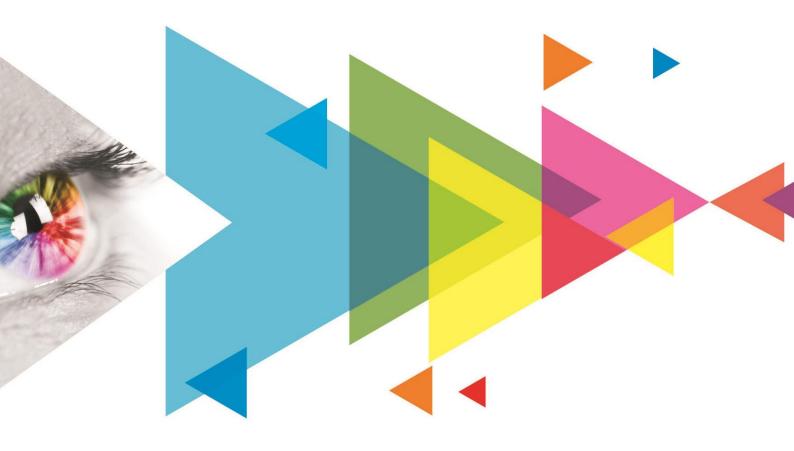


# MCTRL4K

## **LED Display Controller**



## **User Manual**

## Change History

Document Version	Release Date	Description			
V1.2.0	2022-04-01	<ul><li>Added the function of switching from RGB limited to RGB full.</li><li>Added the phase offset function.</li></ul>			
V1.1.1	2020-07-18	Optimized the document content and style.			
V1.1.0	2019-09-04	<ul> <li>Added the 3D function.</li> <li>Added the low latency function.</li> <li>Added the function of individual gamma adjustment for RGB.</li> <li>Added HLG mode.</li> <li>Added the image settings function.</li> <li>Added the function of input source bit depth settings on the control computer.</li> <li>Added the function of importing custom EDID.</li> <li>Added support for the 25Hz frame rate.</li> <li>Added the function of adaptation to decimal frame rates.</li> <li>Optimized HDR10 performance by adding low grayscale mode adjustment.</li> <li>Optimized the Mapping function illustration diagram.</li> </ul>			
V1.0.0	2019-09-26	First release			

## Contents

1.1 Introduction       1         1.2 Features       1         2 Appearance       2         3 Applications       5         4 Cascade Devices       6         5 Home Screen       7         6 Menu Operations       9         6.1 Oluck Screen Configuration       9         6.1.1 Step 1: Set Input Mode       9         6.1.2 Step 2: Set Input Resolution       10         6.1.3 Step 3: Guickly Configure the Screen       13         6.2 Brightness Adjustment       14         6.3 Screen Settings       14         6.3 Screen Settings       14         6.3 I Advanced Configuration       15         6.4 Display Control       15         6.4 Display Control       15         6.5 A Mapping Function       16         6.5 1 Mapping Function       16         6.5 4 Stave to Hardware       18         6.5 5 Redundancy Settings       18         6.5 6 A Display Control       26         7 Operations on PC       26         7 2 Low Latency       28         7 3 Input Source Bit Depth.       30         7 4 2 Operations on PC       32         7 5 Software Operations on PC       33         7 4	1 Overview	1
2 Appearance	1.1 Introduction	1
3 Applications       5         4 Cascade Devices       6         5 Home Screen       7         6 Menu Operations       9         6.1 Quick Screen Configuration       9         6.1.1 Step 1: Set Input Mode       9         6.1.2 Step 2: Set Input Resolution       10         6.1.3 Step 3: Quickly Configure the Screen       13         6.2 Brightness Adjustment       14         6.3 Screen Settings       14         6.3.1 Advanced Configuration       14         6.3.2 Image Offset       15         6.4 Display Control       15         6.5 Advanced Settings       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Factory Reset       18         6.5.7 HDR       18         6.5.8 Ostings       21         6.5.9 Genlock Settings       22         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Lowe Latency       28	1.2 Features	1
3 Applications       5         4 Cascade Devices       6         5 Home Screen       7         6 Menu Operations       9         6.1 Quick Screen Configuration       9         6.1.1 Step 1: Set Input Mode       9         6.1.2 Step 2: Set Input Resolution       10         6.1.3 Step 3: Quickly Configure the Screen       13         6.2 Brightness Adjustment       14         6.3 Screen Settings       14         6.3.1 Advanced Configuration       14         6.3.2 Image Offset       15         6.4 Display Control       15         6.5 Advanced Settings       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Factory Reset       18         6.5.7 HDR       18         6.5.8 Ostings       21         6.5.9 Genlock Settings       22         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Lowe Latency       28	2 Appearance	2
4 Cascade Devices       6         5 Home Screen       7         6 Menu Operations       9         6.1 Quick Screen Configuration       9         6.1.1 Step 1: Set Input Mode       9         6.1.2 Step 2: Set Input Resolution       10         6.1.3 Step 3: Quickly Configure the Screen       13         6.2 Brightness Adjustment       14         6.3.1 Advanced Configuration       14         6.3.1 Advanced Configuration       14         6.3.1 Advanced Configuration       15         6.4 Display Control.       15         6.4 Display Control.       15         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       21         6.5.6 Factory Reset       18         6.5.7 UBR       22         6.5.8 Obstitings       26         6.5.9 Genicok Setting       26         6.5.0 Gornunication Settings       26         6.5.1 Hardware Version       26         6.5.2 Operations on PC       27         7 Operations on PC       28         7.4 Operations on PC <td></td> <td></td>		
5 Home Screen       7         6 Meru Operations       9         6.1 Quick Screen Configuration       9         6.1.1 Step 1: Set Input Mode       9         6.1.2 Step 2: Set Input Resolution       00         6.1.3 Step 3: Quickly Configure the Screen       13         6.2 Brightness Adjustment       14         6.3 Screen Settings       14         6.3.1 Advanced Configuration       14         6.3.2 Image Offset       15         6.4 Display Control.       15         6.5 Advanced Settings.       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Screen Settings       18         6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       18         6.5.6 ThDR       18         6.5.6 Redundancy Settings       21         6.5.8 3D Settings       21         6.5.9 Genlock Setting       26         6.5.1 Mapring Function Files       26         6.5.6 Communication Setting       26         6.5.7 HDR       18         6.5.6 Communication Setting       26         6.5.7 HDR       28         7.1 Individual Gamma Adjustment for RGB		
6 Menu Operations       9         6.1 Quick Screen Configuration       9         6.1.1 Step 1: Set Input Mode       9         6.1.2 Step 2: Set Input Resolution       10         6.1.3 Step 3: Quickly Configure the Screen       13         6.2 Brightness Adjustment       14         6.3 Screen Settings       14         6.3.1 Advanced Configuration       14         6.3.2 Image Offset       15         6.4 Display Control.       15         6.5 Advanced Settings.       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.3.5 Redundancy Settings       18         6.5.6 Redundancy Settings       18         6.5.7 HDR.       18         6.5.7 HDR.       18         6.5.8 3D Settings       21         6.5.9 Genlock Settings       22         6.5.1 Mayner May Settings       26         6.5.2 Low Latency       28         7.1 Destings       26         6.5.6 Rotory Reset       18         6.5.7 HDR.       26         6.5.8 D Settings       21         6.5.9 Genlock Setting       26         6.5.10 Hardware Version       26		
6.1 Quick Screen Configuration       9         6.1.1 Step 1: Set Input Mesolution       10         6.1.2 Step 2: Set Input Resolution       10         6.1.3 Step 3: Quickly Configure the Screen       13         6.2 Brightness Adjustment       14         6.3 Screen Settings       14         6.3 Advanced Configuration       14         6.3.1 Advanced Configuration       14         6.3.2 Image Offset       15         6.4 Display Control.       15         6.4 Advanced Settings       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       21         6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.8 Obstings       21         6.5.9 Genlock Setting       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth       30         7.4 Operations on PC       33         7.5 StmartLCT </td <td></td> <td></td>		
6.1.1 Step 1: Set Input Resolution       9         6.1.2 Step 2: Set Input Resolution       10         6.1.3 Step 3: Quickly Configure the Screen       13         6.2 Brightness Adjustment       14         6.3 Screen Settings       14         6.3.1 Advanced Configuration       14         6.3.1 Advanced Configuration       14         6.3.2 Lange Offset       15         6.4 Display Control.       15         6.4 Display Control.       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Factory Reset       18         6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.6 Communication Settings       21         6.5.6 Gould Cabinet Meritings       26         6.5.7 I DR       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth.       30         7.4 Diperations on PC       33         7.5 Software Operations on PC       33         7.5 Software Operations on PC       33 <tr< td=""><td>•</td><td></td></tr<>	•	
6.1.2 Step 2: Set Input Resolution       10         6.1.3 Step 3: Quickly Configure the Screen       13         6.2 Brightness Adjustment       14         6.3 Screen Settings       14         6.3.1 Advanced Configuration       14         6.3.2 Image Offset       15         6.4 Display Control       15         6.5 Advanced Settings       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       18         6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.7 HDR       18         6.5.7 Operations on PC       26         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth       30         7.4 Operations on PC       33         7.5 Stimware Operations on PC       33	•	
6.1.3 Step 3: Quickly Configure the Screen       13         6.2 Brightness Adjustment       14         6.3 Screen Settings       14         6.3.1 Advanced Configuration       14         6.3.2 Image Offset       15         6.4 Display Control       15         6.5 Advanced Settings       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Factory Reset       18         6.5.7 HDR       18         6.5.8 aD Settings       21         6.5.9 Genlock Setting       26         6.5.1 O Hardware Version       26         6.5.2 Load Cabinet Configuration Files       21         6.5.5 Factory Reset       18         6.5.6 Communication Settings       21         6.5.7 HDR       26         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       278         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth       30         7.4 2 Operations on PC <t< td=""><td></td><td></td></t<>		
6.2 Brightness Adjustment       14         6.3 Screen Settings       14         6.3.1 Advanced Configuration       14         6.3.2 Image Offset       15         6.4 Display Control       15         6.5 Advanced Settings       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         7.6.5 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       18         6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.8 Openicock Setting       21         6.5.9 Genlock Setting       22         6.5.10 Hardware Version       26         6.5.2 Load Rubings       21         6.5.3 Genduck Setting       22         6.5.4 Gommunication Settings       22         6.5.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.4 Deperations on PC       33         7.5 Software Operations on PC <td></td> <td></td>		
6.3 Screen Settings       14         6.3.1 Advanced Configuration       14         6.3.2 Image Offset       15         6.4 Display Control.       15         6.5 Advanced Settings       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds       18         6.5.5 Redundancy Settings       18         6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.8 do Settings       21         6.5.9 Genlock Settings       21         6.5.9 Genlock Settings       22         6.6 Communication Settings       26         6.7 Language.       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB.       28         7.2 Low Latency       28         7.4 Deprations       32         7.5 Software Operations on PC       33         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.5.2 SmartLCT       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       33		
6.3.1 Advanced Configuration       14         6.3.2 Image Offset       15         6.4 Display Control.       15         6.4 Display Control.       15         6.5 Advanced Settings.       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       18         6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.8 3D Settings       21         6.5.9 Genlock Setting       26         6.5.10 Hardware Version       26         6.5.10 Hardware Version       26         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth       30         7.4 Deprations on PC       32         7.5 Software Operations on PC       33         7.5 Software Operations on PC       33         7.5 Software Operations on PC       33         7.5 Software Operations on PC		
6.3.2 Image Offset       15         6.4 Display Control.       15         6.4 Display Control.       15         6.5 Advanced Settings.       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files.       17         6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       18         6.5.6 Factory Reset       18         6.5.7 HDR.       18         6.5.7 Genicok Settings       21         6.5.8 3D Settings       21         6.5.9 Genicok Setting       26         6.5.10 Hardware Version       26         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth.       30         7.4 Operations on PC       33         7.5 Software Update       33         7.6 Pirmware Update       33     <		
6.4 Display Control.       15         6.5 Advanced Settings.       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       18         6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.8 3D Settings       21         6.5.9 Genlock Setting       26         6.5.10 Hardware Version       26         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth       30         7.4 Deprations on PC       33         7.5 Offware Operations on PC       33         7.5 Software Operations on PC       33         7.5.2 SmartLCT       33         7.6 Firmware Update       33         7.6.1 NovaLCT       33		
6.5 Advanced Settings.       16         6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds.       18         6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       18         6.5.6 Factory Reset.       18         6.5.7 HDR       18         6.5.8 3D Settings       21         6.5.9 Genlock Setting.       26         6.5.0 Hardware Version       26         6.5.10 Hardware Version       26         6.6 Communication Settings.       26         6.7 Language.       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB.       28         7.2 Low Latency.       28         7.3 Input Source Bit Depth.       30         7.4 Operations on Web Page.       31         7.4.1 Environment Configuration       32         7.5.2 Software Operations on PC       33         7.5.2 Software Update       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT.       34	•	
6.5.1 Mapping Function       16         6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       18         6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.6 Factory Reset       21         6.5.7 HDR       18         6.5.6 Factory Reset       21         6.5.7 HDR       21         6.5.9 Genlock Setting       26         6.5.10 Hardware Version       26         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth       30         7.4 Operations on Web Page       31         7.4.1 Environment Configuration       32         7.5.1 NovaLCT       33         7.5.2 SmartLCT       33         7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       34		
6.5.2 Load Cabinet Configuration Files       17         6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       18         6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.8 3D Settings       21         6.5.9 Genlock Setting       26         6.5.10 Hardware Version       26         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth       30         7.4 Operations on Web Page       31         7.4.1 Environment Configuration       32         7.5.1 NovaLCT       33         7.5.2 SmartLCT       33         7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6 SmartLCT       33		
6.5.3 Set Alarm Thresholds       18         6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       18         6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.8 Solutings       21         6.5.9 Genlock Setting       26         6.5.0 Hardware Version       26         6.5.10 Hardware Version       26         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth.       30         7.4 Operations on Web Page       31         7.4.2 Operations on PC       33         7.5 oftware Operations on PC       33         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6 SomartLCT       33         7.6 SomartLCT       33		
6.5.4 Save to Hardware       18         6.5.5 Redundancy Settings       18         6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.7 HDR       18         6.5.7 Bolt       21         6.5.8 3D Settings       21         6.5.9 Genlock Setting       26         6.5.10 Hardware Version       26         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth.       30         7.4 Operations on Web Page.       31         7.4.1 Environment Configuration       32         7.5 Software Operations on PC       33         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       34	•	
6.5.5 Redundancy Settings       18         6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.7 HDR       18         6.5.8 3D Settings       21         6.5.9 Genlock Setting       26         6.5.10 Hardware Version       26         6.5.10 Hardware Version       26         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth       30         7.4 Operations on Web Page       31         7.4.1 Environment Configuration       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       34		
6.5.6 Factory Reset       18         6.5.7 HDR       18         6.5.7 HDR       18         6.5.8 3D Settings       21         6.5.9 Genlock Setting       26         6.5.10 Hardware Version       26         6.6 Communication Settings       26         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth       30         7.4 Operations on Web Page       31         7.4.1 Environment Configuration       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.5.2 SmartLCT       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       34		
6.5.7 HDR.       18         6.5.8 3D Settings       21         6.5.9 Genlock Setting       26         6.5.10 Hardware Version       26         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth       30         7.4 Operations on Web Page       31         7.4.1 Environment Configuration       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.5.2 SmartLCT       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       34		
6.5.8 3D Settings       21         6.5.9 Genlock Setting       26         6.5.10 Hardware Version       26         6.6 Communication Settings       26         6.7 Language       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB       28         7.2 Low Latency       28         7.3 Input Source Bit Depth       30         7.4 Operations on Web Page       31         7.4.1 Environment Configuration       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.5.2 SmartLCT       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       34	•	
6.5.9 Genlock Setting.       26         6.5.10 Hardware Version       26         6.6 Communication Settings.       26         6.7 Language.       27         7 Operations on PC.       28         7.1 Individual Gamma Adjustment for RGB.       28         7.2 Low Latency.       28         7.3 Input Source Bit Depth.       30         7.4 Operations on Web Page.       31         7.4.1 Environment Configuration       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.5.2 SmartLCT.       33         7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT.       34		
6.5.10 Hardware Version       26         6.6 Communication Settings.       26         6.7 Language.       27         7 Operations on PC.       28         7.1 Individual Gamma Adjustment for RGB.       28         7.2 Low Latency.       28         7.3 Input Source Bit Depth.       30         7.4 Operations on Web Page.       31         7.4.1 Environment Configuration       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT.       33         7.6 Firmware Update       33         7.6.1 NovaLCT.       33         7.6.2 SmartLCT.       34	-	
6.6 Communication Settings.       26         6.7 Language.       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB.       28         7.2 Low Latency.       28         7.3 Input Source Bit Depth.       30         7.4 Operations on Web Page.       31         7.4.1 Environment Configuration       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT.       33         7.6 Firmware Update       33         7.6.1 NovaLCT.       33         7.6.2 SmartLCT       34		
6.7 Language.       27         7 Operations on PC       28         7.1 Individual Gamma Adjustment for RGB.       28         7.2 Low Latency       28         7.3 Input Source Bit Depth.       30         7.4 Operations on Web Page.       31         7.4.1 Environment Configuration       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.5.2 SmartLCT       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       34		
7 Operations on PC.       28         7.1 Individual Gamma Adjustment for RGB.       28         7.2 Low Latency.       28         7.3 Input Source Bit Depth.       30         7.4 Operations on Web Page.       31         7.4.1 Environment Configuration.       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT.       33         7.6 Firmware Update.       33         7.6.1 NovaLCT.       33         7.6.2 SmartLCT.       34	-	
7.1 Individual Gamma Adjustment for RGB.       28         7.2 Low Latency.       28         7.3 Input Source Bit Depth.       30         7.4 Operations on Web Page.       31         7.4.1 Environment Configuration.       32         7.4.2 Operations       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT.       33         7.5.2 SmartLCT       33         7.6 Firmware Update       33         7.6.1 NovaLCT.       33         7.6.2 SmartLCT       34		
7.2 Low Latency       28         7.3 Input Source Bit Depth.       30         7.4 Operations on Web Page.       31         7.4.1 Environment Configuration       32         7.4.2 Operations       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.5.2 SmartLCT       33         7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       34	7 Operations on PC	28
7.3 Input Source Bit Depth	•	
7.4 Operations on Web Page       31         7.4.1 Environment Configuration       32         7.4.2 Operations       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.5.2 SmartLCT       33         7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       34	7.2 Low Latency	28
7.4.1 Environment Configuration       32         7.4.2 Operations       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.5.2 SmartLCT       33         7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       34	7.3 Input Source Bit Depth	30
7.4.2 Operations       32         7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.5.2 SmartLCT       33         7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       33	7.4 Operations on Web Page	31
7.5 Software Operations on PC       33         7.5.1 NovaLCT       33         7.5.2 SmartLCT       33         7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       33         7.6.2 SmartLCT       34	7.4.1 Environment Configuration	32
7.5.1 NovaLCT	7.4.2 Operations	32
7.5.2 SmartLCT	7.5 Software Operations on PC	33
7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       34	7.5.1 NovaLCT	33
7.6 Firmware Update       33         7.6.1 NovaLCT       33         7.6.2 SmartLCT       34	7.5.2 SmartLCT	33
7.6.1 NovaLCT		
7.6.2 SmartLCT		
	8 Specifications	35



