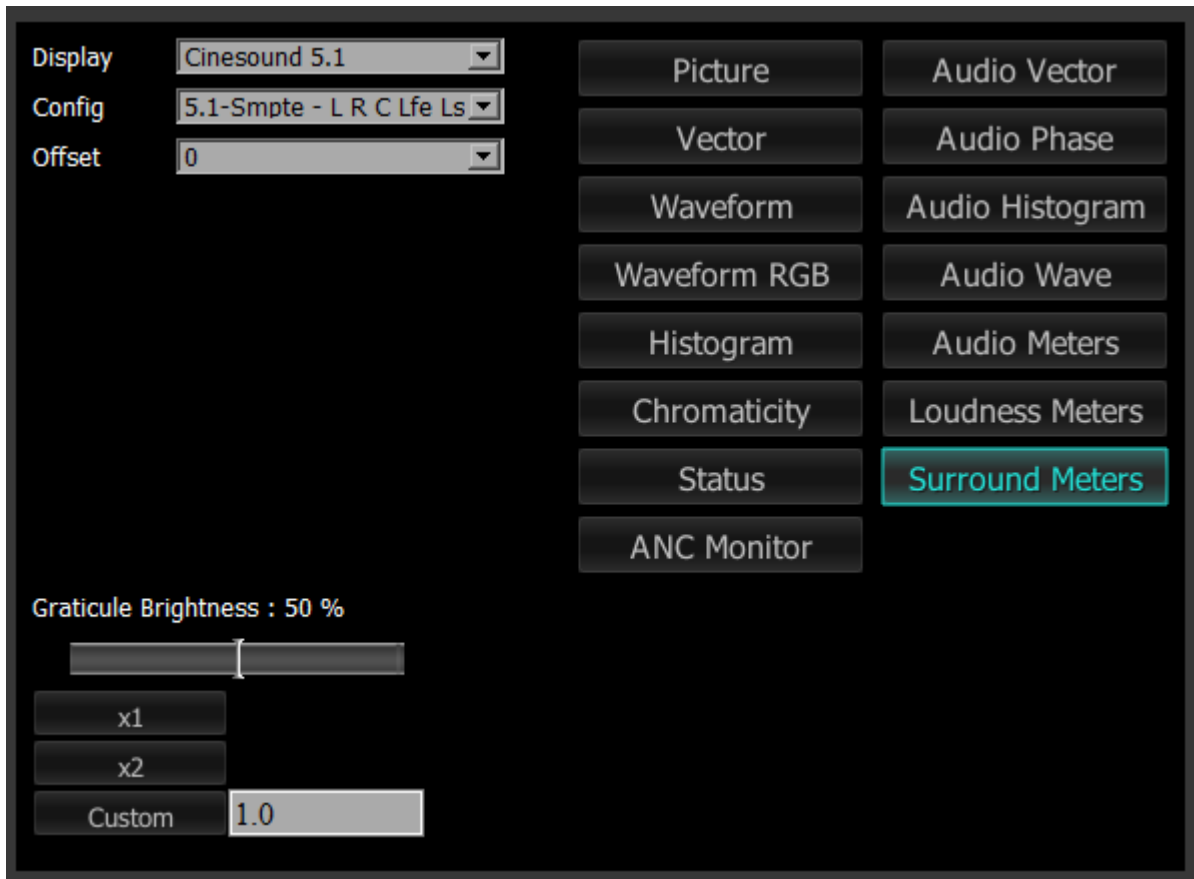


A set of up to 8 **Loudness Meters** (pairs) are displayed, depending on the capabilities of the system. Note that the Config must be set to one of the loudness settings for this set of meters to see any levels.

3.2.19 Surround Meter

3.2.19.1 Surround Meter Setup

To set up the Surround Meter press the **Scope Config** button. This opens the Scope Config window. Click on the **Surround Meter** button on the right. There are a number of options to set up the Surround Meter display:



Display pulldown menu – select between Cinesound 5.1, or Cinesound 7.1 settings.

Config pulldown menu – use the Config menu to set the type of surround sound being used.

Choices here include:

With Cinesound 5.1 selected:

- 5.1 Smpte - L R C Lfe Ls Rs
- 5.1-Protocols - L C R Ls Rs Lfe
- 5.1-AAC - C L R Ls Rs Lfe
- 5.1-DTS - L R Ls Rs C Lfe

With Cinesound 7.1 selected:

- 7.1-Smppte - L R C Lfe Lss Rss Lsr Rsr
- 7.1-Prottools - L C R Lss Rss Lsr Rsr Lfe
- 7.1-EXT - L R C Lfe Lss Rss Lsr Rsr
- 7.1-Dolby - L C R Ls Rs Lfe Bsl Bsr

The descriptions for the channels (abbreviated above) are as follows:

- L - Left
- R = Right
- C = Center
- Ls = Left Surround
- Rs = Right Surround
- Lfe = Low Frequency Effects
- Lss = Left Side Surround
- Rss = Right Side Surround
- Lsr = Left Rear Surround
- Rsr = Right Rear Surround
- Bsl = Back Surround Left
- Bsr = Back Surround Right

Offset pulldown menu – this setting shifts the channel allocation one over, to allow the user to specify the first channel of surround sound so the rest of the channels line up with the meters.

Graticule checkbox – when selected, the graticule is laid over the Histogram display. The brightness of the Graticule may be adjusted using the **Graticule Brightness** slider described below.

Graticule Brightness slider – moving the Graticule Brightness slider adjusts the brightness of the graticule overlay, 0% providing no display and 100% being maximum brightness.

x1 button – clicking this button sets the display to standard size

x2 button – clicking this display zooms in to set the display at 200%, or 2x normal display.

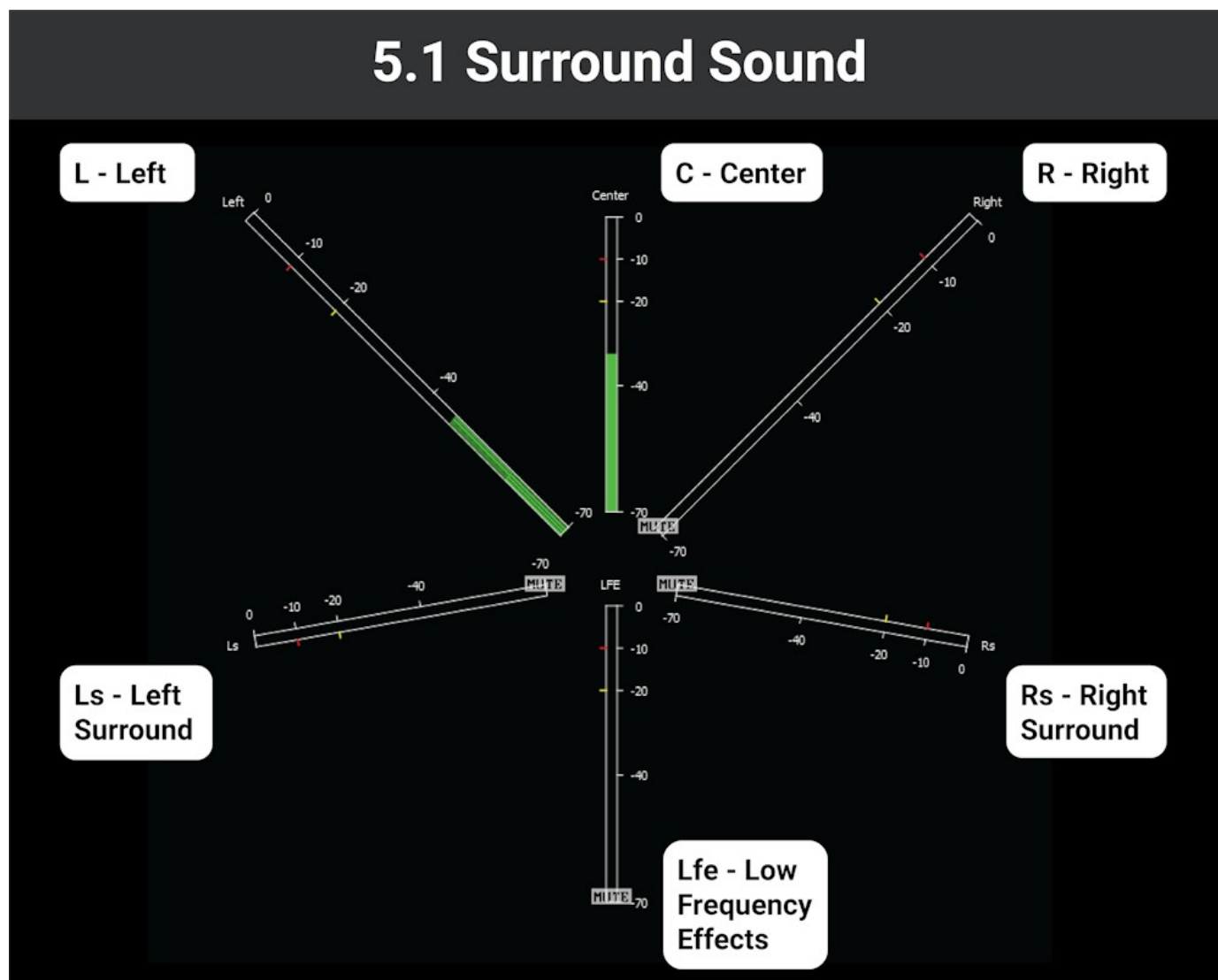
Pressing the x1 button sets the display back to normal.

Custom button and field – The user may enter a custom enlargement value in the field, and press the Custom button to zoom in and see details up close. Pressing the x1 button sets the display back to normal.

Pressing the x in the upper right corner will close the Scope Config window.

3.2.19.2 5.1 Surround Sound Window

The Surround Sound window has 4 modes for setting up 5.1 inputs.



Smpte - L R C Lfe Ls Rs

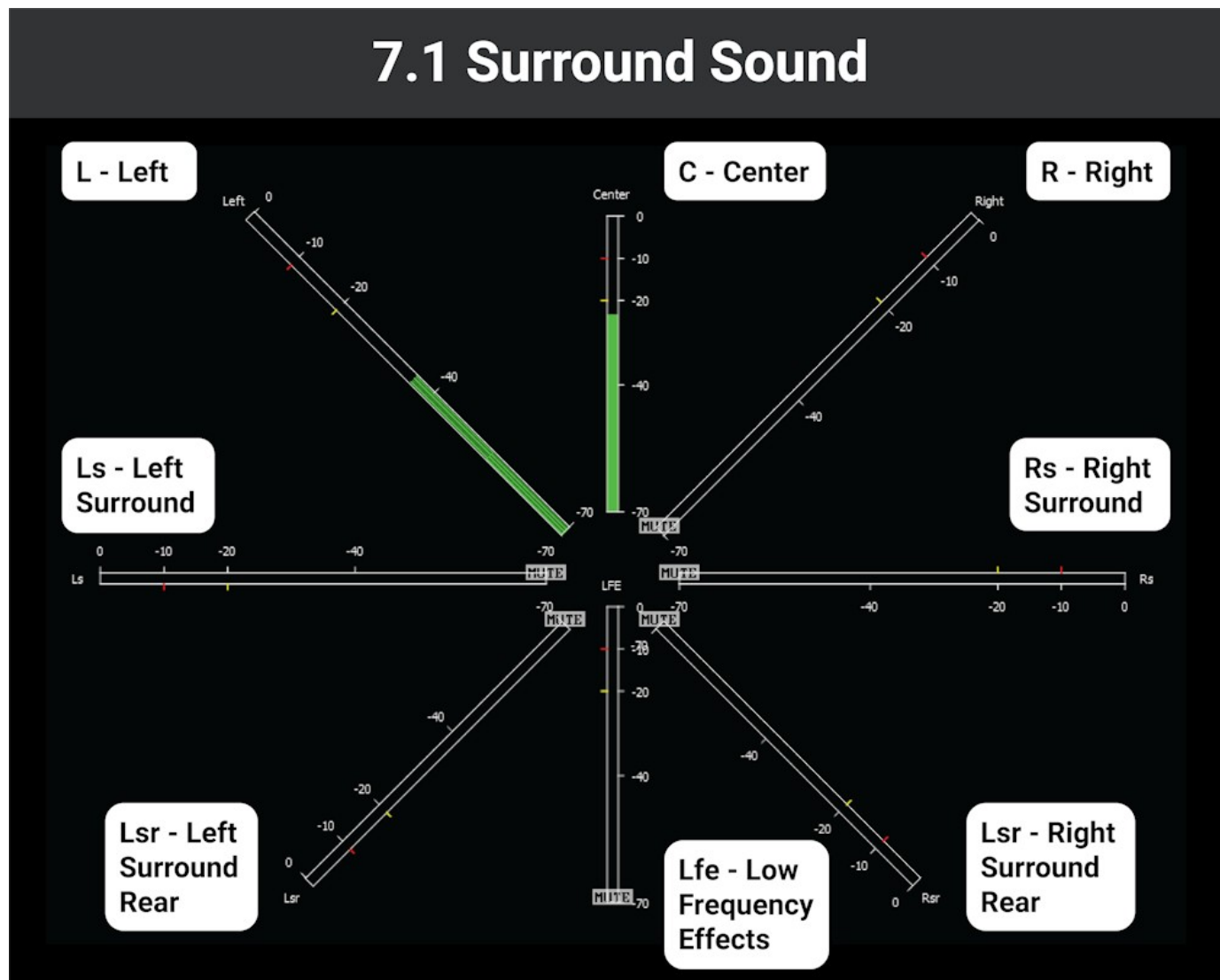
Protools - L C R Ls Rs Lfe

AAC - C L R Ls Rs Lfe

DTS - L R Ls Rs C Lfe

3.2.19.3 7.1 Surround Sound Window

The **Surround Sound** window has 4 modes for setting up 7.1 inputs.



Smpte - L R C Lfe Lss Rss Lsr Rsr

Protools - L C R Lss Rss Lsr Rsr Lfe

EXT - L R C Lfe Lsr Rsr Lss Rss

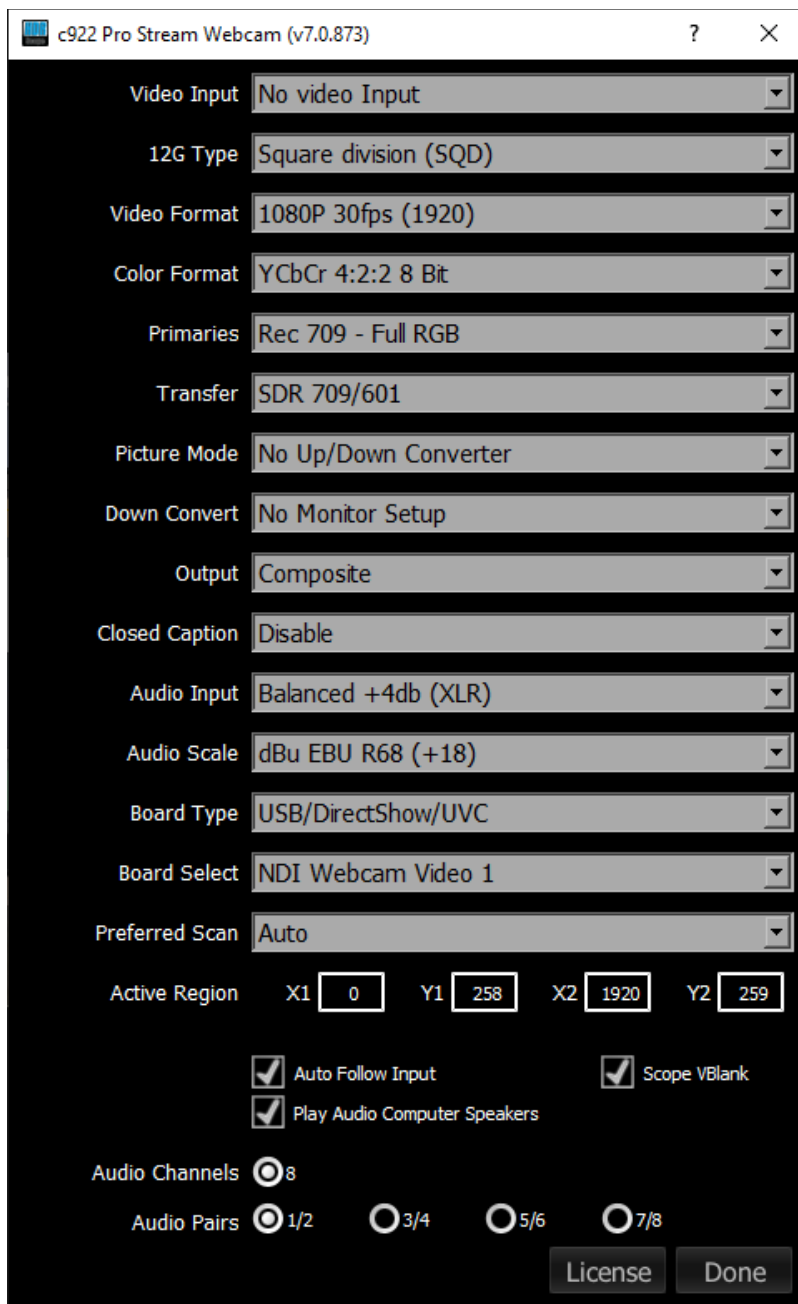
Dolby - L C R Ls Rs Lfes Bsl Bsr

3.3 System Configuration Window



System Configuration button – Opens the System Configuration window, which allows the user to adjust settings for the video and audio I/O type, and to license the software.

Here is a look at the options in the System Configuration window.



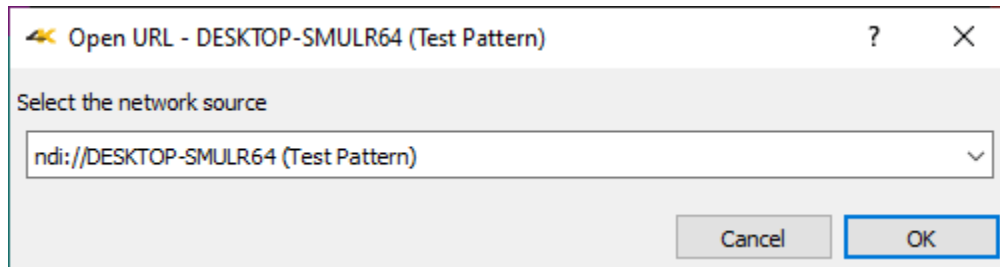
The Settings window is designed to sense and reflect the capabilities of the board or stream the system is set up to view.

When set to an NDI input, the IP Video setup button appears at the top, and the 12G Type pulldown is removed. When set to another source, the IP Video Setup button disappears and the 12G Type pulldown is provided.

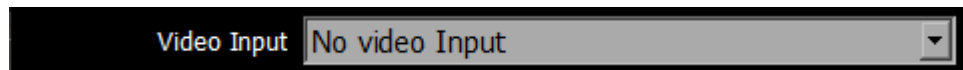
3.3.1 IP Video Setup



IP Video Setup – opens the Open URL window, which allows the user to select between available IP sources. The list will be populated with the most recent sources that have been selected.



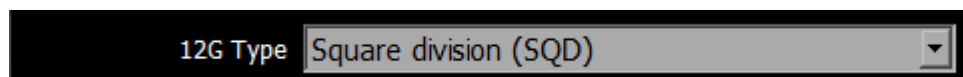
3.3.2 Video Input



Video Input pulldown - allows the user to select between the HD-SDI, HDMI or analog inputs. In the case of dual link, 2 inputs are used. In the case of quad HD (3840 x 2160) and 4K (4096 x 2160), all four I/O ports of the board are in use, so the downconvert is HDMI and analog only. The user may be presented with a list similar to this:

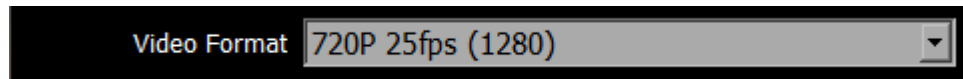
- Serial Digital Single Link (4:2:2)
- Serial Quad Link 4K Y'Cb'Cr SQD
- Serial Quad Link 4K RGB SQD
- Serial Dual Link 4K Y'Cb'Cr SQD

3.3.3 12G Type



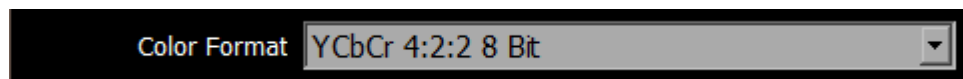
12G Type pulldown – displays the current setting, and allows the user to select between Square Division (SQD), or 2SI (two sample interleave) on some hardware. This pulldown may not be available if HDRScope is set to an NDI video input.

3.3.4 Video Format



Video Format pulldown - displays the current setting, and allows the user to select between the signal formats supported by the I/O hardware. HDRScope supports a wide range of signal formats from NTSC CCIR-601 to 8K [8192 x 4320] 60fps.

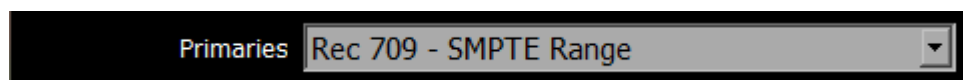
3.3.5 Color Format



Color Format pulldown - allows the user to select the processing mode. In the case of single link, this can be 8 or 10 bit YCbCr or RGBA 8. For dual link it is normally YCbCr 10 or RGB 10. There user will be presented with a list similar to this:

- YCbCr 4:2:2 10 bit
- YCbCr 4:2:2 8 bit
- YCbCr Alternate
- RGBA 4:4:4:X 8 bit
- RGB 4:4:4 10 bit
- RGB 4:4:4 8 bit

3.3.6 Primaries



Primaries pulldown – the user will be presented with a list similar to this:

- Auto 2020 709 601
- CCIR 601 - SMPTE Range
- Rec 709 - SMPTE Range
- BT 2020 - SMPTE Range
- CCIR 601 - Full RGB
- Rec 709 - Full RGB
- BT 2020 - Full RGB

- DCI P3 (in 2020)
- Display P3 (in 2020)

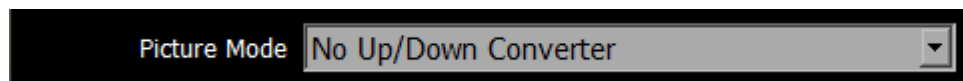
3.3.7 Transfer



Transfer pulldown – adjust the Transfer Gamma setting. The user will be presented with a list similar to this:

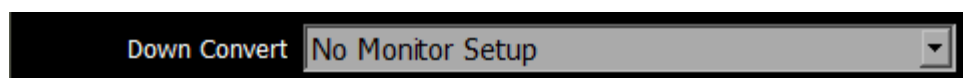
- SDR 709/601
- PQ/HDR10
- HLG

3.3.8 Picture Mode



Picture Mode pulldown - allows the user to select how up/down conversion is done. All standard modes for up and down conversion are supported. Requires an up/down converter.

3.3.9 Down Convert



Down Convert pulldown menu - allows the user to select the output signal type. The output can match the input or be converted to another up or down signal format. Requires a Monitor setup.

3.3.10 Output



Output pulldown - allows the user to select between available analog output formats. In SD this can be Composite, S-video or Component. For HD, only component is supported. The user will be presented with a list similar to this:

- Composite - single wire output
- Component RGB – three wire RGB output
- Component YUV - Sony VTR three wire output
- Component YUV MII – Panasonic VTR three wire output
- Component YUV SMPTE – Standard SMPTE three wire output

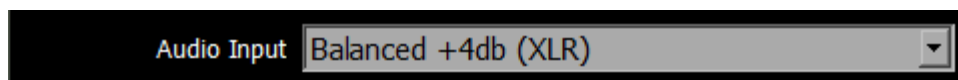
3.3.11 Closed Caption



Closed Caption pulldown - allows the user to select which closed caption format is to be displayed, or to not display closed captions. The user will be presented with a list similar to this:

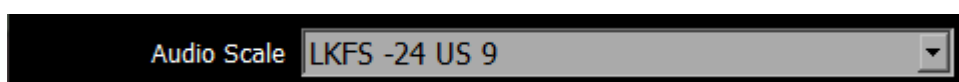
- Disable
- CC1/Subtitle (608)
- CC2 (608)
- CC3 (608)
- CC4 (608)
- Service1 (708)
- Service2 (708)
- Service3 (708)
- Service4 (708)
- OP-47

3.3.12 Audio Input



Audio Input pulldown – (hardware dependent) allows the user to select between the embedded audio tracks (HD-SDI or HDMI depending on input), or the AES/EBU audio inputs. On some hardware, analog audio inputs are also available.

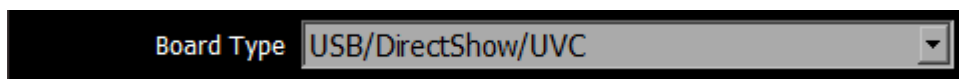
3.3.13 Audio Scale



Audio Scale pulldown – change the audio meter modes between RMS, Loudness 9 and Loudness 18 modes. The user will be presented with a list similar to this:

- dBFS RMS
- dBu SMPTE RP155 (+24)
- dBu EBU R86 (+18)
- dBu EBU R86 (0)
- dBu EBU PPM
- dBu BBC PPM
- LUFS -23 EBU 9
- LKFS -24 US 9

3.3.14 Board Type

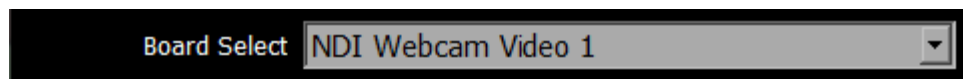


Board Type pulldown – select the type of board to use. The user may be presented with a list similar to this:

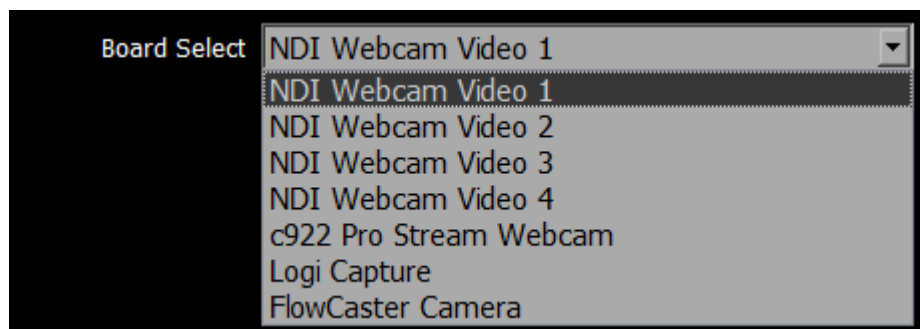
- Auto Select
- AJA
- AJA Shared
- Bluefish
- Blackmagic

- UltraScope
- Matrox
- DirectShow/UVC
- NDI
- Desktop
- Adobe ScopeDirect
- Avid ScopeDirect
- OpenFX ScopeDirect
- Assimilate ScopeDirect
- AvVr3D ScopeDirect

3.3.15 Board Select



Board Select – allows the user to select which board or screen to use. Sometimes if there is more than one board in the system, the application may be looking at the wrong one. In fact, certain types of devices may appear to be out of order, depending on whether different boards have been used in the system. Clicking between boards can reset the selected board. HDRScope will take a look at how the device identifies itself and populate the list with any devices seen in the system. Here is an example:



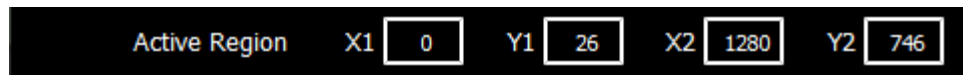
3.3.16 Preferred Scan



Preferred Scan pulldown – Select between available scan settings. The user may be presented with a list similar to this:

- Auto
- Interlaced (i)
- Segmented (psf)

3.3.17 Active Region



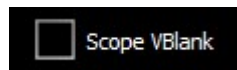
Active Region fields – shows the active region of the video signal. X1 sets the upper left pixel location, Y1 sets the lower left pixel location, X2 sets the upper right pixel location, Y2 sets the lower right pixel location.

3.3.18 Auto Follow Input



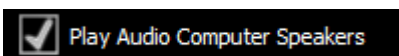
Auto Follow Input checkbox is selected, whenever the input type is changed, the settings for HDRScope are changed as well. If not checked, switching the input signal will not switch the settings.

3.3.19 Scope Vblank



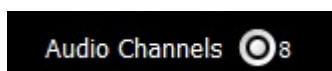
Scope Vblank – by default, the waveform/vectorscopes do not use the vertical blanking area. If this is set, the vertical blank lines will be treated as active picture

3.3.20 Play Audio Computer Speakers



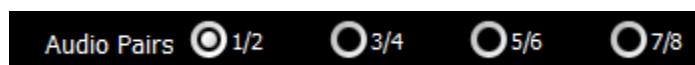
Play Audio Computer Speakers checkbox – when checked, play source audio through the system audio output (speakers, headphones etc.). If the audio is already being monitored via the source, having two outputs may cause summing, and potentially feedback. Unchecking the checkbox will turn off audio output through the system output.

3.3.21 Audio Channels



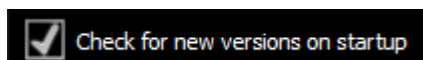
Audio Channels – (hardware dependent) In systems that support 16 channel audio, the user would be able to select between 8 and 16 channel audio.

3.3.22 Audio Pairs




Audio Pairs – (hardware dependent) buttons allow the user to select the audio pair that will be monitored.

3.3.23 Check for New Versions on Startup



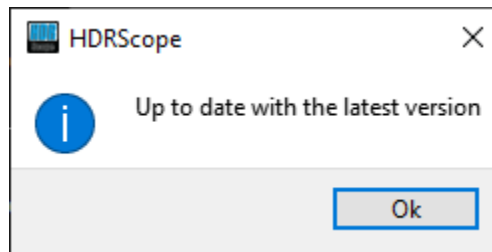
Check for new versions on startup checkbox – each time the system is started, check the current version of the build available on the Drastic website, in case the version you have installed is no longer current.

3.3.24 Check For Updates

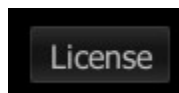
A rectangular button with a dark background and the text "Check For Updates" in a light, sans-serif font.

Check For Updates button – check the current version of the build available on the Drastic website, in case the version you have installed is no longer current.

If you have the latest version installed, you should see the following success message:



3.3.25 License



License button - Press the **License** button to open the licensing dialog.

A screenshot of the "dtlicense (v7.0.1)" dialog box. The window has a title bar with a magnifying glass icon, the text "dtlicense (v7.0.1)", and standard minimize, maximize, and close buttons. The main content area is enclosed in a blue border and contains the text "License has been validated for:" followed by a list of software titles: "- Drastic DDR Software", "- MediaReactor Software", "- MediaNXS HD", "- Hurricane", "- VideoQC", "-Preview -PreviewPro -4KScope -SDIScope", "-CC -4K -Camera Raw -Device Control", "-Cineform -AVCi -DNxHD -JPEG-2000", and "-NXC -SCP -BBReplay -FBReplay -dTouch". Below the list, it says "(Trial license, 14 days remain)". Below the blue-bordered area, there are input fields for "User Name" (containing "Corey Cousineau"), "Email Address" (containing "corey@drasticttech.com"), and "Site Code" (containing ".EIXMSwOS1Njb3BlIDYgOiBXaW42NA=="). To the right of the "Email Address" and "Site Code" fields are buttons labeled "Generate", "Copy", and "Send". Below the "Site Code" field is a "Site Key" label and a large empty text area. To the left of this text area are four buttons: "Paste", "Register", "Remove", and "Folder".

The top field displays the current status of the license.

The **User Name** field allows the user to type in a first and last name during the licensing process.

The **Email Address** field allows the user to type in the email at which they would like to receive the site key for their license.

Once the name and address fields have been filled out, pressing the **Generate** button populates the **Site Code** field with a string of alphanumeric characters. This string is the Site Code.

The **Site Code** field is where the site code displayed during the licensing process. The user may

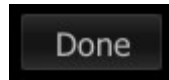
select the site code and use Ctrl+C to copy it to the clipboard, or use the **Copy** button. The user will need to send the site code to Drastic Authorization to get a Site Key to enable the license.

If the system has been set up with email, pressing the **Send** button will open a new email to Drastic Authorization, with the site code in the body of the email.

Once a reply email containing the **Site Key** has been returned by Drastic Authorization, copy it, then paste it into the Site Key field either using the **Paste** button or Ctrl+V.

Once the Site Key has been pasted into the **Site Key** field, pressing the **Register** button registers the license. The system may need to be restarted for the change in license status to be updated. Pressing the x in the upper right corner will close the **License** window.

3.3.26 Done

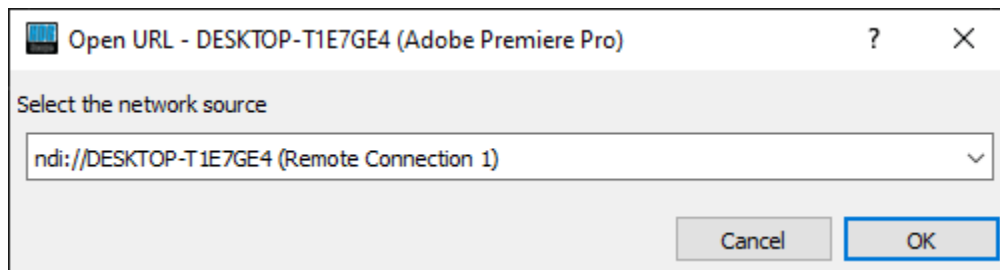


Done button. Pressing the Done button in the System Configuration window closes the window and enables any changes that have been made.

3.4 IP Setup



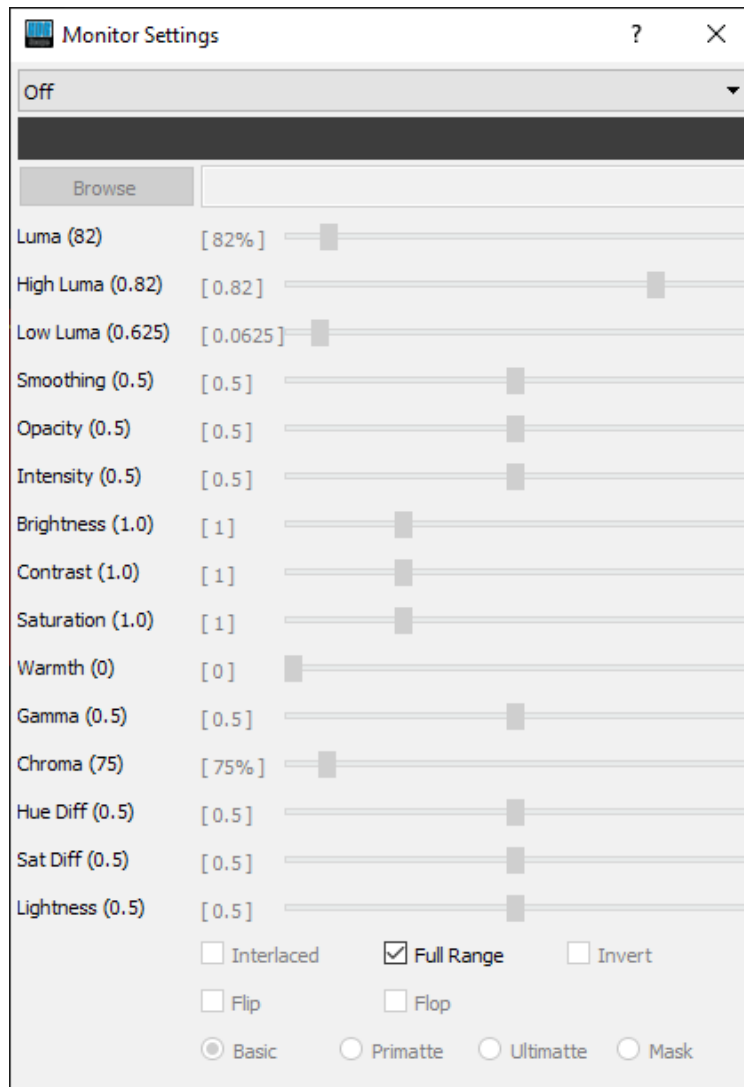
IP Setup button – opens the Open URL window, which allows the user to select between available IP sources. The list will be populated with the most recent sources that have been selected.



3.5 Display Modes



Display Mode button – opens the Monitor Settings window, which allows the user to select between available display modes.



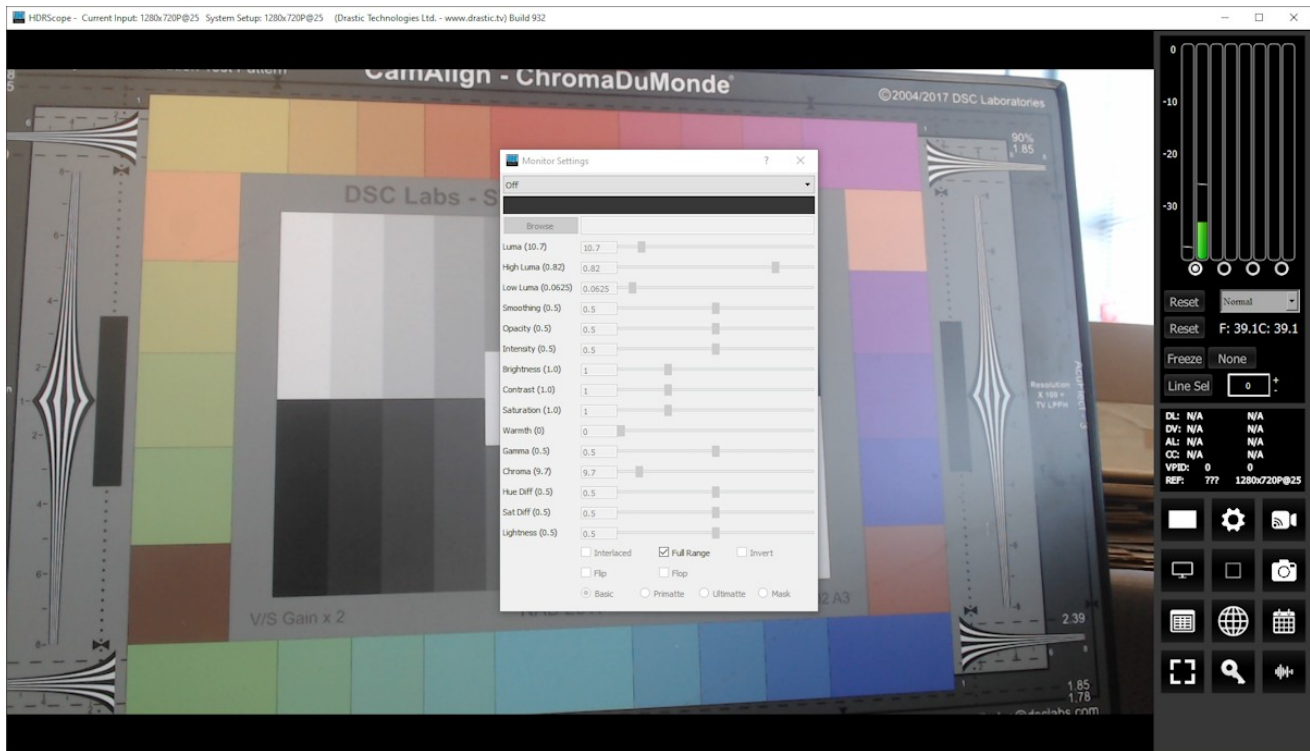
Monitor Settings window

The pulldown menu at the top allows the user to select between various display modes.

Display modes include:

3.5.1 Off

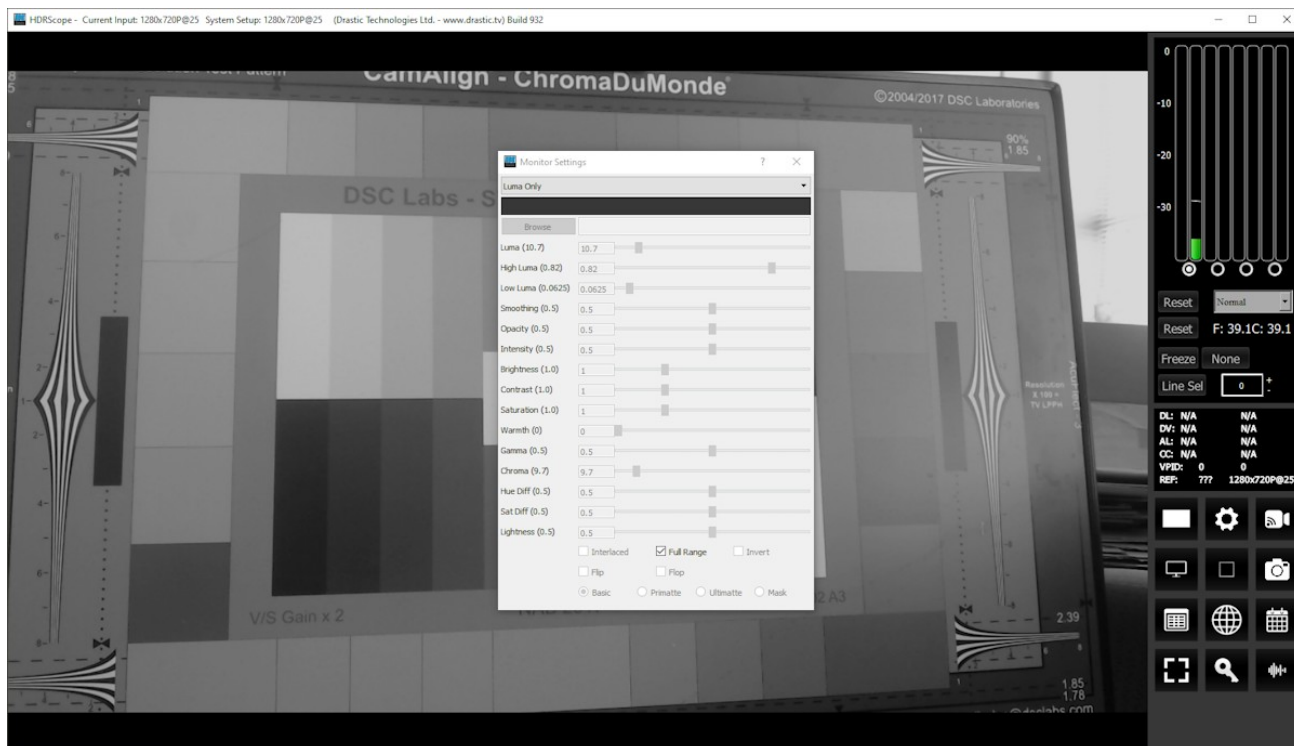
Display the signal normally. This is the default picture view.



