

Quantum II User Guide

Revision 1.1

October 2021



CINEO
LIGHTING™
A NBCUNIVERSAL COMPANY

Welcome to the new Quantum II from Cineo Lighting

Following the success of Quantum 120, released in 2016, Cineo Lighting has harnessed the latest technologies available to build the Quantum II, a premium large format LED soft light.

The Quantum II delivers up to 100,000 lumens of beautiful, easily controllable, full-gamut light across a diffused 4' x 4' aperture. With built in power supply and quiet operation, the Quantum II delivers 800 watts of power in a package that weighs 55 lbs and is less than 5.5 inches deep.

In addition to Cineo's proprietary phosphor-converted white light LEDs, the Quantum II uses phosphor-converted saturated color LEDs. The phosphor-converted LEDs use the exact same dyes as the white LEDs, so all light emitting elements of the Quantum II carry identical thermal stability and perform over time with identical differential aging. So after years of service, color stability remains consistent.

The Quantum II operates on the Cineo C²OS platform, a Linux-based operating system that provides a wealth of new features and connectivity, and platform to support future StageLynx® smartstage innovations. The Quantum II incorporates an intuitive control strategy that allows predictable, repeatable results, either using the on-board touchscreen control panel or remotely with wired DMX/RDM, built-in wireless CRMX or ART-Net/sACN over ethernet. Software upgrades are easily accomplished using a USB drive or network connectivity.

Local and remote operations include a variety of personalities, including:

- 8-bit or 16-bit DMX resolution
- HSIK, RGBK full-gamut color spaces
- Dim-only and Dim+CCT modes

The Quantum II whisper-quiet active cooling, is ruggedly built, water resistant and offers multiple mounting options for easy setup.

Features

- Cineo C²OS Control Platform – This standard Cineo platform utilizes a quad-core processor, 2GB memory, 32GB storage and operates on industry-standard Linux OS.
- Touchscreen Control – Our new user interface means no moving parts, greater reliability and a simpler method to control the fixture.
- Adaptive Color Space – In addition to supporting Cineo's legacy color space (S410, LightBlade, LB1K), we now support UCS color space, which closely correlates to REC.2020. The color space can be selected, similar to a preset, for matching other lighting sources and/or camera LUTs. More LUTs will be available in future releases.
- +/- Green Control – The ability to tune the fixture away from the black body curve to match other lighting sources.
- Local Zone Control – Local control operates in 16-bit resolution.
- Presets and Effects - The Cineo Preset Library will include standard gels; the Cineo Effects Library includes popular motion-based dynamic lighting elements. Users can add their own, save them on the fixture and transport their effects and presets via USB or network.
- Expanded Control Protocols – In addition to DMX/RDM and CRMX, the unit supports sACN/ARTNet over wired or wireless networks.

General Notes

1. Please read through this manual carefully before operating the Quantum II and keep this manual for future reference.
2. There are numerous safety instructions and warnings that must be adhered to for your own safety.
3. The Quantum II is not intended for residential use. It is intended for use in a professional studio.
4. The Quantum II must be serviced by a qualified technician.
5. The Quantum II is rated as IP23 – for wet environments.
6. The Quantum II products are not certified for use in hazardous locations.
7. The Quantum II has a typical operating temperature of 50°C (122°F).

Fixture Set Up

Read these safety instructions carefully to ensure fixture and accessories are used safely.

Ensure the Junior Pin adapter is correctly mounted onto the yoke before rigging.

Always use secondary safety cables of suitable length when hanging Quantum II units.

The Quantum II weighs 83.5 lbs (37.9 kg.) excluding accessories. The combined weight should be considered when choosing a suitable safety cable.

Safety cables must securely be attached to the yoke on Quantum II and be as short as possible to reduce travel distance if primary hanging accessory fails.

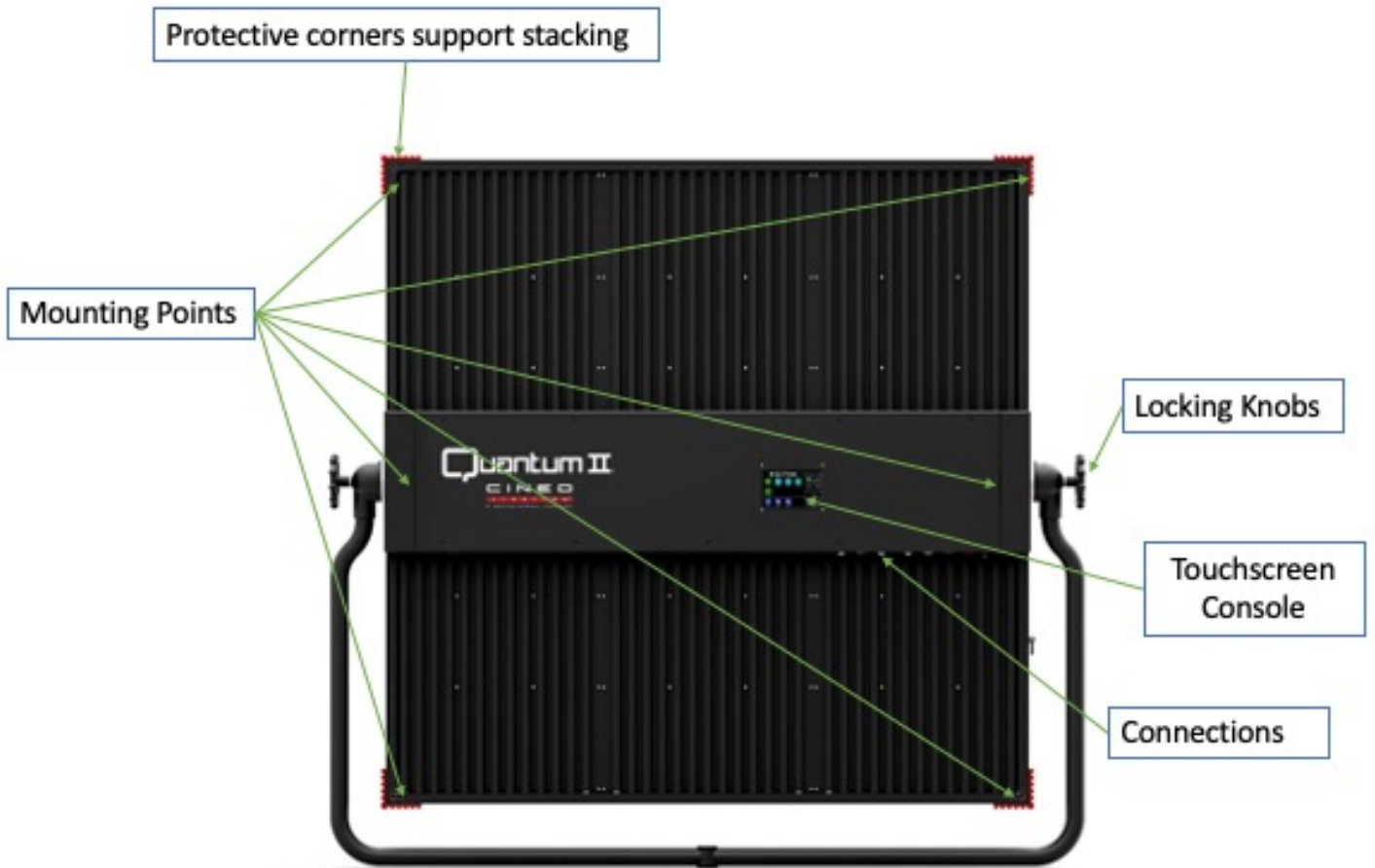
Ensure that the yoke lock is correctly tightened when manipulating Quantum II in the required orientation for safety purposes.

