

Prism Projection, Inc.



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# RevEAL CW with TrueSource® Technology Operating Manual

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# Prism Projection Inc. - RevEAL CW Operating Manual

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*Product Specifications and Information Subject to Change*

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# Warnings & Product Specifications

## Read This Manual Prior To Use

- This product is NOT for residential use.
- This product is intended for use by qualified individuals in the field of entertainment lighting.
- This product is designed for damp conditions, but is NOT to be used in wet locations. For Wet locations use the IP65 model.
- Due to risk of injury the safety cable MUST be attached while the product is suspended.
- The product MUST be attached to the appropriate power, which meets the following conditions:
  - 90-264 VAC
  - 47-63 Hz
  - NOT for use on dimming circuits.
- Any attempt to disassemble or service the product other than described in this user manual will void the warranty and may result in injury.

# TrueSource® Technology

After significant research and development efforts, Prism Projection has solved many of the problems associated with LED based lighting devices developing the TrueSource® system. TrueSource assures color consistency by utilizing active live color metering, achieves a full spectral response by using carefully selected multiple primary emitters and provides a consistent flat field with next generation optics and reflector systems.

## Live Color Metering

At the heart of every TrueSource system is a Tristimulus color sensor. Tristimulus sensors, while electronic, actually “see” in a way that mimics the human eye’s response to color. Even though every human sees color differently, there are well established base lines for normal color response. By taking live measurements and adjusting how each LED or group of LEDs is being driven, the problems of color shift during use are removed. Tristimulus values are referenced to the well established CIE 1931 2° observer color space. By referencing a standard, TrueSource systems are inherently calibrated to each other. The problems of using only an initial calibration and predictive algorithms are not an issue with TrueSource systems.

## Full Spectrum

TrueSource systems use several colors of primary emitters. At the minimum each TrueSource system will use 5 primary colors. These primaries are carefully chosen to minimize the valleys of the SED curve. When outputting 3200k “white”, TrueSource systems have a CRI of 95+. With deep understanding of how to drive each individual LED, TrueSource is not locked into only using a fixed number of primary emitters. TrueSource is also flexible enough to utilize LEDs from several manufacturers at once. With this discreet control, TrueSource systems can pick from the best available LEDs on the market.

Since all TrueSource enabled instruments are structured to provide a full spectral response, they have a very wide gamut.

## Interfacing with Color

TrueSource systems allow the designers and operators to ask for and interface with color in very specific ways not normally seen in current lighting equipment. Instead of asking designers to describe color in a non-standardized way, ie. unknown RGB values, RGBW, RGBA, RGBCA, or seven discreet primaries. TrueSource

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instruments can be configured to respond directly to x,y coordinates on the CIE 1931 2° color space. An RGB mode that is based on the NTSC gamut, but slightly wider is available. The designer may also elect to use Hue and Saturation to describe the desired color. Each of these modes uses a dedicated dimmer channel that does not shift the color. Designers may also add a specific Correlated Color Temperature channel (CCT). The CCT channel takes over from the other color channels, not by adding white, but producing specific white points along the black body curve.

## **Optics**

The TrueSource optical systems are truly the next generation of optical design. The beams are flat, and fully collimated.

Each unit produces one shadow. A shadow that would be expected from a traditional source or natural sunlight. Of course diffusion can be added to soften or adjust the shadow, instead of starting from an unfamiliar shadow.

## **TrueSource at a Glance**

- References international standards to describe color, CIE 1931 2° observer
- Uses multiple primary emitters to ensure full spectrum response
- Live color monitoring using Tristimulus sensor, sensing color similar to the human eye
- Wide gamut from one lighting instrument
- CRI above 95
- CCT Channel (as low as 1,800k up to 10,000k)
- Independent dimmer channel with no color shift
- A shadow that matches conventional sources
- 5 year warranty that includes color

# Basic Installation

Before installing this product please make sure that you have read all warnings and safety information provided in this manual.

**Caution:** The product must be placed/mounted on a rack, shelf, or other suitable surface that is rated to support the weight of the product: 9.1 kg (20 lbs.).