## 1 Overview

### 1.1 Introduction

The MCTRL4K is an LED display controller with an ultra-large loading capacity developed by NovaStar. A single unit features a loading capacity of up to 4096×2160@60Hz. It supports any custom resolutions with a width or height up to 7680 pixels, meeting the on-site configuration requirements of ultra-long or ultra-wide LED displays.

The MCTRL4K comes with many industry-leading technologies such as HDR, individual gamma adjustment for RGB, low latency, 3D, and pixel level brightness and chroma calibration. These technologies improve the display brightness, grayscale and color performance, presenting more uniform, detailed and vivid images.

The MCTRL4K is stable, reliable and powerful, dedicated to providing users with an ultimate visual experience. It can be mainly used in the rental and fixed installation applications, such as concerts, live events, security monitoring, Olympic Games, various sports centers, and much more.

## 1.2 Features

- A variety of input connectors
  - 1x DP 1.2
  - 1x HDMI 2.0
  - 2x DL-DVI
- 16 Neutrik Gigabit Ethernet ports and 4 optical ports

For DP/HDMI input, the maximum loading capacity is 8,800,000 pixels.

For DVI input, the maximum loading capacity is 8,300,000 pixels.

The maximum output height or width of a single MCTRL4K is 7680 pixels.

- High bit-depth inputs: 8bit/10bit/12bit
- HDR function

HDR10 and HLG are supported.

The MCTRL4K can work with the receiving cards that support HDR to greatly enhance the image quality of the display, presenting more vivid and detailed images.

3D function

The MCTRL4K can work with the 3D emitter EMT200 and 3D glasses, allowing you to experience 3D display effects.

Individual gamma adjustment for RGB

For 10-bit or 12-bit inputs, this function can individually adjust the red gamma, green gamma and blue gamma to effectively control image non-uniformity in low grayscale conditions and white balance offset, allowing for a more realistic image.

• RGB limited to RGB full

This function automatically converts the color range of the input source from RGB limited to RGB full so as to display natural black in low grayscale conditions.

Low latency

When low latency and input source sync are enabled, and cabinets are connected vertically, the delay between the input source and receiving card can be reduced to one frame.

Inputs with decimal frame rates

Adaptive to 23.98/29.97/47.95/59.94/71.93/119.88 Hz

• Pixel level brightness and chroma calibration

The MCTRL4K can work with NovaStar's high-precision calibration system to calibrate the brightness and chroma of each pixel, effectively removing brightness differences and chroma differences, enabling high brightness consistency and chroma consistency.

- Ultra-high resolution input Supports ultra-high resolution settings with NVIDIA graphics card.
- Screen configuration on web
- Cascading of up to 10 MCTRL4K units



## 2 Appearance

## **Front Panel**



Button/Connector	Description		
Power button	Power on or off the device.		
USB	Connect to a USB drive.		
LCD screen	Display the device status, menus, submenus and messages.		
Knob	Select menus, adjust parameters, and confirm operations.		
BACK	Go back to the previous menu or exit the current operation.		
	Power button USB LCD screen Knob		

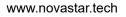
#### Note

Hold down the knob and **Back** button simultaneously for 5s or longer to lock or unlock the front panel buttons.

## **Rear Panel**



Connector Type	Connector Name	Description
Input	DP 1.2	1x DP 1.2
		<ul> <li>Supported maximum resolution: 4096×2160@60Hz, supported minimum resolution: 640×480@24Hz</li> </ul>
		Custom resolutions supported
		Maximum width: 7680 pixels (7680×1080@60Hz)
		Maximum height: 7680 pixels (1080×7680@60Hz)
		HDCP 1.3 compliant
		<ul> <li>Supported standard resolutions:</li> </ul>
		1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz
		1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz
		1440×900@(24/25/30/48/50/60/72/75/85/100/120)Hz
		1600×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz



1920x1008(24/25/30445/06/07/27/58/51/001/20)Hz           1920x12008(24/25/30448/50/60/72/758/51/001/20)Hz           250x12008(24/25/30448/50/60/72/758/51/001/20)Hz           3840x10808(24/25/30448/50/60/72/758/51/001/20)Hz           3840x10808(24/25/30448/50/60/72/758/51/001/20)Hz           3840x10808(24/25/30448/50/60/72/758/51/001/20)Hz           3840x10808(24/25/30448/50/60/72/758/51/001/20)Hz           3840x10808(24/25/30448/50/60/72/758/51/001/20)Hz           3840x10808(24/25/30448/50/60/72/758/51/001/20)Hz           14.HDMI 2.0           15.HDDMI 2.0           14.HDMI 2.0           14.HDMI 2.0           14.HDMI 2.0           15.HDDMI 2.0           14.HDMI 2.0	Г		
Upper temperature         1920-2160/8/24/253/044/50/600727758/5100/120)Hz           2560x1600/8/24/253/044/50/60072758/5100/120)Hz         3840x1008/24/253/044/50/60072758/5100/120)Hz           3840x2160/8/24/253/044/50/60072758/5100/120)Hz         3840x2160/8/24/253/044/50/60072758/5100/120)Hz           140M12.0         14 MDMI2.0         Supported maximum resolution: 4096x2160/8/60Hz, supported minimum resolution: 500x60/8/30Hz           140M12.0         14 MDMI2.0         Supported maximum resolution: 500x60/8/30Hz           140K12.0         14 MDMI2.0         Supported maximum resolution: 500x60/8/30Hz           140K12.0         14 MDMI2.0         Supported maximum resolution: 500x60           140K12.0         14 MDMI2.0         Supported maximum resolution: 500x60           140K12.0         14 MDMI2.0         Supported maximum resolution: 500x60           140K12.0         14 Maximum width: 7680 pixels (7680x100/120)Hz         140x90x90/24/24/25/30/44/50/6007275/58/100/120)Hz           1200x101004/24/22/530/44/50/6007275/58/100/120)Hz         120x9/1200/24/24/25/30/44/50/6007275/58/100/120)Hz         150x9/120/120/12           1200x10106/24/24/25/30/44/50/6007275/58/100/120)Hz         120x9/120/64/24/25/30/44/50/6007275/58/100/120)Hz         120x9/120/64/24/25/30/44/50/607275/58/100/120)Hz           1200x10106/24/24/25/30/44/50/6007275/58/100/120)Hz         120x9/120/64/24/25/30/44/50/607275/58/100/120)Hz         120x1/120/64/24/25/30/44/50/607275/58/100/120)Hz			
2660x1600@(24/25/30/48/50/60/72/75/85/100/120)Hz           3840x1600@(24/25/30/48/50/60)Hz           No support for interfaced input sources           HDMI 2.0           1x HDMI 2.0			, , , , , , , , , , , , , , , , , , ,
S840x1080@(244253)04450/6072/75/85/100/120)Hz 3840x2160@(244253)04450/6072/75/85/100/120)Hz           HDMI 2.0         1x HDMI 2.0           HDMI 2.0         1x HDMI 2.0           HDMI 2.0         Supported maximum resolution: 4096x2160@60Hz, supported minimum resolutions: 800x600@30Hz           Output         - Output           HDMI 2.0         Supported maximum resolution: 4096x2160@60Hz, supported Maximum width: 7680 pixels (7680x1080@60Hz)           HDCP 1.4 and HDCP 2.2 compliant         Supported standard resolutions: 1280x1024 @(244253)048/50/6072775/85/100/120)Hz           140x900@(244253)048/50/6072775/85/100/120)Hz         1290x1024 @(244253)048/50/6072775/85/100/120)Hz           1290x1024 @(244253)048/50/6072775/85/100/120)Hz         1290x1020 @(244253)048/50/607275/85/100/120)Hz           1290x1026 @(244253)048/50/607275/85/100/120)Hz         1290x1026 @(244253)048/50/607275/85/100/120)Hz           1290x1026 @(244253)048/50/607275/85/100/120)Hz         1280x1024 @(24253)048/50/607275/85/100/120)Hz           1290x1026 @(24253)048/50/607275/85/100/120)Hz         1280x1024 @(24253)048/50/607275/85/100/120)Hz           1280x1024 @(24253)048/50/607275/85/100/120)Hz         1280x1024 @(24253)048/50/607275/85/100/120)Hz           1280x1024 @(24253)048/50/607275/85/100/120)Hz         1280x1024 @(24253)048/50/607275/85/100/120)Hz           1280x1024 @(24253)048/50/607275/85/100/120)Hz         1280x1024 @(24253)048/50/607275/85/100/120)Hz           1280x1024 @(24253)048/50/607275/			
0ulput         3840x2160@(2425/30/48/50/60)Hz           • No support for interlaced input sources           HDMI 2.0         1x HDMI 2.0           1x Supported maximum resolution: 4096x2160@60Hz, supported minimum resolutions supported Maximum height: 7680 pixels (7680x1080@60Hz) Maximum height: 7680 pixels (7680x7680@60Hz)           0x1000 (2425/30/48/50/607275/85/100/120)Hz           1x40x900@(24/25/30/48/50/607275/85/100/120)Hz           1x40x900@(24/25/30/48/50/607275/85/100/120)Hz           1x40x900@(24/25/30/48/50/607275/85/100/120)Hz           1x40x900@(24/25/30/48/50/607275/85/100/120)Hz           1x920x1200@(24/25/30/48/50/607275/85/100/120)Hz           1x920x1200@(24/25/30/48/50/607275/85/100/120)Hz           1x920x1200@(24/25/30/48/50/607275/85/100/120)Hz           1x920x2100@(24/25/30/48/50/607275/85/100/120)Hz           1x920x2100@(24/25/30/48/50/607275/85/100/120)Hz           1x920x2100@(24/25/30/48/50/607275/85/100/120)Hz           1x920x2100@(24/25/30/48/50/607275/85/100/120)Hz           1x920x2100@(24/25/30/48/50/607275/85/100/120)Hz           1x920x2100@(24/25/30/48/50/607275/85/100/120)Hz           1x920x2100@(24/25/30/48/50/607275/85/100/120)Hz           1x920x1200@(24/25/30/48/50/607275/85/100/120)Hz           1x920x1200@(24/25/30/48/50/607275/85/100/120)Hz           1x920x1200@(24/25/30/48/50/6077275/85/100/120)Hz           1x920x1200@(24/25/30/48/50/6077275/85/100/120)Hz			· · · · · · · · · · · · · · · · · · ·
• No support for interlaced input sources            HDMI 2.0         1x HDMI 2.0           • Supported maximum resolution: 4096x2160@60Hz, supported minimum resolution: 800x600@30Hz         • Custom resolutions supported Maximum width: 7680 pixels (1080x7860@60Hz)           • HDCP 1.4 and HDCP 2.2 compliant         • UDCP 1.4 and HDCP 2.2 compliant           • B000 (24/25/30/48/50/607/27/5/85/100/120)Hz         1400x1020@(24/25/30/48/50/607/27/5/85/100/120)Hz           1920x1008@(24/25/30/48/50/607/27/5/85/100/120)Hz         1920x108@(24/25/30/48/50/607/27/5/85/100/120)Hz           1920x1008@(24/25/30/48/50/607/27/5/85/100/120)Hz         1920x108@(24/25/30/48/50/607/27/5/85/100/120)Hz           1920x108@(24/25/30/48/50/607/27/5/85/100/120)Hz         2060x1600@(24/25/30/48/50/607/27/5/85/100/120)Hz           1920x108@(24/25/30/48/50/607/27/5/85/100/120)Hz         2060x1600@(24/25/30/48/50/607/27/5/85/100/120)Hz           204bx1153@(24/25/30/48/50/607/27/5/85/100/120)Hz         2060x1600@(24/25/30/48/50/607/27/5/85/100/120)Hz           3840x1080@(24/25/30/48/50/607/27/5/85/100/120)Hz         204bx113840 pixels (800x3840@60Hz)           0UAL DVI-D1         DUAL DVI-D2         • No supported standard resolutions: 1280x102@(24/25/30/48/50/607/27/5/85/100/120)Hz           1280x120@(24/25/30/48/50/607/27/5/85/100/120)Hz         1360x120@(24/25/30/48/50/607/27/5/85/100/120)Hz           1380x120@(24/25/30/48/50/607/27/5/85/100/120)Hz         1360x120@(24/25/30/48/50/607/27/5/85/100/120)Hz			
HDMI 2.0         1x HDMI 2.0           Supported maximum resolution: 4096x2150@60Hz, supported minimum resolution: 800x600@30Hz         Custom resolution: 800x600@30Hz           Custom resolution: supported Maximum height: 7680 pixels (7680x1080@60Hz)         HDCP 14, and HDCP 2.2 compliant           Supported standard resolutions: 1280x1024@(2425/30/48/50/60/727/58/5/100/120)Hz         140x900@(2425/30/48/50/60/727/58/100/120)Hz           140x900@(2425/30/48/50/60/727/58/100/120)Hz         1520x1202@(2425/30/48/50/60/727/58/100/120)Hz           1520x1202@(2425/30/48/50/60/727/58/100/120)Hz         1520x1202@(2425/30/48/50/60/727/58/100/120)Hz           1520x1202@(2425/30/48/50/60/727/58/100/120)Hz         1520x1202@(2425/30/48/50/60/727/58/100/120)Hz           1520x1202@(2425/30/48/50/60/727/58/100/120)Hz         2560x1600@(2425/30/48/50/60/727/58/100/120)Hz           1520x1202@(2425/30/48/50/60/727/58/100/120)Hz         2560x1600@(2425/30/48/50/60/727/58/100/120)Hz           250x1600@(2425/30/48/50/60/727/58/100/120)Hz         2560x1600@(2425/30/48/50/60/727/58/100/120)Hz           3840x126@(2425/30/48/50/60/727/58/100/120)Hz         1260x102@(2425/30/48/50/60/727/58/100/120)Hz           10UAL DVI-D2         2x DL-DVI           10UAL DVI-D2         2x DL-DVI           10UAL DVI-D2         2x DL-DVI           10UAL DVI-D2         2x DL-DVI           12x 100@(2425/30/48/50/60/7275/85/100/120)Hz           12x 100@(2425/30/48/50/60/7275/85/100/120)Hz			
Output         • Supported maximum resolution: 4096x2160@60Hz, supported minimum resolution: 800x600@30Hz.           • Custom resolutions supported Maximum width: 7680 pixels (7680×1080@60Hz) Maximum width: 7680 pixels (7680×7680@60Hz)           • HDCP 1.4 and HDCP 2.2 compliant           • Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz           1400x102@(24/25/30/48/50/60/72/75/85/100/120)Hz           1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz           1290x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz           1290x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz           1290x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz           1290x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz           2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz           2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz           2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz           2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz           2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz           2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz           2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz           2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz           1260x100@(24/25/30/48/50/60/72/75/85/100/120)Hz           1260x100@(24/25/30/48/50/60/72/75/85/100/120)Hz           1260x102@(24/25/30/48/50/60/72/75/85/100/120)Hz           1260x102@(24/25/30/48/50/60/72/75/85/100/120)Hz           12			
Output         1-16         inimum resolution: 800x600@30Hz           Output         1-16         intersolutions supported Maximum width: 7680 pixels (7680x1080@60Hz) Maximum height: 7680 pixels (1080x7680@60Hz)           HDCP 1.4 and HDCP 2.2 compliant         Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1400x100@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz 2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz 2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz 2360x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1360x786@(24/25/30/48/50/60/72/75/85/100/120)Hz 1360x786@(24/25/30/48/50/60/72/75/85/100/120)Hz 1360x786@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x1080@(24/25/30/48/50/60)Hz 3340x1800@(24/25/30/48/50/60)Hz 3340x1800@(24/25/30/48/50/60)Hz 3340x1800@(24/25/30/48/50/60)Hz 3340x1800@(24/25/30/48/50/60)Hz 3340x1800@(24/25/30/48/50/60)Hz 3340x180@(24/25/30/48/50/60)Hz 3340x180@(24/25/30/48/50/60)Hz 3340x180@(24/25/30/48/50/60)Hz 3340x180@(24/25/30/48/50/60)Hz 3340x180@(24/25/30/48/50/60)Hz 3340x180@(24/25			
Maximum width: 7680 pixels (7560×1080@60Hz) Maximum height: 7680 pixels (1080×7680@60Hz)           • HDCP 1.4 and HDCP 2.2 compliant           • Supported standard resolutions: 1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1400×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 2048×1536@(24/25/30/48/50/60/72/75/85/100/120)Hz 2048×1536@(24/25/30/48/50/60/72/75/85/100/120)Hz 2048×1536@(24/25/30/48/50/60/72/75/85/100/120)Hz 2048×1536@(24/25/30/48/50/60/72/75/85/100/120)Hz 2840×2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 2840×2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 2840×2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 2840×2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 2840×2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 2840×2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 2840×2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 2840×2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 1860×108@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1360×102@(24/25/30/48/50/60/72/75/85/100/120)Hz 1360×102@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×102@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×102@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×102@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×102@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×102@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×108@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×108@(24/25/30/48/50/60)Hz 3340×1080@(24/25/30/48/50/60)Hz 3340×1080@(24/25/30/48/50/60)Hz 3340×1080@(24/25/30/48/50/60)Hz 3340×1080@(24/25/30/48/50/60)Hz 3340×1080@(24/25/30/48/50/60)Hz 3340×1080@(24/25/30/48/50/60)Hz 3340×1080@(24/25/30/48/50/60)Hz 3340×1080@(24/25/30/48/50/60)Hz 3340×1080@(24/25/30/48/50/60)Hz 3340×1080@(24/25/30/48/50/60)Hz 3340×1080@(24/25/30/48/50/60)Hz 340			minimum resolution: 800×600@30Hz
Maximum height: 7680 pixels (1080×7680 @60Hz)HDCP 1.4 and HDCP 2.2 compliantSupported standard resolutions: 1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1440×900@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 2048×15569(24/25/30/48/50/60/72/75/85/100/120)Hz 2048×15569(24/25/30/48/50/60/72/75/85/100/120)Hz 2560×1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 2560×1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 2560×1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 2560×1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 2560×1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 2560×1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 2560×1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 2560×1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 260×1500@(24/25/30/48/50/60/72/75/85/100/120)Hz 260×1500@(24/25/30/48/50/60/72/75/85/100/120)HzDUAL DVI-D1 DUAL DVI-D22x DL-DVI • Each with a maximum resolution of 3840×1080@60Hz and minimum resolution s00×600@30Hz • Custom resolutions: 1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×120@@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×120@@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×120@@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×120@@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×120@@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320×120@@(24/25/30/48/50/60)Hz 3340×2160@@(24/25/30/48/50/60)Hz 3340×2160@@(24/25/30/48/50/60)Hz 3340×2160@@(24/25/30/48/50/60)Hz 3340×2160@@(24/25/30/48/50/60)Hz 3340×2160@@(24/25/30/48/50/60)Hz 3340×2160@@(24/25/30/48/50/60)Hz 3340×2160@@(24/25/30/48/50/60)Hz 3340×2160@@(24/25/30/48/50/60)Hz 3340×2160@@(24/25/30/48/50/60)Hz 3340×2160@			Custom resolutions supported
HDCP 1.4 and HDCP 2.2 complant           Supported standard resolutions:           1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz           1440x900@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x1000@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x1000@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x100@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x100@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x100@(24/25/30/48/50/60/72/75/85/100/120)Hz           2560x1600@(24/25/30/48/50/60/72/75/85/100/120)Hz           2560x1600@(24/25/30/48/50/60/72/75/85/100/120)Hz           3840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz           3840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz           3840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz           3840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz           3840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz           1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz           1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz           1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz           1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x120@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x120@(24/25/30/48/50/60/72/75/85/100/120)Hz           1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x2160@(24/25/30/48/50/60			
Output1-16Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1440x900@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 2044z/5/30/48/50/60/72/75/85/100/120)Hz 2044z/5/30/48/50/60/72/75/85/100/120)Hz 2044z/5/30/48/50/60/72/75/85/100/120)Hz 2044z/5/30/48/50/60/72/75/85/100/120)Hz 2044z/5/30/48/50/60/72/75/85/100/120)Hz 2044z/5/30/48/50/60/72/75/85/100/120)Hz 2840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 2840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 2840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 2840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 290x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 2044z/5/30/48/50/60/72/75/85/100/120)Hz 2042@(24/25/30/48/50/60/72/75/85/100/120)Hz 2042@(24/25/30/48/50/60/72/75/85/100/120)Hz 2042@(24/25/30/48/50/60/72/75/85/100/120)Hz 1360x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1360x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1360x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x1020@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x1020@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x2160@(24/25/30/48/50/60)Hz 2560x1600@(24/25/30/48/50/60)Hz 2560x160@(24/25/30/48/50/60)Hz 2560x160@(24/25/30/48/50/60)Hz 2660x1080@(24/25/30/48/50/60)Hz 2660x1080@(24/25/30/48/50/60)Hz 2660x1080@(24/25/30/48/50/60)Hz 2660x1080@(24/25/30/48/50/60)Hz 2660x160@(24/25/30/48/50/60)Hz 2660x160@(24/25/30/48/50/60)Hz 2660x160@(24/25/30/48/50/60)Hz 266			Maximum height: 7680 pixels (1080×7680@60Hz)
Output         1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz         1440x900@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x1000@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x1000@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x1000@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x1000@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x1000@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x1000@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x100@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x120@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x1200@(24/25/30/48/50/60/72/			HDCP 1.4 and HDCP 2.2 compliant