Ensure the Quantum II is operated within an ambient temperature range of -20 to +40°C (-4 to 104°F).

Mounting Options

The Quantum II can be mounted on a fully rotational yoke with a Junior Pin mount. The yoke can be removed, and pipe clamps can be attached mid-line via 3/8 x 16 reinforced threaded holes for mounting to a pipe grid or truss. In addition, (4) 3/8 x 16 threaded mounting points allow top-hanging via cable harness.

Component Locations



Power and Communications interfaces

All connectors and system controls for the Quantum II are located on bottom edge of the center chassis. The touchscreen control display provides access to menu selections, local control, effects/presets and remote-control options. Power connections and switch allow for easy set up and strike. The DMX connections, RJ45 Ethernet port, embedded wireless transceivers, RDM responders and powered USB port support many options for external control.

Power Connector/Power Switch/Circuit Breaker

The Quantum II unit is powered by an internal power supply, 110 – 220VAC via a locking True1 connector. Power is applied with the switch above the connector. Maximum power draw is 1,500 watts. A self-resetting circuit breaker is located near the power connection, which requires no user interaction. If the breaker trips, it will reset within one minute of tripping.

NOTES:

1. Ensure the power cable is disconnected before servicing.
2. Do not connect to a variable supply, such as a dimmer rack.
3. The power cable should be plugged into the power supply before switching the power ON. The power supply should be switched OFF before removing the power cable.

Wired DMX Connections

Quantum II uses industry-standard 5-Pin XLR male and female connectors to receive and pass-thru DMX signals and RDM signals. The DMX port is self-terminating and does not require external DMX termination when used in a chain. If the unit is the last device on a DMX chain, make sure that there is no cable inserted into the DMX Out connector.

The DMX pin wiring is as follows:

- Pin 1: Signal Common
- Pin 2: Data –
- Pin 3: Data +
- Pin 4: Spare
- Pin 5: Spare

RDM Support

The Quantum II can remotely report unit information to an RDM controller via the RDM Identify command on either wired or wireless DMX. The RDM information provided includes the model number (Quantum II), manufacturer's number (1A0D), followed by the last 8 values from the wifi MAC address, which corresponds to the Unit ID.

Functions that can be programmed remotely include DMX Personality and DMX Master Address.

DMX Bridge

The DMX Bridge port is a DMX output that regenerates all communication received by the fixture. When in REMOTE mode, whatever control method used to control the fixture (DMX, wireless, network, etc.) is outputted as a full DMX512 signal. RDM is not supported on this port.

Ethernet Port

This waterproof RJ45 jack is used for network connections, including TCP/IP, sACN or ARTnet communications.

USB Port

Type-A powered USB 2.0 port, designed to update software and up/download user libraries.

Control Console

Capacitive touchscreen for managing local control and remote communications

Touchscreen Control Operation

Home Screen

The Quantum II incorporates a high-resolution touchscreen, Linux-based 64-bit processor, 32GB storage and a precision real-time clock. This platform provides an intuitive user interface for local control, system setup and diagnostics, specialized functions and remote operation.

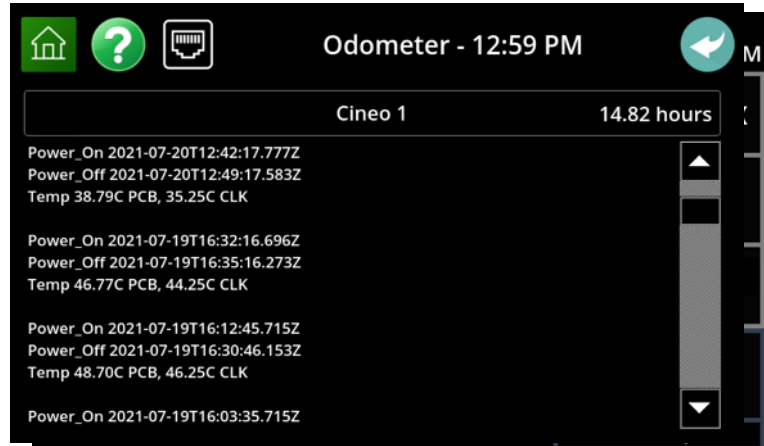
The Green icons represent settings, while the teal icons contain additional features, and the blue icons are controls.

System Information

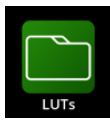
On the top line of the display, the software version number is displayed. Touching this will display details of both software and firmware versions, as well as the UID and separate MAC addresses for wired and wireless network connections.