The product must also be placed such that the safety cable can be attached. The safety cable must be attached in such a way that it can not be removed without releasing the clip.

The safety cable should be attached at all times during both installation and removal of the product. Attaching the safety cable should be the first step before installing the product and the last step after removing the product.

## Mounting the product

**Step 1:** Install a c-clamp or other appropriate rated pipe coupling device to the steel yoke of the RevEAL CW Instrument.

**Step 2:** Loop the safety cable through your support, such that after clipping the carabiner the loop cannot slip off of your support.

**Step 3:** After ensuring that the loop cannot slip off of the support, clip the carabiner to the safety cable.

**Step 4:** Position the mouth of the c-clamp over your intended mounting surface. Once you are happy with the location, tighten the clamp until the product is secured to the surface.

**Caution:** The product should never be installed without the proper use of the safety cable. It is recommended that the side knobs may be tightened with a wrench on the flats inside of the handle.

## Attaching Data and Power Cables

**Note:** This lighting fixture can be used individually or modules can be daisy chained. In a chain of fixtures each module can be individually addressed, or each can have its own address wherein each fixture is independent of the others.

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**Step 1:** If Needed attach an appropriate connector to the end of the power cord included with the product. Any connector you attach to the end of the product must be rated for 15 Amperes and 250VAC, and of the grounding type. The conductors in the power cable are color coded for ease of assembly.

<u>Wire Color</u>	<u>Conductor function</u>
Green or Green with Yellow Stripe	GROUND
Blue or White	NEUTRAL
Brown or Black	LINE

**Step 2:** After attaching the appropriate connector to the power cord you can attach the power cord to the fixture. The power cord will go into the power-in port (blue). Slide the connector into the port and twist the connector clockwise.

**Step 3:** Now that the unit has power you need to provide data to the unit. This is done by plugging in an approved 5 pin DMX cable. The data-in port is found on the right side, while facing the back of the fixture. If you have daisy chained your units, data-in from your second unit should come from the data-out port of the first unit. Continue attaching cables in this fashion, 1 to 2, 2 to 3, and so on. Follow best practices for DMX wiring, Do not exceed recommended cable lengths or number of receivers on a chain.

*The unit may also be controlled via ArtNet. Contact Prism Projection for details.*

*While using this product, ensure that the number of fixtures being fed off of one power line does not exceed 7 fixtures for 120VAC. The number of fixtures that are daisy chained using 240VAC should not exceed 14.*

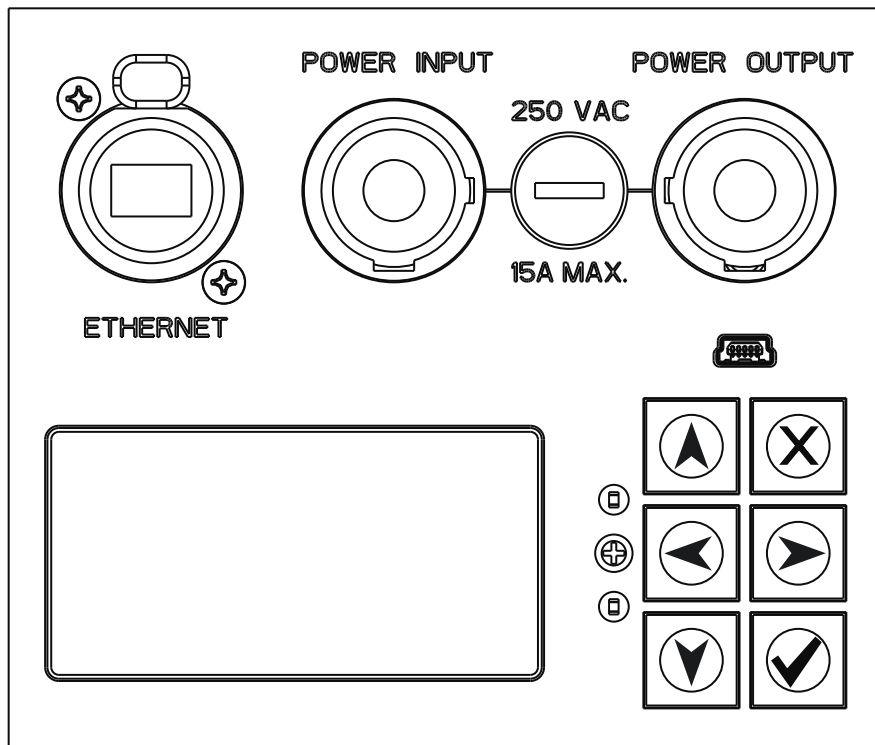
# Interface Panel

Located on the top of the instrument, all settings and options can be accessed by using the button pad and LCD on the Interface Panel.