Output         1440x900@(24/25/30/48/50/60/72/75/85/100/120)Hz           1600x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x100@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz         2560x1600@(24/25/30/48/50/60/72/75/85/100/120)Hz           2560x1600@(24/25/30/48/50/60/72/75/85/100/120)Hz         2560x1600@(24/25/30/48/50/60/72/75/85/100/120)Hz           3840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz         3840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz           3840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz         3840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz           3840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz         3840x1080@60Hz)           Maximum width: 3840 pixels (800x3840@60Hz)         Maximum height: 3840 pixels (800x3840@60Hz)           Maximum height: 3840 pixels (800x3840@60Hz)         Maximum height: 3840 pixels (800x3840@60Hz)           Supported standard resolutions:         1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz           1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz         1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x1200@(24/25/30/48/50/60/72/75/85/100)Hz           1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x120@(24/25/30/48/50/60/72/75/85/100)Hz           1920x1200@(24/25/30/48/50/60)72/75/			<ul> <li>Supported standard resolutions:</li> </ul>
Output1-161600x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz1920x1000@(24/25/30/48/50/60/72/75/85/100/120)Hz1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz2560x1600@(24/25/30/48/50/60/72/75/85/100/120)Hz2560x1600@(24/25/30/48/50/60/72/75/85/100/120)Hz2560x1600@(24/25/30/48/50/60/72/75/85/100/120)Hz2840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz2840x2160@(24/25/30/48/50/60)Hz0UAL DVI-D12x DL-DVIDUAL DVI-D22x DL-DVI0UAL DVI-D2Each with a maximum resolution of 3840x1080@60Hz and minimum resolution of 800x600@30Hz0UAL DVI-D2Support for interlaced input sources1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz1920x1200@(24/25/30/48/50/60)Hz3840x2160@(24/25/30/48/50/60)Hz3840x2160@(24/25/30/48/50/60)Hz3840x2160@(24/25/30/48/50/60)Hz3840x2160@(24/25/30/48/50/60)Hz3840x2160@(24/25/30/48/50/60)Hz3840x2160@(24/25/30/48/50/60)Hz3840x2160@(24/25/30/48/50/60)Hz3			
Output         1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz           2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz         2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz           2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz         3840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz           3840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz         3840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz           3840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz         3840x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz           10UAL DVI-D1         2x DL-DVI         Each with a maximum resolution of 3840x1080@60Hz and minimum resolution supported           Maximum height: 3840 pixels (3840x1080@60Hz)         Maximum height: 3840 pixels (3840x1080@60Hz)           Maximum height: 3840 pixels (3800x3840@60Hz)         1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz           1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz         1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz           1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920x1200@(24/25/30/48/50/60)/72/75/85/100/120)Hz           1920x1200@(24/25/30/48/50/60)/72/75/85/100/120)Hz         1920x120@(24/25/30/48/50/60)Hz           2560x1600@(24/25/30/48/50/60)Hz         3840x2160@(24/25/30/48/50/60)Hz           1920x120@(24/25/30/48/50/60)Hz         3840x2160@(24/25/30/48/50/60)Hz           1920x120@(24/25/30/48/50/			
Output1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz 2050x1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840x1080@(24/25/30/48/50/60)/72/75/85/100/120)Hz 3840x2160@(24/25/30/48/50/60)/72/75/85/100/120)Hz 3840x2160@(24/25/30/48/50/60)/72/75/85/100/120)Hz 3840x2160@(24/25/30/48/50/60)/72/75/85/100/120)Hz 3840x2160@(24/25/30/48/50/60)/72/75/85/100/120)Hz 3840x2160@(24/25/30/48/50/60)/72/75/85/100/120)HzDUAL DVI-D1 DUAL DVI-D2Zx DL-DVI Each with a maximum resolution of 3840x1080@60Hz and minimum resolutions supported Maximum height: 3840 pixels (3840x1080@60Hz) Maximum height: 3840 pixels (3840x1080@60Hz) Maximum height: 3840 pixels (800x3840@60Hz) Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz 			
Output1920x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 2048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz 2560x1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840x1080@(24/25/30/48/50/60)72/75/85/100/120)Hz 3840x2160@(24/25/30/48/50/60)72/75/85/100/120)Hz 3840x2160@(24/25/30/48/50/60)72/75/85/100/120)Hz 2x DL-DVIDUAL DVI-D1 DUAL DVI-D22x DL-DVI • Each with a maximum resolution of 3840x1080@60Hz and minimum resolutions of 800x600@30Hz • Custom resolutions supported Maximum width: 3840 pixels (3840x1080@60Hz) • Maximum width: 3840 pixels (3840x1080@60Hz) • Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60)72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60)Hz 3840x180@(24/25/30/48/50/60)Hz 3840x180@(24/25/30/48/50/60)Hz 3840x180@(24/25/30/48/50/60)Hz 3840x180@(24/25/30/48/50/60)Hz 3840x180@(24/25/30/48/50/60)Hz 3840x180@(24/25/30/48/50/60)Hz 3840x180@(24/25/30/48/50/60)Hz 3840x180@(24/25/30/48/50/60)Hz 3840x180@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24/25/30)Hz 3840x2160@(24			
Output1-161048x1536@(24/25/30/48/50/60/72/75/85/100/120)Hz 2560x1600@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz Custom resolution of 3840x1080@60Hz and minimum resolution of 800x600@30Hz • Custom resolutions supported Maximum height: 3840 pixels (3840x1080@60Hz) Maximum height: 3840 pixels (3840x1080@60Hz) Maximum height: 3840 pixels (3840x1080@60Hz) • Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz • No support for interlaced input sources · For 8-bit input sources: 650,000 pixels · For 8-bit input sources: 320,000 pixels · No support for audio output · Support for			
Output1-1615600@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840x1080@(24/25/30/48/50/60)72/75/85/100/120)Hz 3840x2160@(24/25/30/48/50/60)Hz • No support for interlaced input sourcesDUAL DVI-D1 DUAL DVI-D22x DL-DVI • Each with a maximum resolution of 3840x1080@60Hz and minimum resolution of 800x600@30Hz • Custom resolutions supported Maximum width: 3840 pixels (3840x1080@60Hz) Maximum height: 3840 pixels (3840x1080@60Hz) • Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1320x102@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 1920x1200@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30)Hz • No support for interlaced input sourcesOutput1-1616x Neutrik (NE8FBH) Gigabit Ethernet ports • Maximum capacity of a single port: For 8-bit input sources: 650,000 pixels For 10-bit/12-bit input sources: 320,000 pixels • No support for raudio output • Support for radundancy between Ethernet ports <td></td> <td></td> <td></td>			
Output3840x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 3840x2160@(24/25/30/48/50/60)Hz • No support for interlaced input sourcesDUAL DVI-D1 DUAL DVI-D22x DL-DVI • Each with a maximum resolution of 3840x1080@60Hz and minimum resolution supported Maximum height: 3840 pixels (3840x1080@60Hz) Maximum height: 3840 pixels (3840x1080@60Hz) Maximum height: 3840 pixels (3840x1080@60Hz) • Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30)Hz • No support for interlaced input sourcesOutput1~1616x Neutrik (NE8FBH) Gigabit Ethernet ports • Maximum capacity of a single port: For 8-bit input sources: 650,000 pixels For 10-bit/12-bit input sources: 320,000 pixels • No support for raduio output • Support for rad			
Output1-163840x2160@(24/25/30/48/50/60)Hz • No support for interlaced input sourcesDUAL DVI-D1 DUAL DVI-D22x DL-DVI • Each with a maximum resolution of 3840x1080@60Hz and minimum resolution of 800x600@30Hz • Custom resolutions supported Maximum width: 3840 pixels (3840x1080@60Hz) Maximum height: 3840 pixels (3840x1080@60Hz) • Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1360x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x2100@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x2160@(24/25/30/48/50/60)Hz 2560x1600@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz			
Output• No support for interlaced input sourcesDUAL DVI-D1 DUAL DVI-D22x DL-DVI• Each with a maximum resolution of 3840×1080@60Hz and minimum resolution of 800x600@30Hz• Custom resolutions supported Maximum width: 3840 pixels (3840×1080@60Hz) Maximum height: 3840 pixels (800x3840@60Hz)• Supported standard resolutions: 1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1600×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1200@(24/25/30/48/50/60)Hz 2560×1600@(24/25/30/48/50/60)Hz 2560×1600@(24/25/30/48/50/60)Hz 3840×1080@(24/25/30/Hz • No support for interlaced input sourcesOutput1~1616x Neutrik (NE8FBH) Gigabit Ethernet ports • Maximum capacity of a single port: For 8-bit input sources: 650,000 pixels For 10-bit/12-bit input sources: 320,000 pixels • No support for radio output • Support for radio output • Support for redundancy between Ethernet ports			
DUAL DVI-D1 DUAL DVI-D2         2x DL-DVI           • Each with a maximum resolution of 3840x1080@60Hz and minimum resolution of 800x600@30Hz         • Custom resolutions supported Maximum width: 3840 pixels (3840x1080@60Hz) Maximum height: 3840 pixels (3840x1080@60Hz)           • Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz         • Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz           • 1600x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz         • 1600x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz           • 1920x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz         • 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz           • 1920x2160@(24/25/30/48/50/60/72/75/85/100/120)Hz         • 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz           • 1920x2160@(24/25/30/48/50/60)Hz         • 1920x1080@(24/25/30/48/50/60)Hz           • 1920x2160@(24/25/30/48/50/60)Hz         • No support for interlaced input sources           Output         1~16         16x Neutrik (NE8FBH) Gigabit Ethernet ports           • Maximum capacity of a single port: For 8-bit input sources: 650,000 pixels For 10-bit/12-bit input sources: 320,000 pixels           • No support for radio output         • No support for radio output			
Output1~161~1616x Nutr C indexing in resolution of 800x600@30Hz0. Custom resolutions supported Maximum width: 3840 pixels (3840x1080@60Hz) Maximum height: 3840 pixels (800x3840@60Hz) Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1440x900@(24/25/30/48/50/60/72/75/85/100/120)Hz 1600x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100)Hz 1920x1200@(24/25/30/48/50/60)Hz 2560x1600@(24/25/30/48/50/60)Hz 2560x1600@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30/48/50/60)Hz 3840x2160@(24/25/30)Hz 6 No support for interlaced input sourcesOutput1~1616x Neutrik (NE8FBH) Gigabit Ethernet ports For 8-bit input sources: 320,000 pixels For 10-bit/12-bit input sources: 320,000 pixels For 10-bit/12-bit input sources: 320,000 pixels 		DUAL DVI-D1	2x DL-DVI
Output1~16Invinue16x Neutrik (NE8FBH) Gigabit Ethernet ports • No support for redundancy between Ethernet ports010-bit/12-bit input sources: 320,000 pixels • No support for redundancy between Ethernet ports			• Each with a maximum resolution of 3840×1080@60Hz and
Maximum width: 3840 pixels (3840×1080@60Hz) Maximum height: 3840 pixels (800x3840@60Hz)• Supported standard resolutions: 1280x1024@(24/25/30/48/50/60/72/75/85/100/120)Hz 1366x768@(24/25/30/48/50/60/72/75/85/100/120)Hz 1440×900@(24/25/30/48/50/60/72/75/85/100/120)Hz 1600x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1080@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920x1200@(24/25/30/48/50/60)Hz 2560x1600@(24/25/30/48/50/60)Hz 2560x1600@(24/25/30/48/50/60)Hz 3840×2160@(24/25/30/48/50/60)Hz 3840×2160@(24/25/30/48/50/60)Hz 3840×2160@(24/25/30)HzOutput1~1616x Neutrik (NE8FBH) Gigabit Ethernet ports • Maximum capacity of a single port: For 8-bit input sources: 650,000 pixels For 10-bit/12-bit input sources: 320,000 pixels • No support for redundancy between Ethernet ports			
Output         1~16         16x Neutrik (NE8FBH) Gigabit Ethernet ports           Output         1~16         16x Neutrik (NE8FBH) Gigabit Ethernet ports           Support for redundancy between Ethernet ports         No support for redundancy between Ethernet ports			
Output1~161~1616x Neutrik (NE8FBH) Gigabit Ethernet ports For 10-bit/12-bit input sources: 320,000 pixels For 10-bit/12-bit input sources: 320,000 pixels For 10-bit/12-bit input sources			· · · · · · · · · · · · · · · · · · ·
Output         1~16         1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz           1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz         1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz           1440×900@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920×100@(24/25/30/48/50/60/72/75/85/100/120)Hz           1920×100@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920×100@(24/25/30/48/50/60)72/75/85/100/120)Hz           1920×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz         1920×1200@(24/25/30/48/50/60)72/75/85/100/120)Hz           1920×1200@(24/25/30/48/50/60)72/75/85/100/120)Hz         1920×1200@(24/25/30/48/50/60)Hz           2560×1600@(24/25/30/48/50/60)Hz         2560×1600@(24/25/30/48/50/60)Hz           3840×2160@(24/25/30)Hz         1840×2160@(24/25/30)Hz           • No support for interlaced input sources         16           Output         1~16         16x Neutrik (NE8FBH) Gigabit Ethernet ports           • Maximum capacity of a single port:         For 8-bit input sources: 650,000 pixels           For 10-bit/12-bit input sources: 320,000 pixels         No support for audio output           • No support for redundancy between Ethernet ports         • No support for redundancy between Ethernet ports			
Output         1~16         16x Neutrik (NE8FBH) Gigabit Ethernet ports           Output         1~16         16x Neutrik (NE8FBH) Gigabit Ethernet ports           • No support for inderlaced input sources:         550,000 pixels           • No support for audio output         • No support for audio output			
Output1~1616x Neutrik (NE8FBH) Gigabit Ethernet ports0utput1~1616x Neutrik (NE8FBH) Gigabit Ethernet ports0utput1.~1616x Neutrik (NE8FBH) Gigabit Ethernet ports0.000 pixels For 10-bit/12-bit input sources: 320,000 pixels For 10-bit/12-bit input sources50,000 pixels For redundancy between Ethernet ports			
Output1~161600×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz 1920×1080@(24/25/30/48/50/60/72/75/85/100)Hz 1920×2160@(24/25/30/48/50/60)Hz 2560×1600@(24/25/30/48/50/60)Hz 3840×2160@(24/25/30/48/50/60)Hz 3840×2160@(24/25/30)Hz • No support for interlaced input sourcesOutput1~1616x Neutrik (NE8FBH) Gigabit Ethernet ports • Maximum capacity of a single port: For 8-bit input sources: 650,000 pixels For 10-bit/12-bit input sources: 320,000 pixels • No support for redundancy between Ethernet ports			
1920×1080@(24/25/30/48/50/60/72/75/85/100)Hz1920×1200@(24/25/30/48/50/60)72/75/85/100)Hz1920×2160@(24/25/30/48/50/60)Hz1920×2160@(24/25/30/48/50/60)Hz2560×1600@(24/25/30/48/50/60)Hz3840×1080@(24/25/30)Hz3840×2160@(24/25/30)Hz• No support for interlaced input sourcesOutput1~1616x Neutrik (NE8FBH) Gigabit Ethernet ports• Maximum capacity of a single port: For 8-bit input sources: 650,000 pixels For 10-bit/12-bit input sources: 320,000 pixels• No support for redundancy between Ethernet ports			
0utput1~161~1616x Neutrik (NE8FBH) Gigabit Ethernet ports • Maximum capacity of a single port: For 8-bit input sources: 650,000 pixels For 10-bit/12-bit input sources: 320,000 pixels • No support for redundancy between Ethernet ports			
1920x2160@(24/25/30/48/50/60)Hz 2560x1600@(24/25/30/48/50/60)Hz 3840x1080@(24/25/30)48/50/60)Hz 3840x2160@(24/25/30)HzOutput1~1616x Neutrik (NE8FBH) Gigabit Ethernet ports • Maximum capacity of a single port: For 8-bit input sources: 650,000 pixels For 10-bit/12-bit input sources: 320,000 pixels • No support for redundancy between Ethernet ports			, , , , , , , , , , , , , , , , , , ,
2560×1600@(24/25/30/48/50/60)Hz 3840×1080@(24/25/30/48/50/60)Hz 3840×2160@(24/25/30)HzOutput1~1616x Neutrik (NE8FBH) Gigabit Ethernet ports • Maximum capacity of a single port: For 8-bit input sources: 650,000 pixels For 10-bit/12-bit input sources: 320,000 pixels • No support for redundancy between Ethernet ports			
3840×1080@(24/25/30/48/50/60)Hz 3840×2160@(24/25/30)HzOutput1~1616x Neutrik (NE8FBH) Gigabit Ethernet ports • Maximum capacity of a single port: For 8-bit input sources: 650,000 pixels For 10-bit/12-bit input sources: 320,000 pixels • No support for redundancy between Ethernet ports			
3840×2160@(24/25/30)Hz         • No support for interlaced input sources         Output       1~16         16x Neutrik (NE8FBH) Gigabit Ethernet ports         • Maximum capacity of a single port:         For 8-bit input sources: 650,000 pixels         For 10-bit/12-bit input sources: 320,000 pixels         • No support for audio output         • Support for redundancy between Ethernet ports			
Output       1~16       16x Neutrik (NE8FBH) Gigabit Ethernet ports         • Maximum capacity of a single port:       For 8-bit input sources: 650,000 pixels         For 10-bit/12-bit input sources: 320,000 pixels       No support for audio output         • Support for redundancy between Ethernet ports			
<ul> <li>Maximum capacity of a single port:</li> <li>For 8-bit input sources: 650,000 pixels</li> <li>For 10-bit/12-bit input sources: 320,000 pixels</li> <li>No support for audio output</li> <li>Support for redundancy between Ethernet ports</li> </ul>			No support for interlaced input sources
<ul> <li>For 8-bit input sources: 650,000 pixels</li> <li>For 10-bit/12-bit input sources: 320,000 pixels</li> <li>No support for audio output</li> <li>Support for redundancy between Ethernet ports</li> </ul>	Output	1~16	16x Neutrik (NE8FBH) Gigabit Ethernet ports
For 10-bit/12-bit input sources: 320,000 pixels <ul> <li>No support for audio output</li> <li>Support for redundancy between Ethernet ports</li> </ul>			
<ul><li>No support for audio output</li><li>Support for redundancy between Ethernet ports</li></ul>			
Support for redundancy between Ethernet ports			For 10-bit/12-bit input sources: 320,000 pixels
			No support for audio output
OPT1~OPT4 4x 10G optical ports			Support for redundancy between Ethernet ports
		OPT1~OPT4	4x 10G optical ports