The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.2 Luma Only

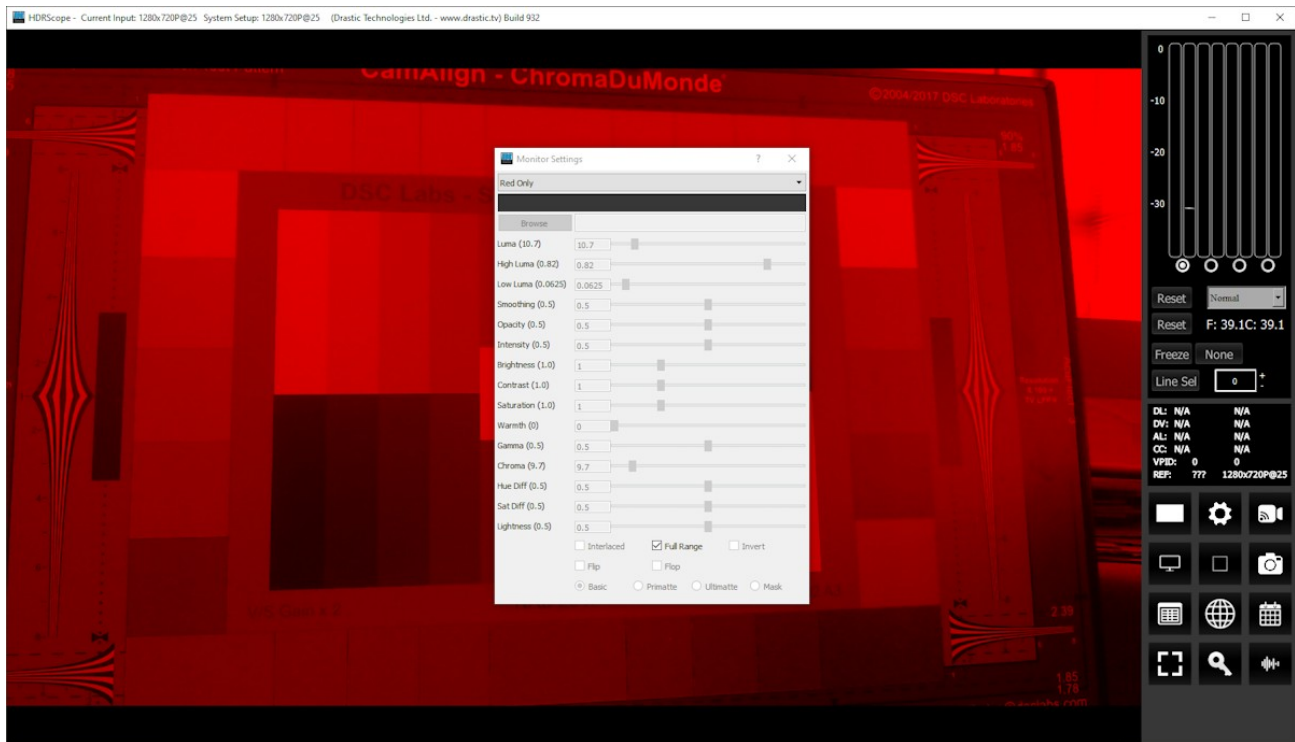
Show only the Y or brightness of the picture. This display setting produces a black and white image, with no chroma.



The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.3 Red Only

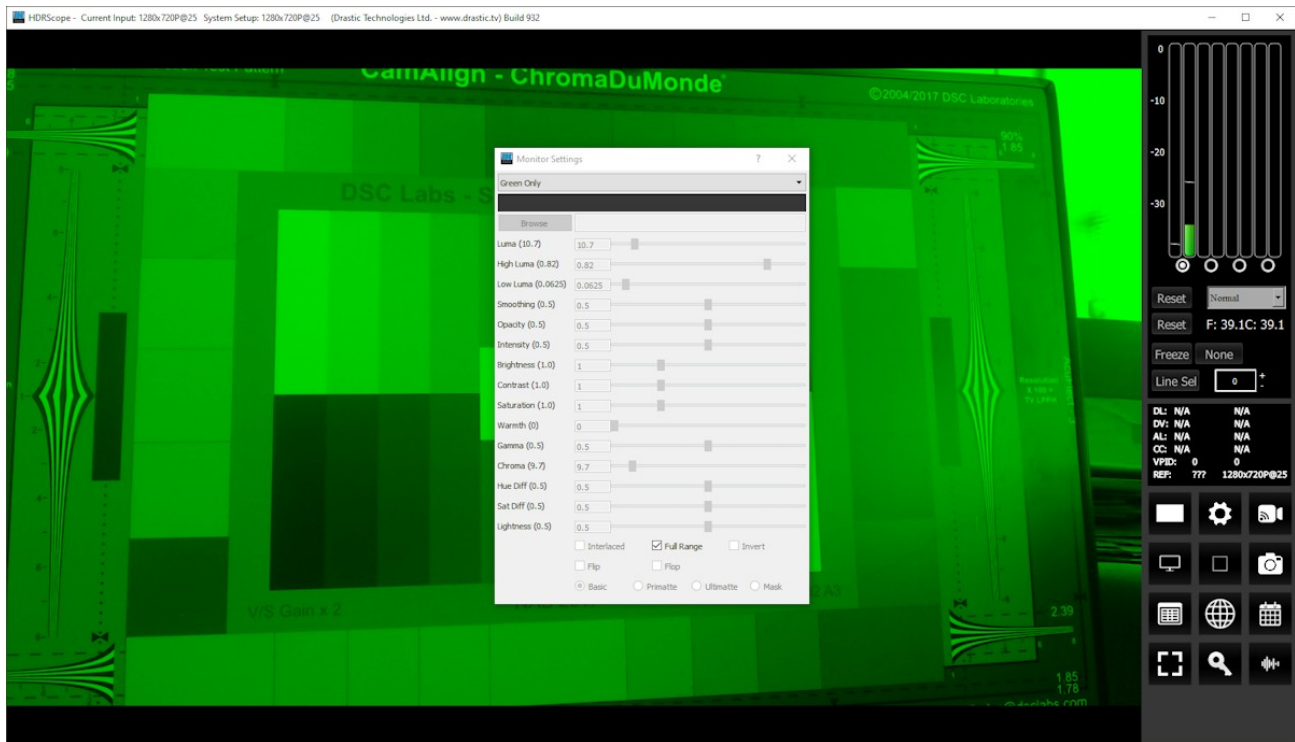
Show only the red channel.



The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.4 Green Only

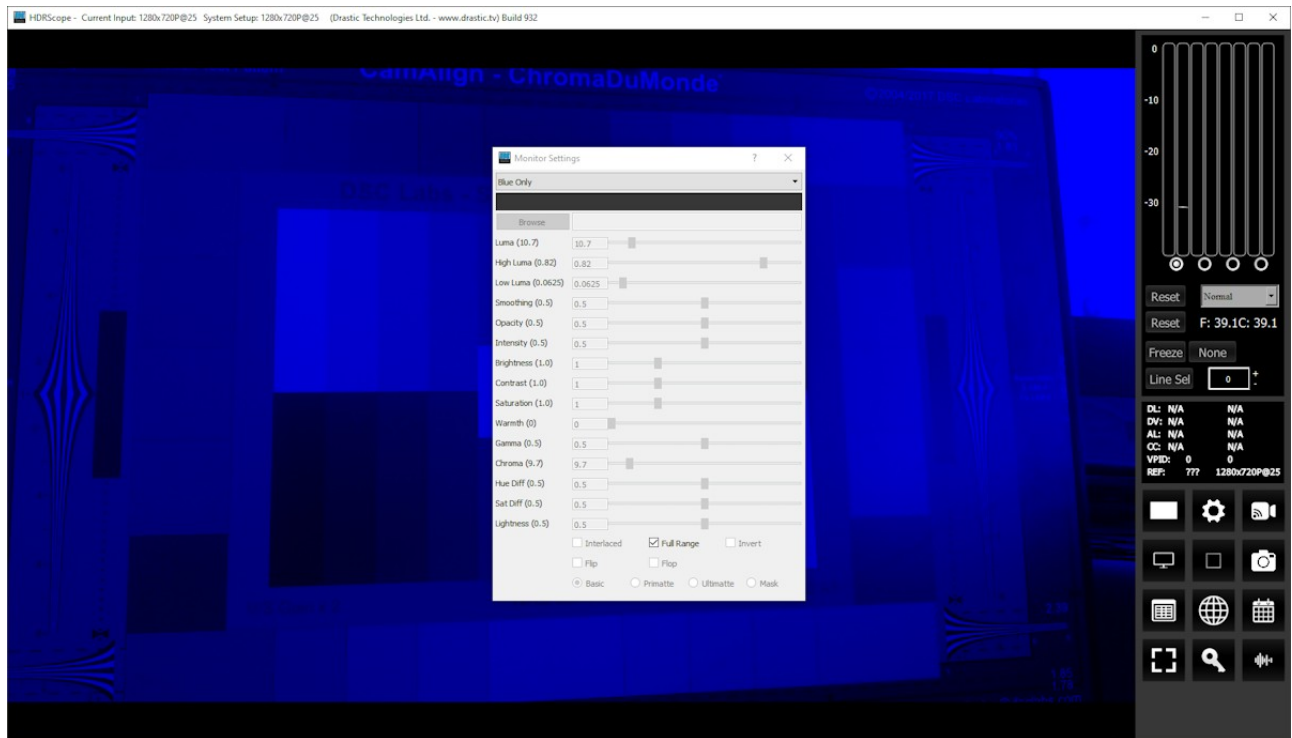
Show only the green channel.



The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.5 Blue Only

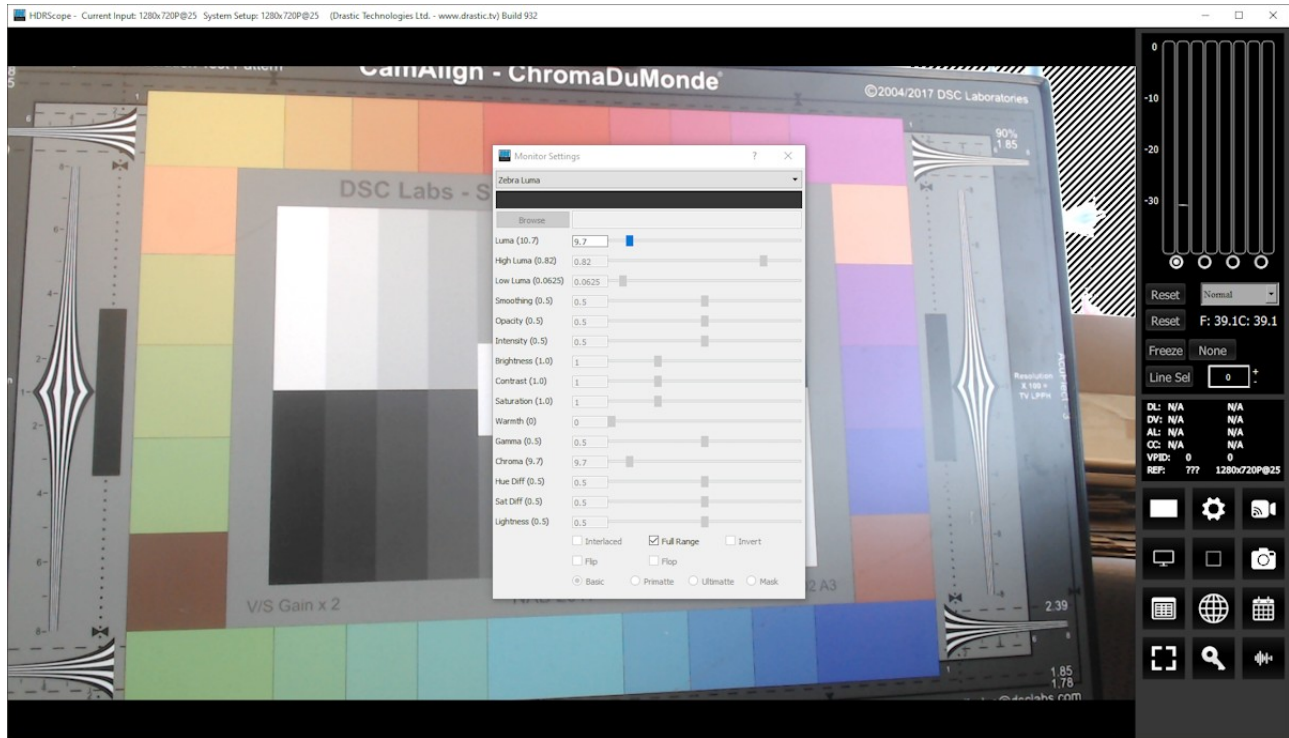
Show only the blue channel.



The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.6 Zebra Luma

Draw zebra bars where the luma is too high.

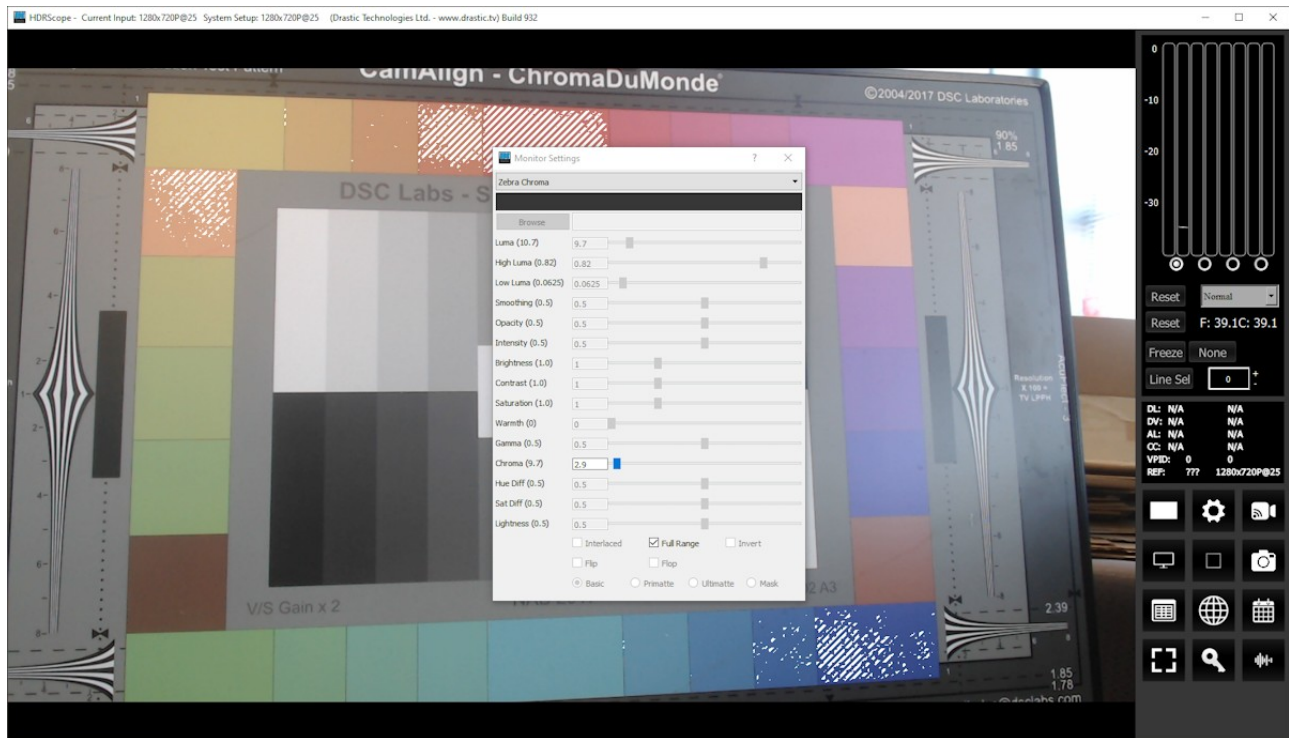


Activates the **Luma** slider, which allows the user to adjust the luma setting. When active, Luma can be adjusted by pulling the slider with the mouse, or using the left and right arrow buttons, in tenths. Click on the slider and use the < and > keys.

The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.7 Zebra Chroma

Draw zebra bars where the chroma is out of range.

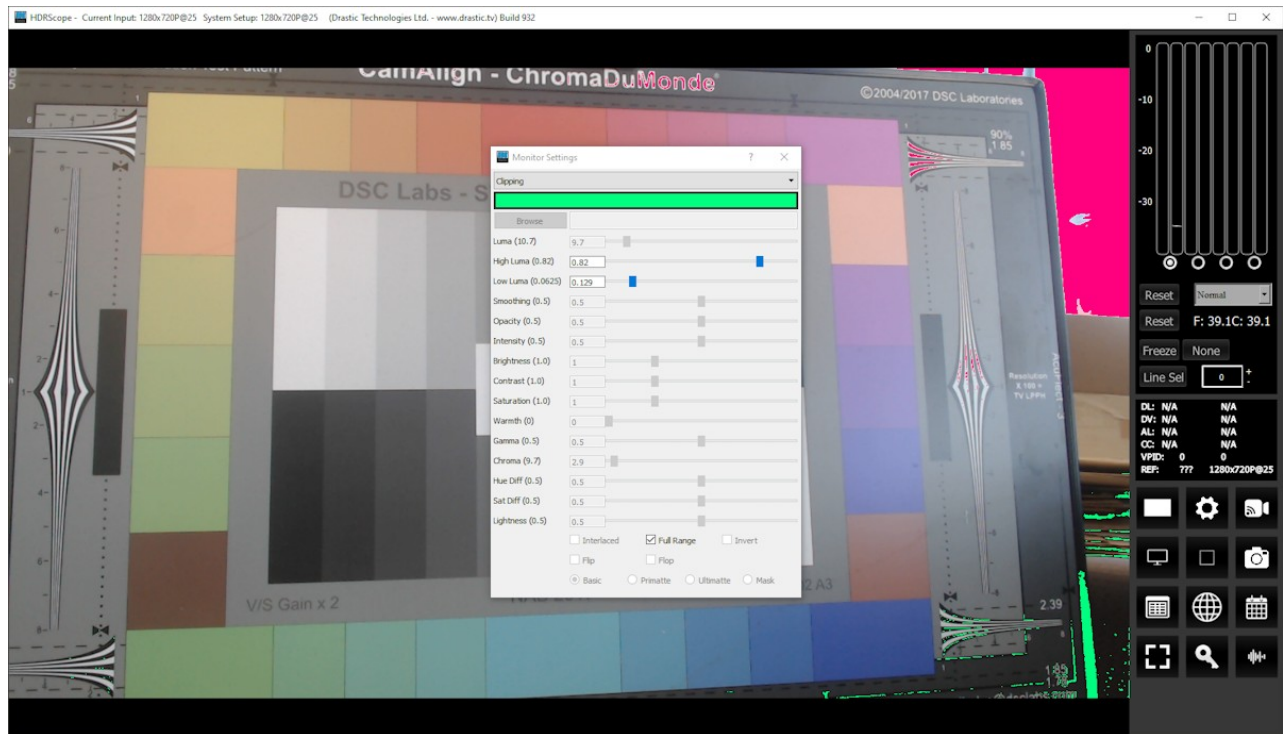


Activates the **Chroma** slider, which allows the user to adjust the chroma setting. When active, Chroma can be adjusted by pulling the slider with the mouse, or using the left and right arrow buttons, in tenths. Click on the slider and use the < and > keys.

The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.8 Clipping

Draw green anywhere the signal is too low, or red anywhere it is too high. If a signal is too low, the blacks will become muddy and lose detail. If it is too high, the whites will bleach out and lose detail.



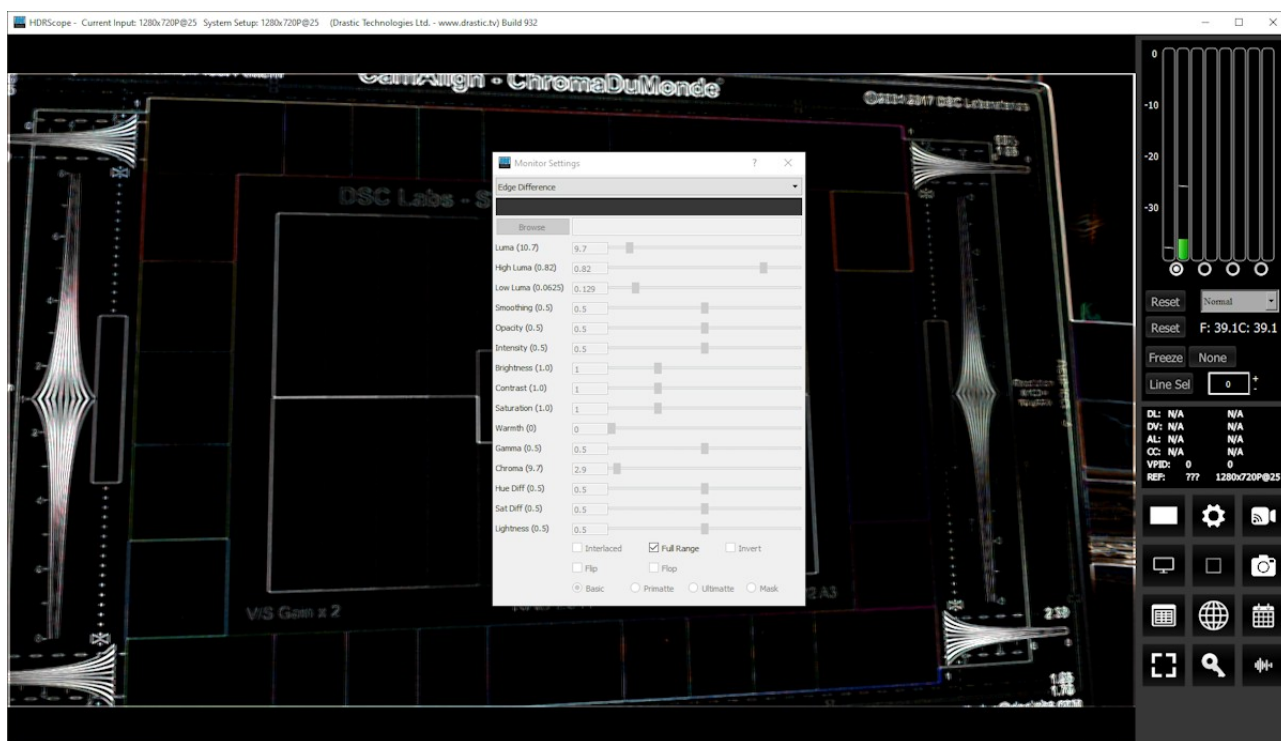
Activates the **Color Picker** (the bar just below the display mode pulldown menu), so the user can choose a primary (too low) color other than green. The secondary (too high) color is automatically generated to be a contrasting color to the primary color.

Activates the **High Luma** slider and the **Low Luma** slider, allowing the user to adjust these settings. When active, High Luma and Low Luma can be adjusted by pulling the slider with the mouse, or using the left and right arrow buttons, in tenths, but displays whole integers only. Click on the slider and use the < and > keys.

The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.9 Edge Difference

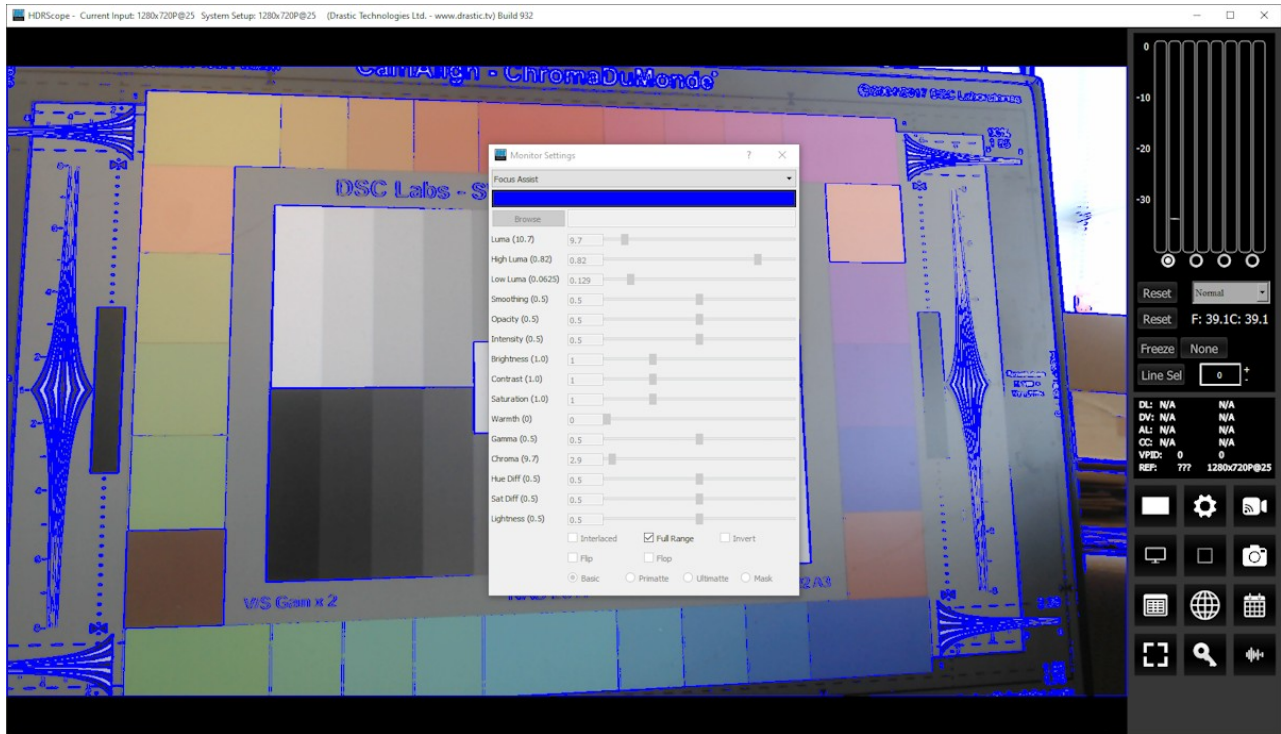
Highlight every edge in the picture, and turn the rest of the picture black.



The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.10 Focus Assist

Paint areas of the image that are in focus with the selected color. This setting allows fine tuning of camera focus settings by making the in-focus areas obvious.

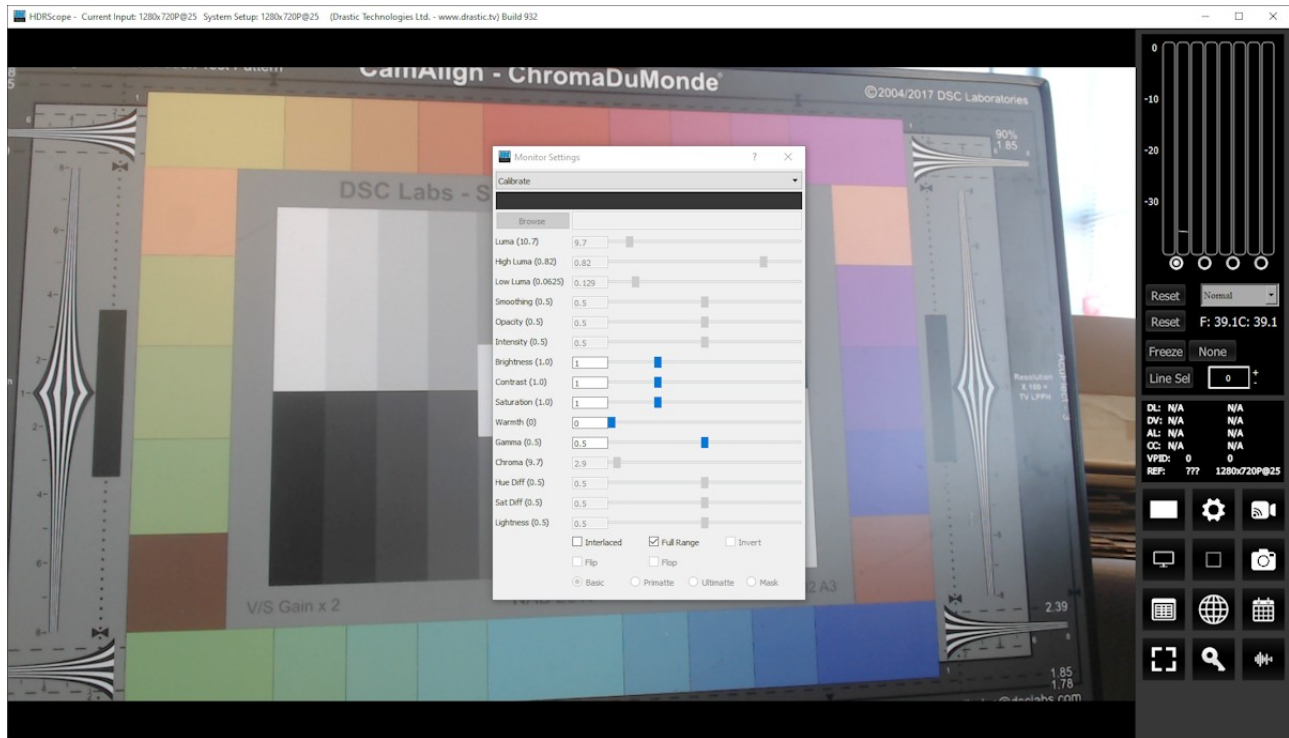


Activates the **Color Picker** (the bar just below the display mode pulldown menu), so the user can choose an appropriate color to contrast from the general hue of the picture.

The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.11 Calibrate

Allows the user to calibrate the display settings. Initially this will show the normal picture view. However, as you move the individual sliders, you can adjust the way the image is displayed to optimize the capabilities of your monitor setup.



Activates the **Brightness**, **Contrast**, **Saturation**, **Warmth**, and **Gamma** sliders, allowing the user to adjust these settings. When active, Brightness, Contrast, Saturation, Warmth, and Gamma can be adjusted by pulling the sliders with the mouse, or using the left and right arrow buttons, in thousandths. Click on the slider and use the < and > keys.

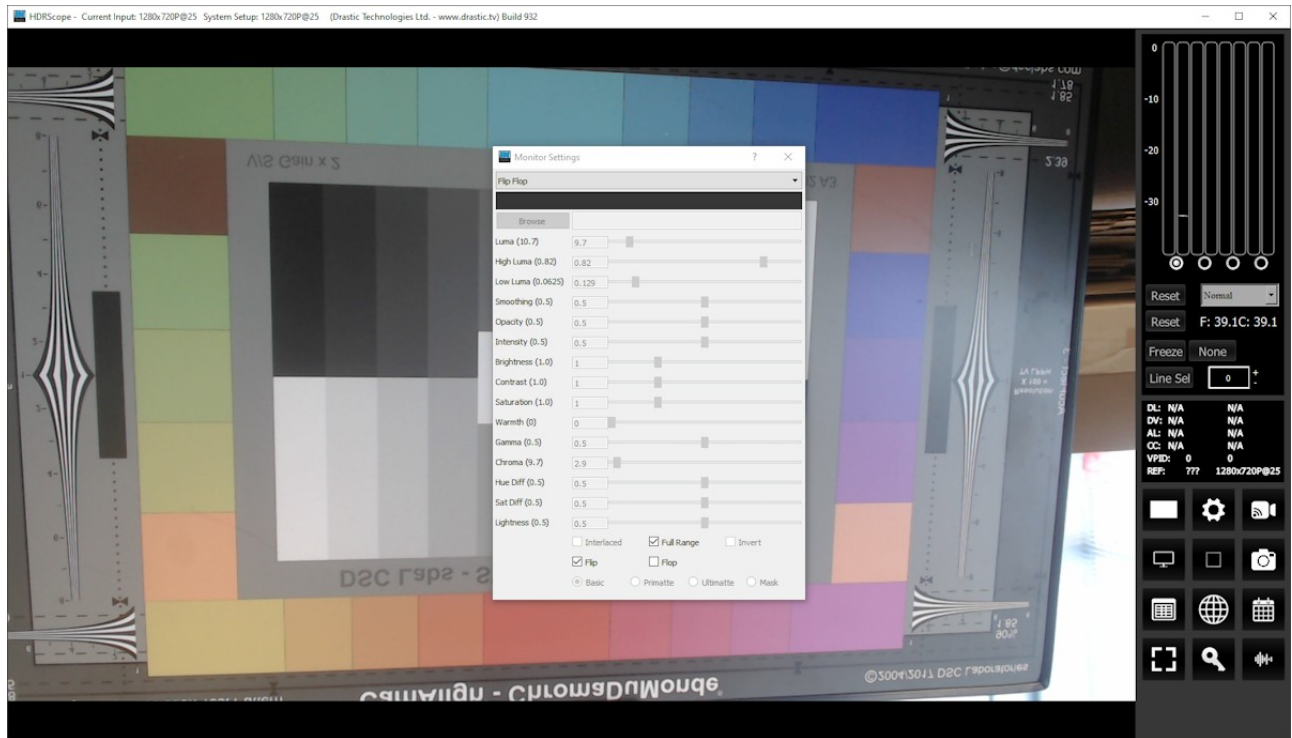
Activates the **Interlaced** checkbox, which allows the user to specify interlaced (checked) or progressive (unchecked) standards to display.

The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

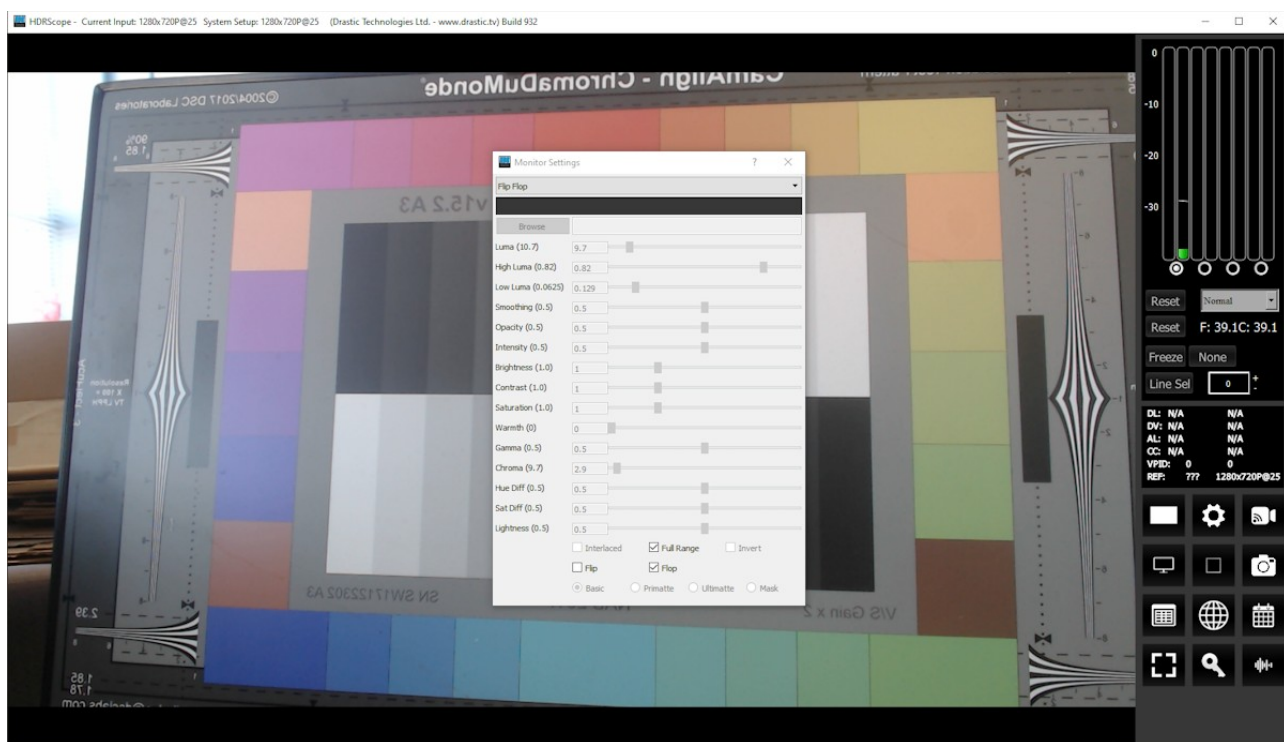
3.5.12 Flip Flop

Reverse the picture horizontally or vertically.

Activates the **Flip** checkbox, which allows the user to reverse the image top to bottom.



Activates the **Flip** checkbox, which allows the user to reverse the image left to right.



DRISCOPE - Current Input: 1280x720P@25 System Setup: 1280x720P@25 (drastic Technologies Ltd. - www.drastic.tv) Build 932

Monitor Settings

Flip Flip

Browse

Luma (10.7) 9.7

High Luma (0.82) 0.82

Low Luma (0.0625) 0.129

Smoothing (0.5) 0.5

Opacity (0.5) 0.5

Internality (0.5) 0.5

Brightness (1.0) 1

Contrast (1.0) 1

Saturation (1.0) 1

Warmth (0) 0

Gamma (0.5) 0.5

Chroma (9-7) 2.9

Hue Diff (0.5) 0.5

Sat Diff (0.5) 0.5

Lightness (0.5) 0.5

☐ Interlaced ☒ Full Range ☐ Invert

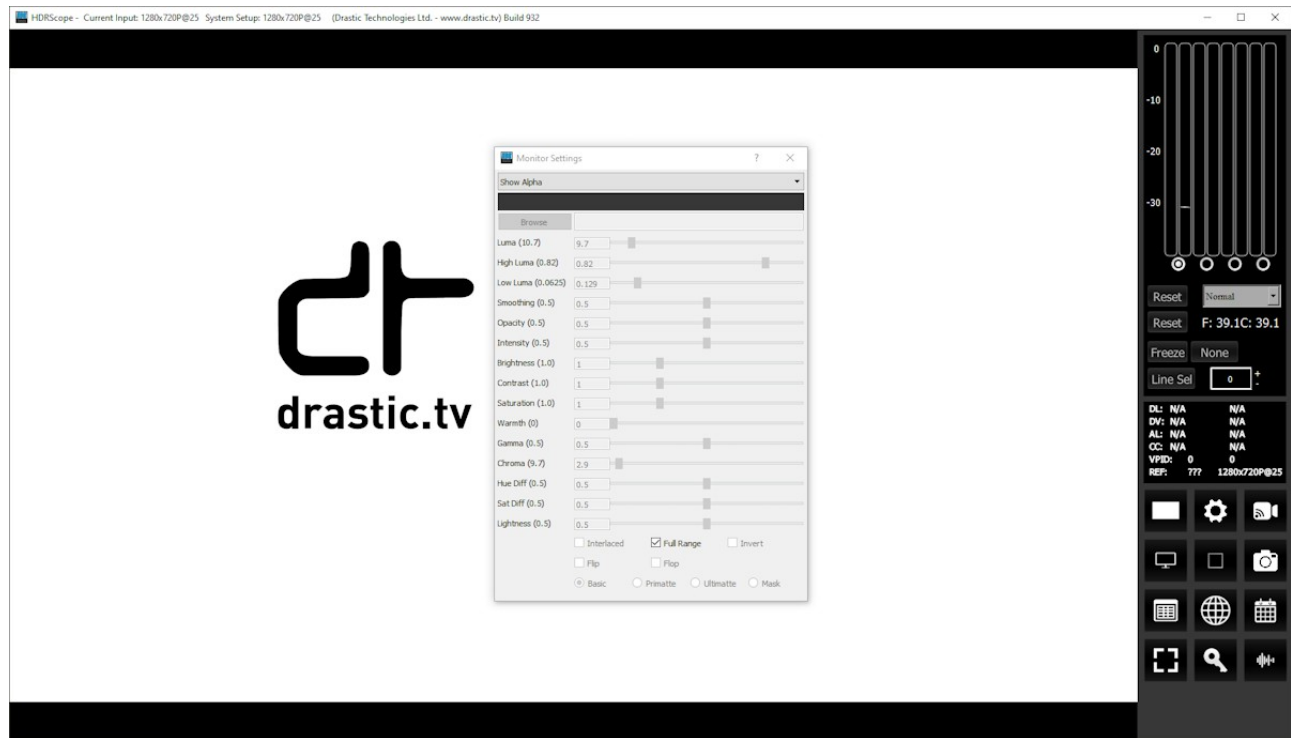
☒ Flip ☒ Flip

☐ Basic ☐ Primatte ☐ Ultimatte ☐ Mask

DL: N/A N/A
 DV: N/A N/A
 AL: N/A N/A
 CC: N/A N/A
 VPID: 0 0
 REP: ??? 1280x720P@25

3.5.13 Show Alpha

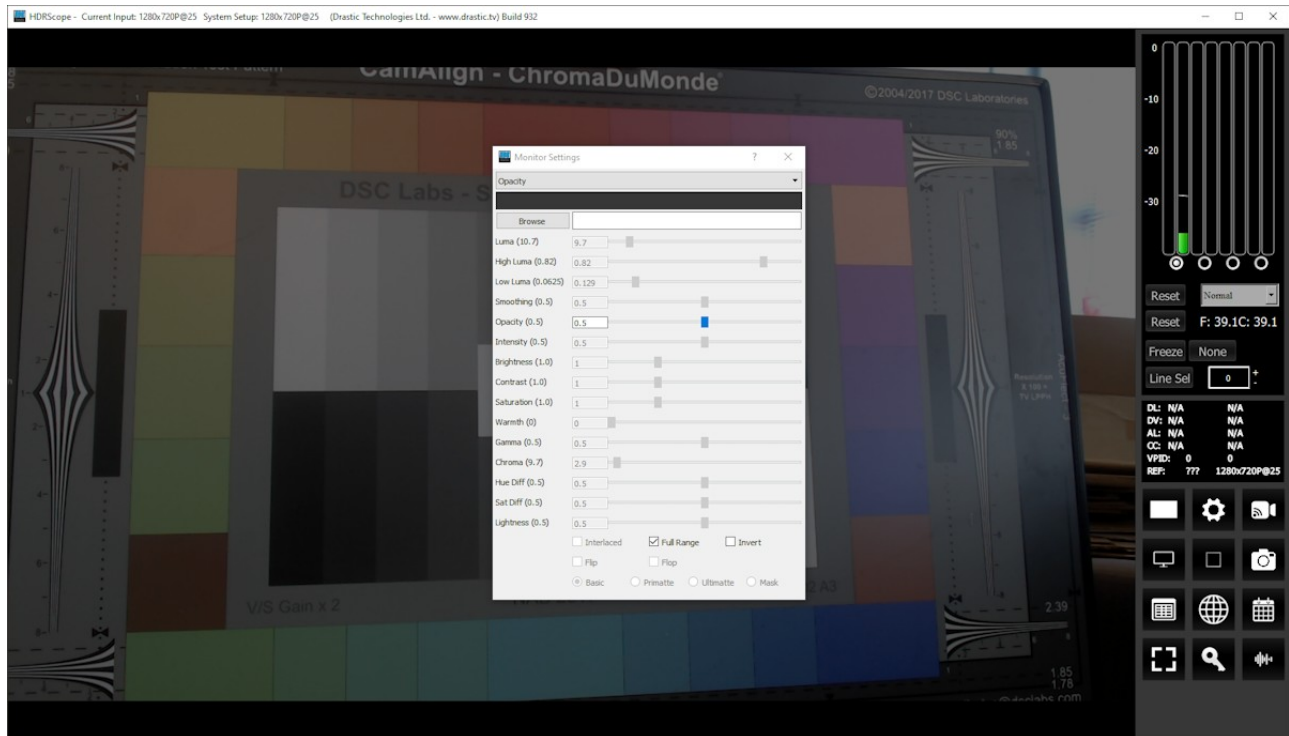
Show the alpha component of an RGBA or YCbCr+A signal. Note that if there is no alpha channel associated with the signal, the screen will show white.