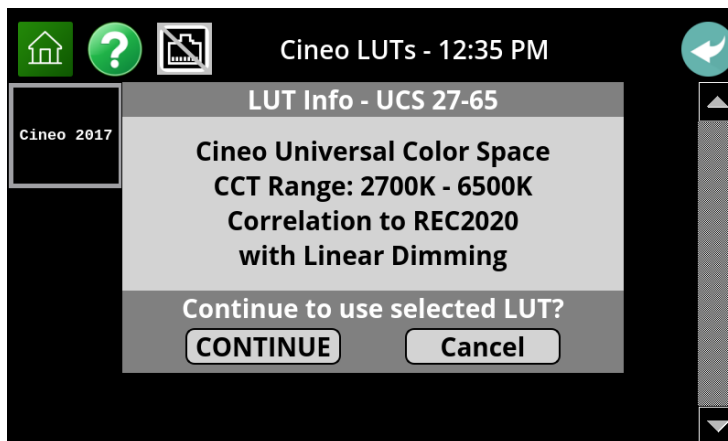
Additionally, holding the OK button for 5 second will display on odometer of the fixture's runtime in detail:



LUTs



The first step in setting up the Quantum II is defining its overall color space and dim characteristics. The C2OS environment supports variable Look Up Tables, or LUTs, which operate in a similar fashion to camera LUTs and set the overall characteristics of the fixture. New LUTs will be created periodically; however, the units initially ship with three basic LUTs: UCS 27-65, eUCS 20-100 and Cineo 2017.



More explanation of these are available in the appendices. The Universal Color Space LUTs (UCS) are designed to closely match REC.2020 with linear dimming and is available in two CCT ranges: 2700-6500K (UCS 27-65) and an extended 2000-10,000K range (eUCS 20-100). The system default is UCS 27-65.

When operating the Quantum II with other legacy Cineo fixtures, the Cineo 2017 LUT matches the color space of the Standard 410, Lightblades, C80, LB1K and older (non-C2OS) Quantum II units. This LUT also selects legacy Cineo PAD dimming curve. Choose this for compatibility with all legacy Cineo fixtures.

Personalities



This parameter defines what method of control is desired, both locally and remotely. Both HSIK and RGBK modes are supported, each with the ability to optionally control +/- Green. In addition, two basic personalities are included to match single CCT or BiColor fixtures, such as Cineo HS or Maverick. Selecting these disables saturated color and creates a smaller DMX footprint for remote operation.

Zones



The Zone icon presents zone options for C²OS fixtures: for Quantum II this is fixed at 1 Zone. Note that for single Zone fixtures, the Wheel control is active.

Controls

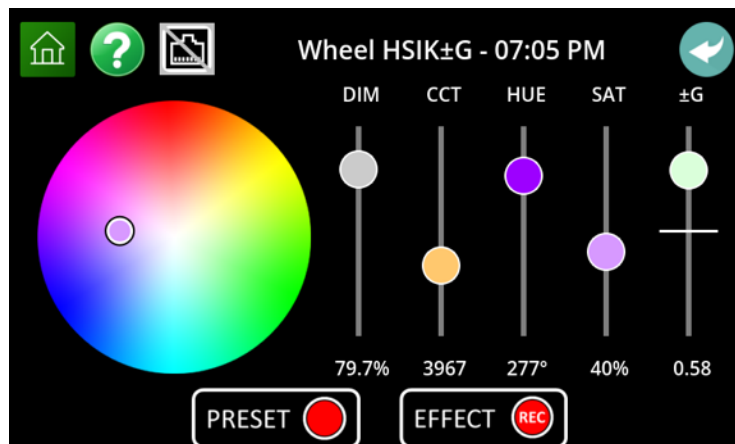


The control section is located at the bottom of the screen, identified by dark blue icons.

HSIK Controls

Wheel Control

The Wheel Cursor and Slider controls are the simplest methods for controlling the fixture. Select the Wheel icon, and a color wheel and four sliders appear: DIM, CCT and HUE and SAT. If the +/- Green Personality is selected, this slider also appears. The Wheel Cursor can be moved within the color wheel to select desired saturated color, along with the amount of saturation added to the CCT value, set on the slider. Using the Sliders, values can more accurately be set. For further accuracy, press and hold the value displayed below the Slider. A keypad is displayed so precision values can be entered. Shortcuts are provided by tapping on either side of the slider to jump to the next or previous logical value for the control. These are:



DIM: Increase or decrease the output in increments of 20% by tapping on either side of the slider.

CCT: Tap the slider bar to jump between 2700, 3200, 4300, 5600, and 6500.

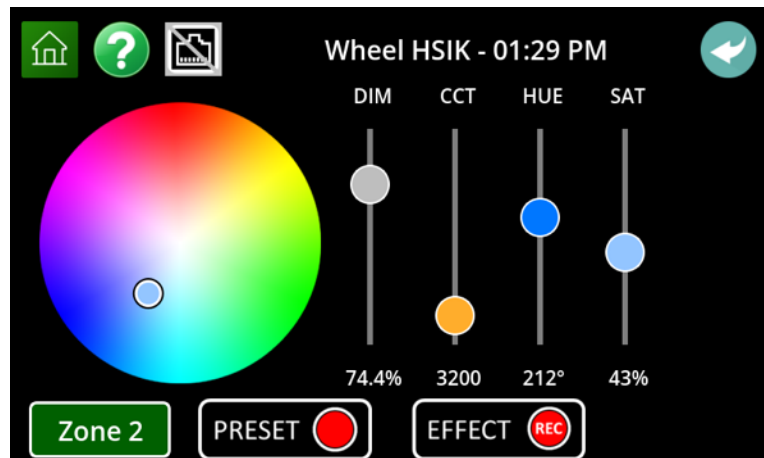
HUE: Tapping this slider bar jumps between the six primary and secondary saturated colors.

SAT: Increases or decreases the percentage of shift from the selected CCT to the selected saturated color.

+/- G: Presets are available at .25, .5 and Full, emulating standard gels.

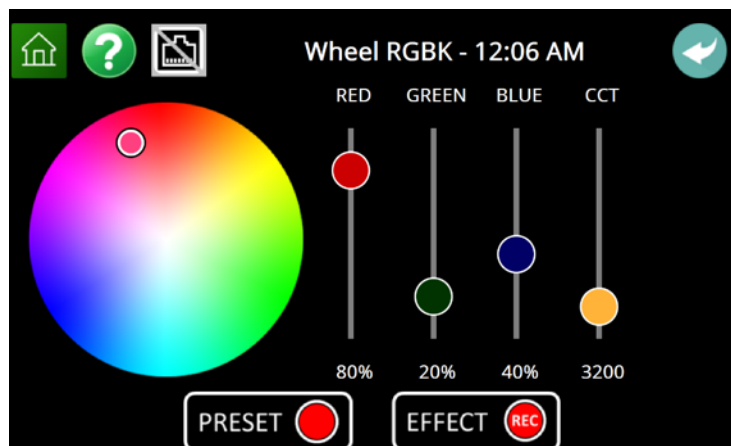
All control screens include the ability to save current settings as either a Preset or Effect, with buttons present at the bottom of all control screens. This will be explained in a following section.