From startup the LCD will be illuminated and cycle to the Home Screen. Pressing either the up or down keys will take the user to the other screens.

*If the display is blacked out, pressing any button will illuminate the display's backlight.*

The Home screen provides an at a glance view of the instrument's configuration and current settings. Including if the fan is spinning, theDMX start address, how many channels the configuration occupies, if DMX is being received, and the current values of each control parameter.



## Menu Tree

All settings can be accessed by using the up, down, left and right buttons. When a screen is highlighted use the check button to go to the highlighted section. Using the x button will always go back up one level. If a selection allows for multiple choices, left and right buttons will cycle through available options.

### Home Screen

#### Fixture Address

- DMX Address (1 to 512)
- Art-Net Universe (0-0 to 15-15)
- Encoding (8-bit or 16 bit)

#### Channel Personality

- Eco Mode (Remote, On, Off)
- Refresh Rate (Remote, Low, Medium, High)
- Color Mode (CIE xy, RGB, Hue + Sat)
- CCT (Remote, Off)
- Intensity (Linear, Standard)
- Algorithm (Color, Brightness)

#### Standalone Control

#### TrueSource

- External Sample

#### System

# Lenses

## Choosing a Lens

RevEAL CW Instruments have a native field angle of 27°. Available separately lenses may be purchased that allow for 37°, 50°, 70° and 90° round fields. There is also an RT lens that provides a 30° x 70° field. Calculating field diameter at a given throw is simple by multiplying the throw distance by the lens multiplying factor (shown below):

Field Angle	Multiplying Factor
27°	0.486
37°	0.666
50°	0.9
70°	1.26
90°	1.62
RT 30° Side	0.54
RT 70° Side	1.26

*For example to find the field diameter at a 16' throw distance with a 27° lens:*

$$16' \times 0.486 = 7.776' \text{ (7' - 9.312")}$$

or

$$4.8768\text{m} \times 0.486 = 2.370\text{m}$$

**Note:** the label of of the RT lens is aligned with the long axis.

## Mounting Lenses

**Step 1:** From the front of the instrument, firmly grasp the flexible “boot” surrounding the front aperture. Using moderate pressure work the boot off the instrument. Handles are worked into the boot to make this much easier.

**Step 2:** Remove the existing lens with your finger tips around the edges of the lens. If necessary a small flat tool may be used with caution.

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Do not touch the internal reflector. Grease from your fingers will leave marks. Over time this may affect the efficiency of the instrument. It possible though difficult to clean grease from the reflector. Do not leave CW instruments without a lens for long periods of time.

**Step 3:** Place desired lens in lens ring. The side of the lens with the holographic diffuser should be placed towards the reflector. Careful to not to leave finger prints on the lens.

**Step 4:** Gently but firmly work the boot back onto the nose of the instrument.

Store unused lenses carefully to avoid scratching and unnecessary finger prints.

# Accessory Hardware

Beneath the CW front boot, there are 4 mounting points. These may be used for an accessory holder, available separately.

It is recommended that for permanent installations the boot and lens may be secured via these mounting points as well. Contact Prism Projection for more information.

# Fixture Address

**Step 1:** Using the up and down arrows select either “DMX Address”, “Art-NetUniverse” or “Encoding”.

**Step 2:** Use the left and right arrow buttons to change the value of the selection.

DMX address may be 1-512, remember to leave enough room for the channels contained in the block as defined by the features enabled.

When setting Art-Net universes, hold down an arrow key until the sub net changes.