The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.14 Opacity

Mix the signal with a loaded still image for reference, using a checkerboard mix or 50% blend. This setting can be used to compare two images to match a camera position from an existing shot with a new camera, where additional shots are needed for a scene and a new camera needs to match its position.



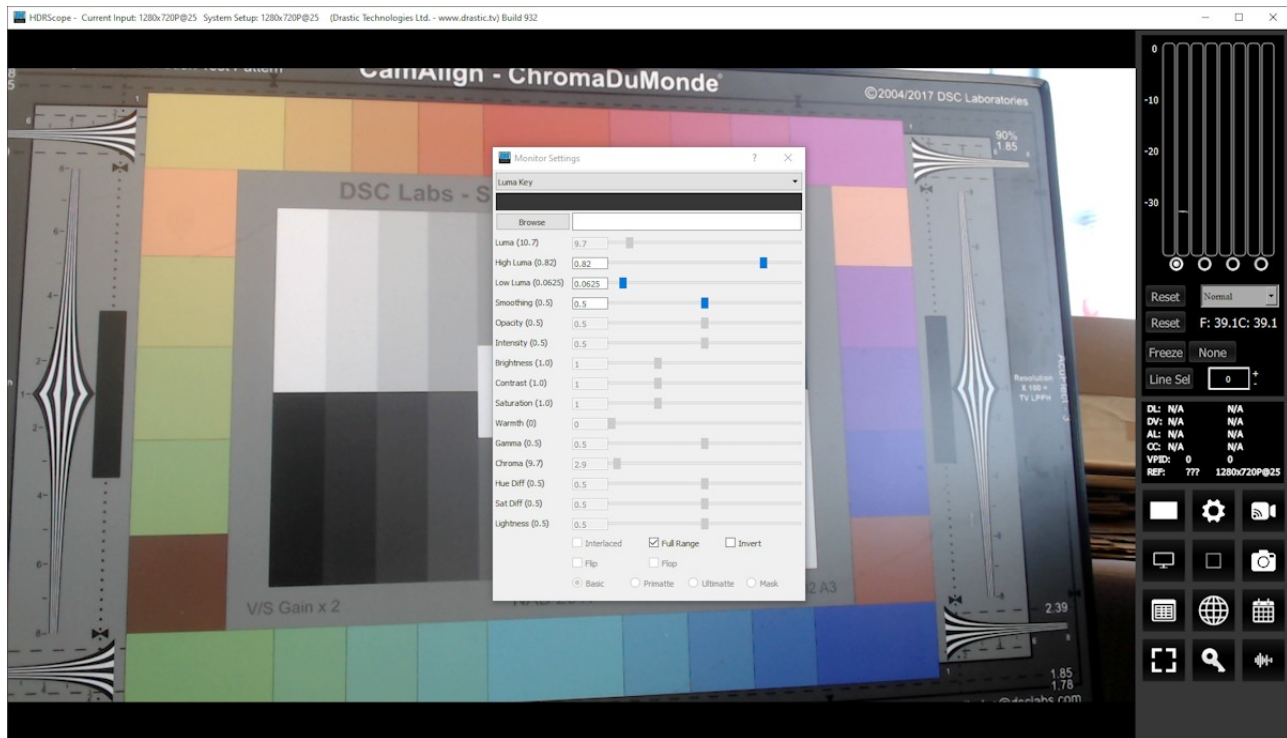
Activates the **Browse** button. This opens a standard browser, which allows the user to load a TGA/PNG/BMP/JPG/v210/YUV to use as the background to compare live video to the existing image.

Activates the **Opacity** slider, and the **Invert** checkbox, which allows the user to set the opacity level, and Invert the display.

The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.15 Luma Key

Show the video luma keyed over a checkerboard or image.



Activates the **Browse** button. This opens a standard browser, which allows the user to load a TGA/PNG/BMP/JPG/v210/YUV to use as the background for the luma key, instead of the checkerboard.

Activates the **High Luma** slider, so the user can adjust the high luma settings. When active, can be adjusted by pulling the slider, or using the left and right arrow buttons, in thousandths. Click on the slider and use the < and > keys.

Activates the **Low Luma** slider, so the user can adjust the low luma settings. When active, can be adjusted by pulling the slider, or using the left and right arrow buttons, in thousandths. Click on the slider and use the < and > keys.

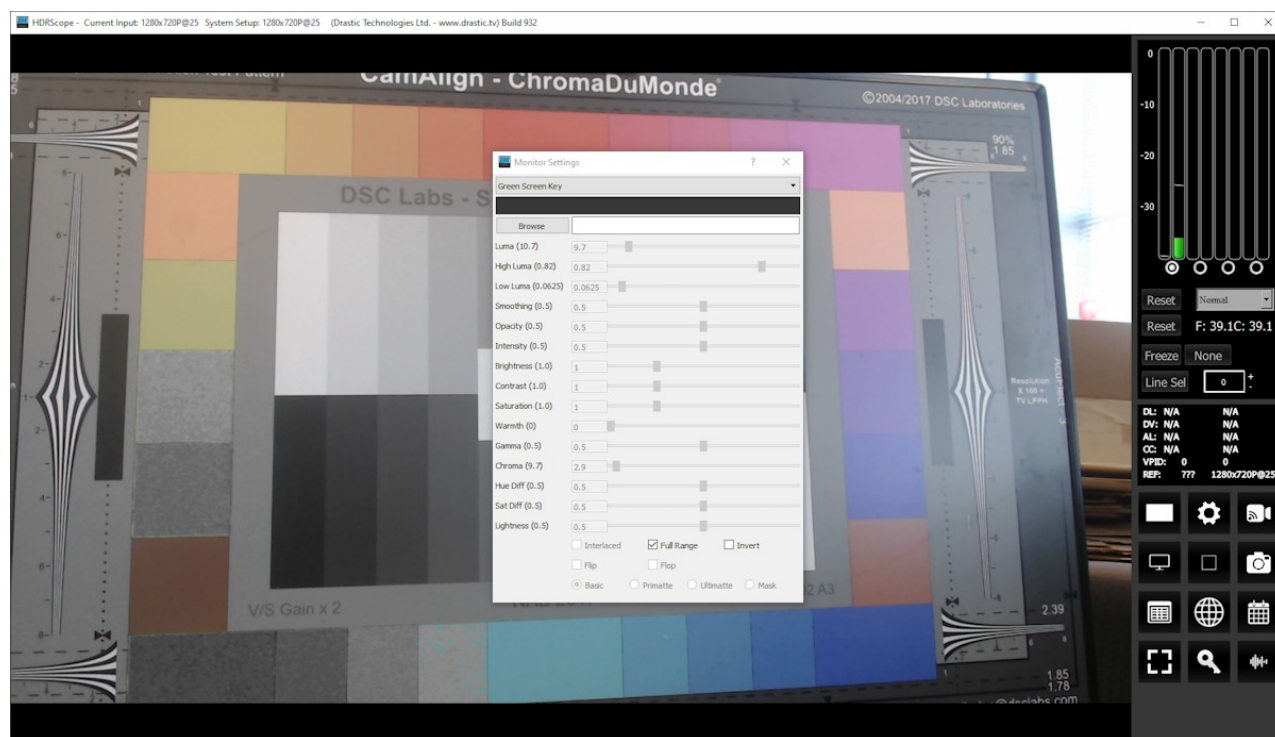
Activates the **Smoothing** slider, so the user can adjust the smoothing settings. When active, can be adjusted by pulling the slider, or using the left and right arrow buttons, in thousandths. Click on the slider and use the < and > keys.

Activates the **Invert** checkbox. The user can check this box to Invert the key.

The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.16 Green Screen Key

Show the image green screen keyed over a checkerboard.



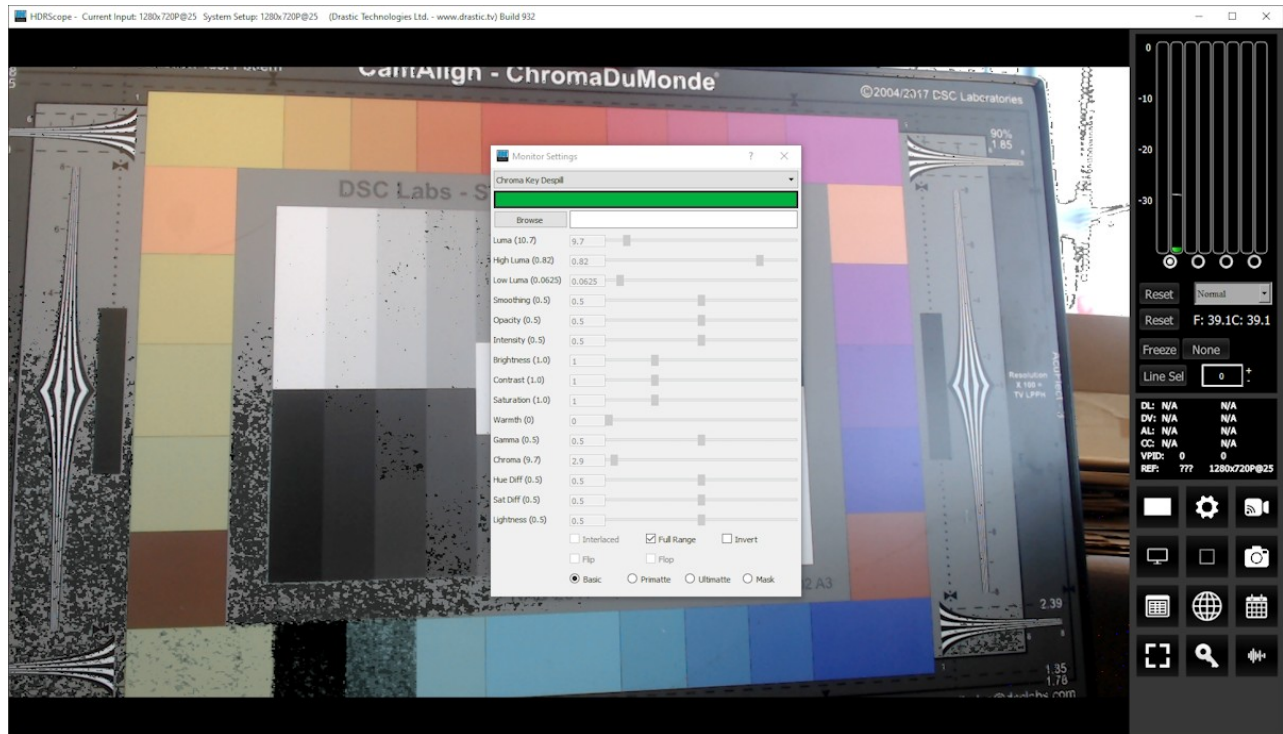
Activates the **Browse** button. This opens a standard browser, which allows the user to load a TGA/PNG/BMP/JPG/v210/YUV to use as the background for the green screen key, instead of the checkerboard.

Activates the **Invert** checkbox. The user can check this box to Invert the key.

The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

3.5.17 Chroma Key Despill

Chroma Keys are applied to pass through background for a particular color. Green screen and blue screen are specific chroma keys. The Despill applies a mix to the pixels at the edge of the color and any objects in the scene.



Activates the **Color Picker** (the bar just below the display mode pulldown menu), so the user can fine tune the green, or any color used for the chroma key.

Activates the **Browse** button. This opens a standard browser, which allows the user to load a TGA/PNG/BMP/JPG/v210/YUV to use as the background for the chroma key despill, instead of the checkerboard.

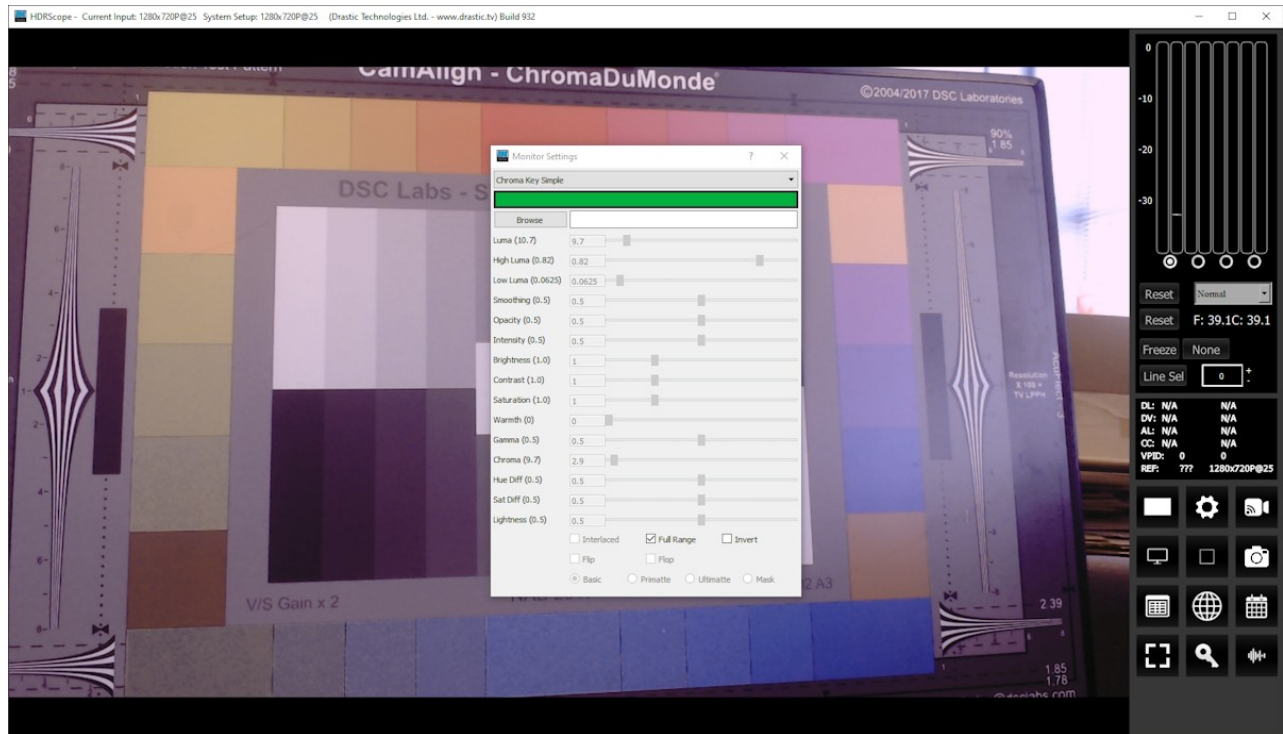
The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

Activates the **Invert** checkbox. The user can check this box to Invert the key.

Activates the **Basic/Primatte/Ultimeatte/Mask** radio buttons, which are chroma key despill types/settings. The user may select between these 4 settings using the radio buttons – when one is selected, the rest are automatically deselected.

3.5.18 Chroma Key Simple

Show the image green screened over a checkerboard or image. Chroma Keys are applied to pass through background for a particular color. Green screen and blue screen are specific chroma keys. The Simple looks at each pixel.



Activates the **Browse** button. This opens a standard browser, which allows the user to load a TGA/PNG/BMP/JPG/v210/YUV to use as the background for the chroma key, instead of the checkerboard.

Activates the **Color Picker** (the bar just below the display mode pulldown menu), so the user can fine tune the green, or any color used for the chroma key.

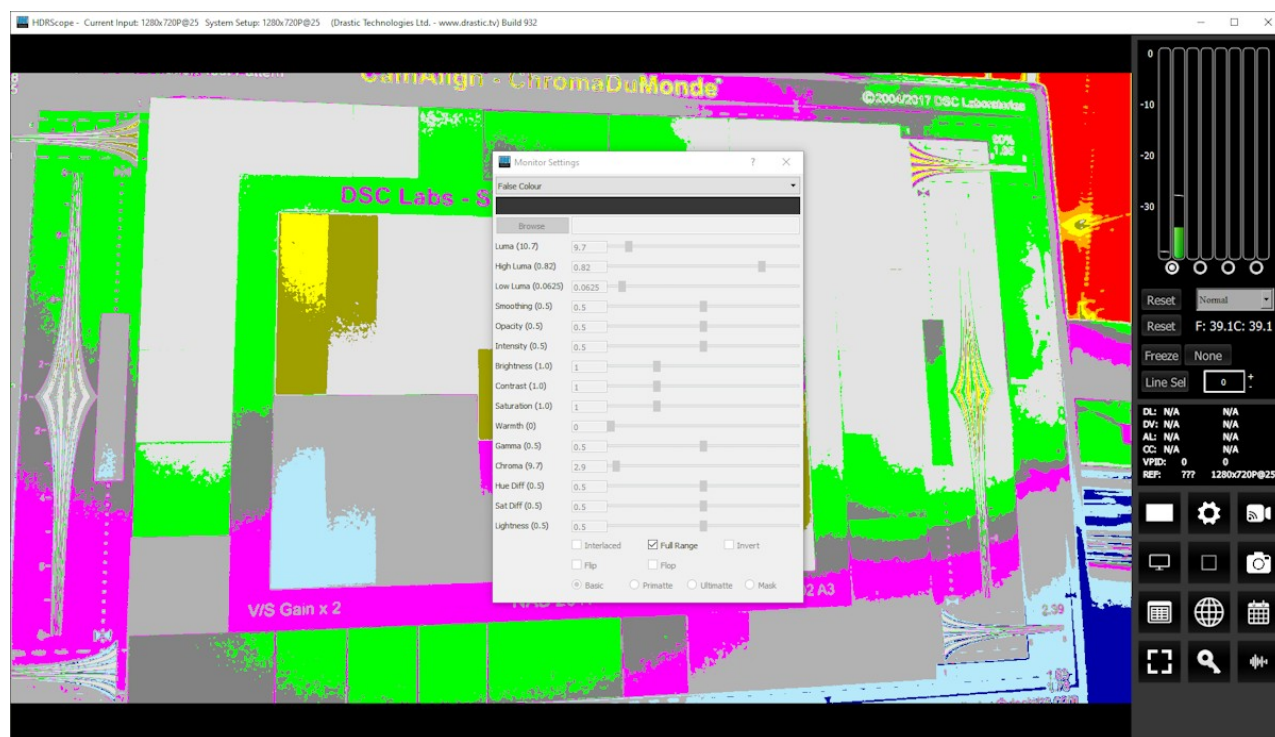
Activates the **Browse** button. This opens a standard browser, which allows the user to navigate to an image to use for the key.

The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

Activates the **Invert** checkbox. The user can check this box to Invert the key.

3.5.19 False Colour

Show each exposure level as a color. Here is an example:



The **Full Range** checkbox may be checked (use Full video range) or unchecked (use the standard SMPTE range). Full Range lets you adjust how the signal is processed to the display and does not affect any of the graticules.

Here are the IRE Breakpoints in False Colour display mode:

0 to 2	Red		Too low
2 to 10	Blue		Underexposed
10 to 20	Light Blue		
20 to 42	60% Gray		
42 to 48	Magenta		
48 to 52	70% Gray		
52 to 58	Bright Green		
58 to 78	80% Gray		Skin Tones
78 to 84	Dark Yellow		
84 to 94	Bright Yellow		
94 to 99	Orange		Overexposed
>99	Red		Too high

The following controls on the **Monitor Settings** window are reserved for future development:

Intensity slider – reserved for future development.

Hue Diff slider – reserved for future development.

Sat Diff slider – reserved for future development.

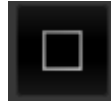
Lightness slider – reserved for future development.

3.5.20 Display Modes Keyboard Controls

The display modes can be set using keyboard commands rather than the Monitor Settings window. Please note, if the Monitor Settings window is open, these keyboard commands will be ignored.

- <ALT>-A - Display mode alpha only
- <ALT>-B - Display mode blue only
- <ALT>-C - Display mode clipping
- <ALT>-D - Display Mode flip flop
- <ALT>-E - Display mode edges
- <ALT>-F - Display mode focus assist
- <ALT>-G - Display mode green only
- <ALT>-H - Display mode HDR false color [shows greater than SDR and less than 64]
- <ALT>-I - Display mode calibrate
- <ALT>-J - Display mode luma key
- <ALT>-K - Display mode chroma key
- <ALT>-L - Display mode luma only
- <ALT>-M - Display mode false color
- <ALT>-N - Display mode none
- <ALT>-O - Display mode opacity
- <ALT>-P - Display mode chroma key despill
- <ALT>-R - Display mode red only
- <ALT>-S - Display mode green screen
- <ALT>-V - Display mode buffer weighted *[not implemented]*
- <ALT>-W - Display mode weighted RGB *[not implemented]*
- <ALT>-X - Display mode expt *[not implemented]*
- <ALT>-Y - Display mode zebra chroma
- <ALT>-Z - Display mode zebra luma

3.6 Manual



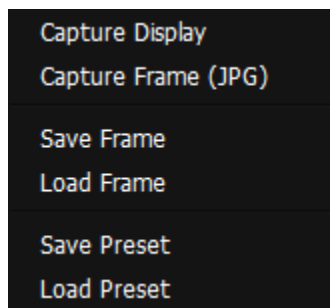
Manual button – opens up this manual for quick reference. Depending on the version of software you have installed, this may not be the most up to date manual that exists. The latest versions of Drastic documentation can generally be found here:

<https://www.drastic.tv/support-59/supportdocumentation>

3.7 Capture Frame



Capture Frame button – provides options for capturing a frame of video for reference. Images are saved in C:\Users\username\OneDrive\Pictures\4kScope. Opens the following dialog:



Capture Display – calls up a save as window [to C:\Users\username\OneDrive\Pictures], set to bmp; the user will need to fill in a file name. You can also save as a .png from this dialog.

Capture Frame JPG - by selecting this option or using <CTRL>-1, a JPG image can be captured to your C:\Users\username\OneDrive\Pictures\4kScope directory, using the filename structure: [Input_DD_MM_YYYY_HH_MM_SS.jpg] in 8 bit YCbCr mode for easy reading and documentation. 10% and 50% JPG scaled versions can also be captured with <CTR>-5 and <CTRL>-9.

Save Frame - The incoming image can be captured as a raw image in full, bit perfect images based on the current system settings. examples include:

YCbCr 8 bit - .yuv

YCbCr 10 bit - .v210

BGRA 8 bit - .bgra

RGB10 – rgb30

They are saved to your C:\Users\username\OneDrive\Pictures\HDRScope directory by selecting this option or by pressing <CTRL>-0. These files are saved using the [Input_DD_M_YYYY_HH_MM_SS.filetype] filename structure. They can be read with videoQC or converted with MediaReactor, or loaded into HDRScope.

Load Frame – opens a browser pointed at your C:\Users\username\OneDrive\Pictures\4KScope directory so you can load a frame you have saved. The file type pulldown lets you filter to only look for .yuv, or only .v210, or to view all uncompressed files.

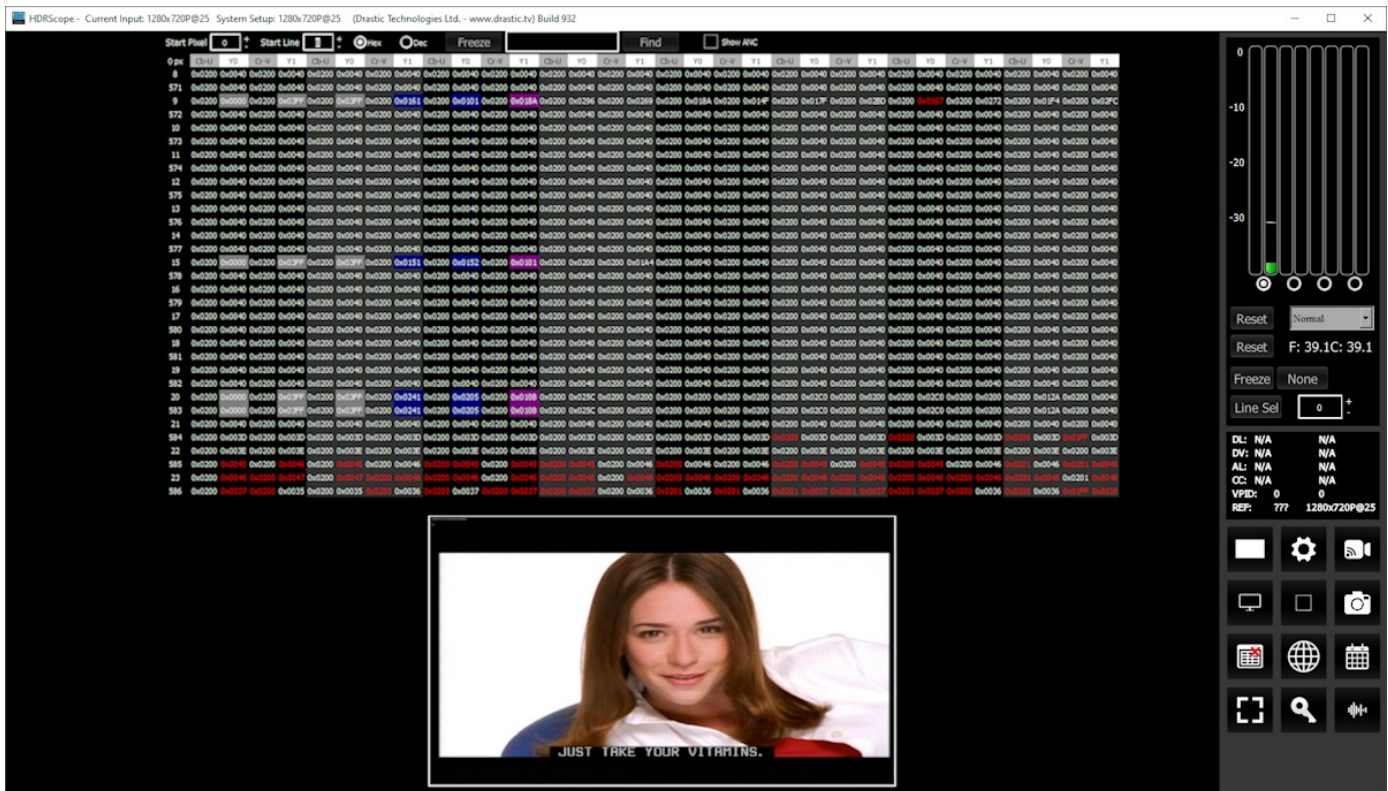
Save Preset – opens a save as dialog, for the user to save their current configuration as a *.ini file, as a preset for similar workflows.

Load Preset – opens a browser, which allows the user to locate and load existing presets.

3.8 Data View



Data View button – populates the Display section with the Data view.



Start Pixel field – displays the current start pixel. The user can enter a new start pixel, or use the + / - buttons to increment the value up or down.

Start Line field – displays the current start line. The user can enter a new start line, or use the + / - buttons to increment the value up or down.

Hex and **Dec** radio buttons – select one or the other button to set the values display to either decimal or hexadecimal.

Freeze button – freezes the current frame of video for closer inspection

Find button – to find a specific hexadecimal value, enter it into the field, then press the find button.

Show ANC checkbox – when selected, displays any valid, decoded ANC it can find.

The Data view allows access to the raw pixel values being monitored on the HDMI or SDI input. Raw values are captured and displayed with no manipulation by the software. This mode is

perfect for checking vertical blank signaling and metadata, as well as picture issues like inner line sync markers or out of range colors. Pixel starts can be selected, along with lines, in the edit boxes above the data area.

3.8.1 Color Coded Values display

Valid ANC data in the signal starts with the values 0x0000, 0x03FF, 0x03FF (in the luma or a chroma channel, so every second value), followed by the DID and sDID value denoting the ANC type, followed by the size of the data.

These are color coded, with the following values and their color schemes:

Start Values - white on gray

DID/sDID Values - white on blue

Size Values - white on magenta.

	Name	DID/sDID	Activity	Status	Location
1	EIA-708 Caption	61/1	Active	Ok	Field 1 / Line 11
2	Tally Control	51/52	Active		Field 1 / Line 22
3	S2016-3 AFD	41/5	Active	14x9 Center	Field 1 / Line 32

```
6101 : SMPTE-334 HD CEA-708 CC : EIA-708 Caption : Active
5152 : Tally Control Packet : Tally Control : Active
4105 : SMPTE-2016-3 ADF/Bar Data : S2016-3 AFD : Active
```

577	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200
15	0x0200	0x0000	0x0200	0x03FF	0x0200	0x03FF	0x0200	0x0151	0x0200	0x0152	0x0200	0x0101	0x0200
578	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200
16	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200
579	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200
17	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200
580	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200
18	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200
581	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200
19	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200
582	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200
20	0x0200	0x0000	0x0200	0x03FF	0x0200	0x03FF	0x0200	0x0241	0x0200	0x0205	0x0200	0x0108	0x0200
583	0x0200	0x0000	0x0200	0x03FF	0x0200	0x03FF	0x0200	0x0241	0x0200	0x0205	0x0200	0x0108	0x0200
21	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200	0x0040	0x0200

Start Values

White on Gray

DID/sDID


White on Blue

Size

White on Magenta

Show ANC checkbox – when selected, displays any valid, decoded ANC it can find. Each ancillary data stream is allocated a row.

Reset


Show ANC

	Name	DID/SIDID	Activity	Status	Location
1	S12M-2 Anc TCode	60/60	Active	11:31:109:16 NDF	Field 2 / Line 571
2	S352 Payload ID	41/1	Active	ST292-1 (1080) 30/1.001 8-Bit	Field 2 / Line 572
3	Not SMPTE 436	57/1	Active		Field / Line
4	S2016-3 AFD	41/5	Active	Full Frame	Field 2 / Line 574
5	S12M-2 Anc TCode	60/60	Active	11:31:29:17 NDF	Field 1 / Line 9
6	S352 Payload ID	41/1	Active	ST292-1 (1080) 30/1.001 8-Bit	Field 1 / Line 10
7	S2016-3 AFD	41/5	Active	Full Frame	Field 1 / Line 11

Reset button – click to reset any lingering values to force a refresh of the Anc monitor.

Show Anc checkbox – click to display the Anc Monitor.

Name column – shows the type of ancillary data being displayed

DID/SDID column – shows Data Identifier/Secondary Data Identifier

Activity column – whether active or paused etc.

Status column – status of the data

Location column – location within the video frame

Details of a selected data stream:

Format – format of the data

DID – Data Identifier

SDID – Secondary Data Identifier

Exp/Act Checksum – shows the expected checksum against the actual checksum

Status – status of the data

Activity – whether active or paused etc.

Type – type of data

Field – which field the data is on if applicable

DC – dc of the data

Line – which line of video the data is on

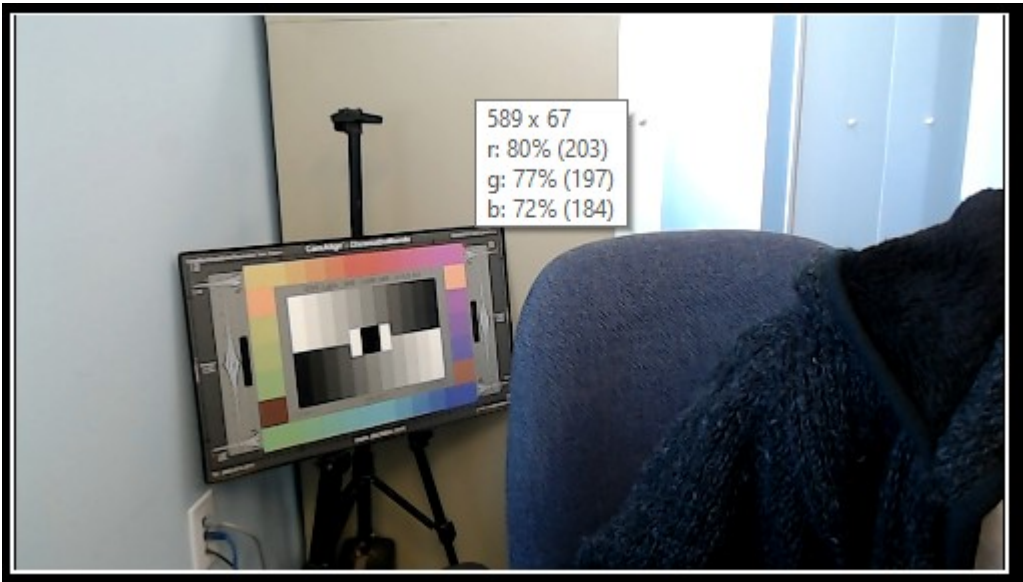
Sample – which sample is being shown

Last Timecode – most recent time code location

Real time values display – displays per pixel details for the selected data

The lower section shows real time details when a row is selected. Current values are displayed. The values will be displayed in white when they are static, and in red when they have changed.

The Data View picture inset also provides real time per pixel data when you hover over any area of the image with the mouse. It displays the specific pixel you are looking at, and shows the RGB values.



The pixels data view analyzes can be set by the user by clicking the **Start Pixel**, or the **Start Line** checkbox, and changing the value. Note, if set to an area outside the signal (such as start pixel 0, start line 0), you will not see any useful information about the video.

Start Pixel	624	+	Start Line	222	+	
624 px	Cb-U	Y0	Cr-V	Y1	Cb-U	Y0
222	0x0083	0x00A3	0x007D	0x00A3	0x0083	0x00A3
223	0x0083	0x00A3	0x007D	0x00A3	0x0083	0x00A3
224	0x0083	0x00A3	0x007D	0x00A3	0x0083	0x00A3
225	0x0083	0x00A3	0x007D	0x00A3	0x0083	0x00A3
226	0x0083	0x00A2	0x007D	0x00A2	0x0083	0x00A2
227	0x0083	0x00A2	0x007D	0x00A2	0x0083	0x00A2
228	0x0083	0x00A2	0x007D	0x00A2	0x0083	0x00A2
229	0x0083	0x00A2	0x007D	0x00A2	0x0083	0x00A2
230	0x0083	0x00A2	0x007D	0x00A2	0x0083	0x00A2
231	0x0083	0x00A2	0x007D	0x00A2	0x0083	0x00A2
232	0x0083	0x00A2	0x007D	0x00A2	0x0083	0x00A2

The Data View can be set to display either hexadecimal, or decimal values for each pixel:

Start Pixel333+Start Line222+HexDec

332 px

Cb-U	Y0	Cr-V	Y1	Cb-U	Y0	Cr-V	Y1	Cb-U	
222	0x0072	0x0077	0x0068	0x0078	0x0071	0x0078	0x0068	0x0078	0x0073
223	0x0072	0x0077	0x0068	0x0077	0x0071	0x0077	0x0068	0x0077	0x0072
224	0x0072	0x0075	0x0068	0x0075	0x0071	0x0075	0x0068	0x0075	0x0072
225	0x0072	0x0074	0x0068	0x0073	0x0071	0x0073	0x0068	0x0073	0x0072
226	0x0072	0x0073	0x0066	0x0073	0x0071	0x0073	0x0066	0x0073	0x0072
227	0x0072	0x0073	0x0066	0x0073	0x0071	0x0072	0x0066	0x0072	0x0072
228	0x0072	0x0073	0x0066	0x0072	0x0071	0x0072	0x0066	0x0072	0x0072
229	0x0072	0x0072	0x0066	0x0072	0x0071	0x0072	0x0066	0x0072	0x0072

Start Pixel333+Start Line222+HexDec

332 px

Cb-U	Y0	Cr-V	Y1	Cb-U	Y0	Cr-V	Y1	Cb-U	
222	0115	0119	0103	0119	0115	0120	0103	0120	0115
223	0115	0118	0104	0118	0115	0119	0104	0119	0115
224	0115	0117	0104	0117	0115	0117	0104	0117	0115
225	0115	0116	0104	0116	0115	0116	0104	0116	0115
226	0114	0117	0103	0116	0114	0116	0103	0116	0115
227	0114	0116	0103	0116	0114	0116	0103	0115	0115
228	0114	0115	0103	0115	0114	0114	0103	0114	0115
229	0114	0115	0102	0114	0114	0113	0102	0113	0115

Hexadecimal values are shown above on the left, and the decimal values on the right.

3.9 Web Page



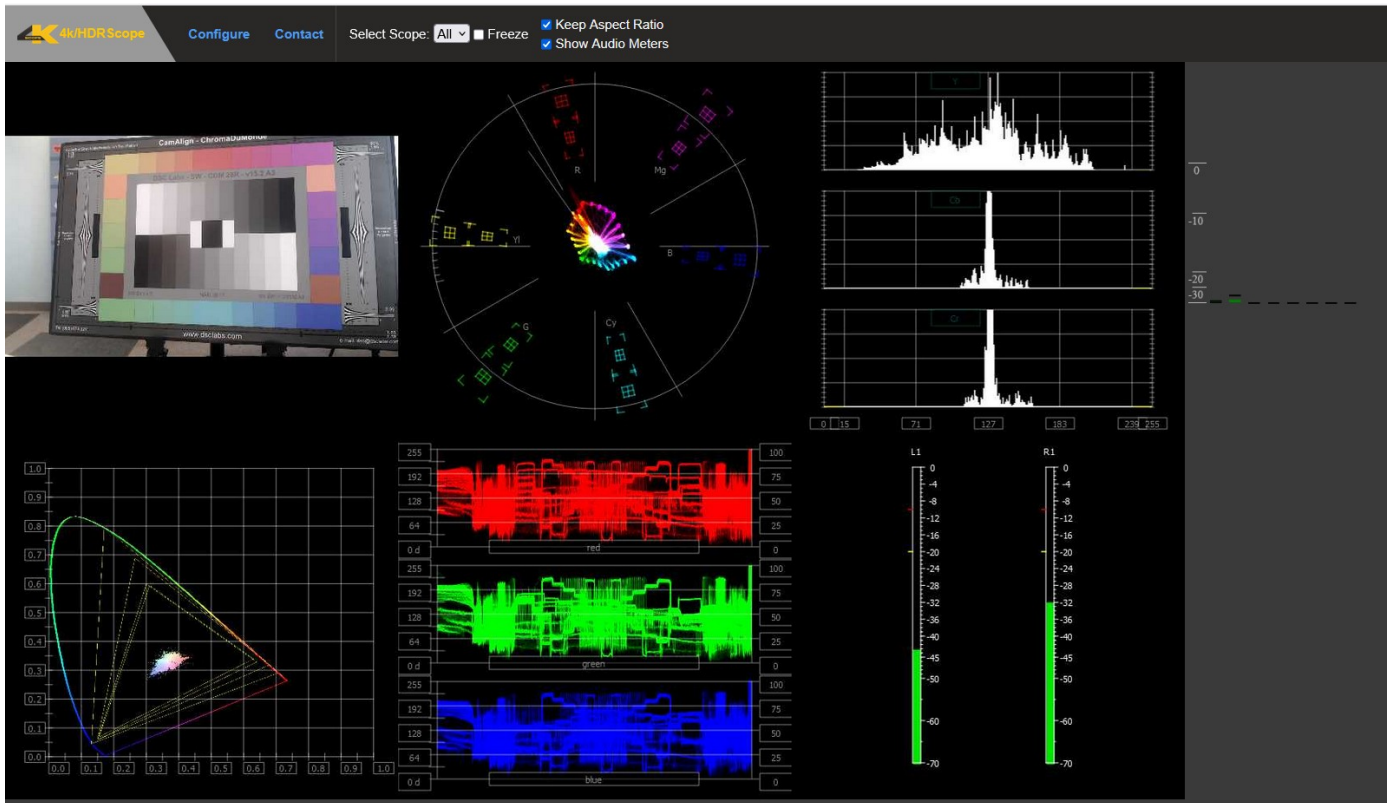
Globe button – opens up the web page for HDRScope. This feature requires UwAmp Wamp Server be installed. There is more information, including download links, here:

<https://www.uwamp.com/en/?page=download>

The web page lets the user set up and view scopes remotely.