The Home icon in the upper left corner always returns you to the Home screen, while the arrow icon in the upper right corner returns you to the previous screen. The network icon shows the status of network connections, as well as displaying the network menu.



RGBK Controls

If RGBK or RGBK+G Personalities are selected, both Local and Remote controls change to support control of the fixture using primary color mixing, similar to theatrical fixtures. When values of R, G and B are equal, the resulting white is adjustable via the CCT slider.



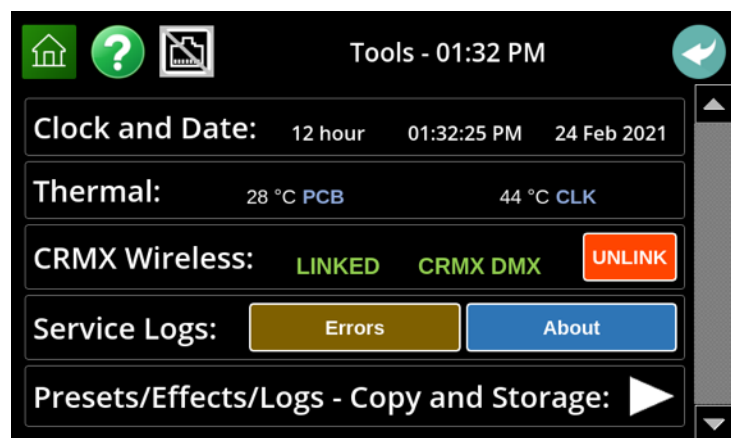
Control screens are similar to operation in HSIK mode, with the exception that only the R, G, B and K values are adjustable in 1-Zone, 2-Zone and 10-Zone modes.

Tools

By touching the Tools icon, several fixture settings are available, as well as temperature and component monitoring status.

Time Set

The Quantum II contains a crystal-accurate clock that is the time reference for the fixture. This includes the date and time displays throughout the user interface, the timestamps used for event logging and creation/modification date stamps for all stored LUTs, Presets and Effects. Touch the Date, Time or 12/24-hour time format to change any of these criteria.



Thermal

The thermal management of Quantum II includes sophisticated software designed to prevent thermal stress.

CRMX Wireless

In this section, the CRMX radio linking and status are managed. The Quantum II includes support for CRMX / Lumen Radio protocol which can receive signals from CRMX and some WDMX transmitters. CRMX receivers always automatically “Link” to the available transmitter in the vicinity. Please note that each fixture can only be linked to a single network at a time and maintains the network ID of its previous linking. Therefore, the fixture’s linking data must be cleared prior to linking to a new network. Touch the red button to “Unlink” the unit to a connected wireless DMX transmitter. This line also displays the current fixture status in relationship to being linked to a transmitter or not. It also shows the status of valid DMX data on the connection.

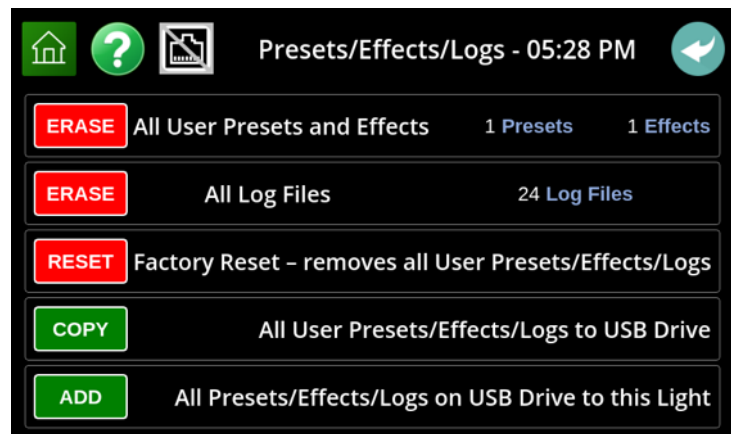
Refer to your wireless DMX transmitter instructions for linking fixtures to a wireless network.

Service Logs

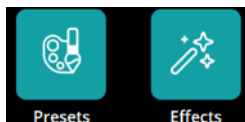
Pressing the “Errors” button show a list of errors reported for diagnostic purposes. The “About” button displays system information, including the software version.

Presets/Effects/Logs – Copy and Storage

By pressing the arrow button, the system memory can be managed, as well as providing tools to move user Presets, Effects and Logs to/from a USB storage device.



Presets and Effects



The Quantum II is capable of recording and playing back static or dynamic settings. In all Control screens, current static output settings for the fixture can be recorded as Presets and recalled for future use. The same is true for saving dynamic lighting changes, created locally or played from a console via supported remote protocols and recorded as Effects. These are organized in the Presets and Effects icons on the Home screen, with static settings stored in Presets, and dynamic settings stored in Effects. In either area, the user can create collections of both Presets and Effects, stored in folders called Libraries.

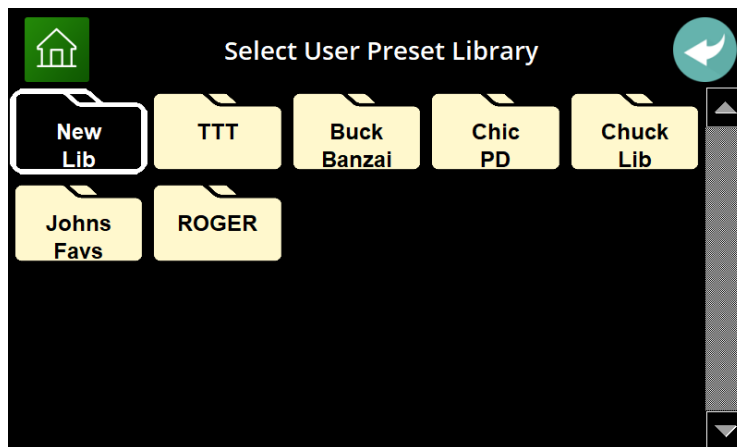
The Quantum II is shipped with pre-built “Cineo Presets” and “Cineo Effects”, with the ability to create your own. Any Cineo Preset or Effect can be recalled by simply selecting the stored item; it can then be modified and stored as a new item in the “User Presets” area of Libraries.