Power	AC 100 V~240 V-5	0/60 Hz		
		LOOP: Genlock loop output connector		
		IN: Genlock input connector		
	LOOP	Support for Bi-level, Tri-level, and Blackburst		
	GENLOCK IN-	Sync signal connector		
		Up to 10 units can be cascaded.		
		Output port for cascading MCTRL4K units		
	USB IN-OUT	• OUT: 1x USB 2.0 (Type-A)		
		Input port for cascading MCTRL4K units, or connecting to a PC for debugging		
		• IN: 1x USB 2.0 (Type-B)		
Control	ETHERNET	Connect to the control computer.		
		<ul> <li>OPT4 is a duplicate channel of OPT2.</li> </ul>		
		<ul> <li>OPT3 is a duplicate channel of OPT1.</li> </ul>		
		OPT2 transmits the data of Ethernet ports 9 to 16.		
		<ul> <li>OPT1 transmits the data of Ethernet ports 1 to 8.</li> </ul>		

#### Note

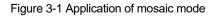
• When the input source is HDMI or DP, the 144 Hz forced resolution input from the front end device can be parsed. In this situation, the loading capacity is reduced by half.

• This product can only be placed horizontally. Do not mount vertically or upside-down.

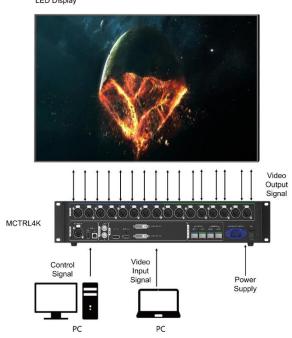
## **3** Applications

The MCTRL4K can work in mosaic and multi-card modes, meeting multiple user application needs.

### **Application 1: Mosaic Mode**

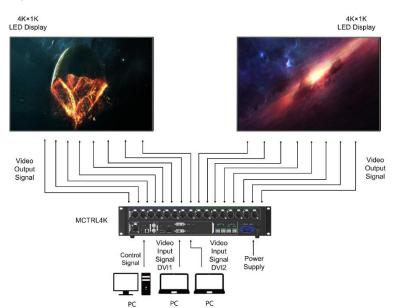


4K×2K LED Display



### **Application 2: Multi-Card Mode**

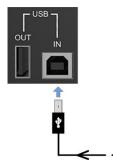


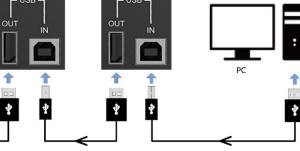


## 4 Cascade Devices

The control computer controls multiple MCTRL4K devices.

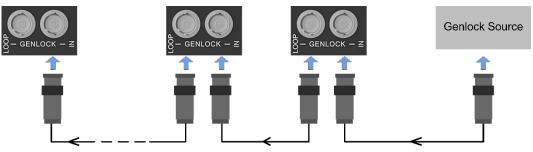
Cascade the MCTRL4K devices via their USB IN and USB OUT ports. Up to 10 devices can be cascaded.





• Multiple MCTRL4K devices output image simultaneously.

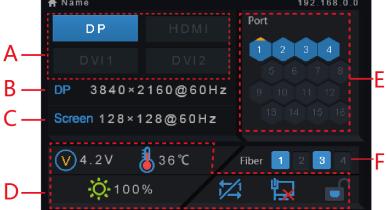
Cascade the MCTRL4K devices via their GENLOCK IN and GENLOCK LOOP connectors. Up to 10 devices can be cascaded.



## 5 Home Screen

After the MCTRL4K is powered on, its home screen appears, as shown in Figure 5-1.

Figure 5-1 Home screen	
🔒 Name	



Area	Description:					
	The access status of	of inputs:				
	On: Input availabl	available				
А	Off: Input unavaila	Off: Input unavailable				
	The interval betwee the DP input cannot	en unplugging and plugging the DP input must be greater than 5s. Otherwise, be detected.				
	Display the current	input information, including input type, resolution and frame rate.				
В	In multi-card mode, both DVI1 and DVI2 have inputs. The information about the two DVI inputs will be displayed alternately.					
С	Display the resolution	on and frame rate of the currently configured LED display.				
	$\bigcirc$	The supply voltage of the motherboard				
	Image:					
	io:	The LED display brightness				
	3D	The 3D function is enabled (This icon is not displayed when the function is disabled).				
	Gen	Genlock is connected (This icon is not displayed when Genlock is r connected).				
D	±∕1 ±−1	Current status of DVI1 and DVI2 inputs:				
		Not in sync/In sync				
	,₽,	The connection status of control ports:				
		USB connected/Ethernet connected/Not connected				
		Front panel buttons unlocked/locked				
	<b>a</b> , <b>a</b>	<ul> <li>Hold down the knob and BACK button simultaneously for 5s or longer to lock or unlock the buttons.</li> </ul>				
		<ul> <li>After the buttons are locked, all the button operations will not take effect and appears on the home screen.</li> </ul>				



Area	Description:				
	The working status of the Ethernet ports				
	<ul> <li>Always on: The Ethernet port connection works and the port serves as primary.</li> </ul>				
_	<ul> <li>Off: The Ethernet port is not connected or the connection does not work.</li> </ul>				
E	<ul> <li>Always on and a mark (not flashing) on top corner of icon: The Ethernet port is in redundancy status, but the redundancy has not taken effect.</li> </ul>				
	• Always on and a mark (flashing) on top corner of icon: The Ethernet port is in redundancy status and the redundancy has taken effect.				
	OPT1/OPT2: Primary optical ports				
	OPT1 corresponds to Ethernet ports 1 to 8 and OPT2 corresponds to Ethernet ports 9 to 16. Their statuses are as below.				
	<ul> <li>Always on: The optical port connection works and the port serves as primary.</li> </ul>				
	<ul> <li>Off: The optical port is not connected or the connection does not work.</li> </ul>				
F	OPT3/OPT4: Backup optical ports				
	OPT3 is the backup of OPT1, and OPT4 is the backup of OPT2. Their statuses are as below.				
	<ul> <li>Off: The optical port is not connected or the connection does not work.</li> </ul>				
	<ul> <li>Always on: The optical port connection works, but the redundancy has not taken effect.</li> </ul>				
	• Always on and a mark on top corner of icon: The optical port connection works and the redundancy has taken effect.				

## 6 Menu Operations

The MCTRL4K is powerful and easy to use. You can quickly configure the LED screen to light it up and display the entire input source following the steps in 6.1 Quick Screen Configuration. With other menu settings, you can further improve the LED screen display effect.

## 6.1 Quick Screen Configuration

Following the three steps below, namely Set Input Mode > Set Input Resolution > Quickly Configure the Screen, you can quickly light up the LED screen to display the entire input source.

### 6.1.1 Step 1: Set Input Mode

The input mode settings include DVI mode, input source, mosaic mode, and limited to full settings.

Main	Input Settings		]	Input Mode	
Ö Brightness 100%	📲 Input Mode	►		DVI Mode	Mosaic
🎢 Input Settings 🕨 🕨	Input Resolution	►		Input Source	DVI×2
Screen Settings				Mosaic Mode	
Display Control	•		•	Color Limited to Full	Enable
Advanced Settings					
Communication Settings					
🚱 Language 🕨 🕨					

Figure 6-1 Input mode settings

- Step 1 Set the DVI mode. Options include Mosaic and Multi-card.
- Step 2 Select an input source. Different DVI modes support different input sources.
  - In mosaic mode, the input source can be Auto, DP, HDMI or DVI×2.

When the input source is **Auto**, the device will detect the inputs automatically in the order of DP > HDMI > DVI.

• In multi-card mode, the input sources can be DVI 1 and DVI 2.