3.10 HDRScope Web Interface

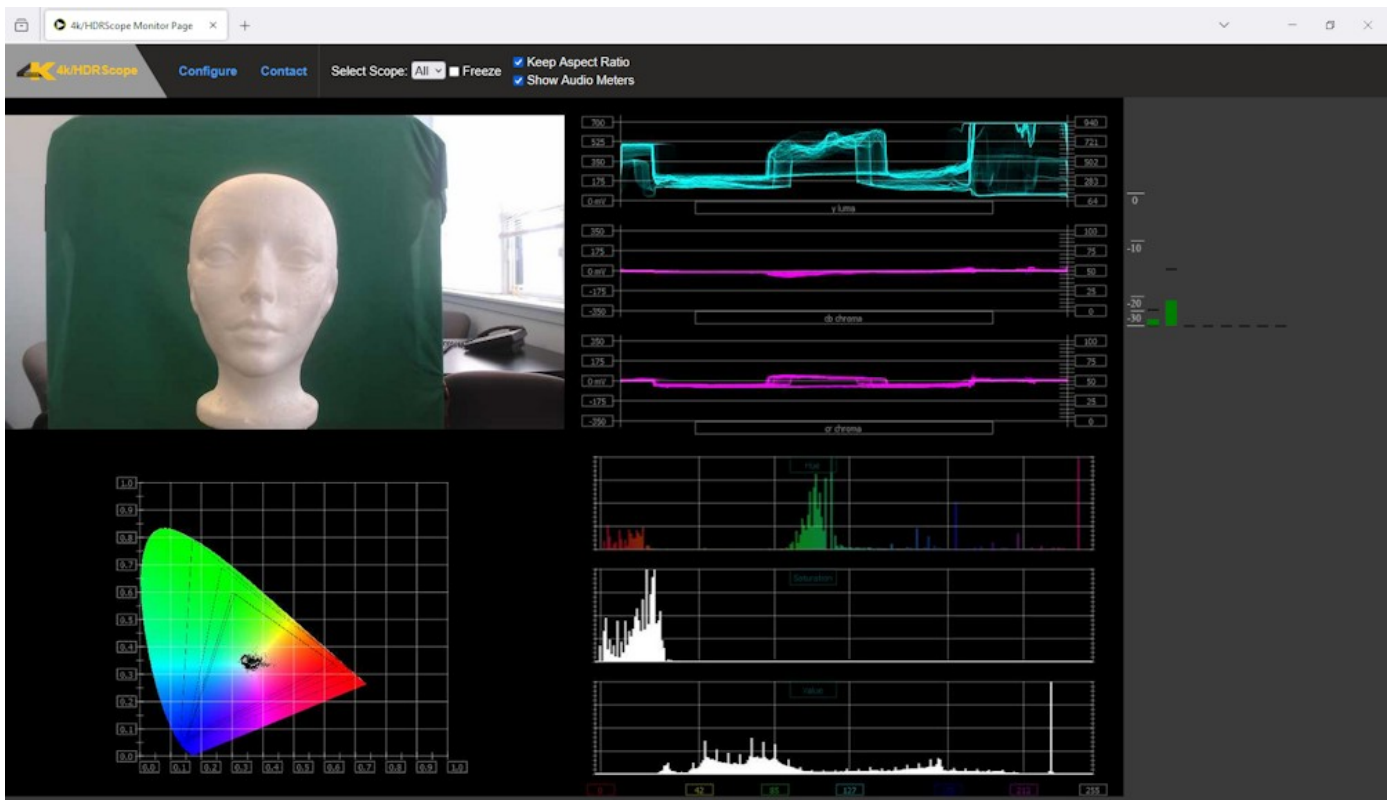
HDRScope version 7 and greater software features a web interface, so the user can remotely set up the scopes and view their signal through the scopes on a web page.



The user can set:

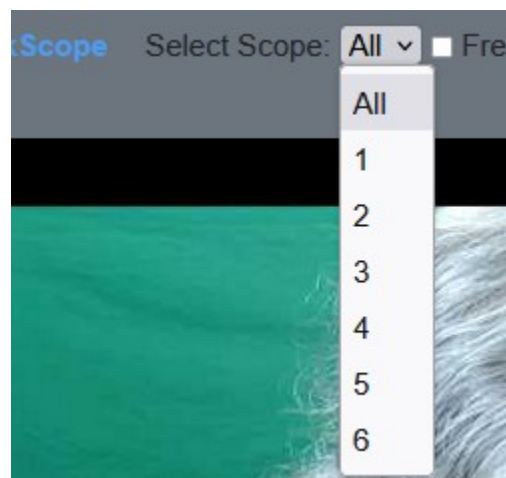
- How many scopes are displayed (1, 2, 4, or 6)
- Where each scope is placed in a multiple scope layout
- How the scope is displayed
- Which overlays are displayed

4KScope/HDRScope Logo – clicking the logo displays the main screen, with the main menu and the scopes and audio meters.



Freeze checkbox – freezes the current frame of video for closer inspection

3.10.1 Select Scope



Use the pulldown menu to only view one of the scopes within the current layout. It is similar to the

'solo' option in many audio software products. Selecting a scope using this pulldown menu closes all the other scopes and enlarges the selected scope for closer inspection.

In a single scope layout, this control will have no effect.

In a two scope layout, the user will be able to select either scope 1 or scope 2 to display. To return to the two scope layout, use the pulldown menu to select All.

In a four scope layout, the user will be able to select scope 1, 2, 3, or 4 to display. To return to the four scope layout, use the pulldown menu to select All.

In a six scope layout, the user will be able to select scope 1, 2, 3, 4, 5, or 6 to display. To return to the six scope layout, use the pulldown menu to select All.

Keep Aspect Ratio checkbox – select to constrain any image scaling to maintain the aspect ratio of the input signal

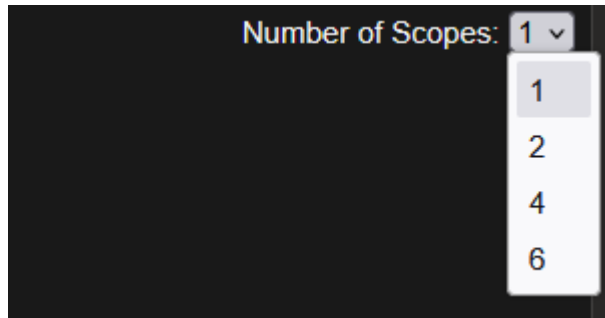
Show Audio Meters checkbox – select to display audio levels in the audio meters to the right of the scopes

Home – displays the scopes as they have been set up.

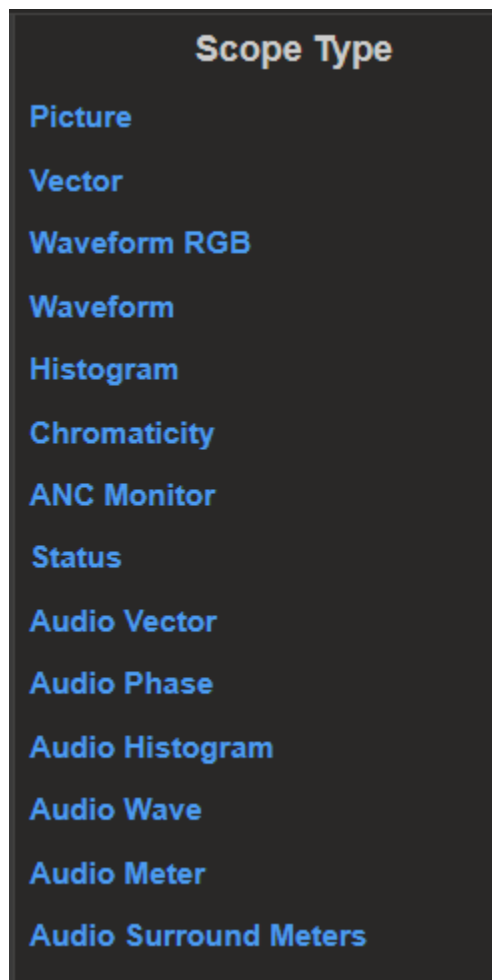
3.10.2 Configure

Pressing the Configure button opens the configuration page, where the user can set up how many scopes are displayed, and how they are displayed.

At the top there is a pulldown menu to select which layout to use. The options are:



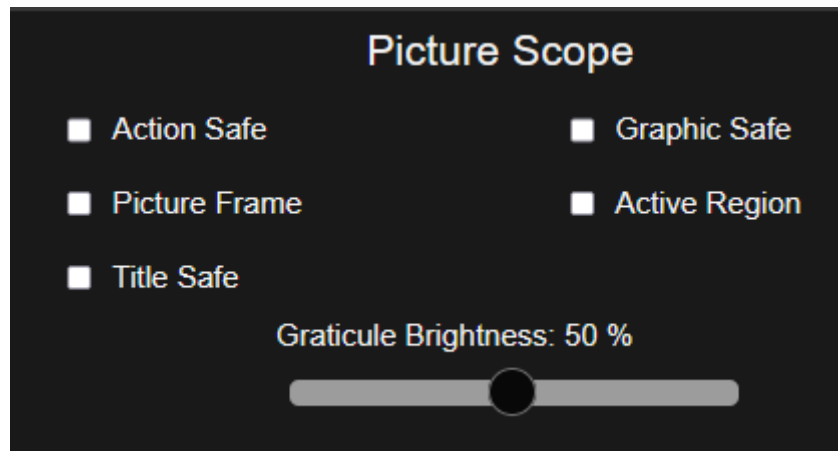
- 1 – Use a single scope
- 2 – Two scopes, side by side
- 4 – 4 scopes in a 2 x 2 grid
- 6 – Two rows of three scopes



Below the layout selector there are buttons to select between the available scopes for display. Currently this selection includes Picture, Vector, Waveform RGB, Waveform, Histogram (YCbCr, RGB, HSV, Luma, H/S), Chromaticity, ANC Monitor, Status, Audio Vector, Audio Phase, Audio Histogram, Audio Wave, Audio Meter, and Audio Surround Meters.

3.10.2.1 *Picture*

Setting a scope to display the Picture view provides the following options:



Action Safe checkbox – select to display the Action Safe rectangle over the picture

Graphic Safe checkbox – select to display the Graphic Safe rectangle over the picture

Picture Frame checkbox – select to display the Picture Frame rectangle over the picture

Active Region checkbox – select to display the Active Region rectangle over the picture

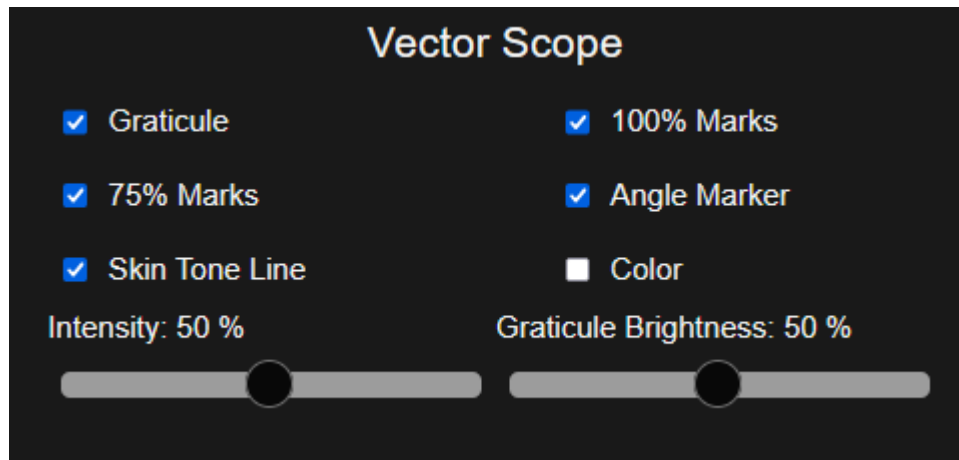
Title Safe checkbox – select to display the Title Safe rectangle over the picture

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider.

Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

3.10.2.2 Vector

Setting a scope to display the Vector view provides the following options:



Graticule checkbox – select to display the graticule over the vectorscope. De-selecting this checkbox turns off all of the graticule elements including the 75%/100% marks, angle marker, and skin tone line.

100% Marks checkbox – select to display the 100% Marks

75% Marks checkbox – select to display the 75% Marks

Angle Marker checkbox – select to display the Angle Marker

Skin Tone Line checkbox – select to display the Skin Tone Line

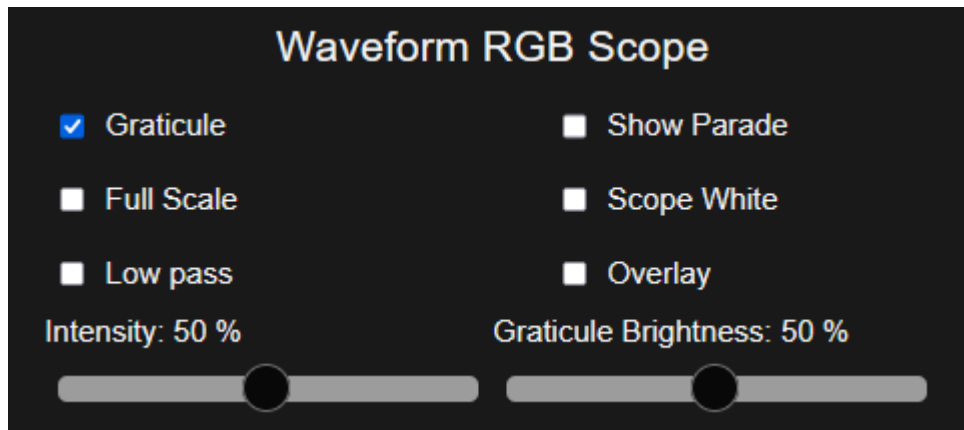
Color checkbox – select to display the signal in color

Intensity slider – use the slider to adjust how intense the vector display will be. Pull to the left reduces the intensity, and pull to the right makes it more intense.

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider. Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

3.10.2.3 Waveform RGB

Setting a scope to display the Waveform RGB view provides the following options:



Graticule checkbox – select to display the graticule over the vectorscope

Show Parade checkbox – select to display the R, G, and B from left to right. When not selected, the display is stacked top to bottom.

Full Scale checkbox – when selected, use the full luminance range. RGB, by default, will be sRGB. The range of each color will be from 16 to 240 (in 8 bit), so the scale will place white at 240 and black at 16 in normal scale. If in full scale, white will be placed at 255 and black at 0.

Scope White checkbox – select to display the signal in white

Low Pass checkbox – select to smooth the scope with a 1/3 filter to remove single pixel anomalies.

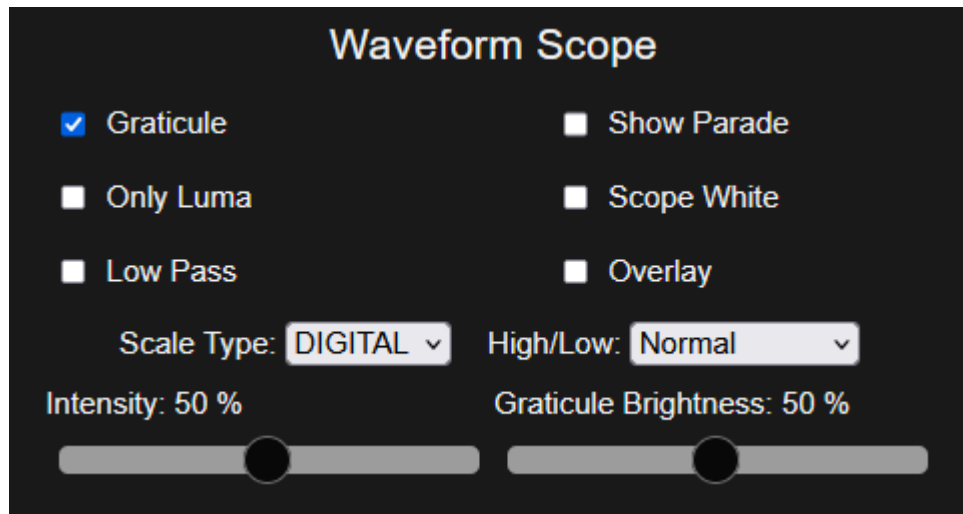
Overlay checkbox – select to display the overlay, or composite scope (only available in HDRScope and Network Video Analyzer)

Intensity slider – use the slider to adjust how intense the vector display will be. Pull to the left reduces the intensity, and pull to the right makes it more intense.

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider. Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

3.10.2.4 Waveform YCbCr

Setting a scope to display the Waveform YCbCr view provides the following options:



Graticule checkbox – select to display the graticule over the vectorscope

Show Parade checkbox – select to display the Y, Cb, and Cr from left to right. When not selected, the display is stacked top to bottom.

Only Luma checkbox – select to display only the luminance in the signal

Scope White checkbox – select to display the signal in white

Low Pass checkbox – select to smooth the scope with a 1/3 filter to remove single pixel anomalies.

Overlay checkbox – select to display the overlay, or composite scope (only available in HDRScope and Network Video Analyzer)

Scale Type pulldown – select between available scale types. Choices include Digital, MV, and IRE.

High/Low pulldown – displays only the highs and lows of the signal so the user can more closely examine whites and blacks. 2X and 3x zooms are available.

Intensity slider – use the slider to adjust how intense the vector display will be. Pull to the left reduces the intensity, and pull to the right makes it more intense.

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider. Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

3.10.2.5 *Histogram*

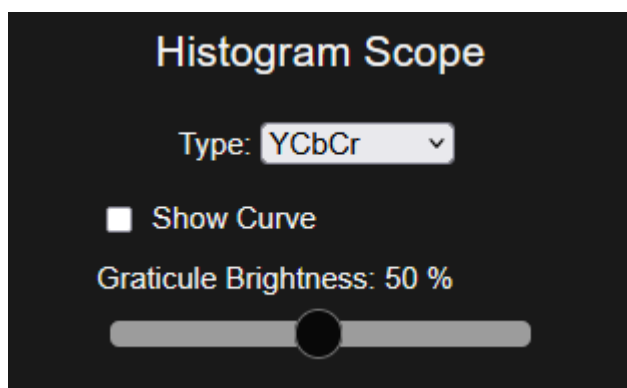
Setting a scope to display the Histogram view provides the following options:

Type pulldown – select between available histogram types.

There are five Histograms available in the histogram panel: the YCbCr Histogram, RGB Histogram, HSV Histogram, Luma Histogram, and the H/S Scope.

Histogram YCbCr

With the YCbCr Histogram selected in the pulldown menu, the following controls are available:

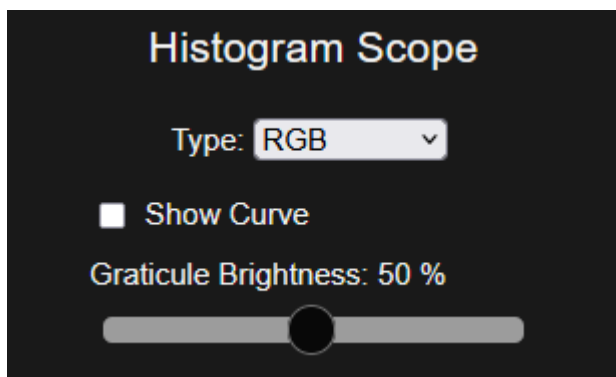


Show Curve checkbox – only used in the H/S Scope

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider. Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

Histogram RGB

With the RGB Histogram selected in the pulldown menu, the following controls are available:



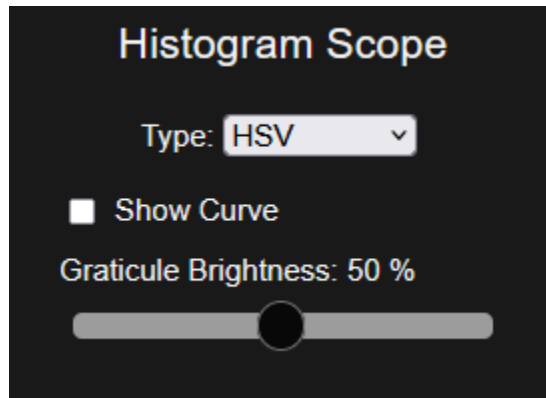
Show Curve checkbox – only used in the H/S Scope

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider.

Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

Histogram HSV

With the HSV Histogram selected in the pulldown menu, the following controls are available:



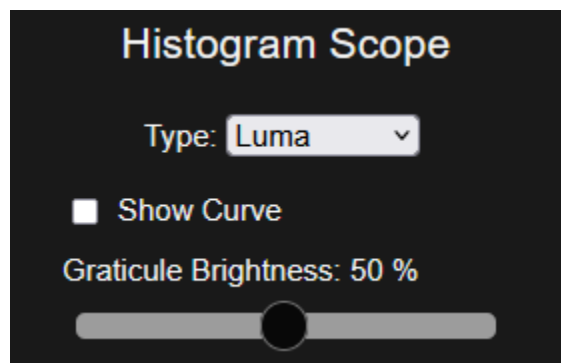
Show Curve checkbox – only used in the H/S Scope

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider.

Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

Histogram Luma

With the Luma Histogram selected in the pulldown menu, the following controls are available:



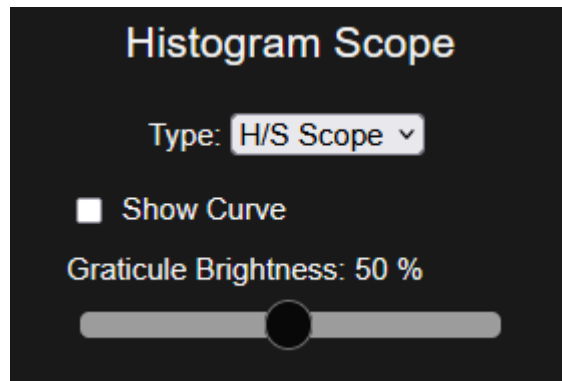
Show Curve checkbox – only used in the H/S Scope

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider.

Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

Histogram H/S Scope

With the H/S Scope Histogram selected in the pulldown menu, the following controls are available:



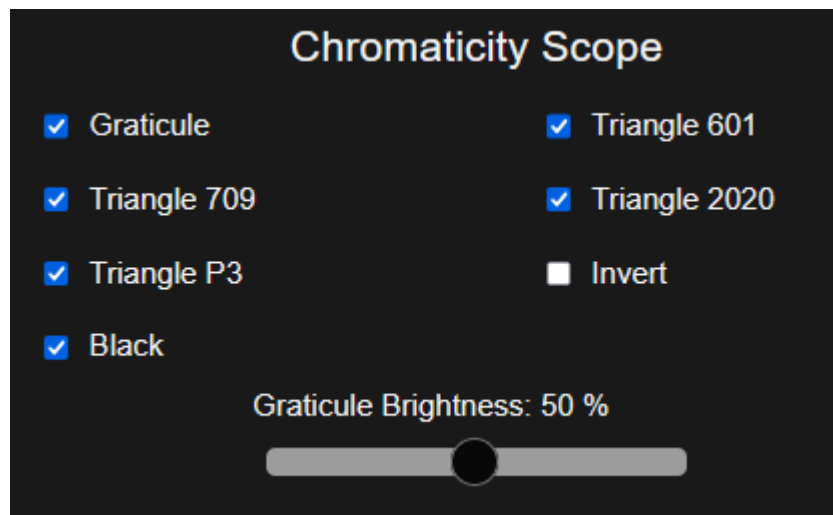
Show Curve checkbox – select to show the curve

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider.

Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

3.10.2.6 Chromaticity

Setting a scope to display the Chromaticity view provides the following options:



Graticule checkbox – select to display the graticule over the chromaticity scope

Triangle 601 checkbox – select to display the 601 triangle

Triangle 709 checkbox – select to display the 709 triangle

Triangle 2020 checkbox – select to display the 2020 triangle

Triangle P3 checkbox – select to display the P3 triangle

Invert checkbox – select to display the signal in color, and the chromaticity triangle in black

Black checkbox – select to display the signal in black

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider.

Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

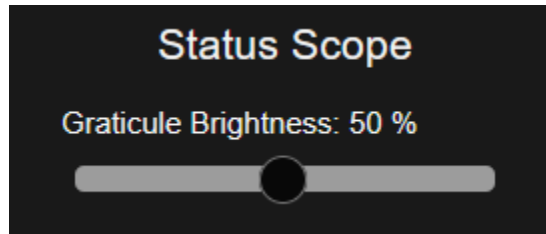
3.10.2.7 *ANC Monitor*

Setting a scope to display the ANC Monitor view does not provide any setup options. It does allow the user to select the ANC monitor.



3.10.2.8 Status

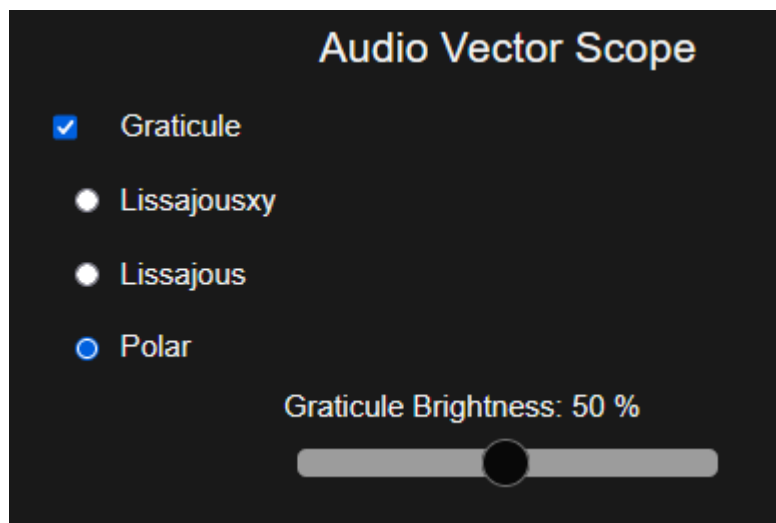
Setting a scope to display the Status view provides the following options:



Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider. Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

3.10.2.9 Audio Vector Scope

Setting a scope to display the Audio Vector Scope view provides the following options:



Graticule checkbox – select to display the graticule over the audio vectorscope

Lissajousxy checkbox – select to set the audio vectorscope to Lissajousxy mode

Lissajous checkbox – select to set the audio vectorscope to Lissajous mode

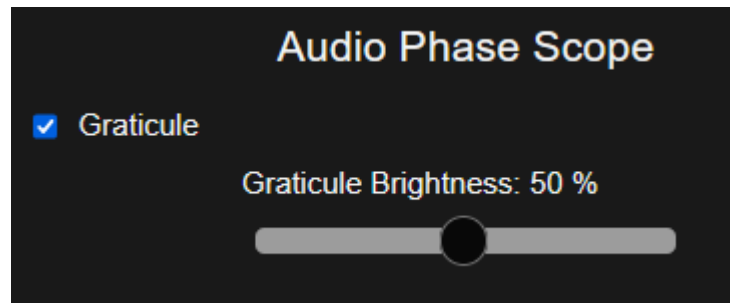
Polar checkbox – select to set the audio vectorscope to Polar mode

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider.

Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

3.10.2.10 *Audio Phase Scope*

Setting a scope to display the Audio Phase Scope view provides the following options:



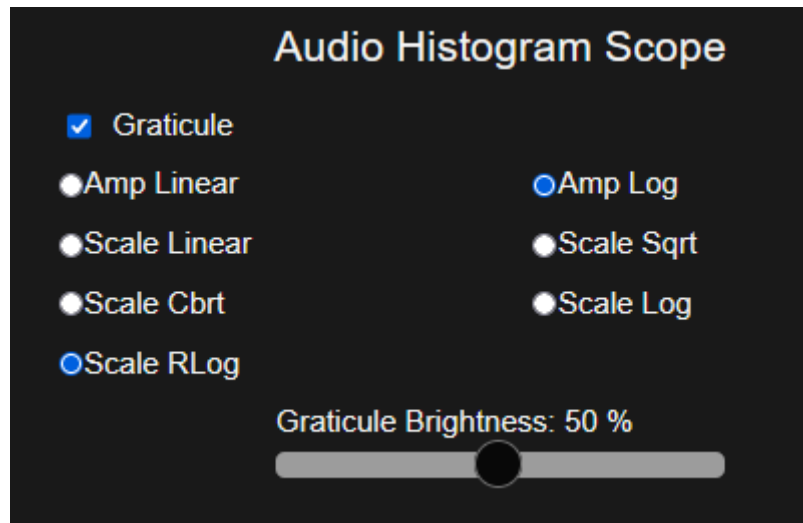
Graticule checkbox – select to display the graticule over the audio phase scope

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider.

Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

3.10.2.11 Audio Histogram Scope

Setting a scope to display the Audio Histogram Scope view provides the following options:



Graticule checkbox – select to display the graticule over the audio histogram scope

Amp linear checkbox – select to set the display to Amp Linear

Amp Log checkbox – select to set the display to Amp Logarithmic

Scale Linear checkbox – select to set the display to Scale Linear

Scale Sqrt checkbox – select to set the display to Scale Square Root

Scale Cbrt checkbox – select to set the display to Square Cube Root

Scale Log checkbox – select to set the display to Scale Logarithmic

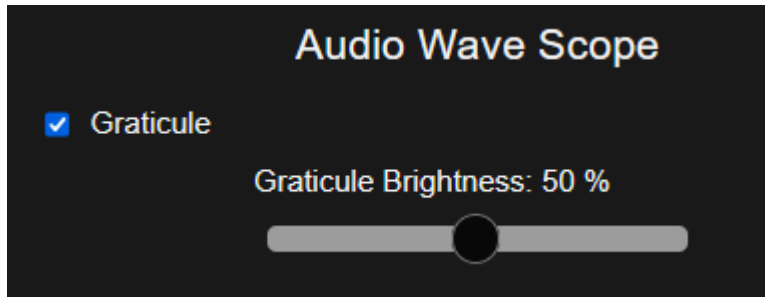
Scale RLog checkbox – select to set the display to Scale R Logarithmic

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider.

Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

3.10.2.12 *Audio Wave Scope*

Setting a scope to display the Audio Wave Scope view provides the following options:



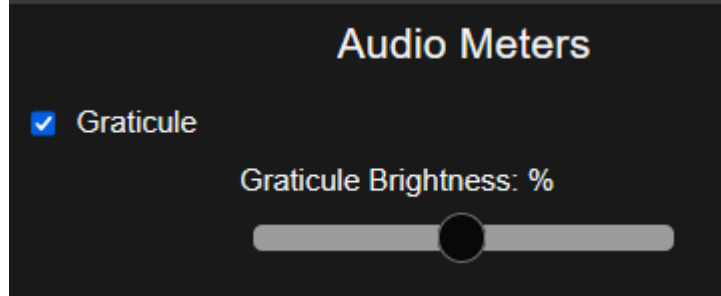
Graticule checkbox – select to display the graticule over the audio phase scope

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider.

Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

3.10.2.13 *Audio Meters Scope*

Setting a scope to display the Audio Meters Scope view provides the following options:



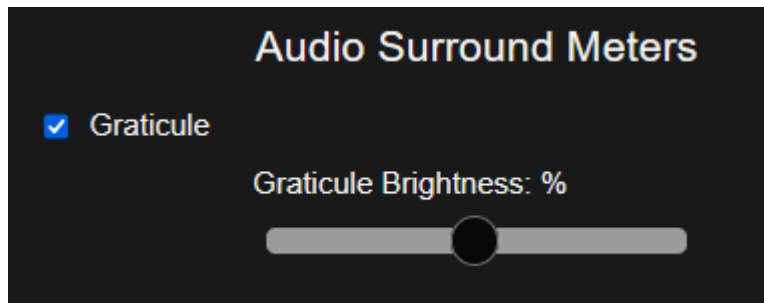
Graticule checkbox – select to display the graticule over the audio phase scope

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider.

Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

3.10.2.14 Surround Sound Scope

Setting a scope to display the Audio Surround Meters view provides the following options:



Graticule checkbox – select to display the graticule over the audio phase scope

Graticule Brightness slider – adjust the brightness of the graticule overlay by using the slider.

Pull to the left makes the graticule dimmer, and pull to the right makes it brighter.

Contact - displays contact information for Drastic Technologies

Drastic Technologies Ltd.

523 The Queensway Suite 201

Toronto, Ontario

Canada M8Y 1J7

Monday To Friday

9:00 am - 5:00 pm EST

Phone: (416) 255-5636

Fax: (416) 255-8780

Email: sales@drastictech.com

3.11Event Log



Log button – opens up the Event Log, which allows the user to review specific types of events, useful for troubleshooting errors or other issues.

HDRScope

☐ Show info events☒ Auto scroll☒ Auto load

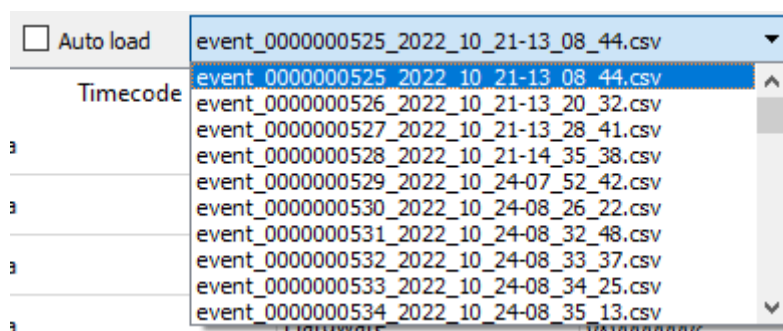
▼

Event SensitivityShow Logs

	Date-Time	Timecode	Code	SubCode	Event	Description	Details
1	2022_11_1-11_27_11	n/a	Hardware	0x00000002	0x0000000A	Found and opened AVNDI	
2	2022_11_1-11_27_12	n/a	Hardware	0x00000002	0x0000000A	Found and opened VGA ...	
3	2022_11_1-11_35_13	n/a	SignalChanged	0x0000000C	0x0000000C	Video signal has changed	Signal format has chang...
4	2022_11_1-11_35_13	n/a	Hardware	0x00000002	0x0000000B	Closing video board	
5	2022_11_1-11_35_13	n/a	Hardware	0x00000002	0x0000000B	Closing video board	
6	2022_11_1-11_35_15	n/a	Hardware	0x00000002	0x0000000A	Found and opened AVNDI	
7	2022_11_1-11_35_15	n/a	Hardware	0x00000002	0x0000000A	Found and opened VGA ...	
8	2022_11_1-11_35_25	n/a	SignalChanged	0x0000000C	0x0000000C	Video signal has changed	Signal format has chang...
9	2022_11_1-11_35_25	n/a	Hardware	0x00000002	0x0000000B	Closing video board	
10	2022_11_1-11_35_25	n/a	Hardware	0x00000002	0x0000000B	Closing video board	
11	2022_11_1-11_35_25	n/a	Hardware	0x00000002	0x0000000B	Closing video board	
12	2022_11_1-11_35_36	n/a	Hardware	0x00000002	0x0000000A	Found and opened AVNDI	
13	2022_11_1-11_35_36	n/a	Hardware	0x00000002	0x0000000A	Found and opened VGA ...	
14	2022_11_1-11_36_50	n/a	Hardware	0x00000002	0x0000000B	Closing video board	
15	2022_11_1-11_36_50	n/a	Hardware	0x00000002	0x0000000A	Found and opened VGA ...	
16	2022_11_1-11_37_00	n/a	Hardware	0x00000002	0x0000000B	Closing video board	
17	2022_11_1-11_37_00	n/a	Hardware	0x00000002	0x0000000A	Found and opened VGA ...	
18	2022_11_1-11_37_08	n/a	Hardware	0x00000002	0x0000000B	Closing video board	
19	2022_11_1-11_37_09	n/a	Hardware	0x00000002	0x0000000A	Found and opened VGA ...	

The following controls are available:

- Show Info Events** checkbox – click to show or hide the events listed in the log.
- Auto Scroll** checkbox – click to automatically scroll the event list to see the most recent entries.
- Auto Load** checkbox – when selected, each time the Log button is pressed, the Event Log will open with the most recent event log displayed. When this checkbox is deselected, the log pulldown menu to the right becomes active, so the user can load other saved event logs.



Selecting an event log from this list lets the user view less recent event logs.

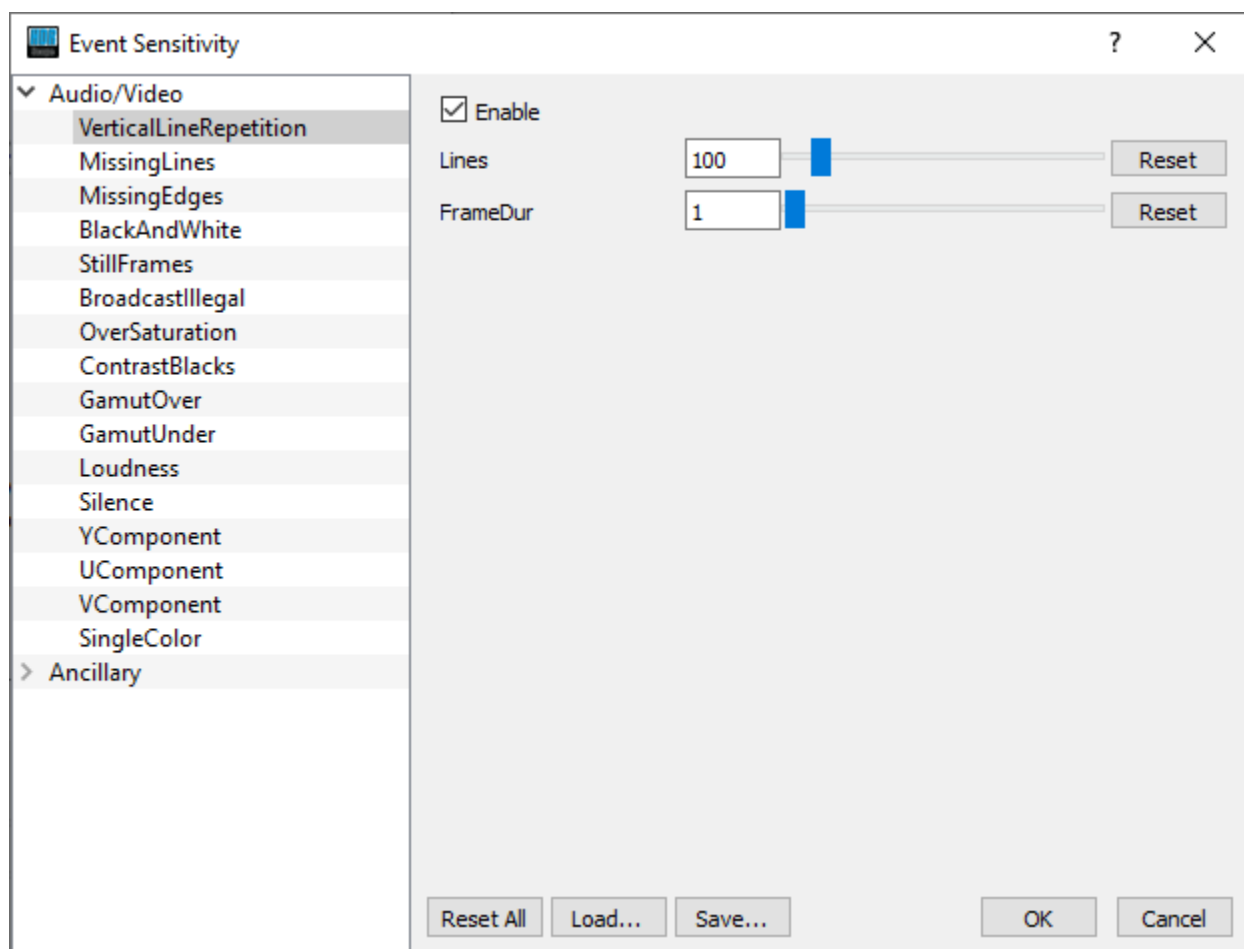
HDRScope							
<input type="checkbox"/> Show info events <input checked="" type="checkbox"/> Auto scroll <input type="checkbox"/> Auto load event_0000000532_2022_10_24-08_33_37.csv Event Sensitivity Show Logs							
	Date-Time	Timecode	Code	SubCode	Event	Description	Details
2476	2022_10_24-08_34_25	00:00:00:00	BroadcastIllegal	0x00000013	0x00000013	Video many broadcast il...	Video has too many bro...
2477	2022_10_24-08_34_25	00:00:00:00	BroadcastIllegal	0x00000013	0x00000013	Video many broadcast il...	Video has too many bro...
2478	2022_10_24-08_34_25	00:00:00:00	BroadcastIllegal	0x00000013	0x00000013	Video many broadcast il...	Video has too many bro...
2479	2022_10_24-08_34_25	00:00:00:00	BroadcastIllegal	0x00000013	0x00000013	Video many broadcast il...	Video has too many bro...
2480	2022_10_24-08_34_25	00:00:00:00	BroadcastIllegal	0x00000013	0x00000013	Video many broadcast il...	Video has too many bro...
2481	2022_10_24-08_34_25	00:00:00:00	BroadcastIllegal	0x00000013	0x00000013	Video many broadcast il...	Video has too many bro...
2482	2022_10_24-08_34_25	00:00:00:00	BroadcastIllegal	0x00000013	0x00000013	Video many broadcast il...	Video has too many bro...
2483	2022_10_24-08_34_25	00:00:00:00	BroadcastIllegal	0x00000013	0x00000013	Video many broadcast il...	Video has too many bro...
2484	2022_10_24-08_34_25	00:00:00:00	BroadcastIllegal	0x00000013	0x00000013	Video many broadcast il...	Video has too many bro...
2485	2022_10_24-08_34_25	00:00:00:00	BroadcastIllegal	0x00000013	0x00000013	Video many broadcast il...	Video has too many bro...

3.11.1 Audio/Video Event Sensitivity

Event Sensitivity button – opens the Event Sensitivity window

Each category of event can be adjusted to suit the requirements of the user's workflow. The default value is displayed, and the user can adjust a parameter by using the sliders provided. A reset button is available for each individual setting.

3.11.1.1 Vertical Line Repetition



Enable checkbox – click to enable checking for Vertical Line Repetition, and adjust any relevant settings.

Lines (number of lines) field, slider, and **Reset** button – default 100

FrameDur (frame duration) field, slider, and **Reset** button – default 1

Reset All button – clicking Reset All returns all values to their default settings.