# Modes and DMX Channels

RevEAL Instruments with TrueSource offer unparalleled options in how they are controlled. Ranging from simple one channel dimmed white light operation to obsessive control of almost every aspect of the fixture. Determining which one is right for your show is straightforward and quick to set.

Operating modes are set by using the button pad to navigate to the Fixture Personality Menu. This menu allows the user to adjust; Color Mode, Color Temperature, Intensity (dimmer curve) and other features.

On the left of each selection will show the number of DMX channels occupied by the selection. The options are shown in the order they will occupy in the DMX block.

## Eco Mode

**Available Options: Remote, On, Off**

### Remote

If Remote is selected a control channel will added at the beginning of the DMX address block. At full this channel will turn off the fan, output of the instrument will be diminished. The amount that output will be diminished is dependent on the color being produced. In general it is between 40-50%. A value other than full will put the fixture in full power mode.

### On

ECO mode "On" turns off the fan, the instrument will operate virtually silently, with diminished output. ECO mode will run the instrument with incredibly high efficiency. The total wattage draw of the instrument will be significantly reduced depending on color. The output of the fixture will also be reduced.

### Off

With "Off" or Full Power Selected the instrument will use all active cooling including the fan and produce the brightest possible output.

## Refresh Rate

**Available Options: Remote, Low, Medium, High**

The Refresh Rate setting, changes the PWM rate of CW instruments. Setting Refresh Rate to medium is recommended for most uses. The ability to change PWM refresh of

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the LEDs ensures that for almost all situations there will be no flicker either visibly or on camera.

### Remote

Adds a channel in the first DMX slot to control PWM refresh. 0 = 300 Hz. Full = 5.4 kHz

### Low

The LEDs in the instrument will refresh at 300Hz. This is only advised in situations where very subtle live color transitions will be used. Low may cause flicker on consumer and prosumer video cameras.

### Medium

**Recommended Configuration** 2.4kHz - found to be flicker free for 24 and 30 FPS capture.

### High

5.4 kHz - may be used for higher frame rate capture.

## Color Modes

### Available Options: CIE xy, RGB, Hue + Sat

RevEAL instruments have 3 calibrated color modes, a dynamic color space mode and the option to only use white. Use the up and down buttons to select “**Color**” then use the left and right buttons to scroll through the available modes.

*While RevEAL instruments contain 5 base colors of LEDs, they are controlled within calibrated color systems. This ensures that the TrueSource TriStimulus sensor can guarantee color match between instruments, over the life of the instrument.*

Users may elect to use 16 bit control for color and intensity channels, from the **Fixture Address** menu. 16 bit control is only recommended for users with advanced lighting consoles.

### CIE xy

CIE x,y allows the user to select color from the CIE 1931 2° Observer color space.

*Many Gel Manufactures have available CIE coordinates measured in the 1964 10° Observer color space. These values will not generate the same colors as the 1931 2° Observer color space. 2° values may be obtained with a color sampling device.*

To determine the DMX decimal values for a given coordinate, simply multiply the coordinate by 255. For example 3200K white light has an x value of 0.4254 and a y of 0.4044.

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x value:  $0.4254 \times 255 = 108$  (42%)

y value:  $0.4044 \times 255 = 103$  (40%)

*If the CCT channel is enabled, the color temperature channel will “take over” color control from the color channels. Generating white light in the Kelvin value specified by the Color Temperature channel.*

*CIE x,y DMX Map (8 bit control):*

1st Color Channel	2nd Color Channel
x coordinate	y coordinate

## RGB

RGB mode allows for familiar Red, Green and Blue control channels. With all channels full, white light will be produced. Unless changed in advanced settings or the color temperature channel is set to remote, the default white point is 3200K. With all channels at 0 no light will be produced regardless of the intensity channel's state.