The MCTRL4K works as two independent sending cards and the loading capacity of each card is up to 3840×1080@60Hz. The images of both DVI 1 and DVI 2 input sources can be displayed on LED display simultaneously, but they cannot be set at the same time.

- Step 3 (Optional) In mosaic mode, set the DVI mosaic mode. The mosaic mode can be **Top and Bottom** or **Side by Side**.
- Step 4 Enable Limited to Full for the input source.

The input source color range includes RGB Full and RGB Limited. This function automatically converts the color range of the input source from RGB Limited to RGB Full, allowing for more accurate video processing.

• Disable: Do not convert RGB Limited to RGB Full.

• Enable: Convert RGB Limited to RGB Full. You are advised to enable this function when the input source has a limited color range.

Note:

You can enable the Limited to Full function only when the input source is RGB limited. When the input source is RGB full, enabling this function will cause grayscale loss.

#### 6.1.2 Step 2: Set Input Resolution

The input resolution can be set through either of the following methods.

#### Method 1: Select a Preset Resolution

Select the target resolution from the standard resolution presets.

Input Source	Available Standard Resolution Presets	
DL-DVI	1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	1440×900@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	1600×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	1920×1200@(24/25/30/48/50/60/72/75/85/100)Hz	
	1920×2160@(24/25/30/48/50/60)Hz	
	2560×1600@(24/25/30/48/50/60)Hz	
	3840×1080@(24/25/30/48/50/60)Hz	
	3840×2160@(24/25/30)Hz	
HDMI	1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	1440×900@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	1600×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	1920×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	1920×2160@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	2048×1536@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	2560×1600@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	3840×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	3840×2160@(24/25/30/48/50/60)Hz	
DP	1280×1024@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	1366×768@(24/25/30/48/50/60/72/75/85/100/120)Hz	
	1440×900@(24/25/30/48/50/60/72/75/85/100/120)Hz	

1600×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz
1920×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz
1920×1200@(24/25/30/48/50/60/72/75/85/100/120)Hz
1920×2160@(24/25/30/48/50/60/72/75/85/100/120)Hz
2560×1600@(24/25/30/48/50/60/72/75/85/100/120)Hz
3840×1080@(24/25/30/48/50/60/72/75/85/100/120)Hz
3840×2160@(24/25/30/48/50/60)Hz

#### Note

The MCTRL4K is adaptive to decimal frame rates (23.98/29.97/47.95/59.94/71.93/119.88 Hz).

#### Method 2: Customize a Resolution

Customize a resolution by setting a custom width, height and refresh rate.

- Step 1 On the home screen, press the knob to enter the main menu screen.
- Step 2 Choose Input Settings > Input Resolution > Custom and set the width, height and refresh rate.
- Step 3 Select Apply and press the knob to apply the custom resolution.

#### How to Set an Ultra-High Resolution

When the input source is DP or HDMI, you can set an ultra-high resolution via the NVIDIA graphics card of the computer. The width or height is up to 7680 pixels.

Recommended graphics cards: NVIDIA GeForce GTX 970, NVIDIA GeForce GTX 1060, and NVIDIA GeForce GTX 750 Ti

#### Note

When the width or height of the output image is greater than 4092 pixels, the resolution must be customized via the NVIDIA graphics card.

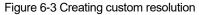
- Step 1 Right-click on desktop.
- Step 2 Select NVIDIA Control Panel.
- Step 3 On the left panel, choose Display > Change resolution. On the right area, select NOVA MCTRL4K.

Figure 6-2 Changing resolution

NVIDIA Control Panel		- 🗅 🗙
Eile Edit Desktop Display Help		
🔾 Back - 🜍 🚮		
Select a Task		
⊕-30 Settings	Change Resolution	Restore Defaults
<ul> <li>Adjust image settings with preview</li> <li>Manage 30 settings</li> </ul>	You can adjust the amount of information appearing on the screen and reduce flokkering. You can also choose the high-definition (HD) format if you are using an HDTV and set a country-specific signal for your standard definition (SD) TV.	incluse between
-Configure Surround, Physk	Too can apply the another in minimizer appearing on the overname memory, not can also choose the high demain (m/) mining in the high and also another in high demain (m/) mining in the high and also another in high and also another in high and also another in high anothe	
Display     Change resolution		
- Adjust desktop color settings - Rotate deplay	1. Select the display you would like to change.	
View HDCP status		
Set up digital audio Adjust desktop size and position		
Set up multiple displays	2NGM79G NOVA_HOME	
- Adjust video color settings		
Adjust video image settings	2. Choose the resolution.	
	a busice un contains	
	Resolution: Refreih rate:	
	Uttra HD, HD, SD A 60Hz V	
	10840-, 1930 × 5080 (witsve)	
	1080, 1764 992 1080, 1680 × 1030	
	1000,100 1024	
	1006, 500 500 1006, 500 100 100 100 100 100 100 100 100 100	
	1000, 149 × 500 1080, 156 × 758	
	Customite	
	3. Apply the following settings.	
	Use default color settings	
	(Use NVDLA color settings	
	Desktop color depth: Output color depth: Highest (12 bit) V 8 bpc V	
	ingress (32-bit)	
	Output color format: Output dynamic range:	
	RGB v Limited v	
	Description:	
		A Restore Defaults
O System Information	Typical usage scenarios:	
		~

Step 4 Under 2. Apply the following settings, click Customize. In the Customize dialog box that appears, click Create Custom Resolution. In the Create Custom Resolution dialog box that appears, set the parameters.

- When you set the timing standard to **Manual**, use the *MCTRL4K Ultra-High Resolution Settings Generator (Rev 1.1)* to calculate the parameters, including active pixels, front porch (pixels), sync width (pixels), polarity, total pixels and refresh rate. Then enter the parameter values manually. Note that the pixel clock must not be greater than 595.0 MHz.
- When you set the timing standard to **CVT reduced blank**, the software will calculate the parameters automatically and they cannot be changed manually.



Select the resolutions that you want to add. You can create a custom resolution for a display that may not use a standard Windows resolution. Note that applying these resolutions may result n a temporary blank display.		that is not currently availabl sting a new custom resolution	le in Windows. Your display may flicker a 1.
Resolutions:	Display mode (as reported	d by Windows)	
Custom	Horizontal pixels:	7680	Vertical lines: 1080
7680 x 1080 at 60Hz (32-bit), progressive	Refresh rate (Hz):	60	Color depth (bpp): 32 V
	Scan type:	Progressive ~	
	Timing		
	Standard: C	VT reduced blank $\vee$	
		Horizontal	Vertical
	Active pixels:	7680 🌲	1080 🗘
	Front porch (pixels):	48 🗘	3 🗘
	Sync width (pixels):	32 🗘	10 🗘
	Total pixels:	7840 🗘	1111 ‡
	Polarity:	Positive (+)	Negative (-)
Enable resolutions not exposed by the display	Refresh rate:	66.66 KHz	60.000 ‡ Hz 522.6144 MH
Create Custom Resolution			(59.000 to 61.000)

Step 5 Click Test. In the displayed dialog box indicating the test is successful, click Yes to save the custom resolution.

Figure 6-4 Applying changes

Apply	Changes		×
<b>9</b>	Test successful. Custom resolutic 75Hz (32-bit) has been applied.	on 7680 x 1080 at	
	Do you want to save this resolution	on?	
	Reverting in 16 seconds	Yes	No

#### 6.1.3 Step 3: Quickly Configure the Screen

Follow the steps below to complete quick screen configuration.

- Step 1 On the home screen, press the knob to enter the main menu.
- Step 2 Choose Screen Settings > Quick Config to enter its submenu and set the parameters.
  - Set Cabinet Row QTY and Cabinet Col QTY (numbers of cabinet rows and columns to be loaded) according to the actual situation of the screen.
  - Set **Port1 Cabinet QTY** (number of cabinets loaded by Ethernet port 1). The device has restrictions on the number of cabinets loaded by the Ethernet ports. For details, see Note a).
  - Set Data Flow (Front View) of the screen. For details, see Note c), d), and e).

Figure 6-5 Quick configuration

#### Note:

a). If *n* ports are used to load the screen, the number of cabinets loaded by each of the first (n-1) ports must be the same and the integral multiple of the number of cabinet rows or columns, and it must be greater than or equal to the number of cabinets loaded by the last port.

#### Example:

If all the 16 Ethernet ports are used to load the screen, the number of cabinets loaded by ports 1–15 must be the same and the integral multiple of the number of cabinet rows or columns. Therefore, you need to set only the number of cabinets loaded by port 1 according to the actual situation. The number of cabinets loaded by port 16 must be less than or equal to the number of cabinets loaded by port 1.

b). For irregular screens, NovaLCT software must be connected to configure the screen.

c). During data flow settings, you can rotate the knob to select a target data flow pattern.

d). During data flow settings, ensure that the cabinets loaded by each Ethernet port are connected one by one in the same direction.

e). During data flow settings, ensure that Ethernet port 1 is at the beginning position of the whole physical connection.

## 6.2 Brightness Adjustment

This function allows you to adjust the LED screen brightness in an eye-friendly way according to the current ambient brightness. Besides, appropriate screen brightness can extend the service life of the LED screen.

Figure 6-6 Brightness adjustment

Main	
🔆 Brightness	100%
Input Settings	
Screen Settings	►
Display Control	►
Advanced Settings	►
Communication Settings	►
S Language	•

- Step 1 On the home screen, press the knob to enter the main menu screen.
- Step 2 Select Brightness and press the knob to confirm the selection.
- Step 3 Rotate the knob to adjust the brightness value. You can see the adjustment result on the LED screen in real time. Press the knob to apply the brightness you set when you are satisfied with it.

## 6.3 Screen Settings

Configure the LED screen to ensure the screen can display the entire input source normally.

Screen configuration methods include quick and advanced configurations. They have constraints:

- The two methods cannot be enabled at the same time.
- After the screen is configured in NovaLCT, do not use any of the two methods on the MCTRL4K to configure the screen again.

#### 6.3.1 Advanced Configuration

Set parameters for each Ethernet port, including number of cabinet rows and columns (**Cabinet Row QTY** and **Cabinet Col QTY**), horizontal offset (**Start X**), vertical offset (**Start Y**), and data flow.

#### Figure 6-7 Advanced configuration

Main       Xie     Brightness       Input Settings       Screen Settings       Xie       Display Control       Xie       Advanced Settings       Communication Settings       Xie       Language	•	Screen Settings	•	Warning: Special Training is ne- cessary before Advanced Config function can be correctly perf- ormed. Continue or not?
--	---	-----------------	---	--

- Step 1 Choose Screen Settings > Advanced Config and press the knob.
- Step 2 In the caution dialog screen, select **Yes** to enter the advanced configuration screen.
- Step 3 Enable Advanced Config, select an Ethernet port, set the parameters for it, and apply the settings.
- Step 4 Select the next Ethernet port to continue setting until all the Ethernet ports are set.

#### 6.3.2 Image Offset

After configuring the screen, adjust the horizontal and vertical offsets (**Start X** and **Start Y**) of the overall display image to ensure it is displayed in the desired position.

Figure 6-8 Image offset

Screen Settings		Quick Config	
Quick Config		📃 Start X	0
Advanced Config		Start Y	0
Image Offset			
	•		

## 6.4 Display Control

Control the display status on the LED screen.

Figure 6-9 Display control

Main		Display Control Image Set	ings
🔅 Brightness	100%	Normal 🗾 Con	trast 50%
Input Settings	•	🖹 Freeze 🗾 Satu	uration 50%
Screen Settings	•	📕 Black Out	10
🔼 Display Control	▶ ▶	Roll Test Pattern 📃 🚩 🐁 Res	et
Advanced Settings	►	Tmage Settings	
Communication Settings	►		
🌍 Language	▶		

- Normal: Display the content of the current input source normally.
- Black Out: Make the LED screen go black and do not display the input source. The input source is still being played in the background.

- Freeze: Make the LED screen always display the frame when frozen. The input source is still being played in the background.
- Test Pattern: Test patterns are used to check the display effect and pixel operating status. There are 8 test patterns, including pure colors and line patterns.
- Image Settings: Adjust the contrast, saturation and hue of the output image to improve the display effect.

Parameter	Description
Contrast	Range: 0% to 100%; step: 1%
Saturation	Range: 0% to 100%; step: 1%
Hue	Range: -180 to +180; step: 1

Note

The image settings function is unavailable when the calibration function is enabled.

## 6.5 Advanced Settings

Figure 6-10 Advanced settings

Main			Advanced Settings	
- Brightness	100%		Mapping Function	Enable
Input Settings			E Load Cabinet Files	
Construction Settings			Alarm Threshold	
Display Control			😑 Save to Hardware	
🔅 Advanced Settings	►	ſ	🔁 Redundancy	Primary
Communication Settings			🚯 Factory Reset	
🜍 Language			HDR HDR	
			3D Setting	•

### 6.5.1 Mapping Function

When this function is enabled, each cabinet of the screen will display the sequence number of the cabinet and the Ethernet port that loads the cabinet.

Figure 6-11 Illustration of mapping function



Example: "P:01" stands for the Ethernet port number and "#001" stands for the cabinet number.

#### Note

The receiving cards used in the system must support the Mapping function.

#### 6.5.2 Load Cabinet Configuration Files

Before you begin: Save the cabinet configuration file (\*.rcfgx or \*.rcfg) to the local PC.

Note: Configuration files of irregular cabinets are not supported.