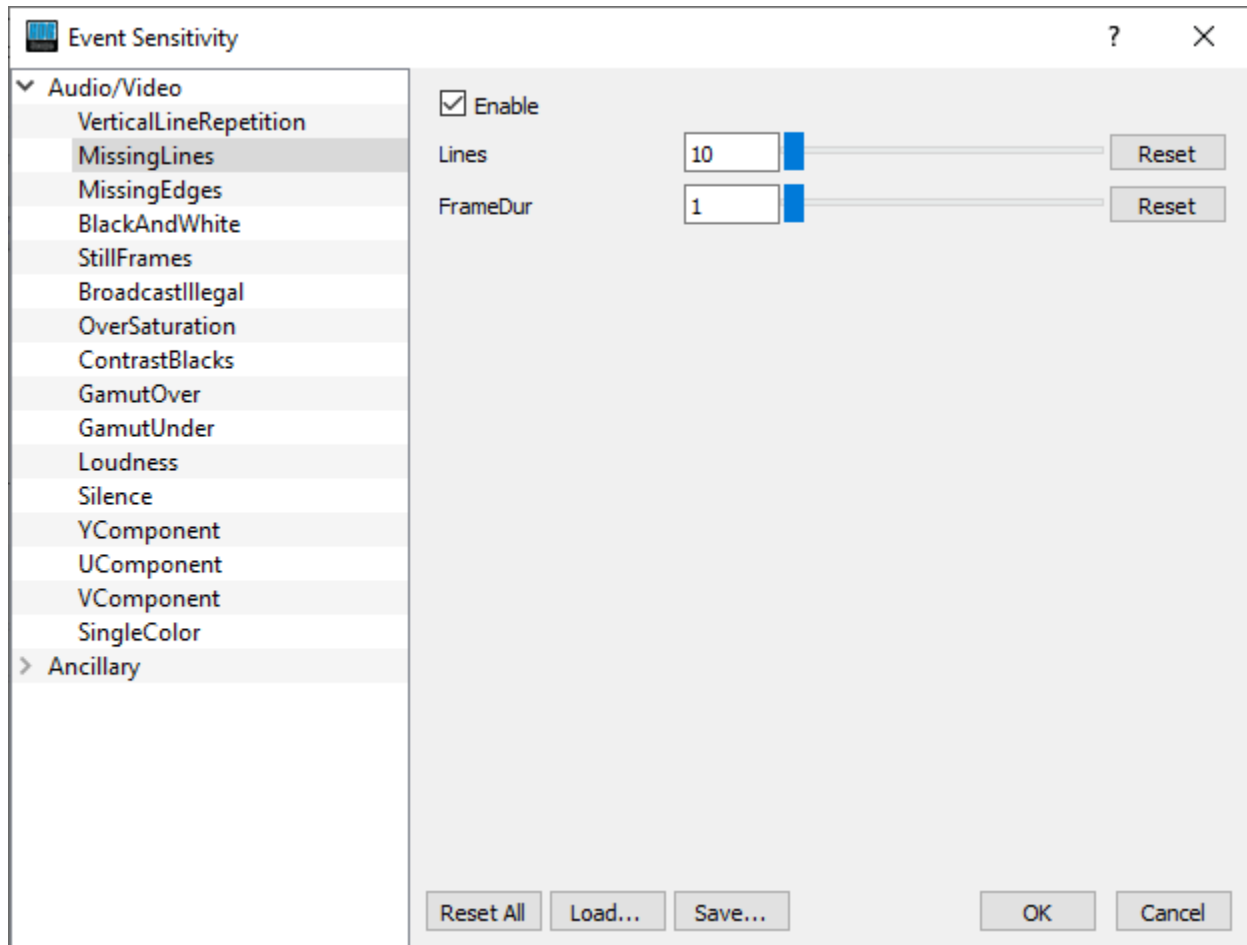
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.2 Missing Lines



Enable checkbox – click to enable checking for missing Lines, and adjust any relevant settings.

Lines (number of lines) field, slider, and **Reset** button – default 10

FrameDur (frame duration) field, slider, and **Reset** button – default 1

Reset All button – clicking Reset All returns all values to their default settings.

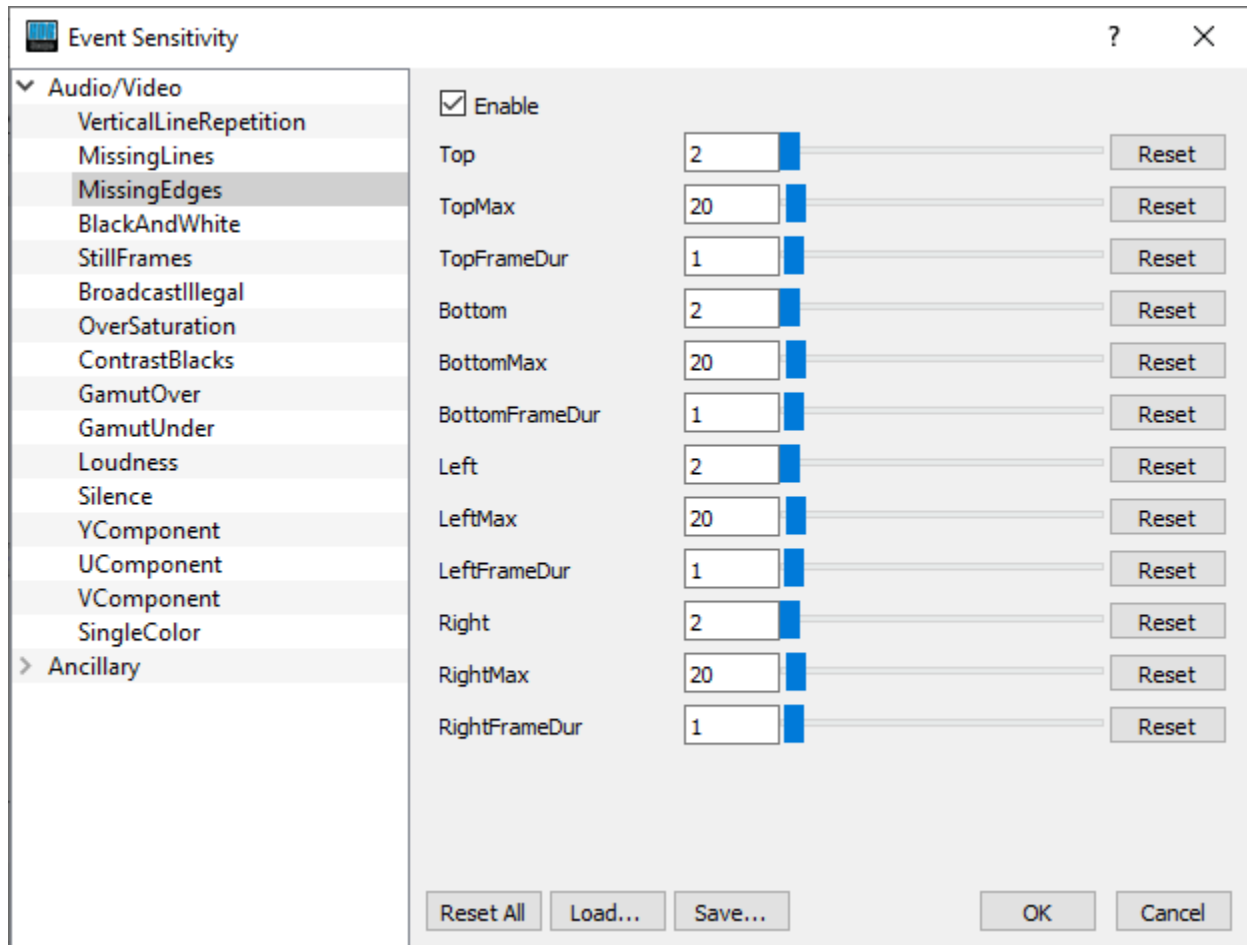
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.3 Missing Edges



Enable checkbox – click to enable checking for missing edges, and adjust any relevant settings.

Top field, slider, and **Reset** button - default 2

TopMax field, slider, and **Reset** button - default 20

TopFrameDur field, slider, and **Reset** button - default 1

Bottom field, slider, and **Reset** button - default 20

BottomMax field, slider, and **Reset** button - default 20

BottomFrameDur field, slider, and **Reset** button - default 1

Left field, slider, and **Reset** button - default 2

LeftMax field, slider, and **Reset** button - default 20

LeftFrameDur field, slider, and **Reset** button - default 1

Right field, slider, and **Reset** button - default 2

RightMax field, slider, and **Reset** button - default 20

RightFrameDur field, slider, and **Reset** button - default 1

Reset All button – clicking Reset All returns all values to their default settings.

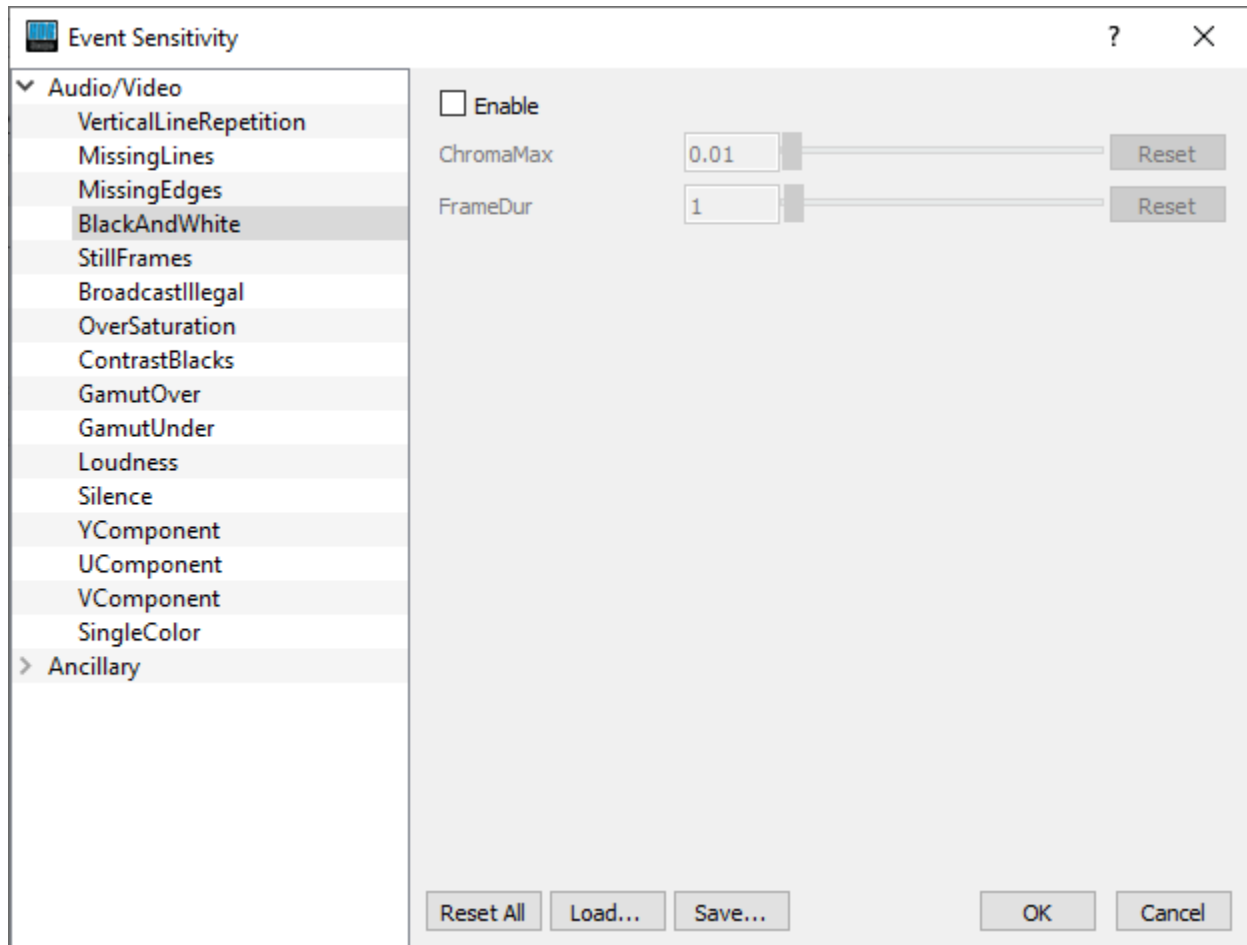
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.4 *Black and White*



Enable checkbox – click to enable checking the black and white levels, and adjust any relevant settings.

ChromaMax field, slider, and **Reset** button - default 0.01

FrameDur field, slider, and **Reset** button - default 1

Reset All button – clicking Reset All returns all values to their default settings.

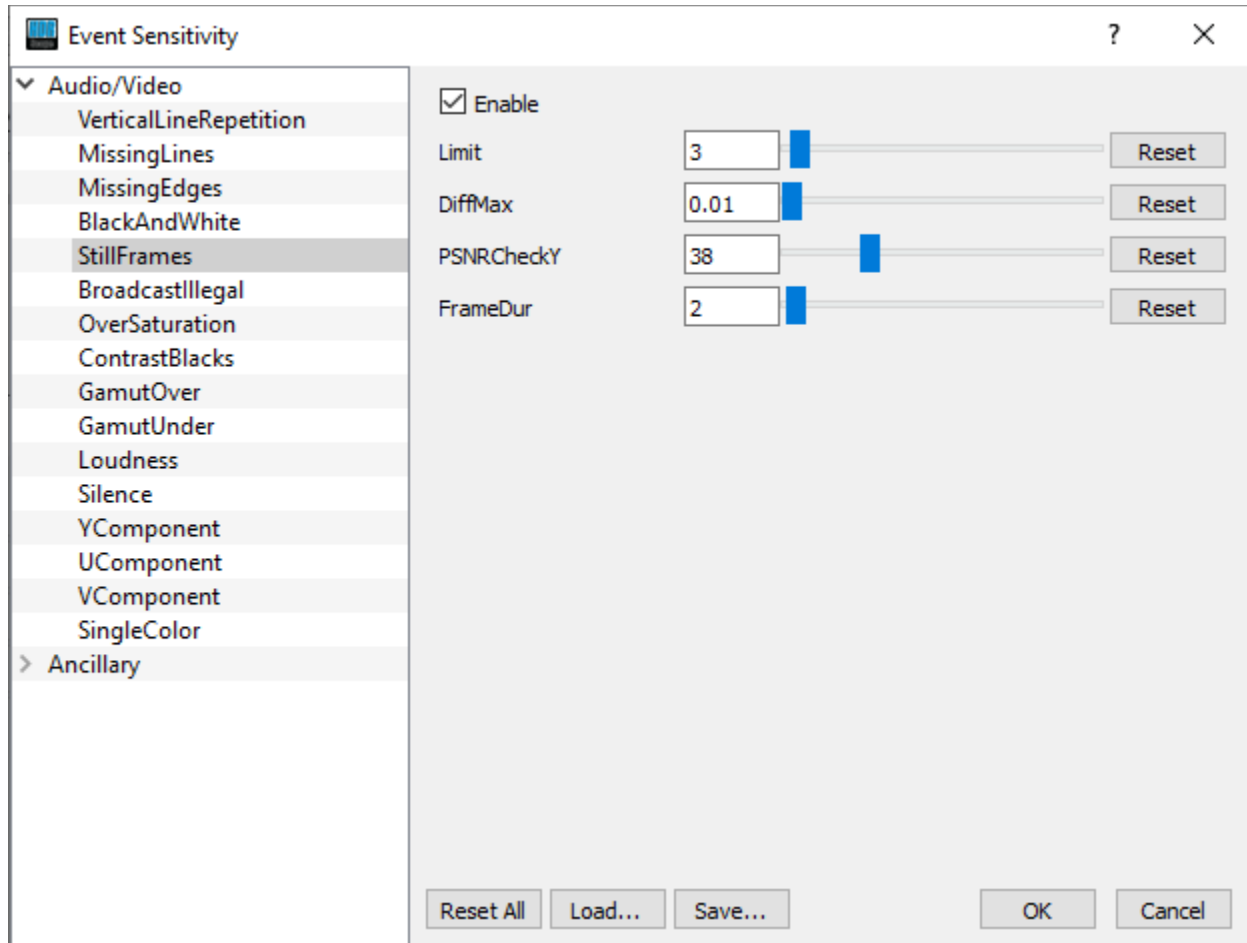
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.5 Still Frames



Enable checkbox – click to enable checking for still frames, and adjust any relevant settings.

Limit field, slider, and **Reset** button - default 3

DiffMax field, slider, and **Reset** button - default 0.01

PSNRCheckY field, slider, and **Reset** button - default 38

FrameDur field, slider, and **Reset** button - default 2

Reset All button – clicking Reset All returns all values to their default settings.

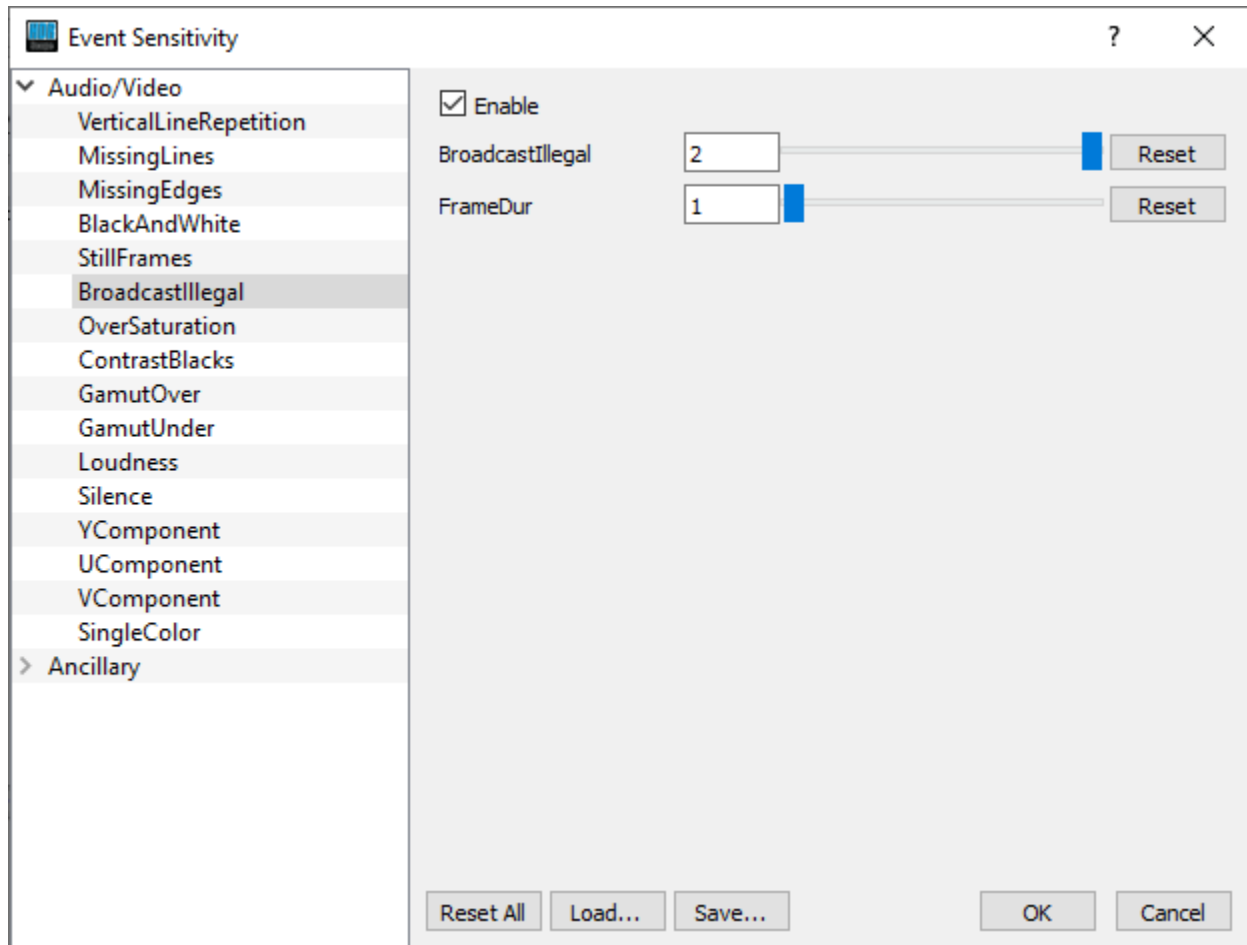
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.6 *Broadcast Illegal*



Enable checkbox – click to enable checking for broadcast illegal, and adjust any relevant settings.

BroadcastIllegal field, slider, and **Reset** button - default 2

FrameDur field, slider, and **Reset** button - default 1

Reset All button – clicking Reset All returns all values to their default settings.

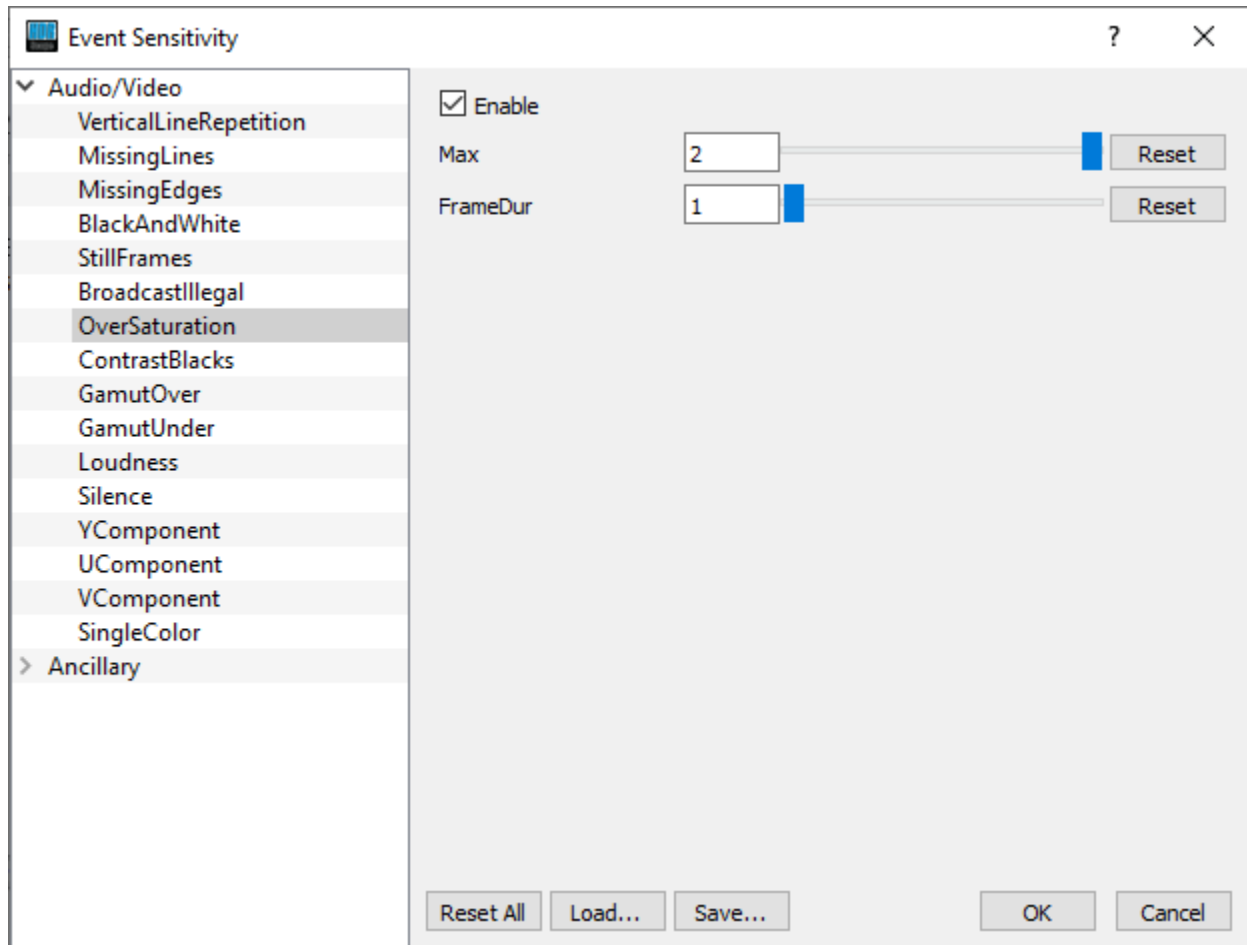
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.7 Oversaturation



Enable checkbox – click to enable checking for oversaturation, and adjust any relevant settings.

Max field, slider, and **Reset** button - default 2

FrameDur field, slider, and **Reset** button - default 1

Reset All button – clicking Reset All returns all values to their default settings.

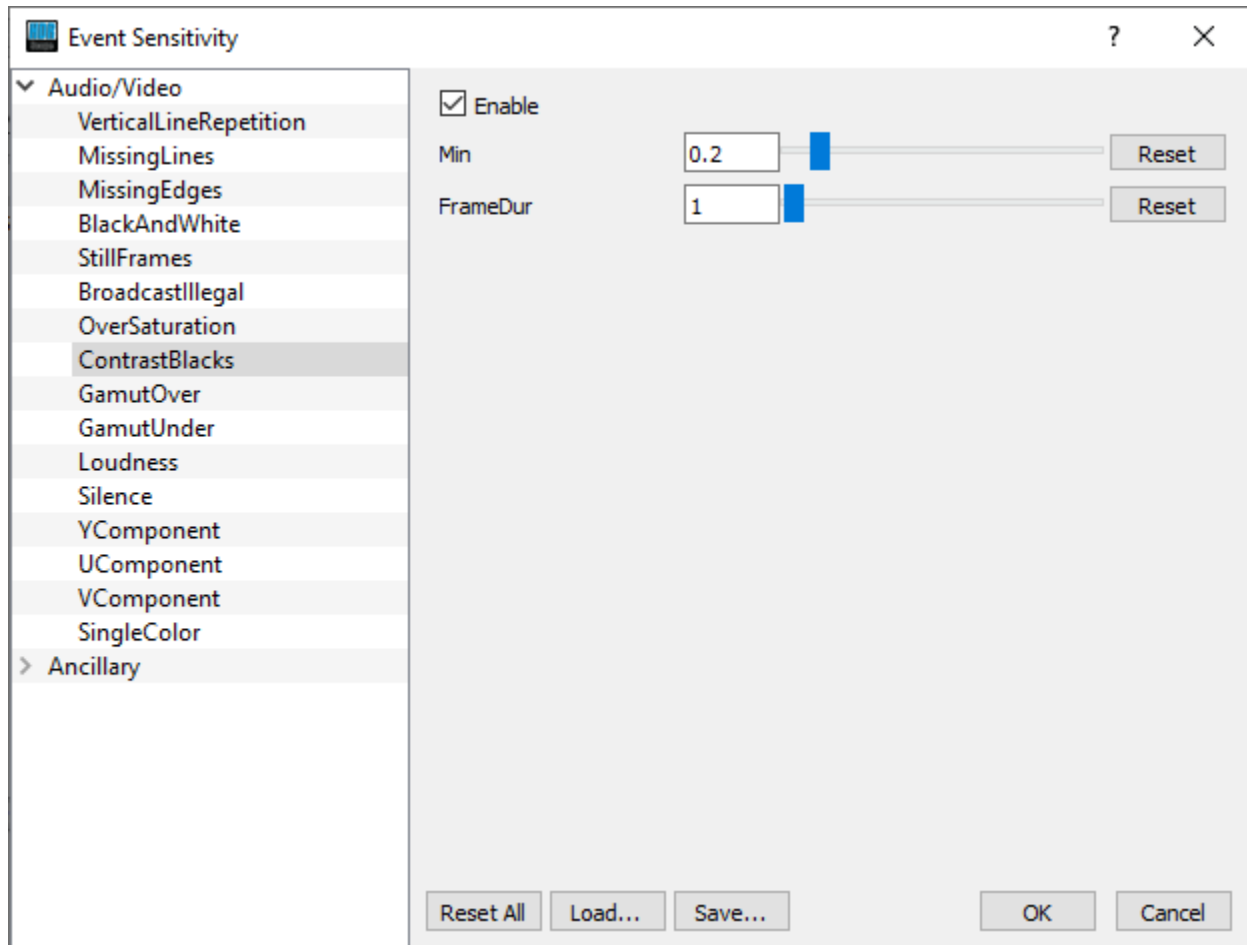
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.8 Contrast Blacks



Enable checkbox – click to enable checking for contrast blacks, and adjust any relevant settings.

Min field, slider, and **Reset** button - default 0.22

FrameDur field, slider, and **Reset** button - default 1

Reset All button – clicking Reset All returns all values to their default settings.

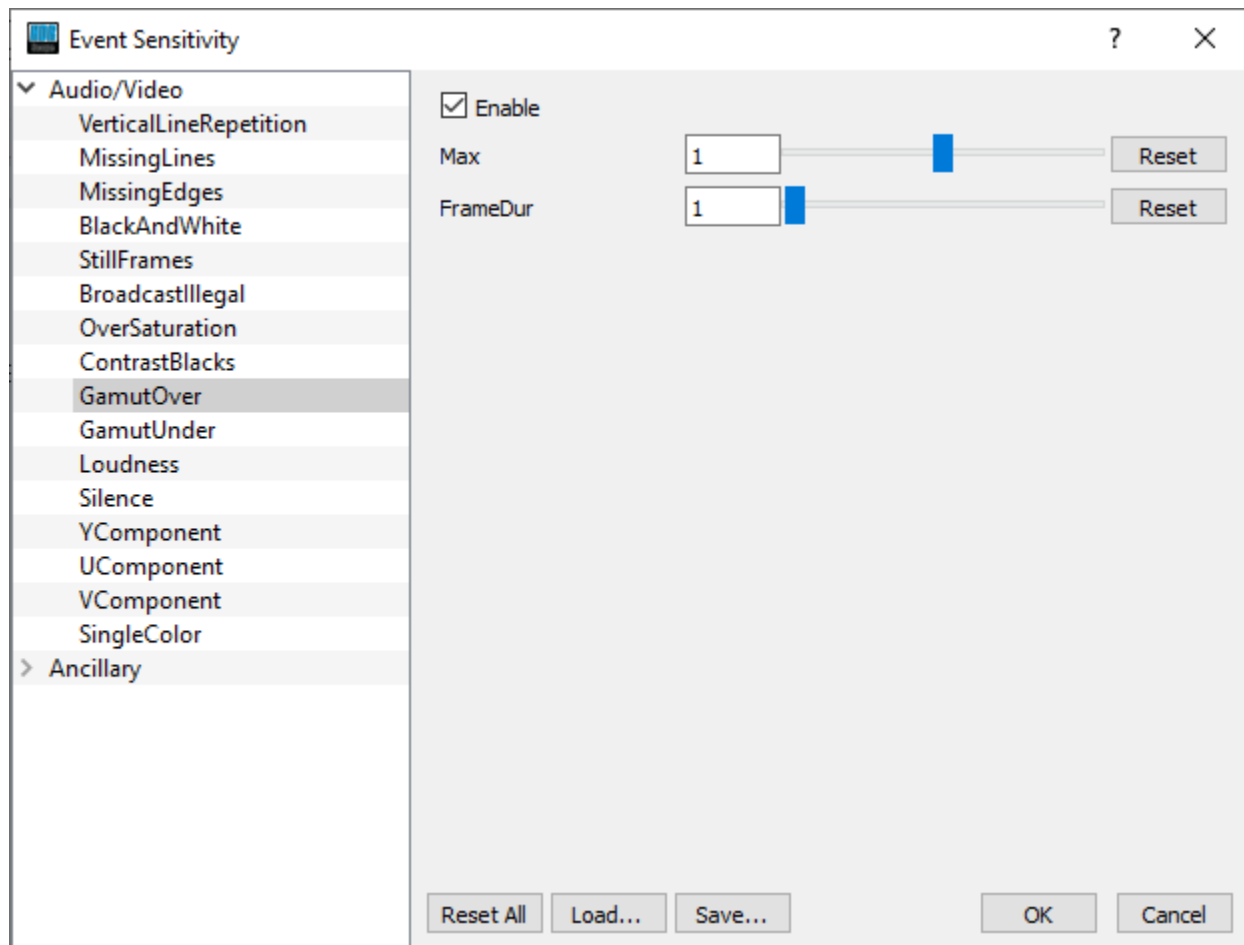
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.9 Gamut Over



Enable checkbox – click to enable checking for gamut over, and adjust any relevant settings.

Min field, slider, and **Reset** button - default 1

FrameDur field, slider, and **Reset** button - default 1

Reset All button – clicking Reset All returns all values to their default settings.

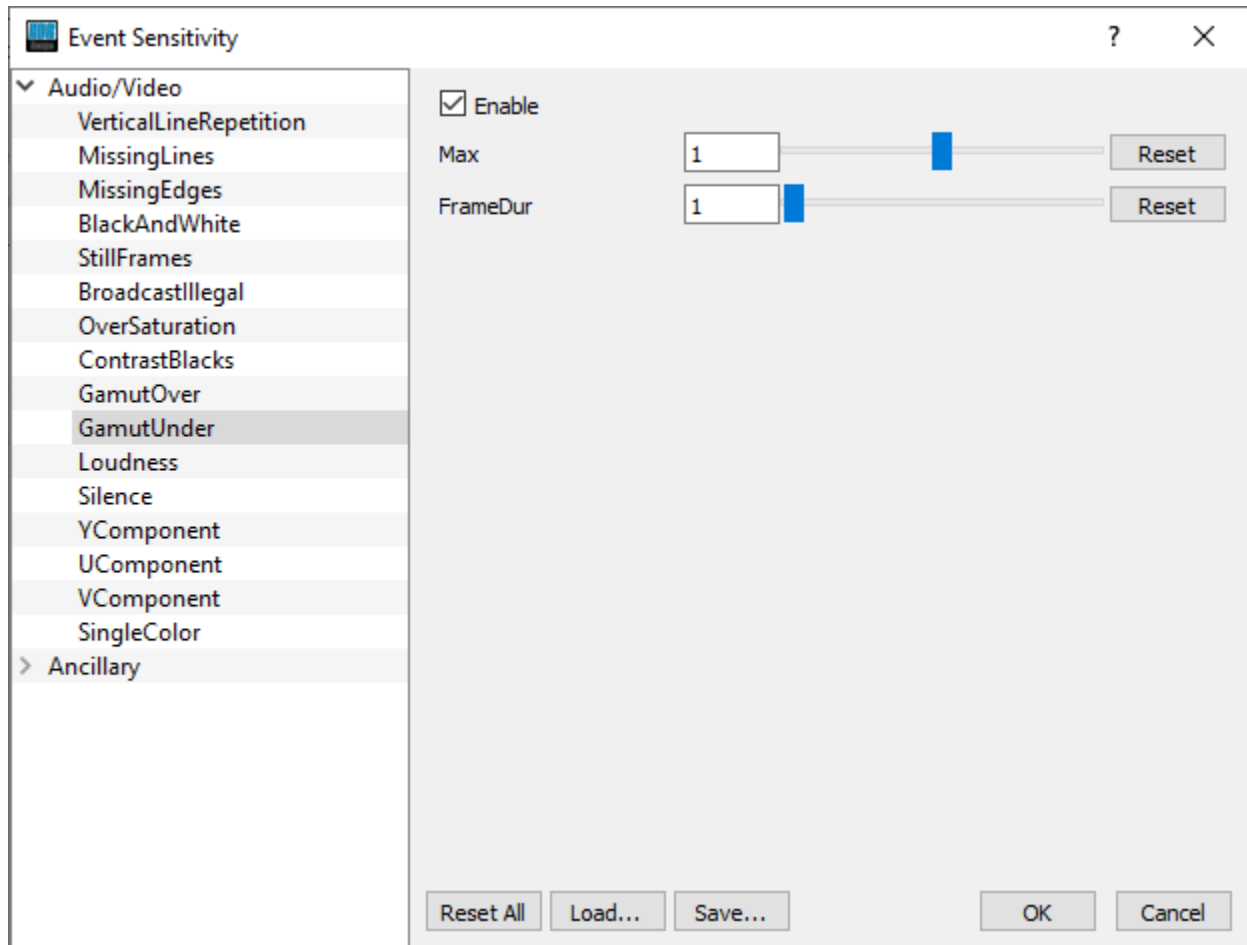
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.10 Gamut Under



Enable checkbox – click to enable checking for gamut under, and adjust any relevant settings.

Max field, slider, and **Reset** button - default 1.0

FrameDur field, slider, and **Reset** button - default 1

Reset All button – clicking Reset All returns all values to their default settings.

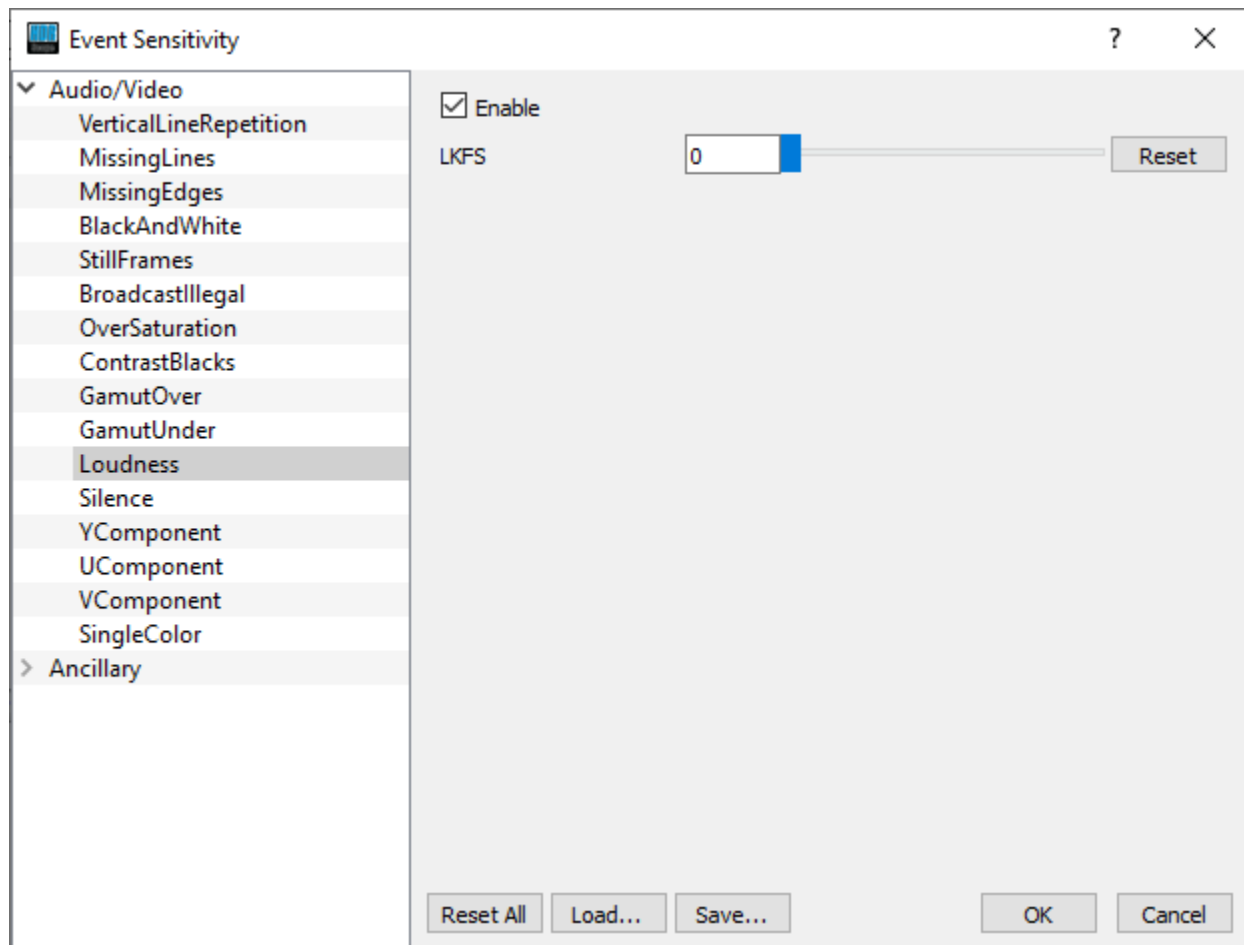
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.11 Loudness



Enable checkbox – click to enable checking for loudness, and adjust any relevant settings.

LKFS field, slider, and **Reset** button - default 0

Reset All button – clicking Reset All returns all values to their default settings.

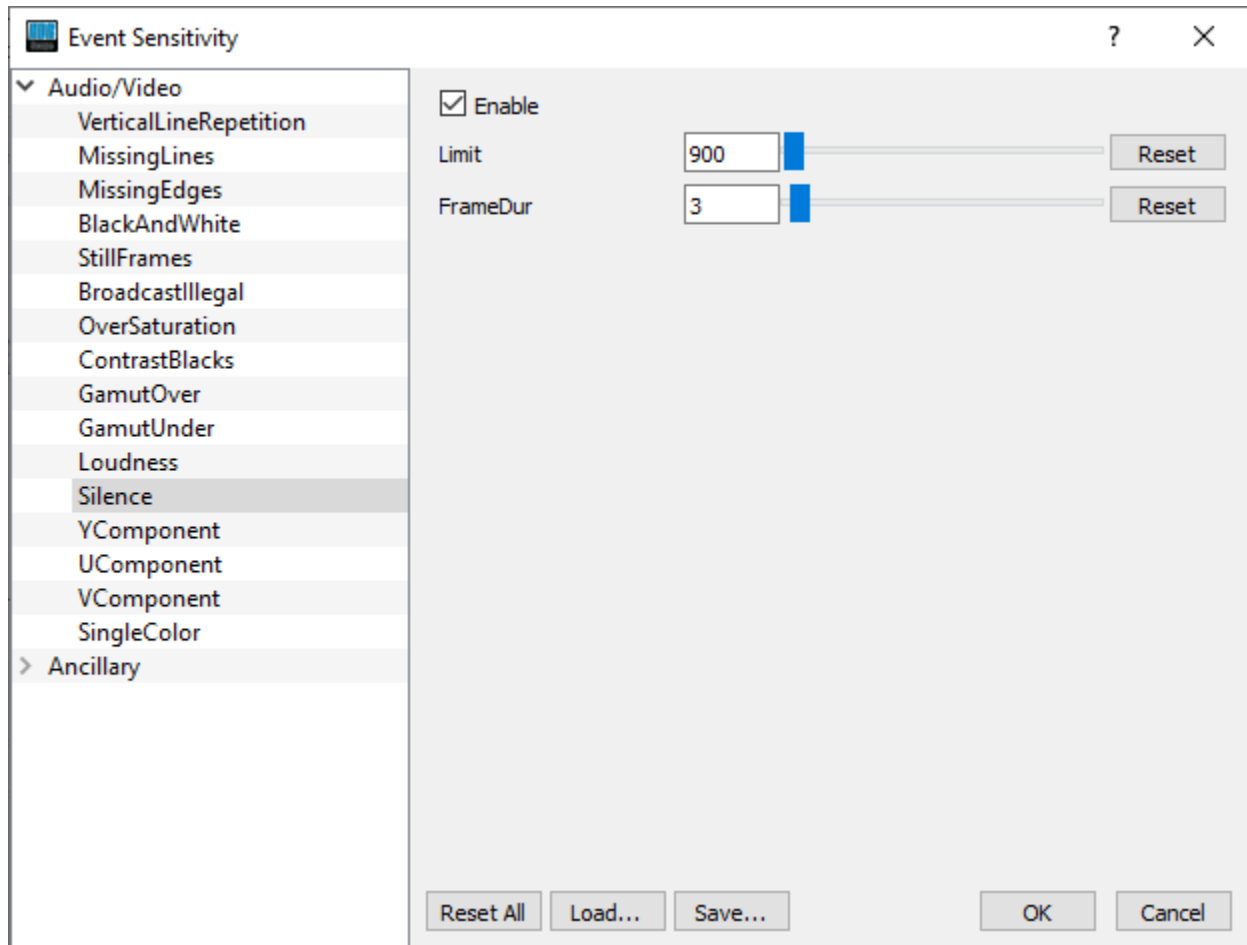
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.12 Silence



Enable checkbox – click to enable checking for silence and adjust any relevant settings.

