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FRESNEL LENS HEADLIGHTS TW+ AND FC

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In a time of fewer innovations, a new brand shines brightly in the sky with ROXX. How did it manage its first success, a fresnel lens fixture with an interchangeable lens system with various outdoor qualities? We used and tested the TW+ and FC/Full Color versions.

Author and illustrations: Herbert Bernstädt | Photos: Herbert Bernstädt, ROXX (1)

**Clear and colored identification of the lenses** You can even send a helper to change the correct lens



**Basic design of the asymmetrical lenses** rubber holding frame, plastic fresnel lens for the beam angle and a 3D effect foil for the fanning out in the width

The spotlight must rock - with these phonetics, the name ROXX was born for a new brand. It may be the Cologne way or his Spanish roots that brought Daniel Garcia and SGM Germany together. This is where a concentrated experience of the lighting industry is now centered. This experience shows in the first series, the E.Show, which presents fresnel lens fixtures with an interchangeable lens system. It is available with a variety of outdoor features and a clever housing design that is just as suitable for use as a pendant luminaire as it is as a floor spotlight or as a suspended fresnel fixture in a rig.

## Fresnel exchange

In the case of the E.Show as a fresnel lens fixture, you have to detach yourself a little from the classic structure of a light step. In contrast to common LED fixtures, where a converging lens or a very small reflector is usually used to focus the light onto the stage lens and the beam angle can be varied with the distance between the fresnel lens and the LED, a large, almost floodlight-compatible reflector with a facetted structure is used here. This irradiates the entire surface of the following step lens, which remains fixed in its position. If you need a different beam angle, you simply have to change the lens. Here, one is more in line with an S4-PAR.

The changing of the lens is done quite smoothly. There is a notch in the rubber frame that encloses the lens, into which an approximately 3cm long bar fits at the top and

bottom of the fixture and holds the lens frame in place. To change the lens, the lower bar can be folded away by means of a spring-loaded tilting mechanism (R.LOK) and the lens can now be easily removed. The tilting mechanism can also be blocked with a small grub screw, which is particularly useful for fixed installations. This mechanism is also very inconspicuous and nicely integrated into the housing. The lenses are made of plastic and have a very narrow step, without any outward curvature, as typically seen with classic glass lenses.

Three Fresnel lenses are available for radial symmetrical light distribution. Their backs are structured and enable homogeneous light mixing. In contrast, the backs of the



**The grub screw** can be used to block the opening of the lens holder

**Light image of the wide, asymmetrical lens (EW)** To ensure that the light field does not end outside the image, the distance from the spotlight to the wall was only 1.8 m in this case



**Light image of the asymmetric lens (EW)** with the light throw directed upwards.



**Light image of the narrow asymmetric lens (EN)** - The distance to the wall has remained the same for comparison purposes



**Light image of the asymmetric lens (EN)** with light throw directed upwards



**Rotationally symmetrical plastic fresnel lens** for narrow beam angle (N)



**Medium beam angle (M)**

two elliptically emitting lenses are kept smooth, because a 3D foil is placed on them, which ensures the oval alignment of the light. The light surface is very homogeneous, as expected from modern LED spotlights. The light distribution runs outwards very nicely and there are no edges, multishadows or halo effects to be seen. Also, no color shadows or other disturbing influences are perceptible. Thus, the ROXX E.Show meets all the requirements for a quality light image.



**Wide beam angle (W)**

## Three sections - one chamber

The ROXX E.Show resonates with an Italian design language, which is also admired in sports cars from this country. As a result you can use the E.Show not only as a classic fixture for events, but also as a chic pendant lamp. To do this, the side bracket attachments are removed and the fixture is suspended at the center of gravity from the safety eyelet. Blind plugs transform the openings of the