- Step 1 Run NovaLCT and choose Tools > Controller Cabinet Configuration File Import.
- Step 2 On the displayed page, select the currently used Ethernet port, click Add Configuration File to select and add a cabinet configuration file.
- Step 3 Click Save the Change to HW to save the change to the controller.

## Figure 6-12 Importing configuration file of controller cabinet Import the Configuration File of Controller Cabinet - X Select Serial Port COM99 • Move Up Move Down dvanced C. Add Configuratio Delete Configur. Rename File Save the Chang.

#### 6.5.3 Set Alarm Thresholds

Set the alarm thresholds for device temperature and voltage. When a threshold is exceeded, its corresponding icon on the home screen will be flashing, instead of displaying the value.

- Voltage alarm. The voltage value is red and flashing. The threshold range is 3.5 V to 7.5 V.
- Imperature alarm. The temperature value is red and flashing. The threshold range is –20°C to +85°C.

#### 6.5.4 Save to Hardware

You can send and save the current screen configuration parameters to the receiving cards. The configuration data will not be lost after the device is powered off.

#### 6.5.5 Redundancy Settings

You can set the MCTRL4K as the primary device or backup device.

- Set as Primary: The icon of the target Ethernet port on the home screen is highlighted.
- Set as Backup: The icon of the target Ethernet port on the home screen is highlighted and a small mark appears on the top corner of the icon.

When the primary device fails, the backup device will take over the work in real time, that is, the backup takes effect. After the backup takes effect, the target Ethernet port icons on the home screen will have marks on top flashing once every 1 second.

#### 6.5.6 Factory Reset

Reset the controller parameters to factory settings.

#### 6.5.7 HDR

HDR is the abbreviation for High-Dynamic Range. HDR function can greatly enhance the display image quality, allowing for a more clear and vivid image when the device is used together with NovaStar A8s or A10s Plus receiving cards.

The HDR supports HDR10 and HLG standards. You can use the following two methods to enable HDR function and set its parameters.

#### Method 1: In LCD Menu

- Step 1 Choose Advanced Settings > HDR and enable HDR function.
- Step 2 Select an HDR type from HDR10 and HLG.
  - When the input source is HDR10, you can set Screen Peak Luma, Ambient Light and Low Grayscale
     Mode to adjust the display effect.

Standard	Parameter	Description
HDR10	Screen Peak Luma	Range: 100 to 10000; step: 10
		Used to adjust the screen brightness during normal operation
	Ambient Light	Range: 0 to 30; step: 10
		Used to display the brightness of ambient light radiated to the screen (You need to enter the brightness value after measuring.)
	Low Grayscale Mode	Range: 0 to 50; step: 1 Used to improve the image display effect. The bigger the value, the clearer the details in shadows.
HLG	HLG Mode	A total of 7 HLG modes supported, including HLG1 (300 nits), HLG2 (450 nits), HLG3 (600 nits), HLG4 (750 nits), HLG5 (1000 nits), HLG6 (1300 nits) and HLG7 (1700 nits)
		Used to adjust the image display effect. You can select a mode based on the actual screen peak Luma value. At the same time, you can try the adjacent HLG modes based on the on-site ambient light brightness to see their effects and select the best mode.

• When the input source is HLG, you can select one HLG mode from the 7 modes, namely HLG1 (300 nits) to HLG7 (1700 nits).

Step 3 (Optional) Choose **Reset** to reset the HDR settings to factory settings.

Figure 6-13 LCD Menu Operations - HDR10



Figure 6-14 LCD Menu Operations - HLG

Main		Advanced Settings		HDR	
🔆 Brightness	100%	Mapping Function	Enable	HDR HDR	Enable
nput Settings	•	Eoad Cabinet Files	•	нор Туре	HLG
Green Settings	•	🔩 Alarm Threshold	•	HLG Mode	HLG-1.4
🖾 Display Control	▶ .	🗧 Save to Hardware	1	🔶 籡 Reset	
🔅 Advanced Settings	►	Redundancy	Primary		
Communication Settings	•	🍓 Factory Reset			
🚷 Language	▶	HDR HDR	►		
		3D 3D Setting	•		

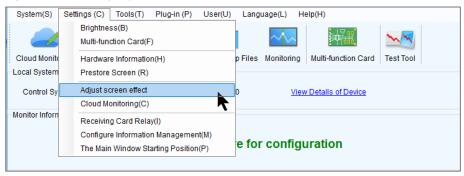
#### Method 2: In Software

Step 1 Run NovaLCT and choose **Settings** > **Adjust screen effect**.

#### Step 2 Under HDR Parameter Settings, select Enable.

- Step 3 Click the drop-down box to select an HDR standard (HDR10 and HLG supported).
- Step 4 Set the HDR parameters to adjust the display effect.
  - When the input source is HDR10, you can drag the sliders to adjust the peak screen brightness, ambient light and low grayscale mode in real time.
  - When the input source is HLG, you can click to select one HLG mode from the 7 modes, namely HLG1 (300 nits) to HLG7 (1700 nits).

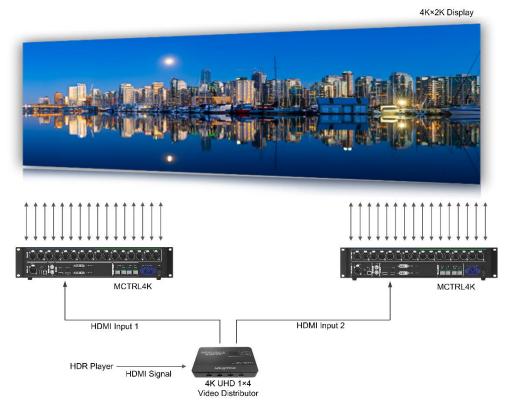
#### Figure 6-15 Selecting Adjust screen effect



#### Figure 6-16 Adjusting screen effect

USB@Port_#0005.Hub_#0001-Screen1	USB@Port_#0005.Hub_#0001-Screen1
Parameter Settings  Enable 18-bit mode  Enable ClearView  Save to HW	Parameter Settings  Enable 18-bit mode Enable ClearView  Save to HW
HDR Parameter Settings  HDR Parameter Settings  Peak Screen   HDR 10  HDR	HDR Parameter Settings ☐ Enable HLG ✓ Restore defaults HLG Mode: (HLG1(300nits) (HLG2(450nits) (HLG3(600nits) (HLG4(750nits)) (HLG5(1000nits) (HLG6(1300nits) (HLG7(1700nits)))
Screen Information 2019-01-14 18:04:22Peak screen brightness set successfully. 2019-01-14 18:04:28Ambient brightness set successfully. 2019-01-14 18:04:32Ambient brightness set successfully. 2019-01-14 18:04:37Peak screen brightness set successfully. Clear	Screen Information 2019-01-14 18:01:46HDR10 type setting succeeded. 2019-01-14 18:01:53HLG type setting succeeded. 2019-01-14 18:02:01HLG2(450nits) mode setting succeeded. 2019-01-14 18:02:07HLG7(1700nits) mode setting succeeded.

### **Applications**



#### Note

- The HDR function supports only the HDMI input connector.
- The HDR function supports only the 10-bit input source.
- When the HDR function is enabled, any calibration operations cannot be performed.
- In NovaLCT, the HDR and ClearView functions cannot be enabled at the same time.
- Using the HDR function will reduce the loading capacity of the MCTRL4K by half because the HDR input source is 10-bit. Please refer to the diagram above and work out a connection solution in advance.
- After HDR is enabled, if the input source does not meet the requirements (10bit, HDR10/HLG), the HDR function will be automatically disabled. When the input source meets the requirements, the HDR function will be enabled automatically.

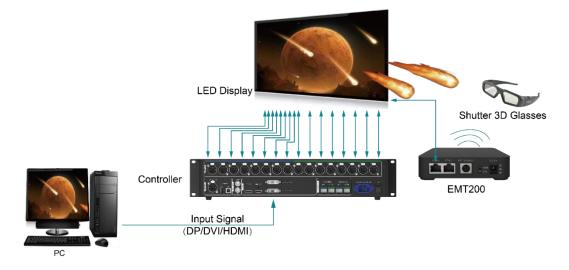
#### 6.5.8 3D Settings

This function works with the 3D emitter EMT200 and 3D glasses to allow users to experience 3D display effects on LED screen. For detailed usage, see 3D Emitter EMT200 Quick Start Guide.

#### **Applications**

• Application 1: EMT200 connected behind the last receiving card

#### Figure 6-17 Application 1



Application 2: EMT200 connected between the controller and receiving card

LED Display Shutter 3D Glasses Controller EMT200 Input Signal (DP/DVI/HDMI) PC

Figure 6-18 Application 2

#### **3D Setting Procedure**

- Step 1 Connect hardware devices according to the corresponding application.
- Step 2 Enable 3D function by using any of the following methods and set 3D parameters.
  - Method 1: In LCD menu
  - 1. On the home screen, press the knob to enter the main menu screen.
    - If the input source is DUAL DVI, go to 2. \_
    - If the input source is HDMI or DP, go to 4.
  - 2. Choose Input Settings > Input Mode > DVI Mode > Mosaic.



- 3. Press the **BACK** button to return to the main menu.
- 4. Choose Advanced Settings > 3D Setting to enter its submenu.
- 5. Enable 3D and set the video source format and eye priority mode.
  - Video Source Format: Set the format to SBS (side-by-side), TAB (top-and-bottom) or Frame SEQ (frame sequential) according to the format of the accessed video source.
  - Eye Priority Mode: Set the mode to Left Eye or Right Eye, wear the 3D glasses to watch the display and adjust the mode based on the display effect.

Figure 6-19 3D settings in LCD menu

Main		Advanced Settings		3D Setting	
G Brightness	100%	Mapping Function	Enable	3D 3D	Enable
Input Settings	•	head Cabinet Files	•	💽 Video Source Format	SBS
Screen Settings	►	-V- Alarm Threshold	►	🗨 Eye Priority Mode	Right Eye
Display Control	▶	Save to Hardware		•	
🔯 Advanced Settings	► <sup>1</sup>	💼 Redundancy	Primary		
Communication Settings	•	🚯 Factory Reset			
🚱 Language	►	HDR HDR	▶		
		3D Setting	►		

- Method 2: In software
- 1. Run NovaLCT, choose Screen Configuration > Sending Card, select Enable in the 3D function area and click Settings to enter the 3D parameter settings page.

Figure 6-20 Screen configuration

ſ	System( <u>S</u> ) Setti	ngs ( <u>C</u> ) Tools( <u>T</u> )	Plug-in ( <u>P</u> ) U	ser( <u>U)</u> Lan	guage( <u>L</u> ) Help(	<u>H</u> )		
					~	ß	~	
	Cloud Monitoring	Screen Configuration	Brightness	Calibration	Screen Control	Local Backup Files	Monitoring	Ţ

ending Card Receiving Card	Screen Connection				
Display Mode					
				Refr	esh
Current Display Mode					
Sending Card ???	Graph	nics Output R	1366 x 768	Curre ???	
Select Input Source					
Video Input			3D Function		
Automati	~	Send	🗹 Enable	Settings	
Source Configuration					
Source: HDMI	$\sim$				
Resolution: 800 x	600 px 🗸 🗸	Custom	1366 🌲	x 768 🜲	
Refresh Rate T 60	∨ Hz Ir	nput Source Bit I	De 8 Bit	~	
				Se	et
Redundancy Set the Current Devi	] Set as Primary	Set :	as Backup	Se	et
Prin	nary		Backu	р	
Serial Number of Primary Sending Card		rot p	rial Number of ackup Sending Card	Serial Number Backup Port	of
Refresh	end		Add	Edit	ete
Restore Factor		Export Screen	M Save System	Co Save	Close

- 2. Set 3D function parameters. Then, click **Save to File** to save the parameters you set as a file. Or, you can click **Load from File** to load an existing 3D configuration file.
  - **Mode Selection**: This parameter is available when the video source is Dual DVI, as shown in the figure below. It is unavailable when the video source is HDMI or DP.

Set 3D Parameters		
Video Source Format		
◙ Side-by-side	🔘 Top-and-bottom	🔘 Frame sequential
Eye Priority		
Right eye	🔘 Left eye	
-Mode Selection		
DVI O DVI1:	DVI2: R	
-3D signal emitter		
🔲 Enable third-party	emitter	
Signal Delay Time		
7 🚔 ms O Flease set an appropr	丈 us (Range: O-20 m iate delay time to make	s) Restore Defa e left and right eye
	Load f	rom File

- Right Eye Start: When you set the video source format to side-by-side or top-and-bottom, you must set the right eye start position.
- Signal Delay Time: When the input source is DP or HDMI, you must set this parameter. Please set this time as required to make sure that the left and right eye image switching of the 3D glasses is in sync with the image switching on the display.

Set 3D Parameters		
Video Source Format		
🔘 Side-by-side	◎ Top-and-bottom	🔘 Frame sequential
Eye Priority		
🔘 Right eye	Left eye	
Right Eye Start (X) DP: 256 🚔		
3D signal emitter	7 emitter	
Signal Delay Time 7 🚔 ms O Please set an approp	🚔 us (Range: 0-20 riate delay time to mak	ms) <b>Restore Defa.</b> .
L		

 On the screen configuration page, click Save to save current configuration parameters to the controller.

#### Note

- The 3D and low latency functions cannot be enabled at the same time.
- When the 3D function is enabled, any calibration operations cannot be performed.
- When the advanced screen configuration is enabled, 3D function is not supported.
- When the input source is DVI, DVI1 loads the images for left eye, and DVI2 loads the images for right eye. When the 3D function is in use, the input mode cannot be switched to multi-card mode.
- When the video source format is set to side-by-side or top-and-bottom, the frame rate of Ethernet output will be doubled (for example, if the frame rate of input source is 60 Hz, the frame rate of Ethernet output will be 120 Hz), and the loading capacity of Ethernet port will be reduced by half.