Limit field, slider, and **Reset** button - default 900

FrameDur field, slider, and **Reset** button – default 3

Reset All button – clicking Reset All returns all values to their default settings.

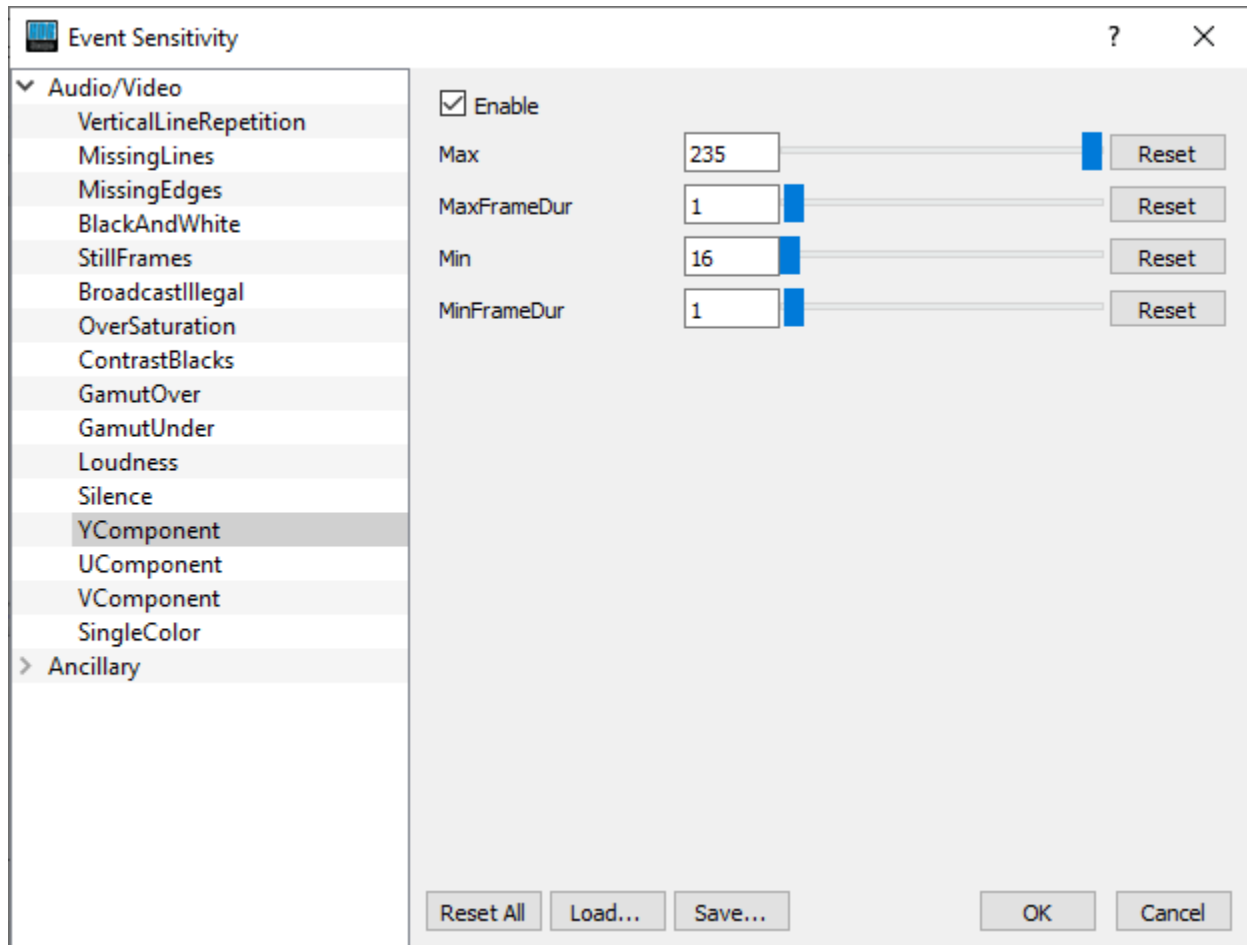
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.13 Y Component



Enable checkbox – click to enable checking the Y component and adjust any relevant settings.

Max field, slider, and **Reset** button - default 235

MaxFrameDur field, slider, and **Reset** button - default 1

Min field, slider, and **Reset** button - default 16

MinFrameDur field, slider, and **Reset** button - default 1

Reset All button – clicking Reset All returns all values to their default settings.

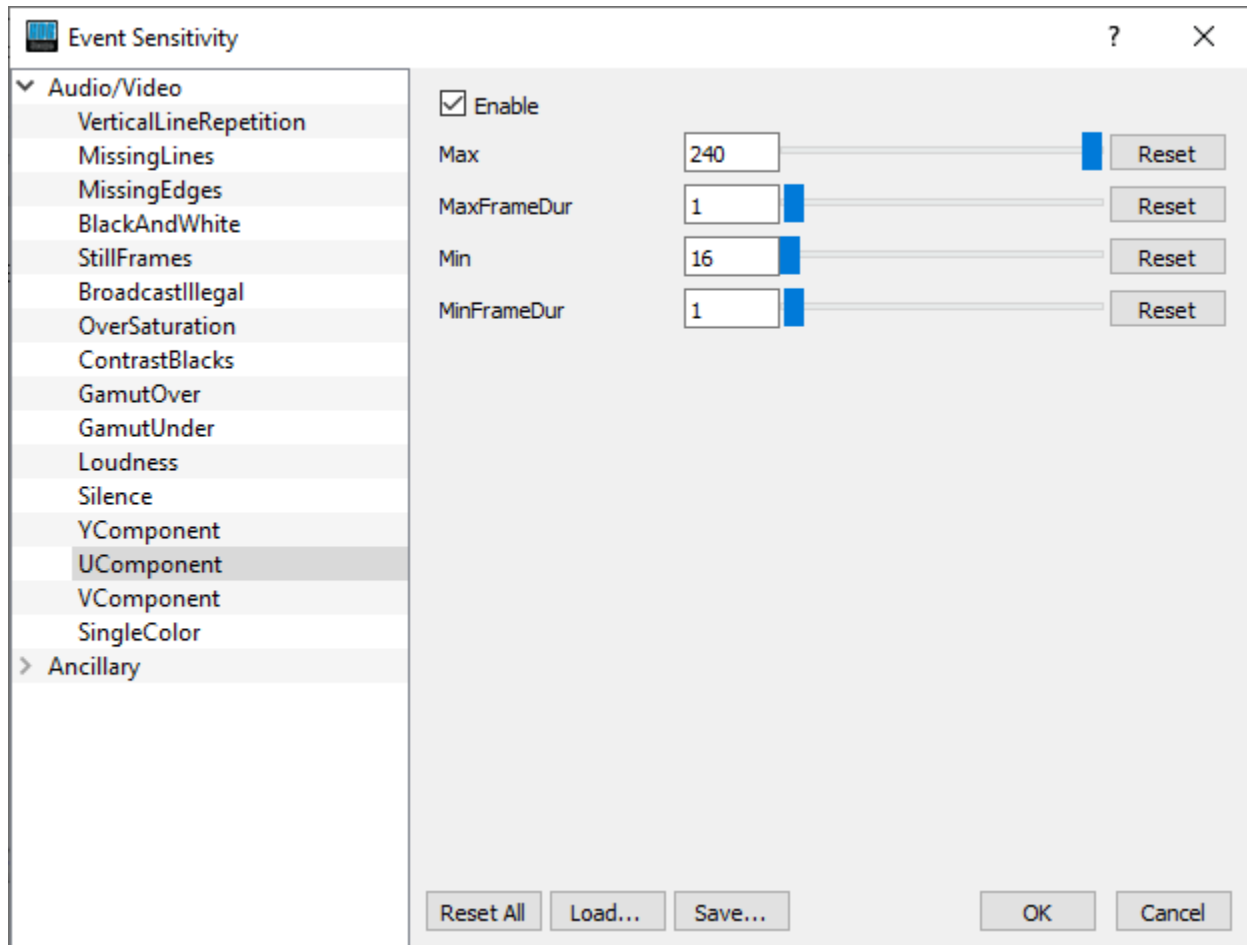
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.14 U Component



Enable checkbox – click to enable checking the U component and adjust any relevant settings.

Max field, slider, and **Reset** button - default 240

MaxFrameDur field, slider, and **Reset** button - default 1

Min field, slider, and **Reset** button - default 16

MinFrameDur field, slider, and **Reset** button - default 1

Reset All button – clicking Reset All returns all values to their default settings.

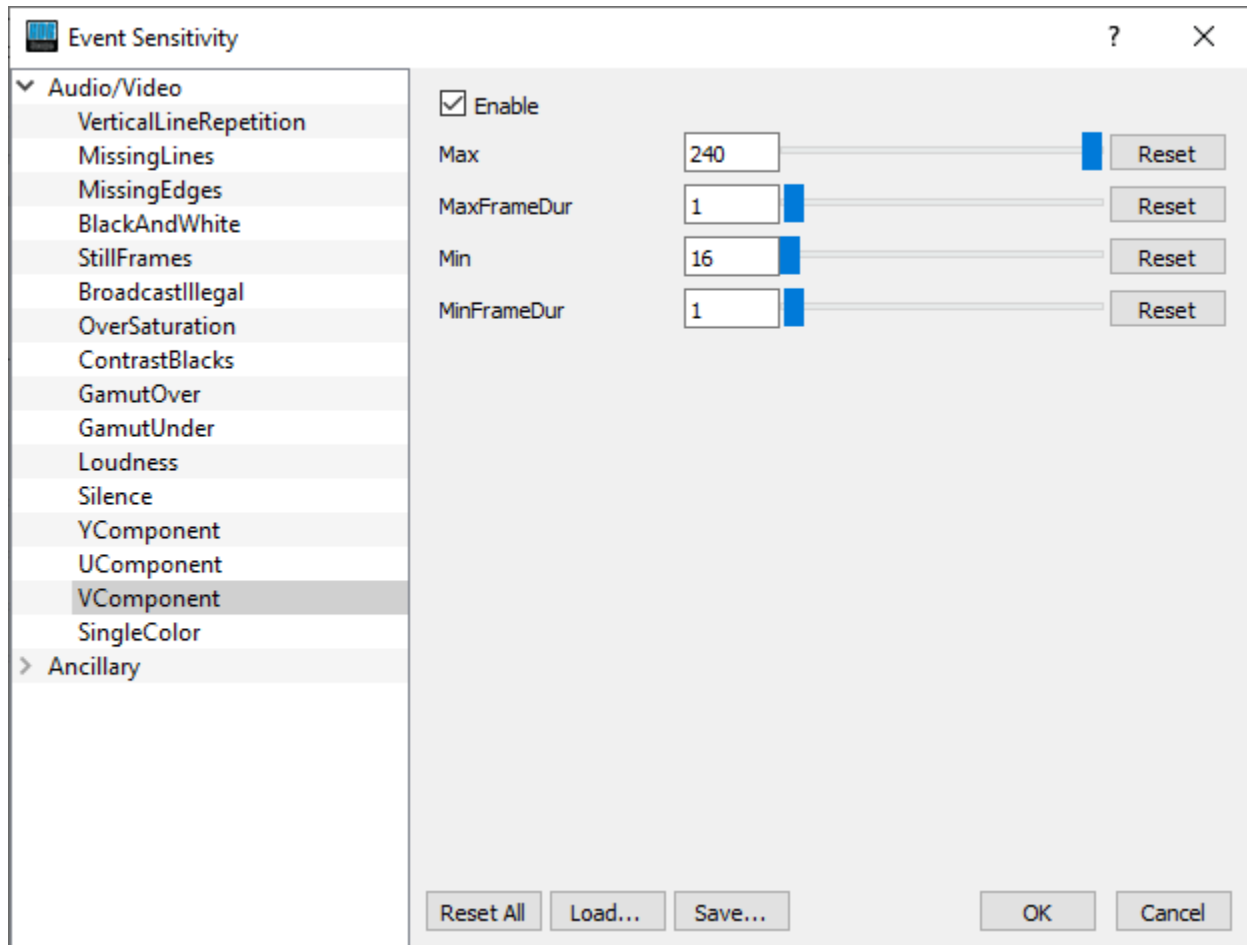
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.15 V Component



Enable checkbox – click to enable checking the V component and adjust any relevant settings.

Max field, slider, and **Reset** button - default 240

MaxFrameDur field, slider, and **Reset** button - default 1

Min field, slider, and **Reset** button - default 16

MinFrameDur field, slider, and **Reset** button - default 1

Reset All button – clicking Reset All returns all values to their default settings.

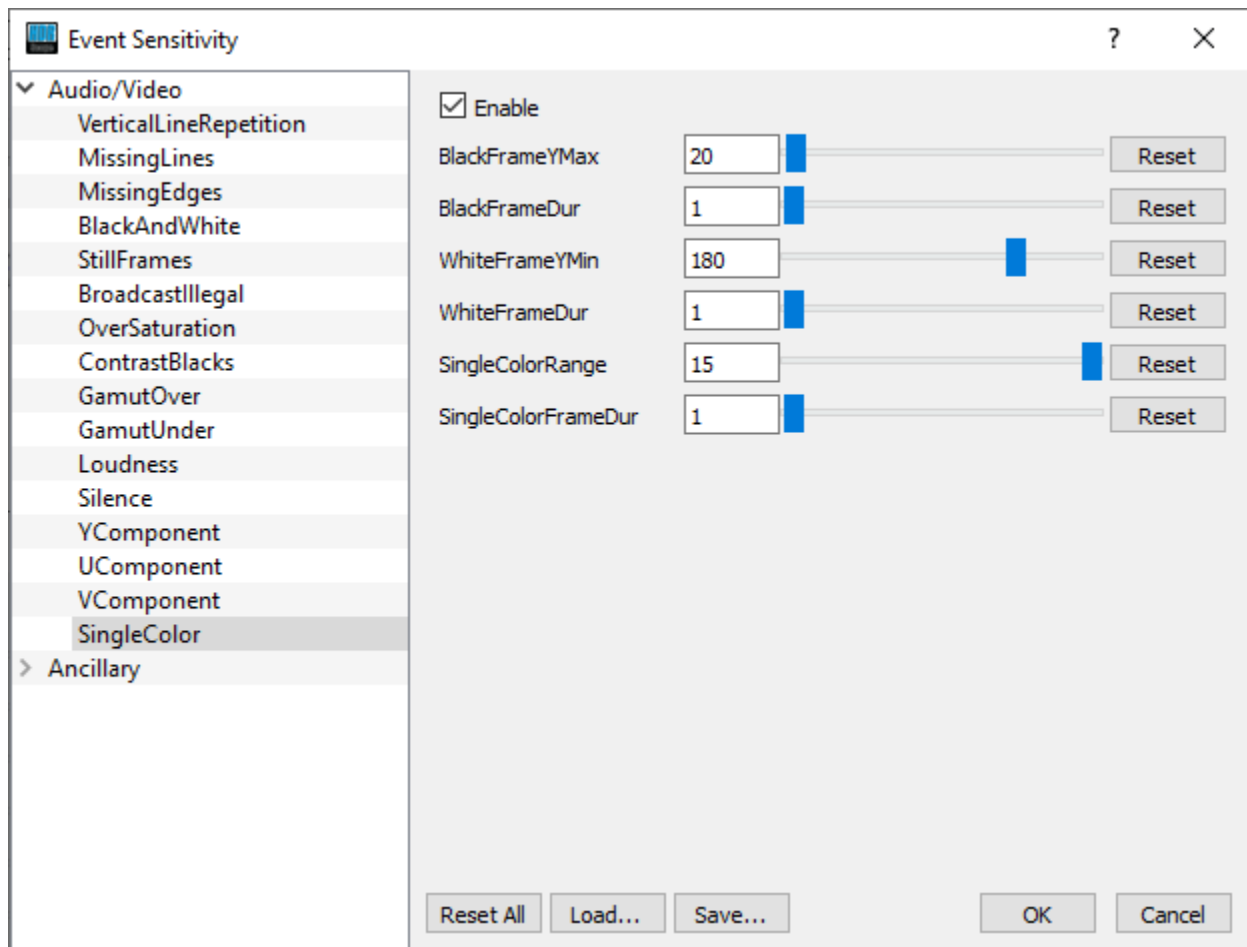
Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

OK button – press OK to enable any changes you have made, and close the Event Sensitivity window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.1.16 Single Color



Enable checkbox – click to enable checking for single color and adjust any relevant settings.

Max field, slider, and **Reset** button - default

BlackFrameYMax field, slider, and **Reset** button - default 20

BlackFrameDur field, slider, and **Reset** button - default 1

WhiteFrameYMin field, slider, and **Reset** button - default 180

WhiteFrameDur field, slider, and **Reset** button - default 1

SingleColorRange field, slider, and **Reset** button - default 15

SingleColorFrameDur field, slider, and **Reset** button - default 1

Reset All button – clicking Reset All returns all values to their default settings.

Load button – opens a browser so you can load a saved event sensitivity file.

Save button – opens a standard Save As window, so you can save the event sensitivity values to a file for later retrieval.

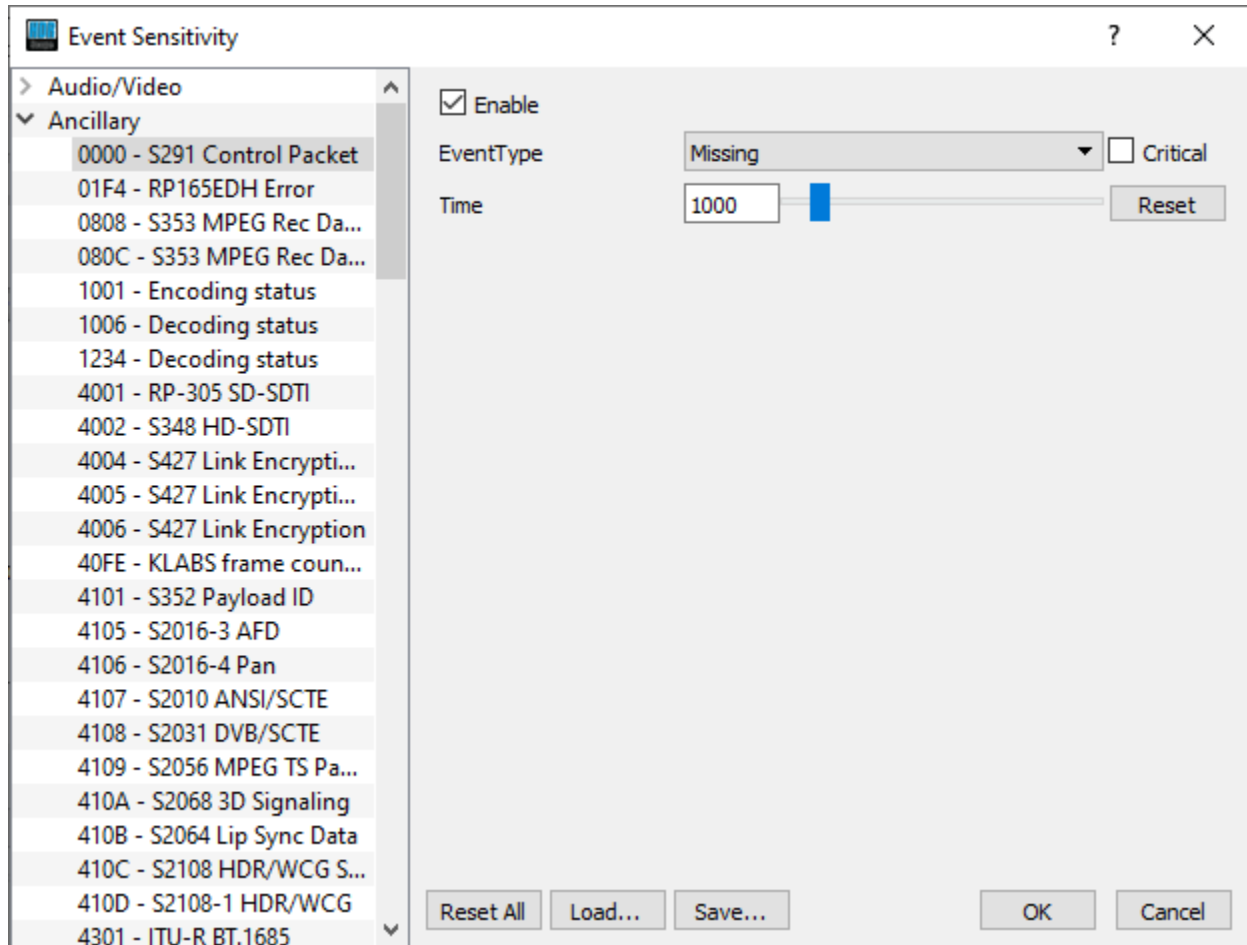
OK button – press OK to enable any changes you have made, and close the Event Sensitivity

window.

Cancel button – press Cancel to exit the Event Sensitivity window without enabling any of the changes you have made.

3.11.2 Ancillary Data Streams Sensitivity

Each type of ancillary data stream can be set to produce an entry in the error log based on a number of settings. The default value is displayed, and the user can adjust a parameter by using the sliders provided. A reset button is available for each individual setting.



For each data type, the following controls are available:

Enable checkbox – click to enable checking for ancillary data and adjust any relevant settings.

EventType pulldown menu – specifies the condition which will trigger an event in the event log for the selected ancillary data type. Conditions include:

Missing – the expected data is not present

Present – the data is present

Appeared – the data is in this frame and was not in the previous frame

Disappeared – the data was present in the previous frame and is not in the current frame

Changed – the data has undergone a change

Occurred – the data occurred in this frame

Critical checkbox – check to indicate that any events in the data stream that trigger a warning are critical.

Time field, slider, and **Reset** button – default 1000

Reset – resets the values to the default settings.

3.11.2.1 *Supported Data Stream Types*

0000 – **S291 Control Packet** [RTP Payload format for SMPTE Ancillary data, as defined by SMPTE ST 291-1]

01F4 – **RP165EDH Error** [Error checking using the RP 165 EDH packets in SD-SDI mode] the SMPTE RP165-EDH packet containing EDH (error data handling) and CRC (cyclic redundancy counts). This only appears on SD-SDI signals.

0808 – **S353 MPEG Rec Data V** [SMPTE 291M defined MPEG recoding data in VANC]

080C – **S353 MPEG Rec Data H** [SMPTE 291M defined MPEG recoding data in HANC]

1001 – **Encoding status** [current encoding status]

1006 – **Decoding status** [current decoding status]

1234 – **Decoding status** [current decoding status]

4001 – **RP-305 SD-SDTI** [Standard Definition Serial Data Transport Interface] SDTI transport in active frame space.

4002 – **S348 HD-SDTI** [SMPTE 291M defined HD-SDTI Transport in active frame space] HD-SDTI Transport in active frame space.

4004 – **S427 Link Encryption 1** [Link Encryption for 1.5Gb/s1 Serial Digital Interface type 1]

4005 – **S427 Link Encryption 2** [Link Encryption for 1.5Gb/s1 Serial Digital Interface type 2]

4006 – **S427 Link Encryption** [Link Encryption for 1.5Gb/s1 Serial Digital Interface type 0]

40FE – **KLABS frame counter** [KLABS frame counter packets]

4101 – **S352 Payload ID** [SMPTE ST 352 Video Payload Identification Codes for Serial Digital Interfaces] Payload identification, HANC space.

4105 – **S2016-3 AFD** [AFD for baseband SDI carriage as standard SMPTE 2016-1-2007, "Format for Active Format Description and Bar Data"] Vertical Ancillary Data Mapping of Active Format Description and Bar Data.

4106 – **S2016-4 Pan** [SMPTE 2016-4 Vertical Ancillary Data Mapping of Pan-Scan Information]

4107 – **S2010 ANSI/SCTE** [ANSI/SCTE 104 messages, a mechanism for signaling advertising avails, program splice points, and DRM signals]

4108 – **S2031 DVB/SCTE** [SMPTE S2031 DVB/SCTE vertical blanking interval data]

4109 – **S2056 MPEG TS Packets** [per SMPTE ST 2056, a standardized wrapper for the carriage of low bit rate MPEG-2 TS packets, in the 10-bit VANC space of a standard definition or high definition serial digital link in accordance with SMPTE ST 291]

410A – **S2068 3D Signaling** [per SMPTE 2068, Stereoscopic 3D frame compatible packing and signaling for HDTV]

410B – **S2064 Lip Sync Data** [the real-time transport of audio and video fingerprints used for audio to video timing measurement. These fingerprints and their containerization are

- defined in SMPTE ST 2064-1]
- 410C – **S2108 HDR/WCG Settings** [per SMPTE ST 2108-1:2018, Settings for HDR/WCG Metadata Ancillary Data Packet]
- 410D – **S2108-1 HDR/WCG** [per SMPTE ST 2108-1:2018, HDR/WCG Metadata Ancillary Data Packets]
- 4301 – **ITU-R BT.1685** [Structure of inter-station control data conveyed by ancillary data packets]
- 4302 – **OP47 Caption SDP** [OP-47 Subtitling Distribution Packet - storage and distribution of Teletext data such as closed captions/subtitles in the vertical ancillary data space of the 10 bit serial HD-SDI signal complying with Recommendation ITU-R BT.1120-7]
- 4303 – **OP47 VBI/WST MP** [OP-47 vertical blanking interval World System Teletext subtitling for HD]
- 4304 – **ARIB-TR-B29 AV Mon** [Association of Radio Industries and Businesses - Metadata to monitor Errors of Video and Audio Signals on a Broadcasting Chain]
- 4305 – **RDD18 Camera Params** [SMPTE RDD 18:2021 - Acquisition Metadata Sets for Video Camera Parameters]
- 4313 – **SMPTE 346M** [time division multiplexing of various standard-definition digital video and generic 8-bit data signals over high-definition serial digital interfaces]
- 4404 – **RP214V KLV Metadata** [Packing KLV Encoded Metadata and Data Essence into SMPTE 291M VANC Ancillary Data Packets] the SMPTE defined KLV Metadata transport in VANC space.
- 4414 – **RP214H KLV Metadata** [Packing KLV Encoded Metadata and Data Essence into SMPTE 291M HANC Ancillary Data Packets] the SMPTE defined KLV Metadata transport in HANC space.
- 4444 – **RP223 UMID/ID** [per SMPTE RP 223, Packing UMID and Program Identification Label Data into SMPTE 291M Ancillary Data Packets]
- 4501 – **S2020 Audio-1** [structure and timing requirements of an asynchronous serial audio metadata stream with respect to an associated video signal – channel 1]
- 4502 – **S2020 Audio-2** [structure and timing requirements of an asynchronous serial audio metadata stream with respect to an associated video signal – channel 2]
- 4503 – **S2020 Audio-3** [structure and timing requirements of an asynchronous serial audio metadata stream with respect to an associated video signal – channel 3]
- 4504 – **S2020 Audio-4** [structure and timing requirements of an asynchronous serial audio metadata stream with respect to an associated video signal – channel 4]
- 4505 – **S2020 Audio-5** [structure and timing requirements of an asynchronous serial audio metadata stream with respect to an associated video signal – channel 5]
- 4506 – **S2020 Audio-6** [structure and timing requirements of an asynchronous serial audio metadata stream with respect to an associated video signal – channel 6]
- 4507 – **S2020 Audio-7** [structure and timing requirements of an asynchronous serial audio metadata stream with respect to an associated video signal – channel 7]
- 4508 – **S2020 Audio-8** [structure and timing requirements of an asynchronous serial audio metadata stream with respect to an associated video signal – channel 8]
- 4509 – **S2020 Audio-9** [structure and timing requirements of an asynchronous serial audio

- metadata stream with respect to an associated video signal – channel 9]
- 4601 – **S2051 Two Frame** [SMPTE ST 2015:2014 Two-Frame Marker for progressive HDTV video formats at 48/1.001(47.95)-Hz, 48-Hz, 50-Hz, 60/1.001(59.94)-Hz, and 60-Hz frame rates]
- 5001 – **RDD8 WSS** [SMPTE RDD8 wide screen signaling for storage and distribution of subtitles] this is the SMPTE defined wide screen switching data packing in the VANC space.
- 5051 – **CineLink-2 MetaD** [CineLink-2 metadata].
- 5101 – **RP215 Film Codes** [Vertical Ancillary Data Mapping of Film Transfer and Video Production Information] the SMPTE defined recommended practice data packing for film codes in VANC space.
- 5102 – **RDD18 Metadata** [per SMPTE RDD 18:2021, Acquisition Metadata Sets for Video Camera Parameters]
- 5152 – **Tally Control** [tally control]
- 5153 – **BMD Dev Control** [Blackmagic SDI PTZ camera control protocol]
- 524D – **Rec start/stop** [record start or record stop]
- 5701 – **CBS ID Info** [Cell Broadcast Service to relay messages related to public warning]
- 5FCF – **TR-B18 Color** [Association of Radio Industries and Businesses - per ARIB technical report TR-B18, Color Frame Information for Component Interface of 525/60 and 1125/60 Television Systems]
- 5FDC – **B37 Mob Captions** [Association of Radio Industries and Businesses - per ARIB STD-B37, structure and operation of closed caption conveyed by ancillary data packets]
- 5FDD – **B37 Ana Captions** [Association of Radio Industries and Businesses - per ARIB STD-B37, structure and operation of closed caption conveyed by ancillary data packets]
- 5FDE – **B37 SD Captions** [Association of Radio Industries and Businesses - per ARIB STD-B37, structure and operation of closed caption conveyed by ancillary data packets]
- 5FDF – **B37 HD Captions** [Association of Radio Industries and Businesses - per ARIB STD-B37, structure and operation of closed caption conveyed by ancillary data packets]
- 5FE0 – **ARIB TR-B.22 ANC** [Association of Radio Industries and Businesses - per ARIB TR-B22, Operational Guidelines for Transport of the Ancillary Data for Television Program Contribution] the ARIB defined Sub information data packet in the VANC space.
- 5FFA – **ARIB TR-B.23(1)** [Association of Radio Industries and Businesses - per ARIB TR-B.23, Operational Guidelines for Ancillary Data Used to Convey Inter-Stationary Data]
- 5FFB – **ARIB TR-B.23(2)** [Association of Radio Industries and Businesses - per ARIB TR-B.23, Operational Guidelines for Ancillary Data Used to Convey Inter-Stationary Data] the ARIB defined user data 2 packet in the VANC space
- 5FFC – **ARIB TR-B.23(1)** [Association of Radio Industries and Businesses - per ARIB TR-B.23, Operational Guidelines for Ancillary Data Used to Convey Inter-Stationary Data] the ARIB defined user data 1 packet in the VANC space.
- 5FFD – **ARIB B.35ProgEx** [Association of Radio Industries and Businesses - per ARIB STD-B35, Data Program Exchange Specification for Digital Broadcasting] the ARIB defined trigger signal data packet for data broadcasting.
- 5FFE – **ARIB B.39** [Association of Radio Industries and Businesses - per ARIB STD-B39,

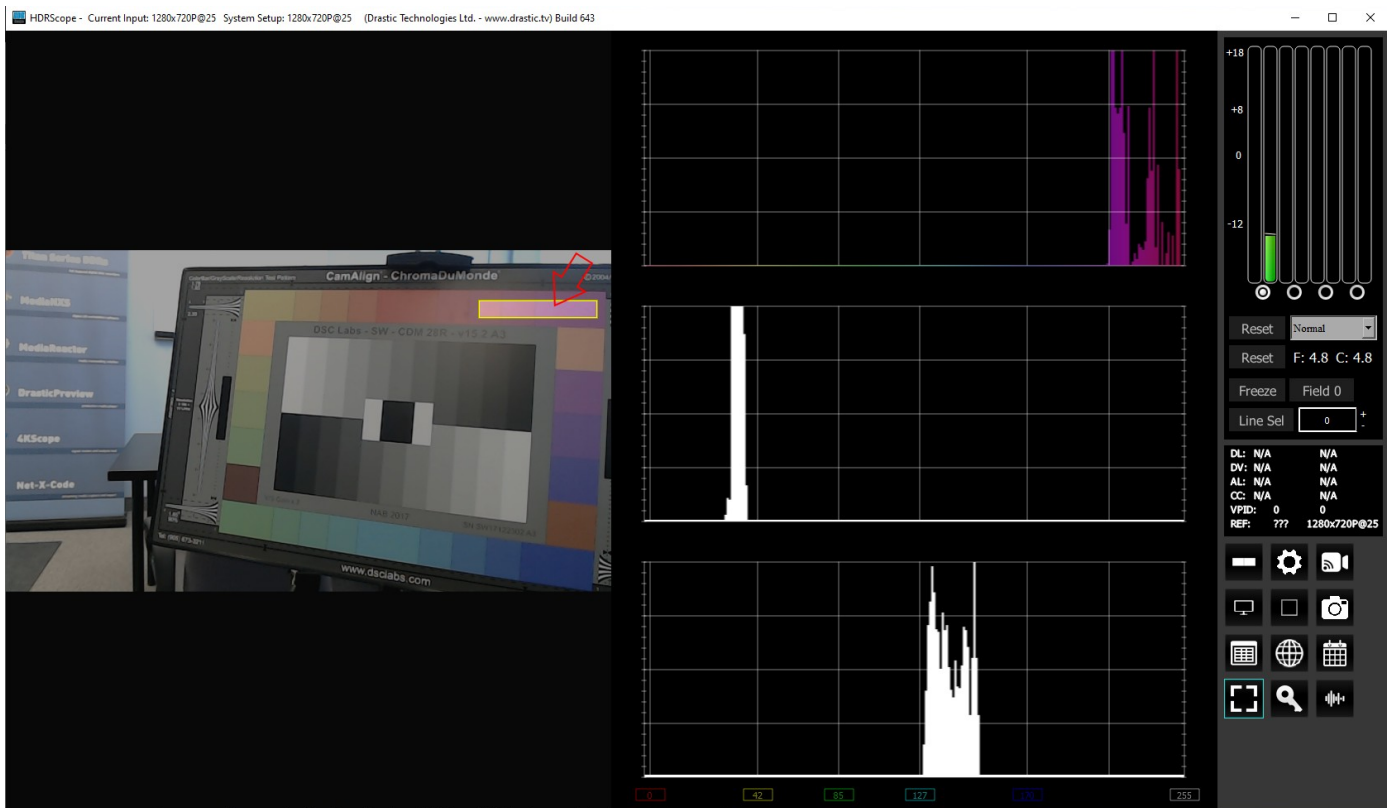
- Structure of Inter-Stationary Control Data Conveyed by Ancillary Data Packets]
- 5FFF – **ARIB B.15** [Association of Radio Industries and Businesses - per ARIB TR-B15, specifies the function of receivers and the operational guidelines in the broadcasting station of the BS and CS digital broadcasting]
 - 6060 – **S12M-2 Anc TCode** [per SMPTE 12M-2, standards to label individual frames of video or film with a timecode]
 - 6061 – **S12M-3 HFR-TCode** [per SMPTE 12M-3, standards to label individual frames of high frame rate video or film with a timecode]
 - 6062 – **Generic Time Label** [generic time of day stamp]
 - 6101 – **EIA-708 Caption** [HD captioning] the EIA standard defined closed caption data for HD-SDI in VANC space.
 - 6102 – **EIA-608 Caption** [SD captioning] the EIA standard defined closed caption data for SD SDI 525i (NTSC) in VANC space.
 - 6103 – **SMPTE334 WST Packet** [per SMPTE ST 334-1:2015, Vertical Ancillary Data Mapping of Caption Data and Other Related Data]
 - 6104 – **SMPTE334 SDE** [per SMPTE ST 334-1:2015, Vertical Ancillary Data Mapping of Caption Data and Other Related Data]
 - 6105 – **SMPTE334 ARIB Caption HD** [per SMPTE ST 334-1:2015, Vertical Ancillary Data Mapping of Caption Data and Other Related Data]
 - 6106 – **SMPTE334 ARIB Caption SD** [per SMPTE ST 334-1:2015, Vertical Ancillary Data Mapping of Caption Data and Other Related Data]
 - 6107 – **SMPTE334 ARIB Caption Ana** [per SMPTE ST 334-1:2015, Vertical Ancillary Data Mapping of Caption Data and Other Related Data]
 - 6201 – **RP207 Program** [per SMPTE RP 207, Transport of Program Description Data in Ancillary Data Packets] the SMPTE RP207 defined program description data packet in VANC space.
 - 6202 – **S334-1 Data BCast** [per SMPTE 334-1-2007, closed caption data from Ancillary data packets]
 - 6203 – **RP208 VBI Data** [per SMPTE RP 208-2002, Transport of VBI Packet Data in Ancillary Data Packets] the SMPTE defined recommended practice VBI Data (vertical blanking interval data) in VANC space.
 - 6464 – **RP196 LTC Timecode** [per SMPTE RP 196, Transmission of LTC Data as HANC Packets in Serial Digital Television Interfaces] the SMPTE defined recommended practice Time Code data packet in HANC space.
 - 647F – **RP196 VITC Timecode** [per SMPTE RP 196, Transmission of VITC Data as VANC Packets in Serial Digital Television Interfaces] the SMPTE defined recommended practice Time Code data packet in VANC space.
 - 8000 – **Mark Deleted** [when a mark has been deleted]
 - 8400 – **End Packet** [signals the end of a packet]
 - 8800 – **Start Packet** [signals the start of a packet]
 - A000 – **HD Aud Ctrl 8** [HD audio control 8]
 - A100 – **HD Aud Ctrl 7** [HD audio control 7]
 - A200 – **HD Aud Ctrl 6** [HD audio control 6]

A300 – **HD Aud Ctrl 5** [HD audio control 5]
A400 – **HD Aud Data 8** [HD audio data 8]
A500 – **HD Aud Data 7** [HD audio data 7]
A600 – **HD Aud Data 6** [HD audio data 6]
A700 – **HD Aud Data 5** [HD audio data 5]
D200 – **QA F1 Test** [F1 quality assurance metric]
D300 – **QA F2 Test** [F2 quality assurance metric]
E000 – **HD Aud Ctrl 4** [HD audio control 4]
E100 – **HD Aud Ctrl 3** [HD audio control 3]
E200 – **HD Aud Ctrl 2** [HD audio control 2]
E300 – **HD Aud Ctrl 1** [HD audio control 1]
E400 – **HD Aud Data 4** [HD audio data 4]
E500 – **HD Aud Data 3** [HD audio data 3]
E600 – **HD Aud Data 2** [HD audio data 2]
E700 – **HD Aud Data 1** [HD audio data 1]
EC00 – **SD Aud Ctrl 4** [SD audio control 4]
ED00 – **SD Aud Ctrl 3** [SD audio control 3]
EE00 – **SD Aud Ctrl 2** [SD audio control 2]
EF00 – **Aud Ctrl 1** [SD audio control 1]
F400 – **Error Detect** [an error has been detected]
F800 – **SD Aud Ext Data 4** [SD audio external data 4]
F900 – **SD Aud Data 4** [SD audio data 4]
FA00 – **SD Aud Ext Data 3** [SD audio external data 3]
FB00 – **SD Aud Data 3** [SD audio data 3]
FC00 – **SD Aud Ext Data 2** [SD audio external data 2]
FD00 – **SD Aud Data 2** [SD audio data 2]
FE00 – **SD Aud Ext Data 1** [SD audio external data 1]
FF00 – **SD Aud Data 1** [SD audio data 1]

3.12 Area Select



Pressing the **Area Select** button allows the user to select an area of the signal and view it through any of the scopes. With the button pressed (it will be outlined), click to drag a rectangle across the picture display.

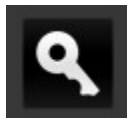


The rest of the screen will be darkened, and the selected area will be highlighted. In the above example, the selected area of the color chart features orange, red, and magenta color chips. With the H/S scope selected, only these areas of the spectrum are seen by the scope.

Note: Vectorscope, Chromaticity, and Histogram displays will respect the boundaries of the rectangle you have selected.

However, the Waveform Monitors (YCbCr and RGB) only respect the top and bottom, and have no way to constrain the left and right boundaries. So, when you select an area in a Waveform monitor, it will 'see' a band across the screen bounded by the top and bottom of the rectangle you have drawn.

3.13 License



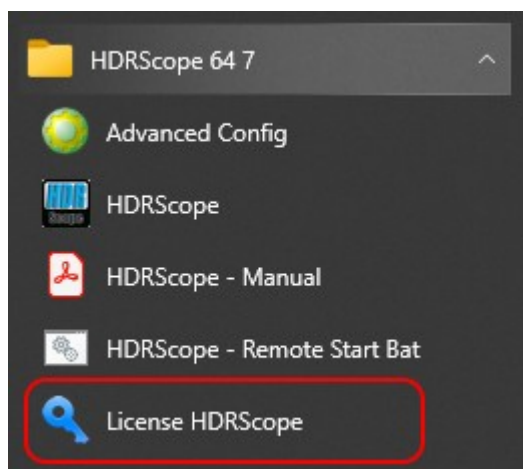
Pressing the **License** button opens the licensing dialog. The licensing dialog provides a way to check the status of the license, and to upgrade or change the status of the license.

3.13.1 How Do I Remove the Watermarks?

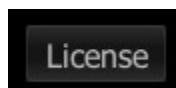
If you run Drastic software without a license, many of the features will be unavailable. Also, there will be watermarks you cannot remove, 10 second media duration, length of run limitations, no hardware support, nag screen, auto-shutoff, and other significant limitations. To remove these limitations, you will need a valid license.