*To translate from CMY values a general rule of thumb is to invert the values. ie:*

*Cyan = Red @ 0, Green @ Full, Blue @ Full*

*Magenta = Red @ Full, Green @ 0, Blue @ Full*

*Yellow = Red @ Full, Green @ Full, Blue @ 0*

*While not completely accurate, because of subtractive filter technology, this will help get RevEAL instruments to a color near CMY based fixtures.*

*RGB DMX Map (8 bit control):*

1st Color Channel	2nd Color Channel	3rd Color Channel
Red	Green	Blue

## Hue + Sat

Hue + Saturation mode is easiest to think of as common color pickers on photo editing software, commonly abbreviated to HSI or HSL. The Hue channel defines an angle on the color wheel, and saturation defines how far from white (the center) of the wheel the color is. Red is at 0° (DMX @ 0) and 360° (DMX @ Full). Green is at 120°, Blue at 240°. The Saturation channel, moves the color closer to the center, creating white. The white point is set either in advanced settings or controlled remotely by the Color Temperature channel, the default is 3200k.

*Hue + Sat DMX Map (8 bit control):*

1st Color Channel	2nd Color Channel
Hue Angle	Saturation

## CCT

### **Available Options: Remote, Off**

When enabled the White setting creates a Correlated Color Temperature (CCT) Channel. If the CCT channel is at any value other than 0, white colors will be produced by the instrument. At full the color generated will be 10000K white, at 0% the color generated will be ~1800K white. As the channel value is raised the color temperature will go up.

**If CCT is at any value other than 0 and the Color Mode is any setting other than None, the instrument will ignore the color channels and only create white light. Moving the CCT channel to 0 will bump the instrument to wherever the color channels are set.**

If enabled, in 8 bit mode 1 channel will be added after the color channels, 2 channels will be added if 16 bit control is being used.

## Intensity

### **Available Options: Linear, Standard**

Users may select either from a linear dimming curve or square law dimming. Square law dimming is frequently used in television production with the low end and top end of the dimming curve are smoothed out.

RevEAL instruments always use an intensity channel, in 16 bit operation 2 channels are used.

## Algorithm

### **Available Options: Brightness, Color**

#### **Brightness**

Brightness algorithm will force the fixture to generate the brightest possible output. When changing color the user may notice slight jumps in brightness.

#### **Color**

The color algorithm smoothes transitions between colors, and allows for some improved subtly of color.

# Standalone Control

Navigating to Standalone Control allows the user to create light without DMX present. To ensure there is no change in the light being produced it is recommended that DMX cables be removed while using standalone control.

Use the up and down arrows to select the parameter to change, then use the left right arrows to change the parameter.

Pressing the X button will return to the previous screen.

To ensure that the light settings established in the Standalone Control mode are maintained through power cycles, always power off the unit from the Standalone Control screen display.

# TrueSource Screen

The TrueSource screen allows the user to verify that the TrueSource system is functioning properly. Target and Measured x,y values are shown.

By pressing the check button, activating the External Sample mode. This mode lets users experiment with using the CW as a color sampling device. The CW will display the x,y coordinates of the color light shining into the barrel. Make sure to use the clear 27° lens when trying this.

The Tristimulus sensor in the CW is tuned specifically for the LEDs Prism uses. External sampling may provide slightly unexpected results. In general it will give close approximations of the samples CIE coordinates, and can be used as a starting place to match gel or other colors.

# System Screen

The system screen displays the instruments serial number, Firmware version and Mac ID.

# Appendix - Common Configuration DMX Maps

*Not all configurations are shown*

## Simple RGB

Eco Mode = Off

Refresh Rate = Medium

Color Mode = RGB

CCT = Off

Intensity = Linear

DMX Channel	Description
1	Red
2	Green
3	Blue
4	Dimmer

## RGB with ECO and CCT

Eco Mode = On

Refresh Rate = Medium

Color Mode = RGB

CCT = On

Intensity = Linear

DMX Channel	Description
1	ECO @ Full Fan Off
2	Red
3	Green
4	Blue
5	CCT @ 0 no change
6	Dimmer

## Hue Sat with ECO and CCT

Eco Mode = On

Refresh Rate = Medium

Color Mode = RGB

CCT = On

Intensity = Linear

DMX Channel	Description
1	ECO @ Full Fan Off
2	Hue
3	Saturation @ 0 generates ~3200K white
4	CCT
5	Dimmer

## Simple x,y

Eco Mode = Off

Refresh Rate = Medium

Color Mode = x,y

CCT = Off

Intensity = Linear

DMX Channel	Description
1	x
2	y
3	Dimmer