#### 6.5.9 Genlock Setting

Set the Genlock phase offset to move the time of the sync source backward.

#### Figure 6-21 Genlock

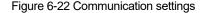
Main	1	Advanced Settings			Genlock Setting	
Brightness 100%		GEN Genlock Setting	•		GEN Phase Offset	Enable
Input Settings		II Hardware Version	V1.2.6.0		🙀 Coarse Tuning (10us)	0
Screen Settings					🤯 Fine Tuning (5us)	0
Display Control	⇒			•		
🔅 Advanced Settings 🕨 🕨	·					
Communication Settings						
🌍 Language 🕨 🕨						

#### 6.5.10 Hardware Version

Check the hardware version of the controller. If a new version is released, you can connect the controller to a PC to update the firmware programs in NovaLCT.

#### 6.6 Communication Settings

Set the communication mode and network parameters of the MCTRL4K.





Communication mode: Include USB preferred and Local Area Network (LAN) preferred.

The controller connects to PC via USB port and Ethernet port. If **USB Preferred** is selected, the PC prefers to communicate with the controller via the USB port, or else via the Ethernet port.

- The network settings can be done manually or automatically.
  - Manual settings include controller IP address and subnet mask.
  - Automatic settings can read the network parameters automatically.
- Reset: Reset the parameters to defaults.

## 6.7 Language

Change the system language of the device.

## 7 Operations on PC

### 7.1 Individual Gamma Adjustment for RGB

The MCTRL4K supports individual gamma adjustment for RGB when the bit depth of input source is 10-bit or 12-bit. This function can effectively control image non-uniformity in low grayscale conditions and white balance offset to improve image quality.

- Step 1 Run NovaLCT, click Screen Configuration, choose the current operation communication port and click Next.
- Step 2 On the Sending Card tab page, select the corresponding input source bit depth and click Set.
- Step 3 On the home page of NovaLCT, choose Brightness > Manually Adjustment.
- Step 4 Under Advanced Settings, choose Gamma > Custom Gamma Adjustment and click Configuration to enter the Gamma Adjustment page.
- Step 5 Adjust Red Gamma, Green Gamma and Blue Gamma.
- Step 6 Click Send.
- Step 7 Close the Gamma Adjustment page. On the Brightness Adjustment page, click Save to HW.

Figure 7-1 Gamma adjustment page

B@Port_#0009. Hub	b_#0001-Screen1						
Brightness	Manually Adjustment	Automatically Adjustment	Gamma Adjustme 💿 Red Gamma 💿 Grayscale Bit Val	Green Gamma	💿 Blue Gamma		
Brightness	•	174 (68.2%)	Gamma table can be generated quickly by adjusting	Gamma table o	an be fine-adjusted by	oditing	the value
	🔲 Reduce Gray Ratio Loss ay R	atio: 68.24%		X	Y	cutting	
				> 0	0	Ē	Move U
			Y-axis Range 0 🖨 _ (85442 🐳	1	128		Move D
			Gamma 🖌 📄 🕨 🕴 1	2	512	-	MOVEL
	Gravscale	Contrast	Recommended Gamma	3	768	-	Save
			🔿 Original 🔿 Mode A 💿 Mode B	4	1024		Loadin
dvanced Settings	s			5	1280	-	Loadin
Gamma	Color Te Color Spa		Picture Quality	6	1536	-	
Contrast			Soft Mode Enhanced Mode	7	1792	_	
Contract				1 8	2048	_	
💿 Gamma Valu	1	۴ 2.8		9	2304	_	
				10	2560	_	
Oustom				11	2816	_	
Gustoin	Configuration			12	3072	_	
				13	3328	_	
				14	3584		
				15	3840	_	
		Refresh Save to HW		16	4112	-	
	ub_#0001-Screen1 Refreshed succes	efully 😵			Send		Exit

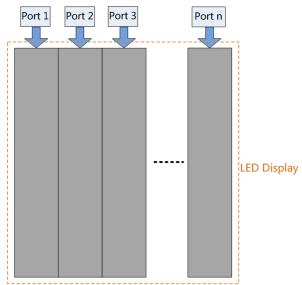
#### Note

When the bit depth of input source is 8-bit, the individual gamma adjustment for RGB is realized by the AXs (V2.0) series receiving cards.

## 7.2 Low Latency

The MCTRL4K supports a low latency of less than 1 ms (when the start position of image is 0). Low latency is used to reduce the time delay between the input of video signal to the controller and the corresponding output. To use the low latency function, you must ensure that each Ethernet port loads the cabinets vertically during screen configuration, as shown in Figure 7-2.

PAGE 28



- Step 1 Run NovaLCT, choose Screen Configuration and enter the Sending Card tab page.
- Step 2 On the Screen Configuration page, select Enable Low Latency.
- Step 3 Click Save System Configuration File and Save.

Figure 7-3 Low latency

System( <u>S</u> ) Setti	ngs ( <u>C)</u> Tools( <u>T</u> ) F	Plug-in ( <u>P</u> ) U	ser( <u>U)</u> Lang	guage( <u>L)</u> Help( <u>I</u>	<u>H</u> )		
				~	ß	~	
Cloud Monitoring	Screen Configuration	Brightness	Calibration	Screen Control	Local Backup Files	Monitoring	

Figure 7-2 Loading vertically

Screen Configuration-COM99	Castle Language		
Sending Card Receiving Card Screen	Connection		
Display Mode			
			Refresh
Current Display Mode			
Sending Card ???	Graphics Output	ut R 1920 x 1080	Curre ???
Select Input Source			
Video Input		3D Function	
Automati	- Send	Enable	Settings
Source Configuration			
Source: HDMI	<b>~</b>		
Resolution: 1920 x 1080 p	Custom	i 1920 🔹 ,	x 1080
Refresh Rate T 60	Hz Input Sour	ce Bit De 8 Bit	
			Set
	-		
Low Latency Enable Low Latency			
·			
Redundancy Set the Current Devi 🥅 Set as	Primary	Set as Backup	
	-		
Primary		Backup	)
Serial Number of Primary Sending	Serial Number of	Serial Number of Backup Sending	Serial Number of
Card	Primary Port	Card	Backup Port
	\		
Refresh Send	J	Add	Edit Delete
Deaters Faster	6		
Restore Factor	Saves	Back Up Ter	mi Save Close

#### Note

- The low latency function is supported when the input source is DP or HDMI.
- The low latency and Genlock functions cannot be enabled at the same time.
- When the low latency function is enabled, the offset of image cannot exceed the size of input source.

## 7.3 Input Source Bit Depth

Set the bit depth of input source, including 8-bit, 10-bit and 12-bit.

- Step 1 Run NovaLCT, choose Screen Configuration and enter the Sending Card tab page.
- Step 2 Click the drop-down box next to Input Source Bit Depth and choose a bit depth.
- Step 3 Click Save System Configuration File and Save.

Screen Configuration-COM99	
Sending Card Receiving Card	Screen Connection
Display Mode	Refresh
Current Display Mode	
Sending Card ???	Graphics Output R 1920 x 1080 Curre ???
Select Input Source	
Video Input	3D Function
Automati	Send     Enable     Settings
Source Configuration	
Source: HDMI	
Resolution: 1920 x	1080 px 👻 🔲 Custom 1920 🚖 x 1080 🚖
Refresh Rate T 60	Hz Input Source Bit De 12 Bit
	8 Bit Set
	10 bit 12 Bit
Low Latency	
Enable Low Latend	cy
Redundancy	
Set the Current Devi	Set as Primary 📄 Set as Backup
Prima	ary Backup
Serial Number of Primary Sending Card	Serial Number of Primary Port Card Serial Number of Backup Sending Backup Port
Refresh	
Restore Factor.	Save System Co., Back Up Termi., Save Close

#### Figure 7-4 Input source bit depth

#### Table 7-1 Input source bit depth adjustment

Bit Depth	Description
8bit	The loading capacity of the MCTRL4K will not be reduced.
10bit	The loading capacity of the MCTRL4K will be reduced by half.
12bit	The loading capacity of the MCTRL4K will be reduced by half.

## 7.4 Operations on Web Page

The MCTRL4K supports web control functions, so the screen configurations can be easily and quickly performed on a PC or mobile device.

#### Note

For LED screen configuration on web, the Google Chrome browser (Chrome 50 or later) is recommended.

#### 7.4.1 Environment Configuration

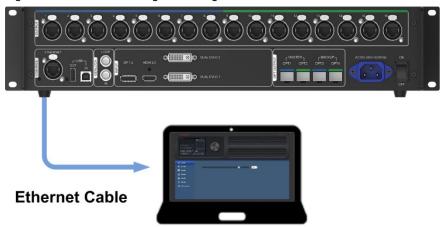


Figure 7-5 Environment configuration diagram

- Step 1 Connect the MCTRL4K to a PC (or a mobile device) via Ethernet cable or router.
- Step 2 Obtain the IP address of the MCTRL4K from the top-right corner of home screen.
- Step 3 Open the suggested web browser on your computer, enter "http//the above device IP address" in the address bar, and then press **Enter** to jump to the Web Control page for the device.

#### Note

The MCTRL4K and PC (or mobile device) must be on the same LAN.

#### 7.4.2 Operations

Figure 7-6 Web control page

NCTURE         COLOR           COLOR         COLOR				
☆ Brightness デ Input Settings Screen Settings Display Control Advanced Settings Network Settings G Language/资源者	 •	60	ĸ	

Area A: Hardware connection statuses and loading capacities of the input, output and other connectors on the MCTRL4K. For details, see chapter 5 Home Screen.

Area B: Operations can be done in this area. For details, see chapter 6 Menu Operations.

Click the menu bar on the left of area B to select the option to be adjusted, and the corresponding operations can be done on the right.



## 7.5 Software Operations on PC

### 7.5.1 NovaLCT

Connect the MCTRL4K to the control computer installed with NovaLCT V5.2.0 or later via USB port to perform screen configuration, brightness adjustment, calibration, display control, monitoring, etc. For details on their operations, see *NovaLCT LED Configuration Tool for Synchronous Control System User Manual*.

Figure 7-7 NovaLCT

System(S) Sett	ings ( <u>C</u> ) T	ools(T) Plug-in	(P) User(U)	Language(L)	Help(H)			
		5	🔆 🛛 🛒			ß	$\sim \sim$	
Cloud Monitoring	Screen Co	nfiguration Brig	htness Calib	ration Screen	Control Local	Backup Files	Monitoring	Ŧ
Local System Inform	mation							12
Control System	1	Other I	Device	0	View Details o	f Device		
Monitor Information								
	睅							
						•		
	-							
Service Status: Ser	vice version:3	.1.1						

### 7.5.2 SmartLCT

Connect the MCTRL4K to the control computer installed with SmartLCT V3.4.0 or later via USB port to perform building-block screen configuration, seam brightness adjustment, real-time monitoring, brightness adjustment, hot backup, etc. For details on their operations, see the SmartLCT user manual.



## 7.6 Firmware Update

#### 7.6.1 NovaLCT

In NovaLCT, perform the following steps to update the firmware.

- Step 1 Run the NovaLCT. On the menu bar, go to User > Advanced Synchronous System User Login. Enter the password and click Login.
- Step 2 Type the secret code "admin" to open the program loading page.
- Step 3 Click Browse, select a program package, and click Update.

#### 7.6.2 SmartLCT

In SmartLCT, perform the following steps to update the firmware.

- Step 1 Run SmartLCT and enter the V-Sender page.
- Step 2 In the properties area on the right, click to enter the **Firmware Upgrade** page.
- Step 3 Click to select the update program path.
- Step 4 Click Update.

# 8 Specifications

Electrical Parameters	Input voltage	AC 100 V~240 V-50/60 Hz		
	Rated power consumption	30 W		
Operating Environment	Temperature	-20°C to +60°C		
	Humidity	10% RH to 90% RH, non-condensing		
Storage Environment	Temperature	-20°C to +70°C		
	Humidity	10% RH to 90% RH, non-condensing		
Physical Specifications	Dimensions	482.6 mm × 372.0 mm × 88.1 mm		
	Weight	4.6 kg		
	Carrying case	530 mm × 420 mm × 193 mm		
		405 mm × 290 mm × 48 mm		
		Accessories:		
		<ul> <li>1x power cord</li> </ul>		
Packing Information	Accessory box	1x Ethernet cable		
		• 1x USB cable		
		• 1x HDMI cable		
		• 1x DP cable		
	Packing box	550 mm × 440 mm × 210 mm		

#### Copyright © 2022 Xi'an NovaStar Tech Co., Ltd. All Rights Reserved.

No part of this document may be copied, reproduced, extracted or transmitted in any form or by any means without the prior written consent of Xi'an NovaStar Tech Co., Ltd.

#### Trademark

NOVASTAR is a trademark of Xi'an NovaStar Tech Co., Ltd.

#### Statement

Thank you for choosing NovaStar's product. This document is intended to help you understand and use the product. For accuracy and reliability, NovaStar may make improvements and/or changes to this document at any time and without notice. If you experience any problems in use or have any suggestions, please contact us via the contact information given in this document. We will do our best to solve any issues, as well as evaluate and implement any suggestions.

Official website www.novastar.tech

Technical support support@novastar.tech