There are 3 ways to open the licensing dialog.

1. Select **License HDRScope** from the main menu.



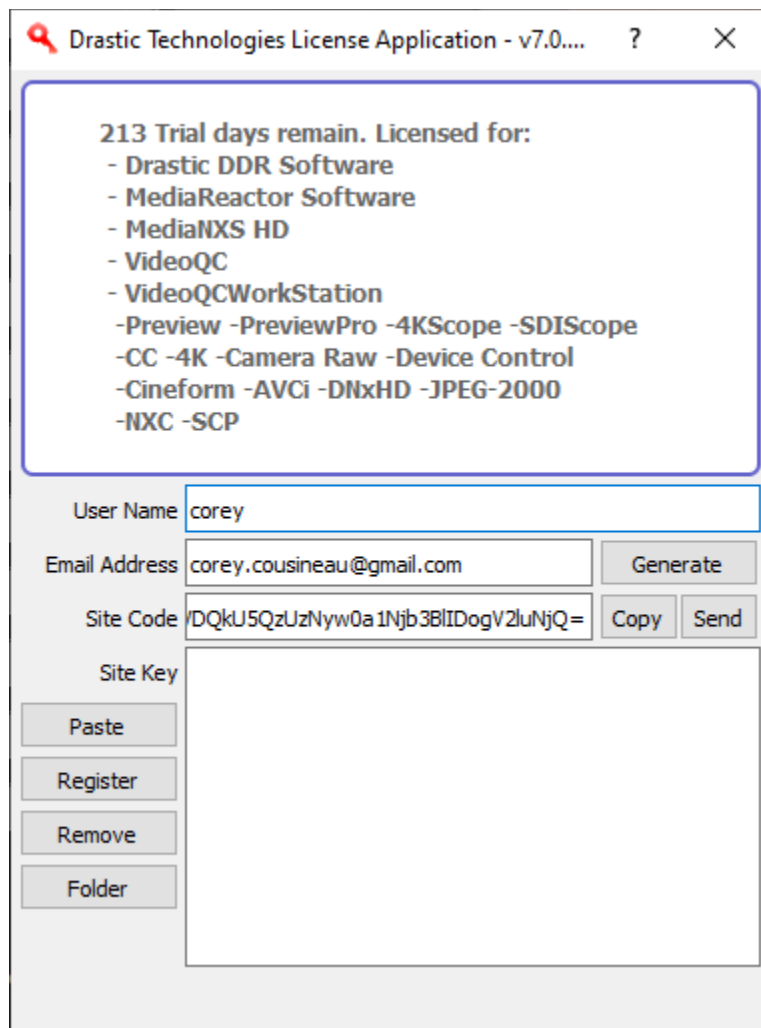
2. Select the License button in the configuration menu:



3. Select the Key icon in the GUI:



These open the licensing dialog.



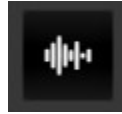
The current status of the license is displayed in the top window of the dialog.

3.13.2 How to license the system

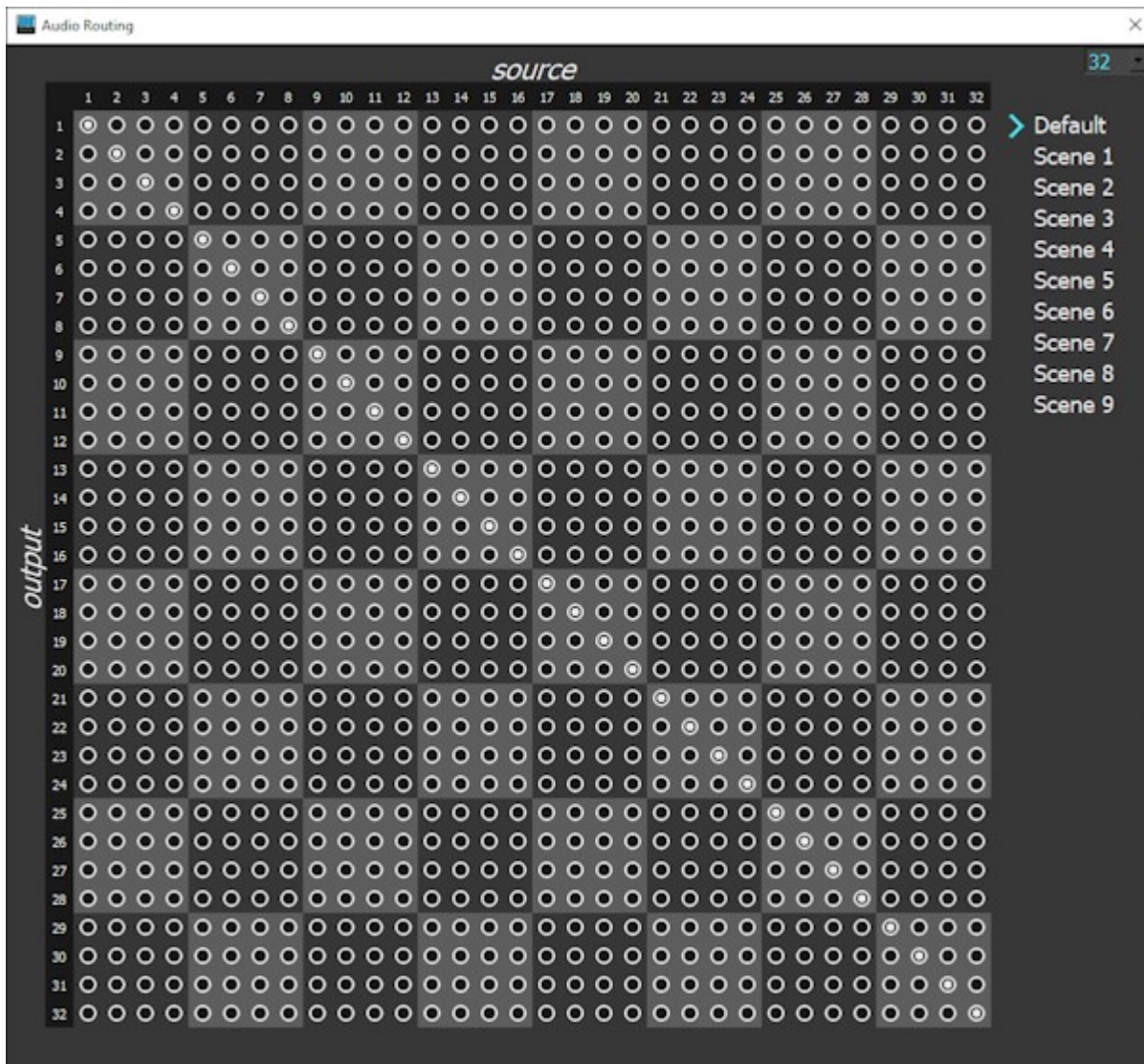
Enter a name and email address and press the Generate button. This will populate the Site Code field. Copy the site code and send it to your contact at Drastic, along with a note about which product you'd like a license for.

We will reply with a Site Key, which you should copy and paste into the Site Key field. Press the Register button to close the licensing application, then restart the software to enable the license.

3.14 Audio Routing



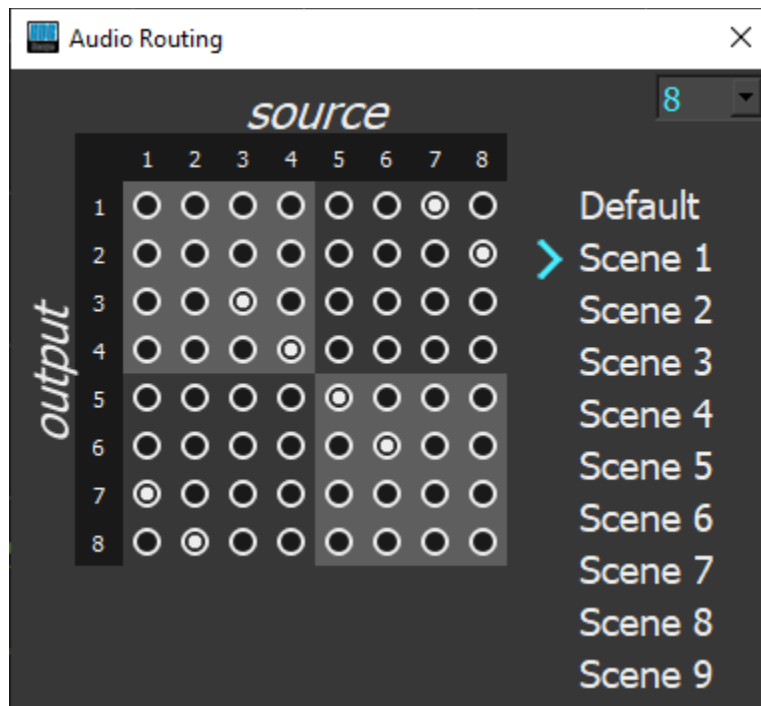
Pressing the **Audio Routing** button opens the audio routing window. This window provides routing for up to 32 channels. The pulldown menu at the top right of the window lets the user select between 8, 16, 24, or 32 channel setups.



The audio routing allows the user to route the output of their audio to whichever channel they like. This feature is hardware-dependent. The above image shows a system set to 32 channels, with no routing applied.

The audio sources come in through the top, where it says **Source**. The outputs go out through the left side, where it says **Output**.

Here is an audio routing scheme where channels 1 and 2 are sent out through channels 7 and 8, and channels 7 and 8 are sent out via channels 1 and 2.



If **Default** is selected, no changes can be made, and audio routing is off. The user needs to select one of the 'scenes' to make changes. Each **Scene** will remember what you set it to last, and can be recalled as needed.

Note: most hardware (video boards and such) is limited to 16 channel audio. Certain IP stream inputs may have as many as 32 channels of audio.

4 Setup

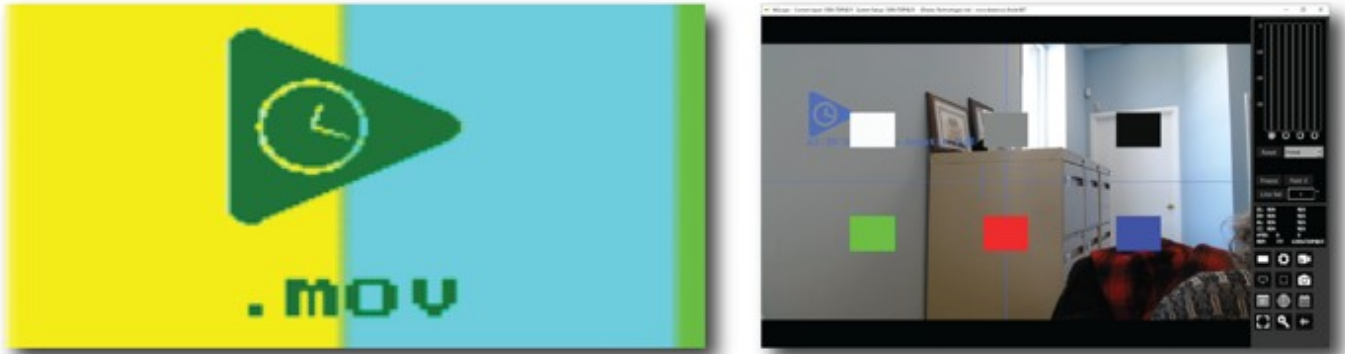
4.1 Install the Software

Install **HDRScope** software on the system. Regardless of the delivery method, the software will be available at some level as an (executable) installable file. Double-click on the file, or right click and select **Open** from the context menu. Follow the prompts to set where the software should be installed and make other installation-specific decisions.

To take full advantage of the hardware based features of **HDRScope**, the system should contain one of the supported AJA, Blackmagic, Matrox or Bluefish444 boards. The board's manufacturers will have up to date recommendations for system specifications.

4.2 License the Software

If you run Drastic software without a license, many of the features will be unavailable. Also, there will be watermarks you cannot remove (image below), 10 second media duration, length of run limitations, no hardware support, nag screen, auto-shutoff, and other significant limitations. To remove these limitations, you will need a valid license.



Sample watermarks

In order to license HDRScope, open HDRScope and navigate to the Settings ("Gear" icon at the bottom right of the application). Next click on the "License" button at the bottom of the Settings menu box and then follow the steps at the following location: <http://license.drastictech.com/>

4.3 Run the Software

Run the software. If the default installation path is used, you can open it at: **Start|Programs|Drastic HDRScope|HDRScope**. The software will then need to be set up.

4.3.1 Confirm Setup

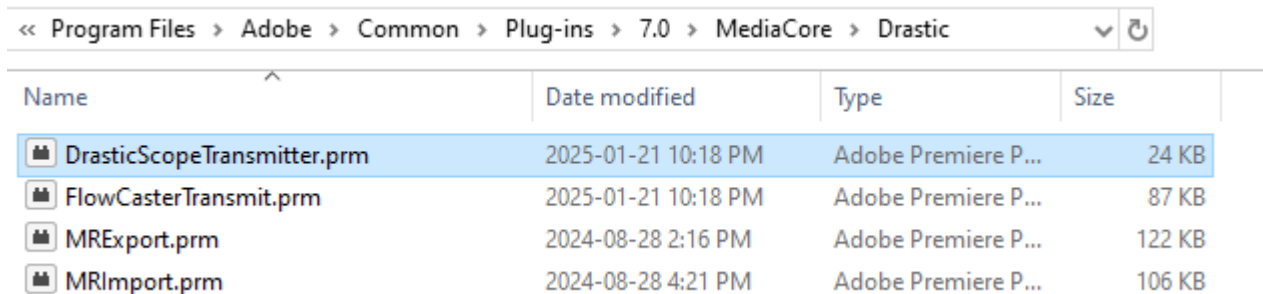
Confirm that the signal you wish to monitor is connected to the correct input(s) of the video board. Click on the **Setup** button to confirm or adjust any settings for the type of signal format being used. Once the system is correctly set up, pressing the **Done** button closes the **Setup** window.





4.4 Using Avid and Adobe ScopeDirect Plugins

HDRScope includes a ScopeDirect plugin that allows users to monitor the main output directly from Adobe, Avid, or OpenFX software without SDI/HDMI or IP Video being used to connect them. This feature lets users analyze the output of these editors through Drastic's wide range of signal analysis tools.

These plugins are installed on Windows if the editor software has been installed. For example, if Adobe has been installed, 4KScope will install its "DrasticScopeTransmitter.prm" plugin in the following folder:

C:\Program Files\Adobe\Common\Plug-ins\7.0\MediaCore\Drastic



<< Program Files > Adobe > Common > Plug-ins > 7.0 > MediaCore > Drastic			
Name	Date modified	Type	Size
 DrasticScopeTransmitter.prm	2025-01-21 10:18 PM	Adobe Premiere P...	24 KB
 FlowCasterTransmit.prm	2025-01-21 10:18 PM	Adobe Premiere P...	87 KB
 MRExport.prm	2024-08-28 2:16 PM	Adobe Premiere P...	122 KB
 MRImport.prm	2024-08-28 4:21 PM	Adobe Premiere P...	106 KB

There will be similar directories for editors like Adobe, DaVinci, Unreal Engine and so on.

4.4.1 Note on macOS ScopeDirect Plugins

Windows installs automatically place the plugins where your editor expects to see them. On mac systems you have to manually add them.

Use "Show Contents" on the HDRScope app. Inside are directories with the zip files.

```
/Applications/HDRScope.app/Contents/Resources/DrasticScope_Monitor.zip  
/Applications/HDRScope.app/Contents/Resources/DrasticScope_OpenIO.zip  
/Applications/HDRScope.app/Contents/Resources/DrasticScopeDirect.zip <- future assimilate  
/Applications/HDRScope.app/Contents/Resources/DrasticScopeTransmitter.zip
```

To install for Avid, unpack DrasticScope_OpenIO.zip to
/Library/Application Support/Avid/AVX2_Plug-Ins/AMA/

To install for Adobe, unpack DrasticScopeTransmitter.zip to

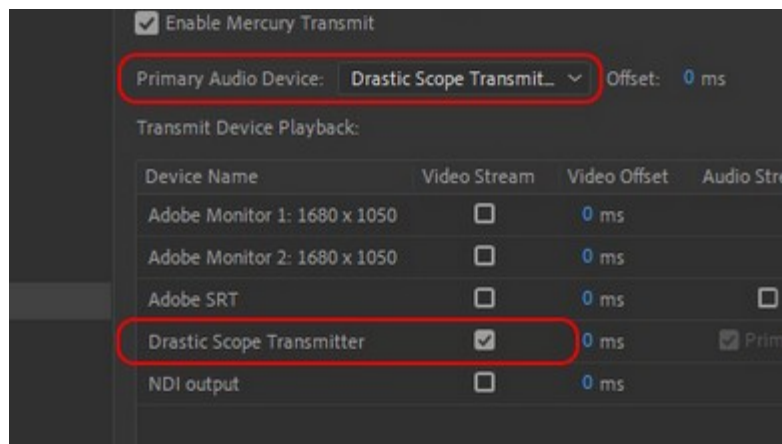
/Library/Application Support/Adobe/Common/Plug-ins/7.0/MediaCore/

To install for OpenFX, unpack DrasticScope_Monitor.zip to
/Library/OFX/Plugins

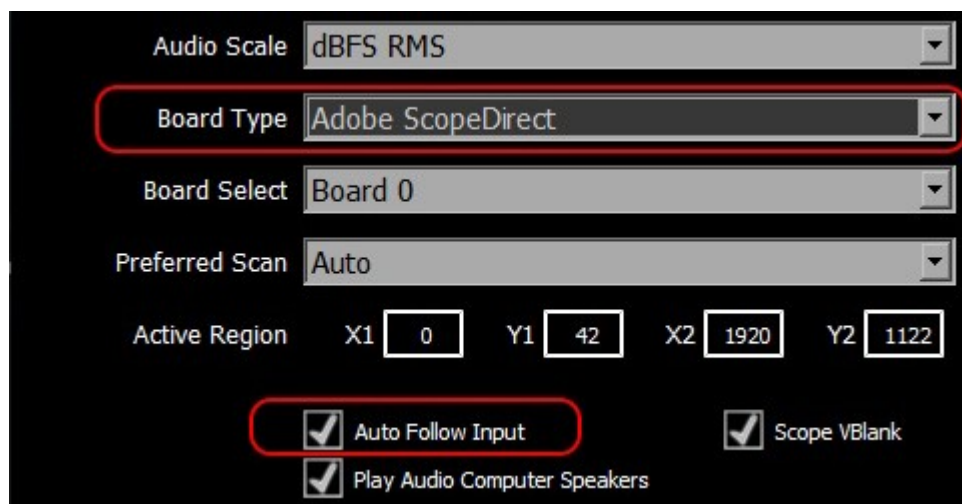
4.4.2 Using ScopeDirect in Adobe

In Premiere Pro, select **Edit | Preferences | Playback** from the menu bar.

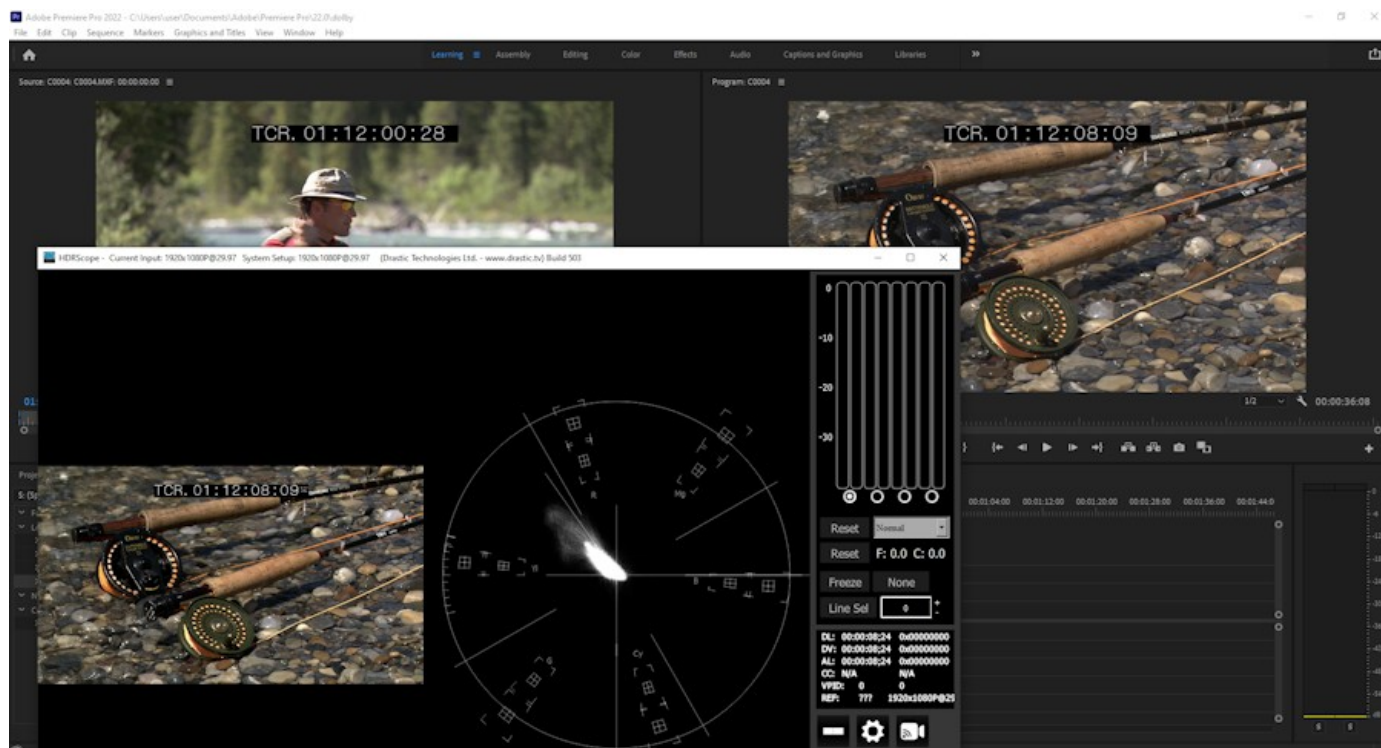
In the **Preferences** window, use the **Primary Audio Device** pulldown to select the **Drastic Scope Transmitter**. Below that, in the **Transmit Device Playback** section, select the Drastic Scope Transmitter.



Open or create a sequence.



Run HDRScope, and open the **Settings** window. Set the **Board Type** to **Adobe ScopeDirect** and check the **Auto Follow Input** box.



With Auto Follow Input checked, HDRScope will change its settings to match the clip and you will see the test clip settings in the top title bar.

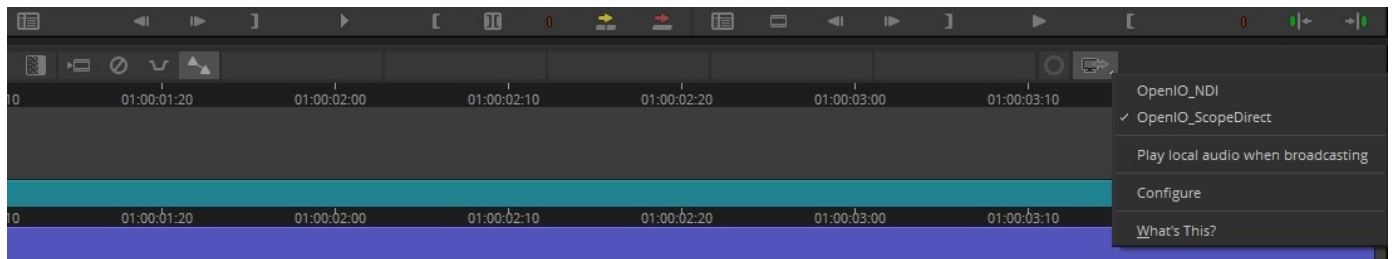
4.4.3 Using ScopeDirect in Avid

Start a new Avid Project. Use settings that match the clip you plan to use. (frame size, interlaced/progressive)

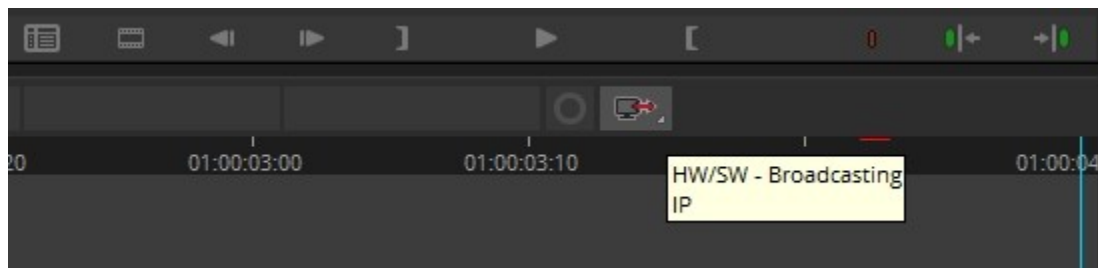
In the **Source Browser** window link the test clip.

Create a sequence to play from the timeline.

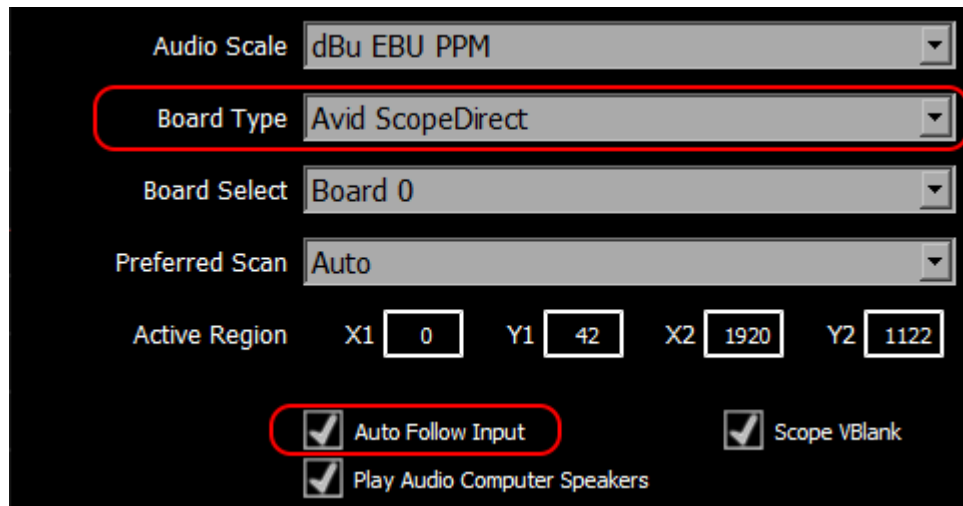
Right click the **HW/SW** button. Confirm **OpenIO_ScopeDirect** is selected.



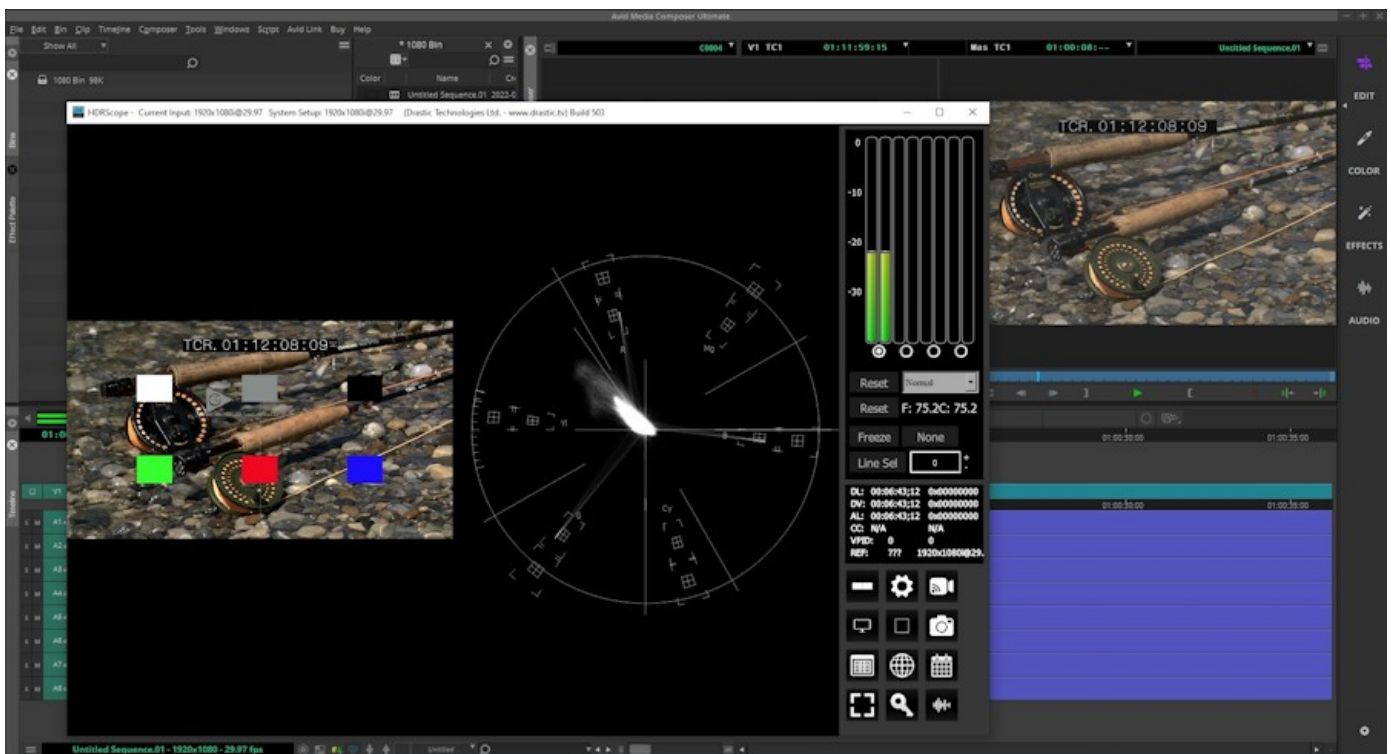
Click on the **HW/SW** button to turn it on. You should see the red arrow flashing.



Run HDRScope. Open the **Settings** window. Set the **Board Type** to **Avid ScopeDirect** and check the **Auto Follow Input** box.



Play the clip from the Media Composer video window - record side, or scrub through the clip on the timeline.



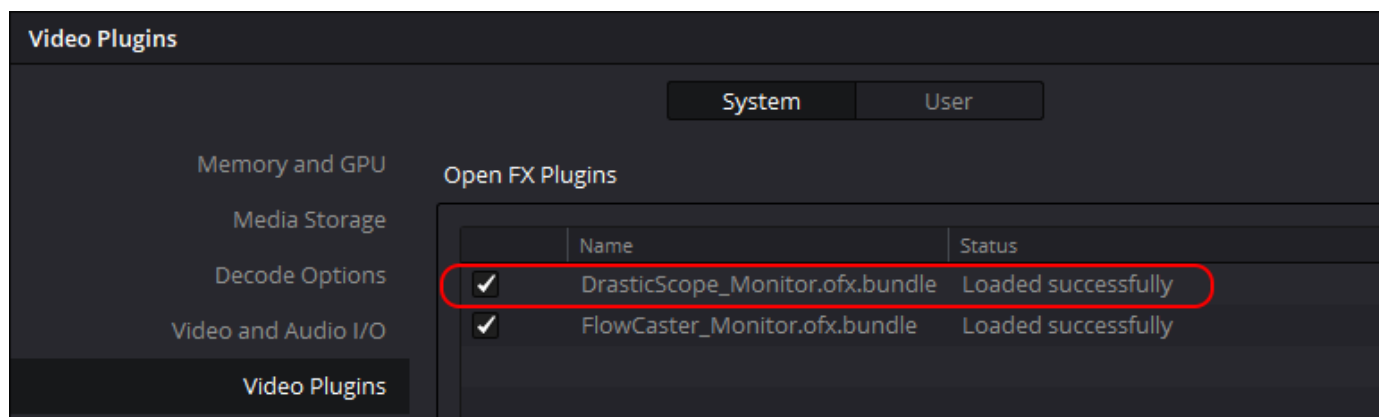
With Auto Follow Input checked, HDRScope will change its settings to match the clip and you will see the test clip settings in the top title bar.

4.4.4 Using ScopeDirect in OpenFX

When you install HDRScope, the install places a ScopeDirect OpenFX plugin, typically in C:\Program Files\Common Files\OFX\Plugins, where OpenFX editors expect to see it.

Note: Various creative software products also support the OpenFX standard and should be able to use ScopeDirect to output to HDRScope, including Autodesk Flame, Foundry Nuke, Sony Catalyst and MAGIX Vegas Pro, Assimilate Scratch, Filmlight Baselight, Boris FX Sapphire and Silhouette, RE:Vision Effects, and others. The following notes are based on testing Blackmagic's DaVinci Resolve.

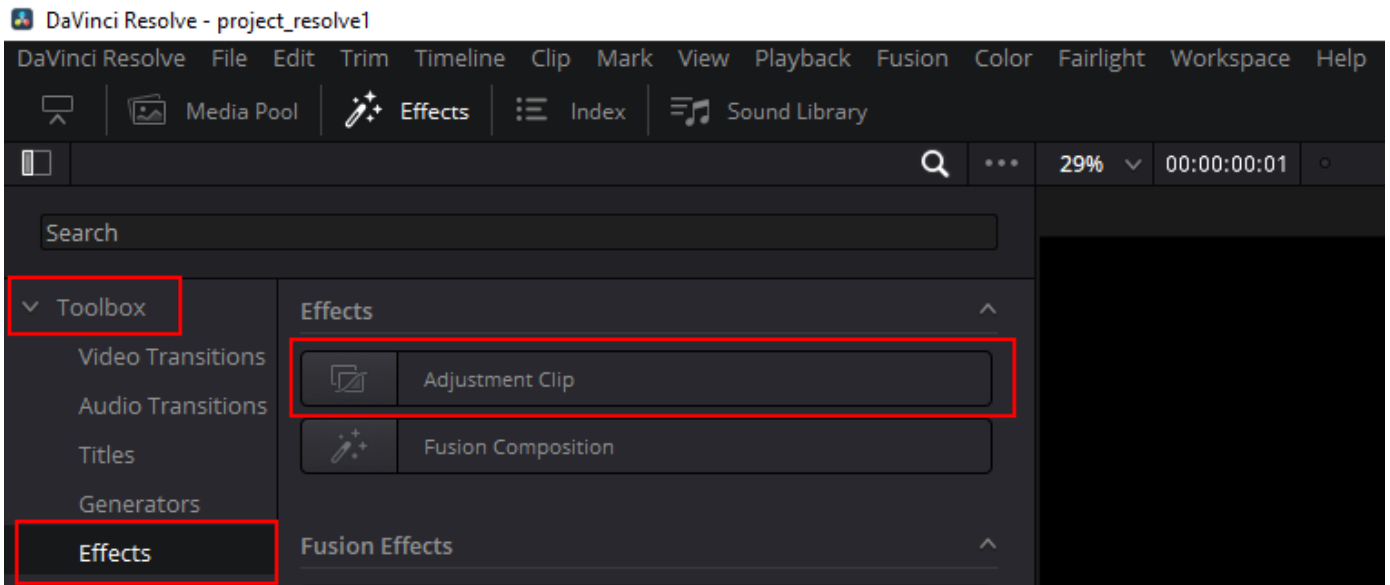
When you run Resolve and open a timeline, you can confirm the plugin has loaded by going to **DaVinci Resolve | Preferences | Video Plugins**:



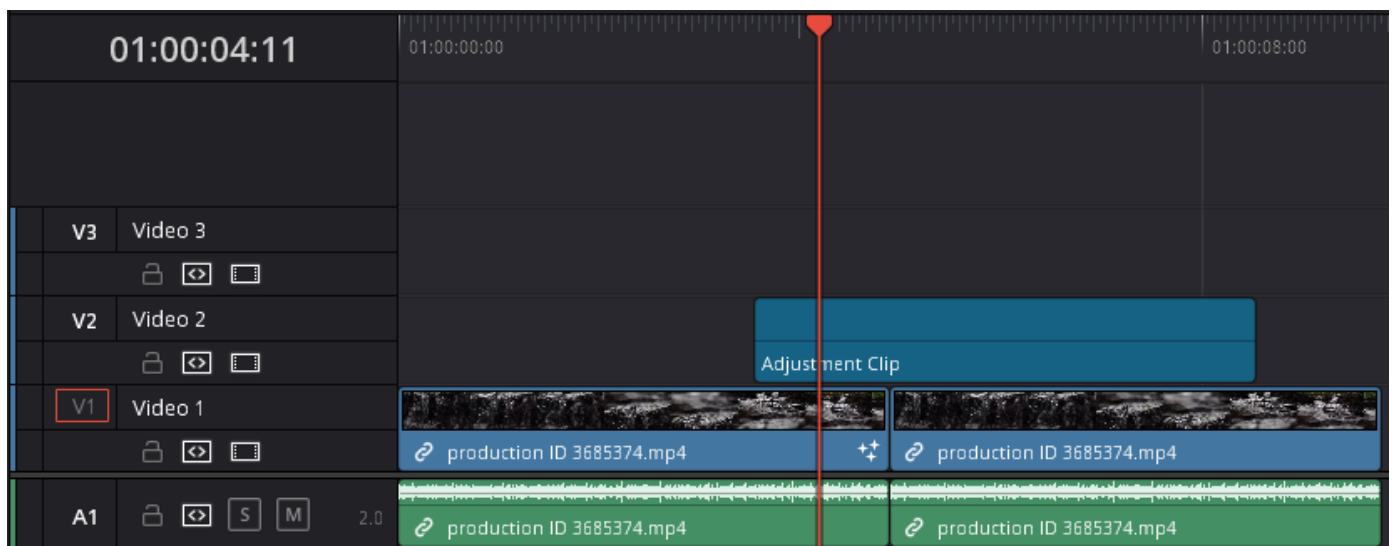
Adjustment Layer Method (Recommended)

To use Drastic's signal analysis tools to monitor the clips in the timeline, you will need to create an adjustment layer above your clips in the timeline in the Edit Page.

Go to **Effects Library | Toolbox | Effects**.



Grab the Adjustment Clip from there, drag and drop it onto the layers you want it to affect. You can stretch the Adjustment Clip to cover the range of clips you want to view by clicking on it and using the handles to resize it.

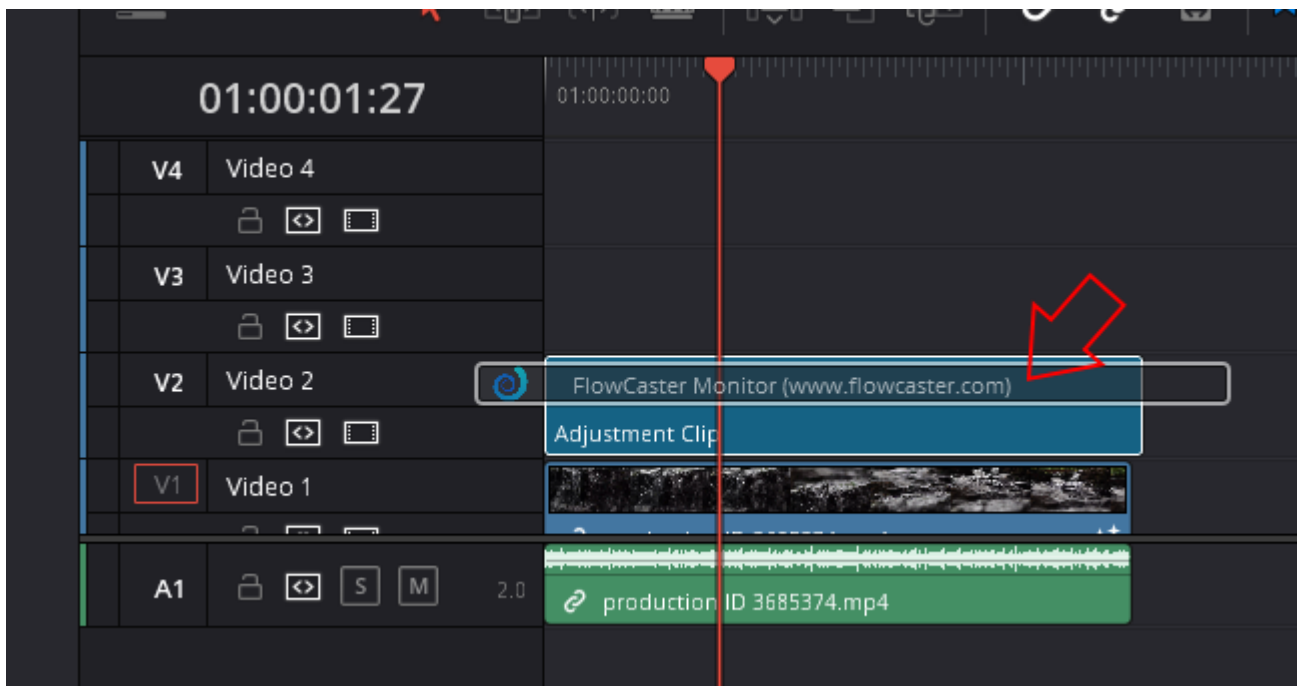


--- Place the plugin on top of that layer

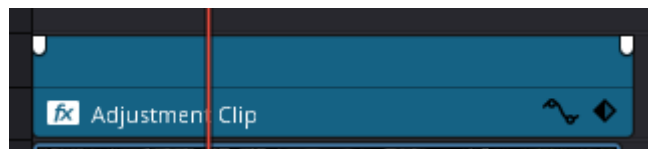
Find **Effects** in the Toolbox in your **Edit Page** on the left side of your timeline.

The ScopeDirect plugin will be at: **OpenFX | Filters | ScopeDirect_Monitor**.

Drag the ScopeDirect plugin on top of that Adjustment Clip.



When the plugin has been dropped onto the Adjustment Clip, an 'fx' icon will be added in its lower left corner.



- Clicking on the Adjustment clip will select it. Go to the **Inspector | Effects | OpenFX** tab, and adjust the settings to match the signal.
- At the bottom of the OpenFX edit window, select **Set New Config**.