Creating Presets

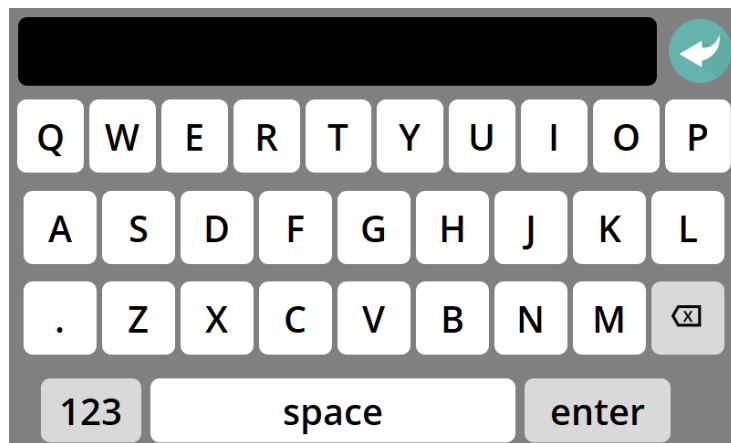
As previously mentioned, all applicable screens, including the remote operation screen offer the ability to record a Preset event.



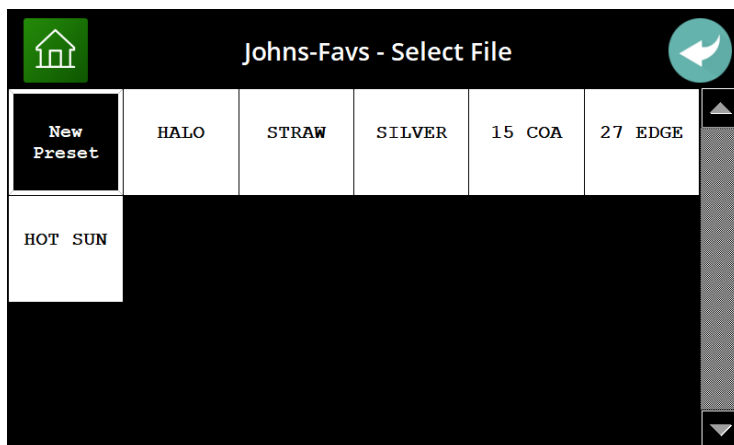
Since a Preset is a snapshot of the current settings, once the Preset button is pushed, the user is prompted to select an existing Library for storage, or the choice to create a new Library.



If creating a new Library, the keypad is displayed for naming the Library, followed by the "New Preset" button. Naming of the Preset follows similar conventions.



If storing in an existing Library, "New Preset" button is shown, along with the existing Presets stored in the Library. The user can choose to overwrite an existing Preset or choose the "New Preset" button. When the latter is chosen, an alphanumeric keypad is then displayed for naming the Preset.

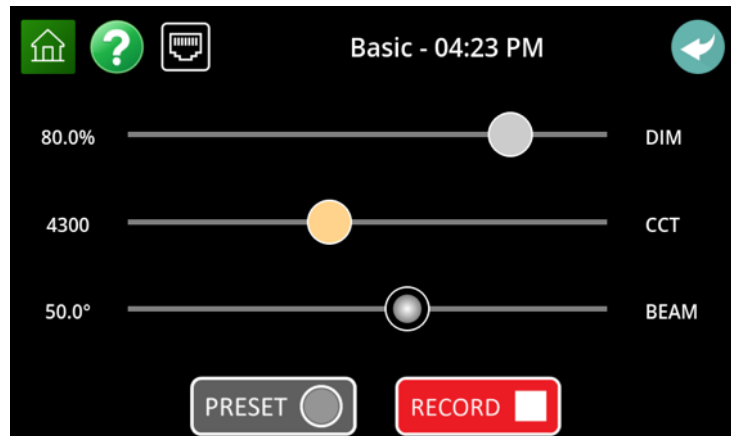


Recalling Presets

To recall an existing preset, simply go to the Presets icon on the Home screen, choose the Library and Preset and the fixture will recall and display the chosen Preset.

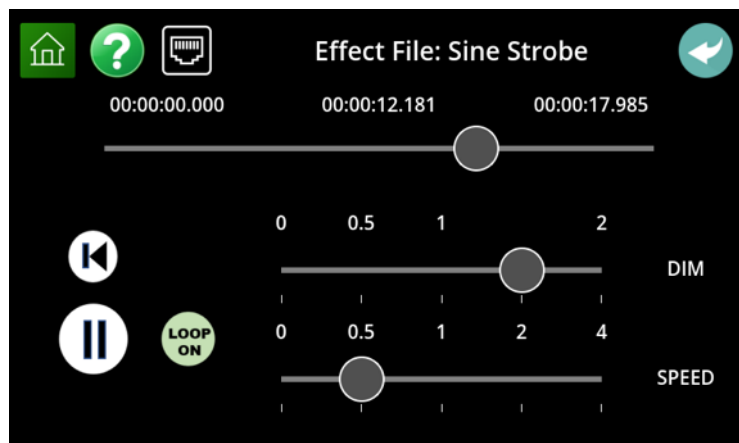
Recording Effects

Effects creation is very similar to Preset creation, except the Effects are time-based. When pressing the Effect button from any control screen, the button changes to "Record". It will now record all changes made to the settings, either locally or remotely, until the Record button is pushed again. A list of Effects Libraries is then displayed, and the ability to select a Library create a new Library, save the Effect or overwrite an existing Effect are identical to the operation of saving Presets.



Effect Playback

Select an Effect to playback in a similar manner to choosing a Preset; however, when the Effect is chosen an Effect Player is displayed. This is a very powerful tool, allowing you to control the playback speed and DIM level, along with the option of looping the Effect. The start and end frame of the effect can be selected by following these steps:



1. Using the timeline slider, park the slider on the desired start frame. Then touch the starting timestamp (on the left). This selects the new start frame for the effect.
2. Move the timeline slider to the desired ending frame. Touch the end frame timestamp (on the right). This selects the effect end frame.
3. If LOOP is on, the effect will play continuously between the revised start and end frames.