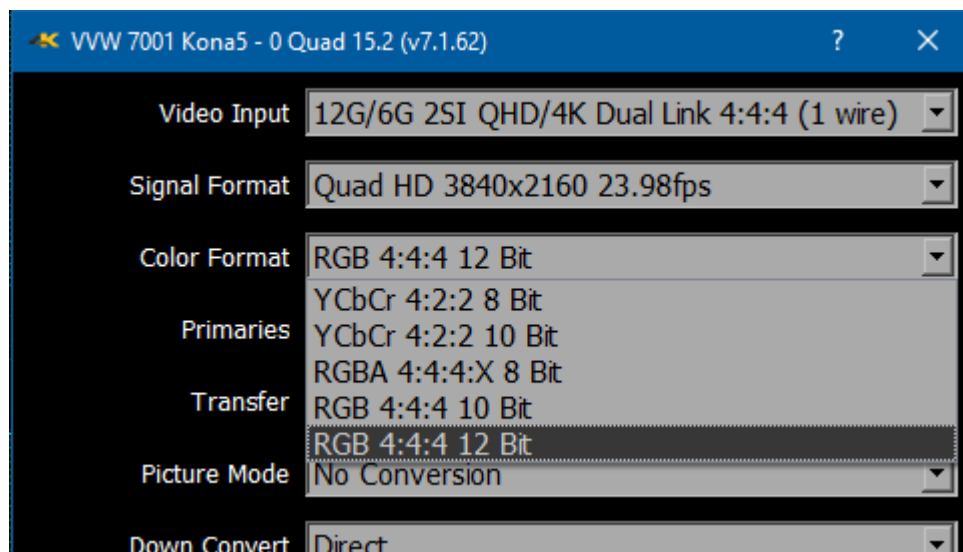
Resolve should then begin sending frames to HDRScope.

4.5 Color Space and HDR/HLG in HDRScope

HDRScope supports 8, 10, and 12 bit color in both YCbCr 4:2:2 and RGB 4:4:4 modes. Correct measurement of signals require the correct setup.

4.5.1 Input Color - YCbCr (YUV) and RGB

Once the signal format is set, the next most important is the overall color format. HDRScope supports YCbCr (broadcast) at 8 and 10 bits, and RGB (post production) at 8, 10 and 12 bit (depending on hardware). For most SDI and HDMI signals you will want to be in YCbCr 10 bit, as this is by far the most common format. Even if the signal source is 8 bit, it will still work in 10 bit and vice versa. If you are monitoring a high end post system (Nucoda, Assimilate, Autodesk, Resolve, etc) then the input may be a 4:4:4 RGB, also known as dual link, input. In this case, it will be either a 10 bit or 12 bit signal. As 10 bit will work for both 10 and 12 source, if the image is incorrect in 12 but correct in 10, then it is likely a 10 bit source. Correct measurement of signals require the correct setup of the bit depth, color format, primaries and transfer mode of the signal you are measuring within HDRScope.



4.5.2 Primaries

HDRScope supports a wide variety of primaries. These describe the color space being used in terms of chrominance and saturation. As a general rule of thumb, the following are the standard primaries for various signal types:

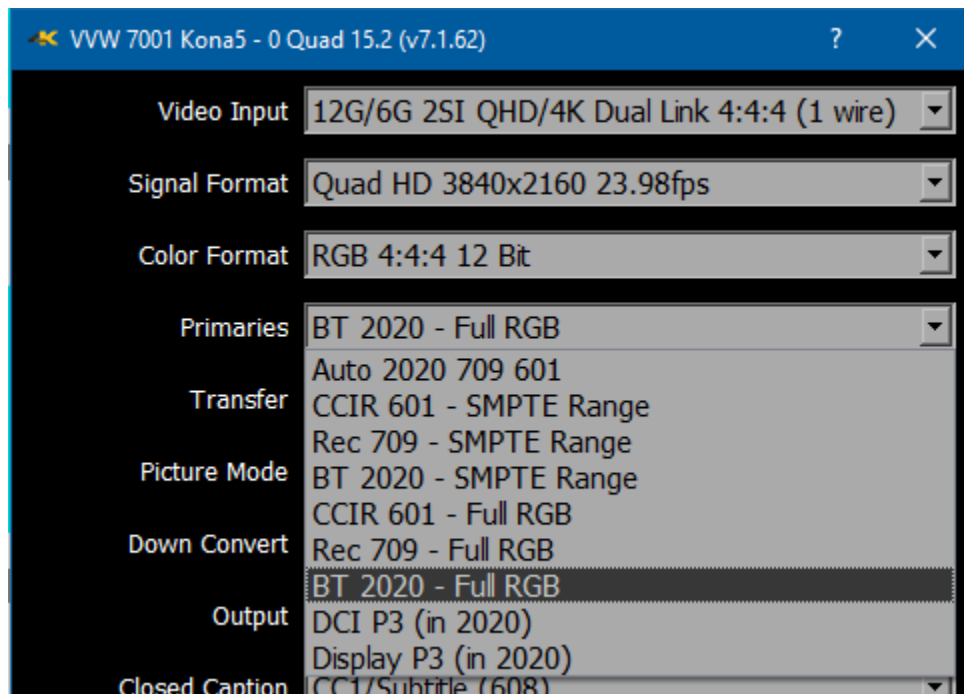
SD - CCIR 601

HD - Rec 709

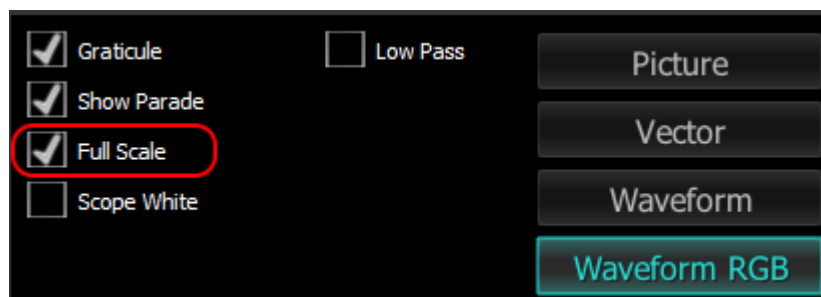
QHD/4K - BT 2020 (but may be Rec 709)

QHD/4K Post - P3/BT 2020/709 (but may be Full Range RGB)

While it is possible to mix these (e.g. send 4K with CCIR 601 primaries), it would be very uncommon. The trickiest part of this configuration can be the SMPTE Video Range vs Full Range RGB, when running in RGB modes. When producing RGB over SDI/HDMI/IP, the creation software can choose to make the 0% color (standard black) and the 100% color (standard white) to be the 0 value and 4095/1023 value. In this case it is using the 'Full' range of the RGB to describe the standard color range. As normal video has a range that allows brighter than white and darker than black, it is very common to duplicate this functionality in RGB space, making standard black 64 and standard white 3760/940. This is known as SMPTE or Video Range. If the signal is using SMPTE or FULL, and HDRScope is set to the opposite, then the graticules will not line up properly. These settings must match.

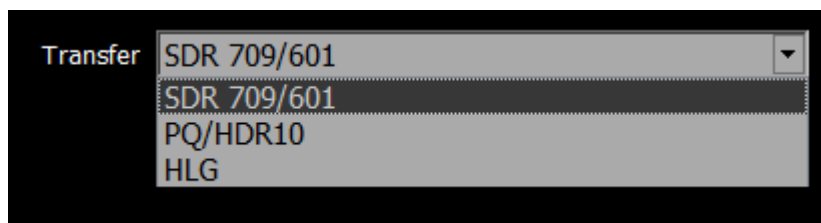


When using RGB Full, it is also important that the RGB Waveform Scope has its 'Full Scale' check box checked or unchecked to match. In some YCbCr cases it needs to be independent from the main primary selection.



4.5.3 Transfer Characteristics

The transfer characteristics describe how the luminance, or brightness, is encoded in the signal. Unless you are measuring a high dynamic range (HDR) signal, this will be set to SDR. If the source is an HDR10, SMPTE 2084 or HDR10+ signal, this should be set to HDR10 (max 10,000 nits). If it is an HLG signal, it should be set to HLG (max 1000 nits).



4.6 Turning Off Background Programs in Linux

If HDRScope is likely to be run with mostly with no direct interaction from the keyboard, and if there is a screen saver/power saver/sleep mode/kernel update set to run, these background programs can cause HDRScope to crash.

Here is how to prevent these from running under Linux.

4.6.1 Disable Hibernation, Sleep

```
sudo systemctl mask sleep.target suspend.target hibernate.target  
hybrid-sleep.target
```

```
sudo systemctl disable
```

```
systemd-hibernate.service  
systemd-hybrid-sleep.service  
systemd-suspend.service
```

4.6.2 Disable Kernel Updates

```
/etc/yum.conf  
add, at the bottom of the file exclude = kernel*
```

4.6.3 Set Default Kernel

```
/etc/default/grub  
GRUB_DEFAULT=saved  
GRUB_SAVEDEFAULT=true
```

5 Operations

HDRScope can be used to view an input signal through supported AJA, Bluefish444, Matrox or Blackmagic video hardware. Once a capable system has been equipped with an install of HDRScope, the user may connect a signal to the appropriate inputs and begin to use the software.

Multiple inputs may be connected to a switcher to compare and adjust any mismatched parameters of setup.

Use the **Setup** Window to confirm or adjust any settings for your video signal.

Use the **Scope Config** window to set the layout (number and arrangement of windows), and which window uses which scope.

At this point if all has been properly set up, the user should be able to view their signal through the appropriate scopes and other signal analysis tools.

5.1 Controlling HDRScope

5.1.1 Zoom and Pan

HDRScope supports zooming the waveform monitors and vectorscope for a closer look at low saturation signals, or the luma elements of the waveform. The live picture can also be zoomed in or out, and panned with the mouse.

To zoom, place the mouse over the picture or scope, and roll the mouse wheel.

To pan the picture, click on it and drag it until the area of interest is visible.

To reset to normal zoom, right click the mouse.

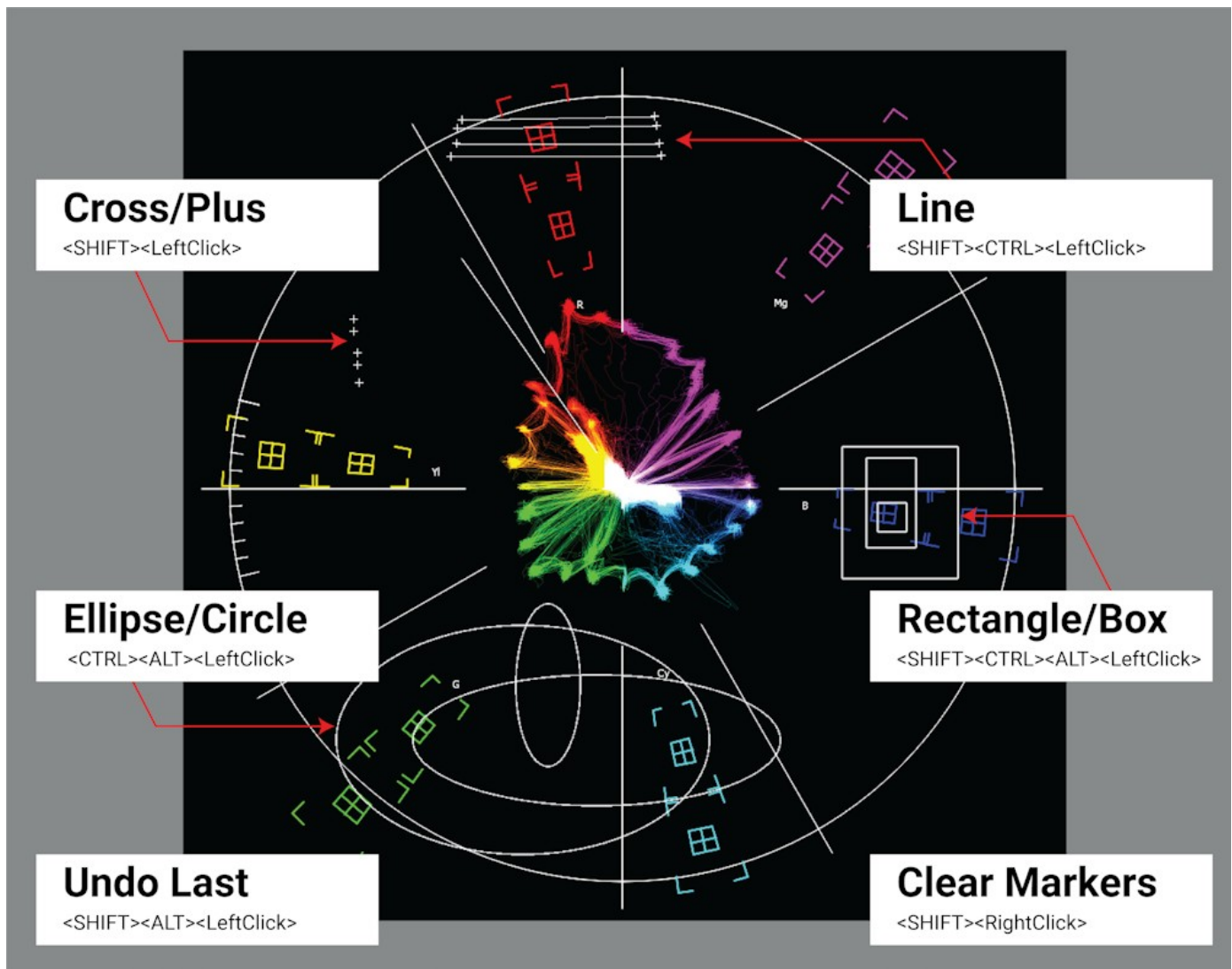
5.1.2 Mouse Control

HDRScope features extended mouse controls. These include:

- <MouseWheel> - zoom in and out symmetrical
- <MouseWheel><Alt> - zoom X axis
- <MouseWheel><Ctrl> - zoom Y axis
- <RightClick> - reset zoom to view all

<LeftClick>Drag - pan and scan the video image in the app
<MiddleClick> - zoom 1:1
<DoubleClick> - enter and exit full screen mode
<T> - enable or disable time code display in full screen

5.1.3 Making Marks/Guides (cross, line and box)



- <SHIFT><LeftClick> - Make a point/cross
- <SHIFT><ALT><LeftClick> - Undo last
- <SHIFT><CTRL><LeftClick> - Drag to make a line
- <SHIFT><CTRL><ALT><LeftClick> - Drag to make a box
- <CTRL><ALT><LeftClick> - Drag to make an ellipse
- <SHIFT><RightClick> - Clear all markers/guides

5.1.4 Frame Compare

HDRScope includes a signal compare feature that can be used to freeze a complete frame of video

(two fields in interlaced), every second line (field) or at a 50/50 dissolve to compare two signals or cameras.

Once frozen, all the standard scopes are still available for setup and comparison. While a frame is frozen, the comparison mode and type of scope can be changed.

To access the frame compare features, press the **Frame Grab** button.

5.1.5 Command Line Parameters

```
4KScope -f -m -s D H P R W V
-f Open in full screen mode
-m Open in maximized mode
-s Open in standard mode
D Show Data view on open
H Show Histogram view on open
P Show Picture view on open
R Show Waveform RGB on open
W Show Waveform on open
V Show Vectorscope on open
```

5.1.6 Set Layout

```
<ALT>-1 - set to single scope
<ALT>-2 - set to two scopes
<ALT>-4 - set to four scopes
<ALT>-6 - set to six scopes
```

5.1.7 Capture Image

<CTRL>-0 Capture uncompressed frames as YUV (8 bit), v210 (10 bit), RGB10 (10 bit)

These are headerless frames, with only the raw data in them. They can be viewed or read in Drastic software like videoQC, DTMediaRead, Net-X-Code Server, etc. Please contact Drastic for the bit format of these files.

```
<CTRL>-1 Capture a full size JPG image (in 8 bit YCbCr only)
<CTRL>-2 Capture a 50% size JPG image (in 8 bit YCbCr only)
<CTRL>-3 Capture a 25% size JPG image (in 8 bit YCbCr only)
<CTRL>-4 Capture a 10% size JPG image (in 8 bit YCbCr only)
<CTRL>-9 Capture a 1% size JPG image (in 8 bit YCbCr only)
```

5.1.8 Other Features

D - Show the frozen frame

F - Toggle full screen

M - Show mix of live and frozen signal

S - Show the live signal

<CTRL><ALT><SHIFT> 0..9 Save a preset to Documents\HDRScope\0..9.ini

<CTRL><ALT> 0..9 Load a preset from Documents\HDRScope\0..9.ini

<CTRL><SHIFT>-D - set the interface dimming for HDR display screens

<CTRL>-F - Freeze and thaw

<ESC> Leave full screen mode

<SPACE> Freeze/Thaw a screen for comparison against live video.

5.2 HDRScope Front Panel Controller

Use the layout menu in the HDRScope GUI to set up the number of screens available to display scopes on.

Once the layout has been set, you can use the front panel controller to change which scope is displayed in which screen, and to set various overlays and methods of display for each scope.

5.2.1 Controls and Displays



Along the left are the LEDs which function as audio meters.

In the center the LCD screen displays various data and menus, and allows the user to navigate to specific scopes to choose which scopes are displayed, and to access settings for each scope. At the right are the controls: The up/down arrows, the left/right arrows, the X, and the check mark. These provide various functions as described below.

5.2.2 Scope Selection

The LCD display will show all the scopes that have been set up. One of the scopes will have angle brackets around it to indicate it is selected.

You can change which scope is selected by using the up/down/left/right arrow keys.

5.2.3 Change Settings For the Scope

Once you have selected a scope, pressing the Check button will bring up the menus for that scope in that location. The menus let you set whether particular graticules are displayed, whether luma or

parade views are displayed for particular scopes, and so on.

You can then go up/down to change the menu you are on and left/right to change the value of that menu.

Pressing the X button will bring you back to the main screen.

5.2.4 Change the Scope

Select the scope you want to change and press the X button; this will show the selection of available scopes and let you select a new scope for that spot.

To select a new scope to display, navigate to it and press the Check button. To cancel, press the X button. Please note, there are more scopes than will fit in one screen. To get the rest of the selections, go to the arrow on the right part of the screen and press the Check button. This will switch to the other screen of choices.

5.2.5 Audio Meters

The LEDs will light up as audio meters going from off to green to orange to red. The time code will be displayed at the bottom of the display, if on the main page.

5.2.6 The Scopes and Settings

The available scopes, overlays, settings options appear on the screen as the text in brackets (below), which are shortened to fit as fields in the LCD display.

Here are the available choices:

<pict >	LCD Picture View
<vect >	LCD Vectorscope
<wrgb >	LCD Waveform Monitor RGB
<wave >	LCD Waveform Monitor YCbCr
<gamut>	LCD Chromaticity Scope
<histo>	LCD Histogram
<timng >	LCD IP Timing
<stat >	LCD Status View
<avect>	LCD Audio Vectorscope
<aphas>	LCD Audio Phase

<ahist>	LCD Audio Histogram
<awave>	LCD Audio Waveform Monitor
<afreq>	LCD Audio Frequency
<meter>	LCD Audio Meters
<asprm>	LCD Audio Spectrum
<data >	LCD Data View
<grat >	LCD Graticule

The available overlays and methods of display for the selected scopes appear on the screen as the text in brackets (below), which are shortened to fit as fields in the LCD display.

Not all choices will be available for all scopes, and certain choices may be scope-specific:

<picture >	Picture Safe
<Action >	Action Safe Overlay
<Graphic >	Graphic Safe Overlay
<Pict Frame>	Picture Frame Overlay
<Active Rgn>	Active Region Overlay
<Title Safe>	Title Safe Overlay
<waveform>	Waveform Overlay
<Graticule >	Graticule Overlay
<100% Marks>	100% Marks Overlay
<75% Marks >	75% Marks Overlay
<AngleMarkr>	Angle Marker Overlay
<Skin Tone >	Skin Tone Overlay
<Show Prade>	Show Parade
<Scp White >	Display the scope using white only
<Scale Type>	Scale Type setting
<Full Scale>	Full Scale Setting
<Only Luma >	Display the scope using only luma
<Color >	Color
<Intensity >	Intensity setting
<vector >	Vectorscope Overlay
<Trngl 601 >	Triangle 601 Overlay
<Trngl 709 >	Triangle 709 Overlay
<Trngl 2020>	Triangle 2020 Overlay
<Trngl P3 >	Triangle P3 Overlay
<Invert >	Invert the black and white in the display
<Black >	Black setting
<Brightness>	Brightness setting
<	> Empty Space
<[>	Open Bracket
<]>	Close Bracket

Specific settings may be available in setting up certain scopes.

- Action Safe
- Title Safe
- Picture Safe
- Graphic Safe
- Active Region
- 8 Bit Processing On/Off
- LissajousXY On/Off
- Lissajous On/Off
- Polar On/Off
- Amp Linear On/Off
- Amp Logarithmic On/Off
- Scale Linear On/Off
- Scale Sqrt On/Off
- Scale Cbrt On/Off
- Scale Logarithmic On/Off
- Scale R Logarithmic On/Off
- Zoom In/Out
- Histogram Type 1
- Histogram Type 2
- Wave MV Scope
- Graticule On/Off
- Lines On/Off
- Marks 100% On/Off
- Marks 75% On/Off
- Angle Marker On/Off
- Skin Tone Marker On/Off
- Drastic Luma Stick On/Off
- Chromaticity/Gamut Scope On/Off
- 709
- 2020
- P3
- Invert Chromaticity Display Black/White
- Chromaticity Black Only
- Intensity Setting
- Quality Setting
- Brightness Setting
- Waveform Parade Display
- Waveform White Only Display
- Illegal Marker On/Off
- Luma Only Display

- RGB Histogram Display
- HSV Histogram Display
- Spectra Histogram Display
- Overlap Histogram Display
- Color Histogram Display
- ST2084 Display
- Full Scale Display
- Intensity Setting
- Quality Setting
- Brightness Setting
- Select Audio Pair

5.2.7 Adding Picture Scope

- Add Picture Scope
 - Action Safe Overlay
 - Graphics Overlay
 - Picture Safe Overlay
 - Active Region Overlay
 - Title Safe Overlay

5.2.8 Adding Vector Scope

- Add Vectorscope
 - Graticule
 - 100% Marks
 - 75% Marks
 - Angle Marker
 - Skin Tone
 - Color
 - Intensity
 - Brightness

5.2.9 Adding Waveform YCbCr Scope

- Add Waveform Monitor
 - Select between (Digital/MV/IRE) Scale Settings
 - Graticule
 - Show Parade Setting

- Luma Only Display
- White Only Display
- MV Scope Scale
- Intensity
- Brightness

5.2.10 Adding Waveform RGB Scope

- Add Waveform RGB
 - Graticule
 - Show Parade
 - Full Scale Setting
 - White Only Display
 - Intensity Setting
 - Brightness Setting

5.2.11 Adding Histogram Scope

- Add Histogram
 - Select between (YCbCr/RGB/HSV/Luma/H/S Scope) Settings
 - Graticule
 - MV Scope Scale

5.2.12 Adding Chromaticity Scope

- Add Chromaticity (Gamut) Scope
 - Graticule
 - TR601 Setting
 - TR 709 Setting
 - TR 2020 Setting
 - TR P3 Setting
 - Invert Black/White Setting
 - Black Only Display

5.2.13 Adding Status Scope

- Add Status Scope
 - Brightness

5.2.14 Adding Audio Phase Scope

Add Audio Phase Scope
Graticule
Brightness Setting

5.2.15 Adding Audio Wave Scope

Add Audio Wave Scope
Graticule
Brightness

5.3 Configuring the Crystalfontz Front Panel Linux

/etc/udev/rules.d/99-usb-crystalfontz.rules

```
SUBSYSTEMS=="usb", KERNEL=="ttyACM[0-9]*", SUBSYSTEM=="tty",  
SYMLINK+="cryfontz", ACTION=="add", ATTRS{idVendor}=="223b", ATTRS  
{idProduct}=="0004", MODE="0666"
```

5.3.1 Permission Commands

```
sudo chown root:root /etc/udev/rules.d/99-usb-crystalfontz.rules
```

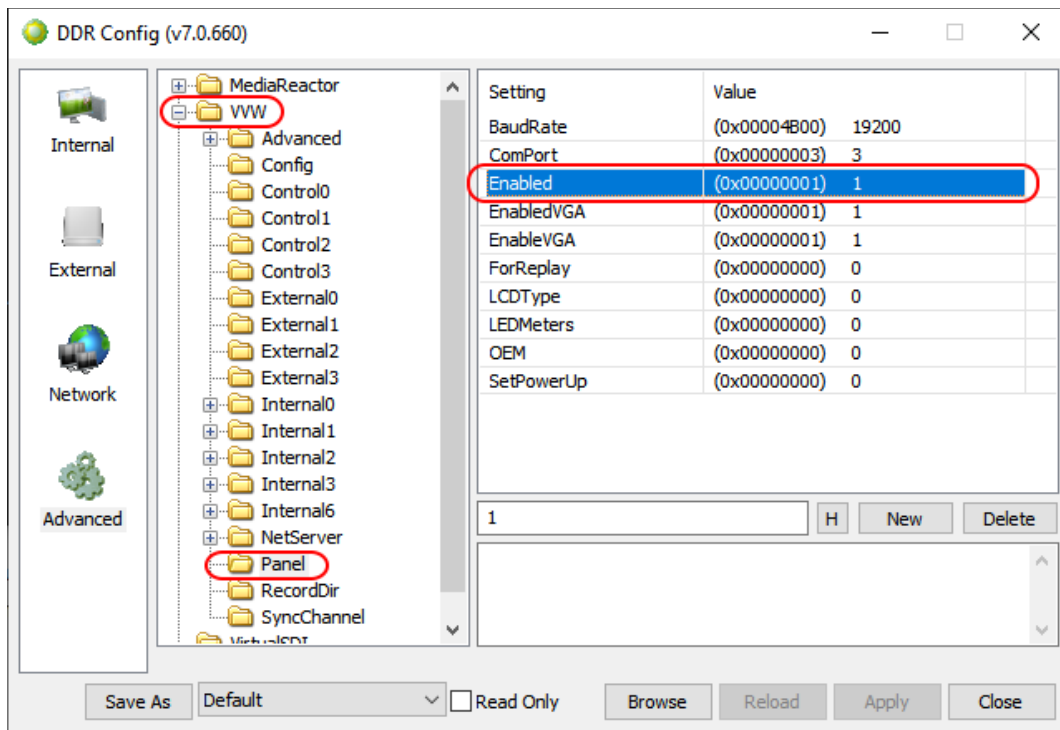
```
sudo chmod 0644 /etc/udev/rules.d/99-usb-crystalfontz.rules
```

```
udevadm control --reload-rules
```

5.3.2 Disabling the Front Panel Controller

In some cases, a demo of HDRScope will take over a front panel controller if a demo is installed on a system. Or you may want to use the front panel controller for other purposes. It is possible to disable HDRScope's use of the controller.

To do this, open **DDRConfig**, and change the config.xml so the /VW/Panel/Enabled = 0



6 REST API Commands

6.1 Basic Command Structure

HDRScope REST API provides many commands that allows you to modify the number of scopes displayed, to select which scopes are displayed, and to adjust specific scope settings.

All commands to HDRScope start with:

`http://127.0.0.1:1080/drasticcmd?`

Most commands must includes an `x=` and `y=` to specify the target scope

`http://127.0.0.1:1080/drasticcmd?x=0&y=1`

The `x` and `y` coordinates represent the positioning of scopes in the form of a grid. This grid has a maximum of 2 rows and 3 columns. The maximum number of scopes that can be displayed is 6 and the minimum is 1 scope. The image below displays 4 possible scope layouts depending on how many scopes the user would like to have active.



The `x` and `y` coordinates can range from (0,0) to (1,2). From the last layout from the image above, the first row is represented by (0,0), (0,1), (0,2) and the second row is represented by (1,0), (1,1), (1,2).

Below is a more detailed explanation about the scope layout.

6.1.1 Number of Scopes

The maximum number of scopes that can be displayed is 6 and the minimum is 1. There are four possibilities on how the scope layout can be displayed. The scope layout can display either 1 scope, 2 scopes, 4 scopes or 6 scopes as provided with the image above. The linear number in the upper left corner in the image below shows each quadrant's ID in the list, while the x/y numbers identify the quadrant's display ID (for positioning and settings). When 4 scopes are visible, we hide scopes 2(0,2) and 5(1,2). For 2 scopes only 0(0,0) and 1(0,1) will be visible.



The **getscopenumber** command will return a value which represents how many scopes are being displayed. It will only return a value of 1, 2, 4 or 6 depending on how many scopes are currently visible. The command below will return how many scopes are currently visible.

<http://127.0.0.1:1080/drasticcmd?getscopenumber=>

```
{
  "response": 0.
  "value": 4
}
```

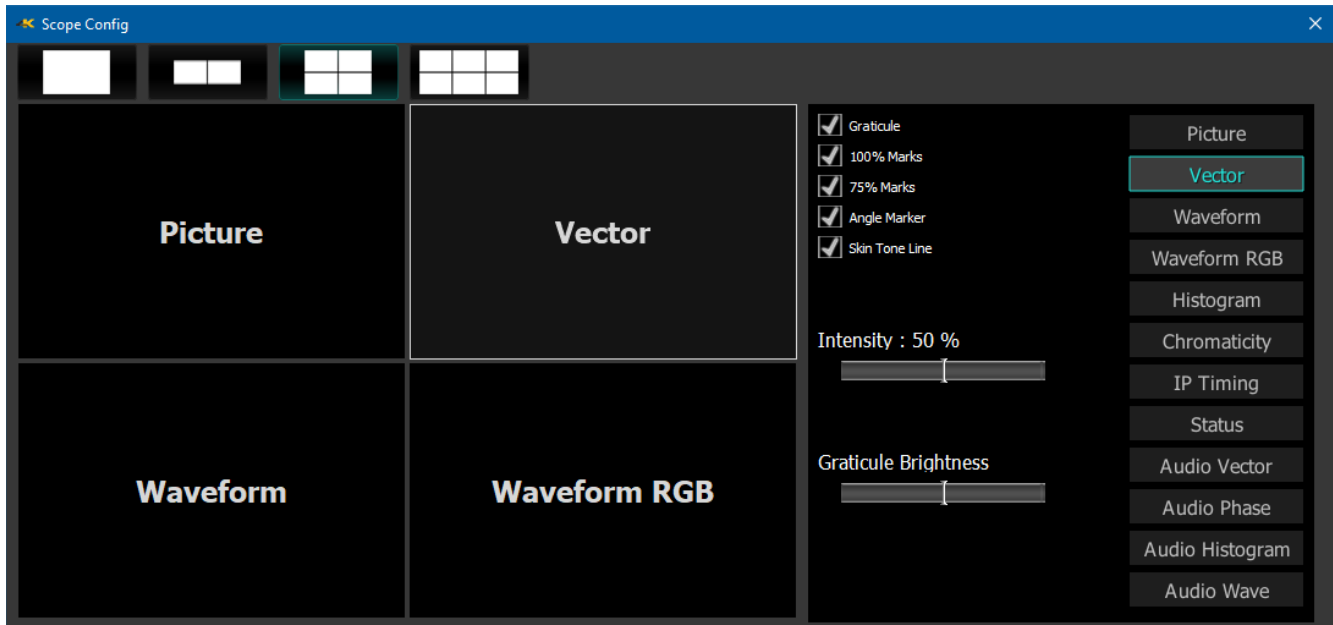
The **setscopenumber** command will allow you to change the number of scopes that are displayed. There are only 4 possible input values when using this command. **setscopenumber** can only be set to 1, 2, 4, or 6. The command below will set the number of scopes visible to 2 scopes.

<http://127.0.0.1:1080/drasticcmd?setscopenumber=2>

```
{
  "response": 0.
}
```

6.1.2 Set/Get Individual Scopes

The commands below provide ways of getting a specific scope and setting a specific scope. The user must make sure the x and y coordinates are within the range of the number of scopes present. From the image below, the selected scope is a Vectorscope as it is highlighted and has an x and y coordinate of (0,1).



The **getscope** command will return a value representing a specific scope type. The user must specify the x and y coordinates in order to get the desired scope. The list below provides scope values and their corresponding scope type. The command for getting the Vectorscope from the image above is provided below.

<http://127.0.0.1:1080/drasticcmd?x=0&y=1&getscope=>

```
{
  "response": 0.
  "value": 1
}
```

The user can then compare this value to the values in the list and find the corresponding scope

List of scope values vs names

- 0 = picture
- 1 = vector
- 2 = waveformrgb
- 3 = waveform
- 4 = histogram
- 5 = gamut

- 6 = timing
- 10 = status
- 11 = audiovector
- 12 = audiophase
- 13 = audiohistogram
- 14 = audiowave
- 15 = audiometers
- 16 = surroundmeters
- 17 = loudnessmeters
- 20 = data

The **setscope** command will allow the user to change the scope based on the x and y coordinates and the scope type name. The command below will change the scope at (0,1) which is the Vectorscope to a Histogram scope

<http://127.0.0.1:1080/drasticcmd?x=0&y=1&setscope=histogram>

```
{
    "response": 0.
}
```

6.1.3 Set/Get Audio Meters

Not Implemented Yet

<http://127.0.0.1:1080/drasticcmd?getmeters=>

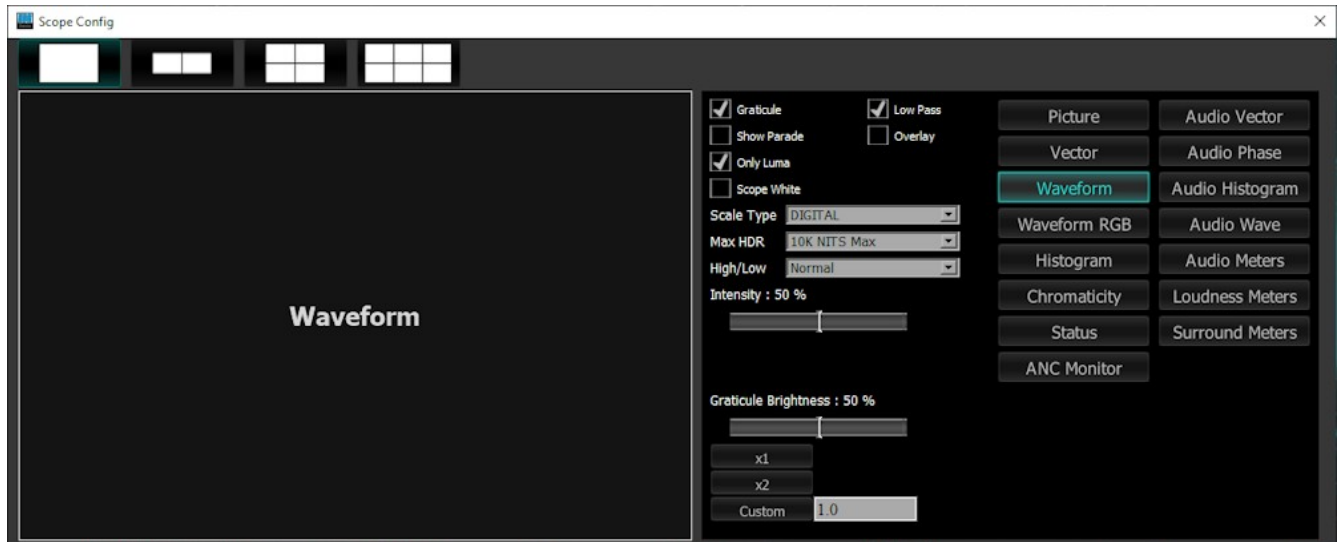
```
{
    "response": 0.
    "value": 2
}
```

<http://127.0.0.1:1080/drasticcmd?setmeters=0>

```
{
    "response": 0.
}
```

6.1.4 Set/Get Scope Settings

The commands below provide ways of getting the settings of a scope or assigning a value to a setting of a specific scope. The image below displays a Waveform scope with multiple settings such as Graticule, Show Parade, Only Luma, Scope White, Intensity and Graticule Brightness.



The list below provides correct input setting name commands according to a specific scope setting

- Active Picture = **activepicture**
- Graphic Safe = **graphicsafe**
- Picture Safe = **picturesafe**
- Active Region = **activerregion**
- Title Safe = **titlesafe**
- Graticule = **graticule**
- 100 Marks = **100marks**
- 75 Marks = **75marks**
- Angle Marker = **anglemarker**
- Skin Tone Line = **skintoneline**
- Color = **color**
- Intensity = **intensity**
- Brightness = **brightness**
- Show Parade = **showparade**
- Only Luma = **onlyluma**
- Scope White = **scopewhite**
- Scale Type = **scaletype**
- Full Scale = **fullscale**
- Triangle 601 = **triangle601**

- Triangle 709 = `triangle709`
- Triangle 2020 = `triangle2020`
- Triangle P3 = `trianglep3`
- Invert = `invert`
- Black = `black`
- Histogram Type = `histogramtype`
- Audio Vector Type = `audvectortype`
- Audio Histogram Log = `audhistlog`
- Audio Histogram Scale = `audhistscale`
- Display Mode = `displaymode`
- Freeze = `freeze`
- Line Select = `lineselect`
- Wave Hi/Lo = `wavehilo`
- Overlay = `overlay`
- Lowpass = `lowpass`
- Display None = `display_none`
- Display Luma = `display_luma`
- Display Red = `display_red`
- Display Green = `display_green`
- Display Blue = `display_blue`
- Display Edges = `display_edges`
- Display False = `display_false`
- Display Alpha = `display_alpha`
- Display Focus = `display_focus`
- Display Zebraluma = `display_zebraluma`
- Display Zebrachroma = `display_zebrachroma`
- Display Clip = `display_clip`
- Display Calibrate = `display_calibrate`
- Display HDR False = `display_hdrfalse`
- Display Weighted RGB = `display_weightedrgb`
- Display Weighted = `display_weighted`
- Display FlipFlop = `display_flipflop`
- Display Opacity = `display_opacity`
- Display Key Luma = `display_keyluma`
- Display Key Green = `display_keygreen`
- Display Key Chroma = `display_keychroma`

The **getsetting** command allows the user to get a specific setting from a scope based on the x and y coordinates provided and the setting name. From the image above, only one scope is present which is the Waveform scope. This scope has (x,y) coordinates of (0,0). The command below will give us the value of the setting Graticule for this Waveform scope

`http://127.0.0.1:1080/drasticcmd?x=0&y=0&getsetting=graticule`

{

```
    "response": 0.  
    "value": 1  
}
```

Since the Graticule box is checked, it is returning a value of 1.

The command below will return the setting value of Show Parade

<http://127.0.0.1:1080/drasticcmd?x=0&y=0&getsetting=showparade>

```
{  
    "response": 0.  
    "value": 0  
}
```

Since the Show Parade box is unchecked it will return a value of 0.

When dealing with checkboxes, a checkbox will either return a value of 1 or 0. If the value is 1 then a checkbox is checked, if 0 then it is not checked. Getting the setting value of Intensity or Graticule Brightness will return the numeric value it is currently set to.

Some scopes may have a pulldown menu with many options. As an example, we can assume the Waveform scope from above has a pulldown setting item called ColorSelection. ColorSelection contains options such as red, blue and green. We can say red, blue and green are stored in a list called colorsList somewhere in the back end of the code. Assume green is already selected. The command below will give us the value of the setting ColorSelection.

<http://127.0.0.1:1080/drasticcmd?x=0&y=0&getsetting=ColorSelection>

```
{  
    "response": 0.  
    "value": 2  
}
```

You can think of colorsList as a list that contains three items, red, blue and green with the corresponding numeric value automatically assigned.

colorsList:

- red = 0
- blue = 1
- green = 2

Each item in the list has a corresponding number value. The user can get information based on the number value returned from the setting. Since the command above returned a value of 2, the color green must be the current setting value of the scope setting ColorSelection.

The **setsetting** command allows the user to set a value to a specific setting. To set a scope setting the user must provide: the x and y coordinate of the desired scope, the scope setting name and a value to set the setting. From the image above, Scope White is unchecked. The command below will set the Scope White setting value to 1. This will allow the Scope White checkbox to be checked

<http://127.0.0.1:1080/drasticcmd?x=0&y=0&setsetting=scopewhite&value=1>

```
{  
    "response": 0.  
}
```

The command below will set the Graticule checkbox to be unchecked

```
http://127.0.0.1:1080/drasticcmd?x=0&y=0&setsetting=graticule&value=0
{
    "response": 0.
}
```

If the scope setting is a checkbox, a value of only 1 or 0 should be used when setting the value. A numeric value between 0-100 can be used when assigning a value to the scope settings Intensity or Graticule Brightness. The command below will change the value of the Intensity setting from the image above from 50 to 60.

```
http://127.0.0.1:1080/drasticcmd?x=0&y=0&setsetting=intensity&value=60
{
    "response": 0.
}
```

Referring back to the setting ColorSelection above, user can set the value of this setting using a numeric value. The command below will set the ColorSelection setting to blue.

```
http://127.0.0.1:1080/drasticcmd?x=0&y=0&setsetting=ColorSelection&value=1
{
    "response": 0.
}
```

The command above looks for the setting ColorSelection and assigns it a value of 1. The value of one is passed back into the code and will be sent to the colorsList.

colorsList:

- red = 0
- blue = 1
- green = 2

Since we set the value of the setting ColorSelection to be 1, it will now set the setting ColorSelection to a value of blue (1).

Drastic Technologies Ltd. does not assume responsibility for loss or damage resulting from errors, omissions, or inaccuracies herein. This document is subject to change, and revisions may be made and issued to include such changes.

No part of this document may be reproduced, saved to a storage and retrieval system, or transmitted in any form or by any means, electronic, mechanical, recorded, or otherwise without the prior written consent of Drastic Technologies Ltd.

This manual has been compiled to assist the user in their experience using **DrasticScope** software. It is believed to be correct at the time of writing, and every effort has been made to provide accurate and useful information. Any errors that may have crept in are unintentional and will hopefully be purged in a future revision of this document. We welcome your feedback.

Drastic Technologies Ltd
523 The Queensway, Suite 201
Toronto, ON, M8Y 1J7
Canada
(416) 255 5636
(416) 255 8780

Copyright 2025 © Drastic Technologies Ltd. All rights reserved. Software products licensed are owned by Drastic Technologies Ltd. and are protected by international treaty provisions and national copyright laws. All Rights Reserved.