Logs

Log files are a time-stamped history of all settings for the fixture. Every time the fixture is powered-on, a new Log file is created and continues to record the events, both locally and remotely that the fixture is doing. These Log files are saved indefinitely unless storage space requires automatic deletion of the oldest logs. Typically, several weeks of previous activity can be reviewed and recalled. There are several purposes of the Log files, including:



- Review and recall any setting or series of settings created before. When selected, Log files are loaded into the Effects player, and can be reviewed.
- Logs show the chronological usage of the fixture, for analytics purposes.
- Diagnostics. Cineo Customer Service can review the Log files as a troubleshooting tool.

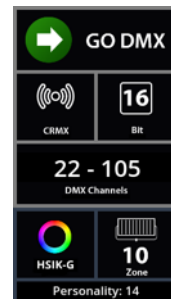
Remote Operation

The Quantum II can be remotely controlled using a wide range of protocols, the simplest of which is DMX/RDM. Current release also supports the built-in CRMX wireless DMX protocol, and future releases will add sACN/ARTNet, Ethernet and Wifi.

All functions in this area are also available via RDM, including the ability to place the unit in Remote or Local operation.

Remote Control method

By selecting this icon, current control methods are presented. In the current release, choices are DMX and CRMX.



8/16 bit protocol

By choosing this icon, 8-bit or 16-bit DMX protocol is selected. Using 16 bits offers considerably more adjustment resolution and doubles the number of DMX channels. Note that all Local controls operate at 16-bit accuracy.



DMX Channels

By touching this area of the screen, a numeric keypad is displayed, providing a method to choose the starting DMX address for the fixture. Based on the Operating Mode, Zone count and 8/16 bit data protocol, the DMX address range is calculated and displayed in the DMX Address area.



Control over Ethernet

All Cineo C2OS fixtures can be operated on wired networks, using both Art-Net and sACN protocols. Commands for both protocols can be intermixed and correctly translated in the fixture. To simplify in the network setup, basic networking elements are pre-configured. Specifically, DHCP is used to assign the IP address for the fixture, based on the address range available within the host router.

Any valid IPv4 address range can work with Cineo fixtures, including both Class A, B and C networks. IPv6 addresses are not currently supported. Connection to the internet is not required, so no DNS services are not used.

To connect a Cineo fixture onto a network, follow these steps:

Locate the Network icon at the top of the display screen.

The icon displays the current state of the network connection:



indicates no physical network connection is available, or networking is disabled

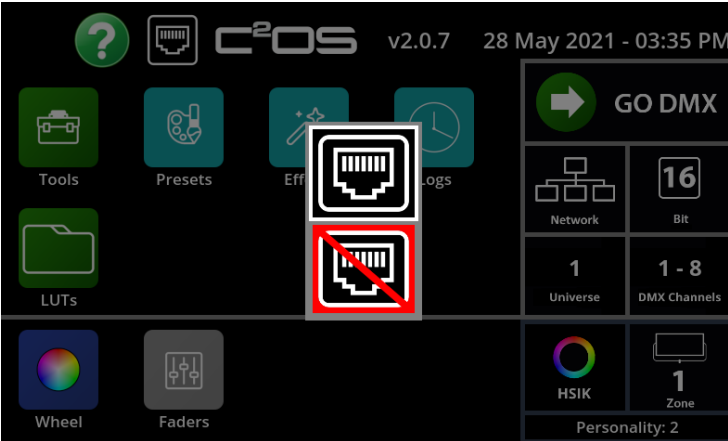


is displayed when the network cable is correctly connected, but no IP address is assigned

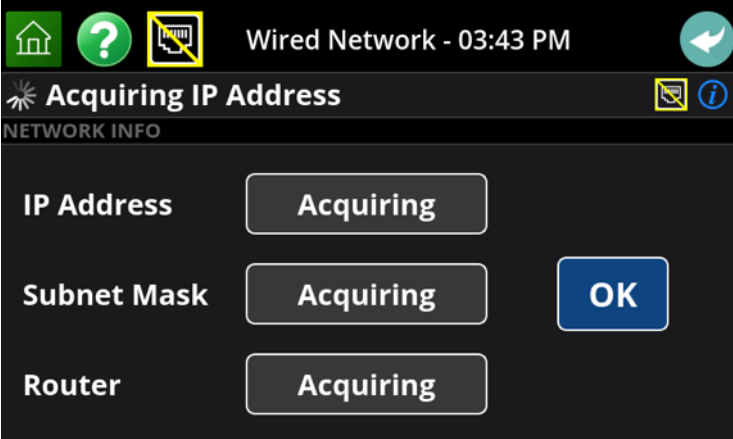


indicates a properly configured network connection

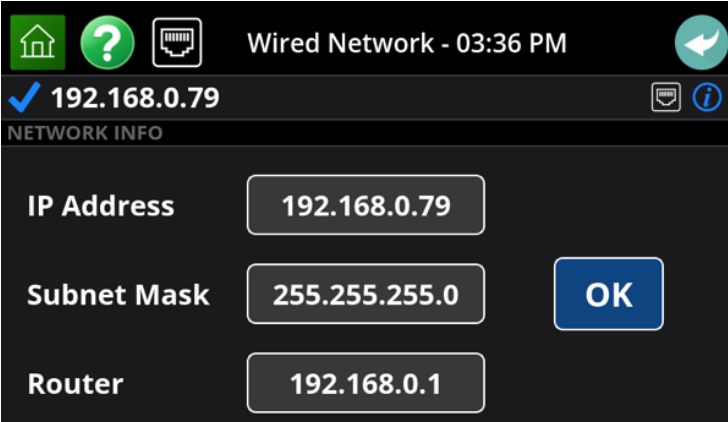
Touch the icon and choose to connect or disconnect the network with the fixture:



If connection is requested, the system first checks for a valid physical network connection, then, using DHCP requests an IP address from the host router:



Once established, the display shows the IP address of the fixture. By touching  the icon, all of the relevant network address information is displayed.



If an IP address is not established, the system will continue requesting address from the host until an address is assigned, or the network connection is disabled.

When Network is selected, the display also presents an option to select the DMX Universe you wish to place the fixture on. Art-Net supports up to 32,000 universes, while sACN supports up to 64,000. Be sure the protocol you are using is within these limits, if unsure keep the universe number below 32,000. Touch the Universe icon and use the numeric keypad.

Go DMX



The right side of the Home screen provides selection of all parameters of remote operation. The top "GO DMX" button places the unit in remote mode, using all of the setting chosen below this.

DMX Operation Screen

When the Quantum II is operating from a remote control, the following screen is displayed on the Control screen. This provides substantial information about the current state of the unit, as well as information that may help troubleshoot any communications issues.

The image shows a control screen for a fixture with several callout boxes explaining its features:

- Home button:** Touching the "Home" button cancels remote operation, returning the unit to Local mode.
- Communication method:** The current communication method configured. If the unit is receiving valid data, a green "checkmark" indicates proper data, while a "red X" indicates no valid data present.
- Fixture address:** The fixture address is displayed in large numbers, easy to read from a distance.
- Operating Mode:** HSIK-G 16-bit
- Address range:** Address range for the fixture: 67 - 76
- Overall fixture settings:** Overall fixture settings. These dynamically change based on DMX settings.
- PRESET and EFFECT buttons:** Choosing either of these buttons records a preset or Effect, based on the fixture's current static or dynamic settings.

Parameter	Value
DIM	59.2%
CCT	4300.0
SAT	42.4%
HUE	245.6°
±G	-0.12

Specifications

Input Power: 110-240VAC, 1,500 watts max. via locking True1 connector

Integrated power supply

Fixture Size: 48" W, 48" H, 6" D (1.2m W, 1.2m H, 152mm D)

Weight (with yoke): 83 lbs. (38 kg.)

Mounting yoke includes Junior Pin

Variable saturated color with presets at Red, Yellow, Green, Cyan, Blue, Magenta

Variable white/color blending

Local and Remote dimming, 0-100%

5-pin wired DMX/RDM In and Thru

Integrated Lumen Radio™ CRMX bi-directional wireless DMX

sACN and ART-Net over Ethernet or Wifi

Completely flicker-free operation

Quiet, dynamic active cooling

Environmental temperature range: -20°C - +40° C

Max. temperature rise: +45° C

Warnings, Disclaimers and Warranty

Risk of Electric shock / Risk of Fire

Do not open. To reduce the risk of electric shock, do not remove cover (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.

Burning Injuries

Be aware of high temperatures in excess of 50°C inside the fixture during and after use. Do not touch the LEDs to avoid burning injuries.

Flammable Materials

Keep flammable materials away from the installation. Insure that the amount of air flow required for safe operation of the equipment is not compromised. Proper ventilation must be provided.

ESD and LED's

LED components used in Quantum II are ESD (Electro-Static Discharge) sensitive. To prevent the possibility of destroying LED components do not touch either while in operation or when switched off.

This Equipment MUST be Grounded

In order to protect against risk of electric shock, the installation should be properly grounded. Defeating the purpose of the grounding type plug will expose you to the risk of electric shock.

AC Power Cords

Use only a rated True1 Connector. The user is responsible for ensuring power cables are of adequate condition for each application. If the power cords are damaged, replace them only with new ones.

Environmental: Disposal of Old Electrical & Electronic Equipment

This product shall not be treated as household waste.

CINEO LIGHTING LIMITED WARRANTY

Products from Cineo Lighting are warranted against defects in materials and workmanship for two years from the date the Product is shipped to Customer. Products are guaranteed to perform substantially in accordance with the accompanying written materials within the warranty period under normal use.

If the Product fails to work as warranted, Cineo Lighting will, in its sole discretion, repair or replace the Product with a new or remanufactured Product that is at least equivalent to the original Product. Customer must obtain a Return Material Authorization number from Cineo Lighting before returning any Products under warranty to Cineo Lighting.

Customer shall pay expenses for shipment of repaired or replacement Products to Cineo Lighting's repair facility. Any repaired or replaced Products will be warranted for the remainder of the original warranty period or thirty (30) days, whichever is longer. Cineo Lighting will pay shipping of repaired goods back to the customer. After examining and testing a returned product, if Cineo Lighting concludes that a returned product is not defective, Customer will be notified, the product returned at Customer's expense.

This Limited Warranty is void if failure of the Products has resulted from accident, abuse, misapplication, or use outside of normal operating conditions. Warranty is void if serial number has been defaced or removed.

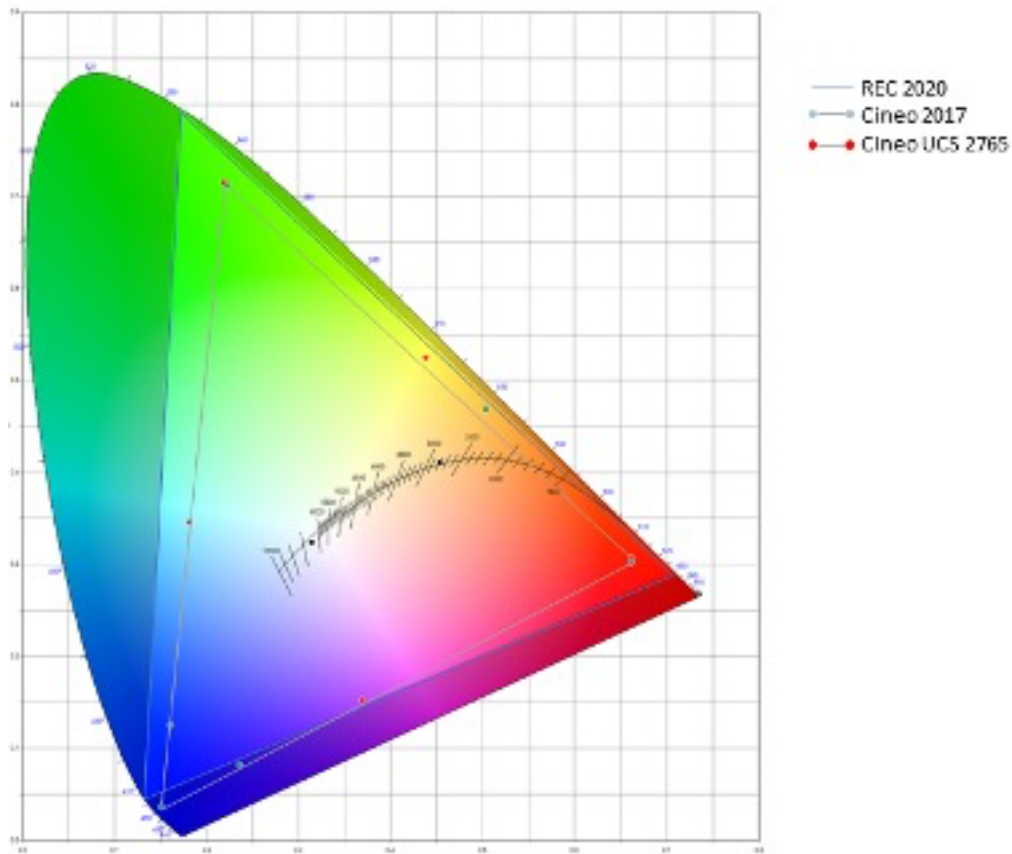
NO OTHER WARRANTIES. EXCEPT AS EXPRESSLY SET FORTH ABOVE, THE PRODUCTS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, AND NO OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED ARE MADE WITH RESPECT TO THE PRODUCTS, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE OR NON-INFRINGEMENT OR ANY OTHER WARRANTIES THAT MAY ARISE FROM USAGE OF TRADE OR COURSE OF DEALING. ELEMENT DOES NOT WARRANT, GUARANTEE, OR MAKE ANY REPRESENTATIONS REGARDING THE USE OF OR THE RESULTS OF THE USE OF THE PRODUCTS IN TERMS OF CORRECTNESS, ACCURACY, RELIABILITY, OR OTHERWISE AND DOES NOT WARRANT THAT THE OPERATION OF THE PRODUCTS WILL BE UNINTERRUPTED OR ERROR FREE. CINEO LIGHTING EXPRESSLY DISCLAIMS ANY WARRANTIES NOT STATED HEREIN. NO LIABILITY FOR CONSEQUENTIAL DAMAGES. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL ELEMENT AND ITS LICENSORS, DISTRIBUTORS, AND SUPPLIERS (INCLUDING ITS AND THEIR DIRECTORS, OFFICERS, EMPLOYEES, AND AGENTS) BE LIABLE FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, ANY SPECIAL, DIRECT, INDIRECT, INCIDENTAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES, EXPENSES, LOST PROFITS, INSTALLATION COSTS, LOST SAVINGS, BUSINESS INTERRUPTION, LOST BUSINESS INFORMATION, OR ANY OTHER DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PRODUCTS, EVEN IF ELEMENT OR ITS LICENSORS, DISTRIBUTORS, AND SUPPLIERS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. CINEO LIGHTING'S TOTAL LIABILITY ON ALL CLAIMS, WHETHER IN CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE OR BREACH OF STATUTORY DUTY), STRICT LIABILITY OR OTHERWISE, SHALL NOT EXCEED THE AMOUNTS PAID BY CUSTOMER FOR THE PRODUCTS.

Customer acknowledges that the applicable purchase price or license fee for the Products reflects this allocation of risk. Because some states/jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply. The above limitations shall apply notwithstanding the failure of any limited remedy to fulfill its essential purpose.

Appendix A

LUT Characteristics

The C²OS introduces a more advanced and precise approach to Color Control that includes selectable Color LUTs (Look Up Tables). The Universal Color Space (UCS) is introduced and is the recommended color space LUT on the new c2OS console for colorimetric accuracy. In addition, the c2OS can use a different LUT to reproduce Cineo2017 (the original color space used on the c80, Standard410, LightBlades and Quantum II products). In the future Cineo will be introducing more LUTs that will be used to map to other color spaces and other fixtures. This document explains how Cineo c2OS Color and LUTs work with an explanation of the color theory behind it.



REC2020 compared to Cineo 2017 LUT and UCS 27-65 LUT

CIE 1931 – Color data shown in this report is actual test data measured using a Sekonic c7000

UCS LUTs

UCS 2.0 LUTs are the preferred color space for the latest Cineo fixtures. It offers higher color precision, correlated to REC.2020 and provides accurate linear dimming. Saturation control and Hue controls are more precise. Two UCS LUTs are offered in the initial release on C²OS: UCS 27-65, with a CCT range of 2700K-6500K, and eUCS 20-100, with a range of 2000K to 10,000K.

Cineo 2017 LUT

Use when operating older Cineo fixtures with C²OS fixtures. This LUT matches the colors of the older S410, LB1000 and other Cineo legacy fixtures.

The Cineo 2017 uses a Photo-Accurate Dimming curve, which offers light output congruent with lens stops on a camera.

Here are examples of how to accurately match camera stops to dimming levels in Local Mode:

Local Dimming: The Rule of 20 (0-100 scale)

Increase output 1 Stop: Add 20 units (fc/lux is doubled)

Decrease output 1 Stop: Subtract 20 units (fc/lux is reduced 50%)

Adjust ½ Stop = 10 Units (0-100)

Adjust ¼ Stop = 5 Units (0-100)

When operating in DMX mode, each increase of 50 units (8-bit) doubles the light output, or the equivalent of opening the lens 1 f-stop.

DMX Value (0-255)	% Output increase	Stop Increase
50	100	0
100	200	1
150	400	2
200	800	3
250	1600	4

Here are examples of how to accurately match camera stops to dimming levels in DMX Mode:

DMX Dimming: The Rule of 50 (0-255 scale)

Increase output 1 Stop: Add 50 DMX values (fc/lux is doubled)

Decrease output 1 Stop: Subtract 50 DMX values (fc/lux is reduced 50%)

Adjust ½ Stop = 25 DMX Values

Adjust ¼ Stop = 12 DMX Values

The following table lists all the 8-bit DMX values for all of the fixture presets:

Dimming		CCT		Saturation		Hue	
100%	255	2700K	000	0%	000	Red	000/255
-1 Stop	200	3200K	034	10%	025	Yellow	043
-2 Stops	150	4300K	107	20%	050	Green	085
-3 Stops	100	5600K	195	50%	128	Cyan	127
-4 Stops	050	6500K	255	80%	204	Blue	170
Off	000			100%	255	Magenta	212

Appendix B

DMX Personalities: Quantum II with C²OS

PERSONALITY	DESCRIPTION	SLOT COUNT
1	1-Zone 8-bit HSIK	4
2	1-Zone 16-bit HSIK	8
3	1-Zone 8-bit RGBK	4
4	1-Zone 16-bit RGBK	8
5	1-Zone 8-bit HSIK-G	5
6	1-Zone 16-bit HSIK-G	10
7	1-Zone 8-bit RGBK-G	5
8	1-Zone 16-bit RGBK-G	10
9	1-Zone 8-bit DIM-Only	1
10	1-Zone 16-bit DIM-Only	2
11	1-Zone 8-bit DIM + CCT	2
12	1-Zone 16-bit DIM + CCT	4
13	Local Control	-