previous bracket fixing into a round shapely pendant lamp. Elegant design also appears in the luminair's construction and IP65 rating. The front section carries the actual LED engine with driver board. The middle section contains the cooling system with an IP65 rated fan and is continuous for air and water. The rear section holds the power supply and the control electronics. Interesting here is that only one Goretex membrane is responsible for the pressure equalization of the lamp. The secret is that the front chamber is connected to the rear chamber via two connecting tubes that house the electrical connections, sealed to the outside, making them just one pressure system. The whole internal design is very structured and neatly executed. As a service technician, you can quickly get to all components and will particularly appreciate the labeling of the connectors. The forced cooling via the fan is rotationally symmetrical on the cast aluminum rib structure of the front LED section. While we are on the
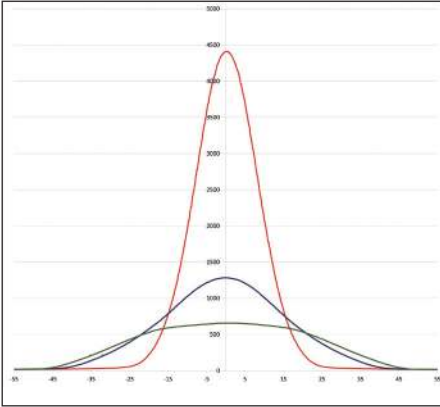
**Light distribution curves of the radially symmetrical lenses N** (Narrow) in red, M (Medium) in blue and W (Wide) in green
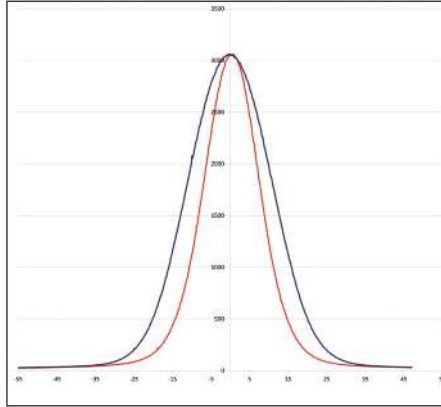


**Light distribution curves of the asymmetrical EN** (Elliptical Narrow), blue in wide beam alignment, red in narrow alignment
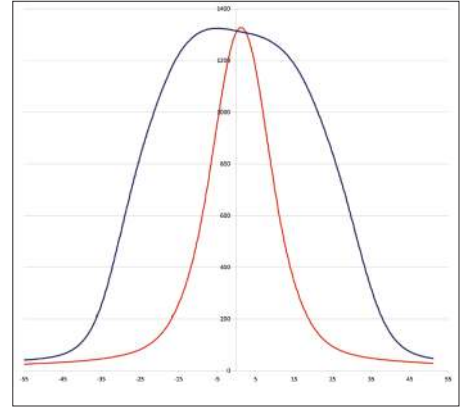


**Light distribution curve of the asymmetrical EW** (Elliptical Wide), blue in wide beam alignment, red in narrow alignment. Clearly visible that in the wide measurement the axis of the lens was not aligned exactly horizontally, resulting in a flattening to the side

subject of cooling: Even in the auto mode of the fan control, the luminaire is pleasantly quiet in operation. This is not surprising when you consider that this light also wants to find its home in architecture. The fan control has set upper limits for the fan rotation, which can be set as Max. Power, Auto, Silent, Studio and "Fan Off". The only thing that could disturb a sensitive user is the fan's short whine during the boot process. In addition to the E.Show series, an A.Show series is also available. The A.Series for architecture is particularly interesting for fixed installations, since here instead of connectors, PG cable glands are used and the IP class has been increased to 66. However, IP66 does not say anything about the long-term weather resistance or the



**Three-part** Front chamber on top with the reflector, LED and LED driver board, the open middle part formed mainly by the cooling fins, for cooling with fan. The last third is the rear chamber with connection terminal, control board and power supply unit



**Connection terminal, control board and power supply** in the rear section



**Antenna for W-DMX** hidden in a plastic cover, in the design of a cooling fin

**Left and right of the fan** Sealing glands for the connecting tubes to the front LED module. Where the gap or a missing cooling fin can be seen, the plastic fin mold with the W-DMX antenna inside is placed



**LED engine of the E.Show FC** with the driver board



**Front part** without lens, without cover, without reflector

influence of salt water. ROXX provides the A.Show series with additional corrosion protection, ideal for theme parks, coastal areas or cruise ships.

## It all depends on the mixture

The FC (Full Color) and TW+ (Tunable White plus Colors) versions were available for us to test. Single-color Tungsten and Daylight versions are also available. We have already noted with other brands that for colored lighting, one goes to the start with several versions. With ROXX E.Show, the customer has to decide whether the focus is on the highest color rendering or whether the saturated colors red, green and blue in maximum brightness are more useful to them. If white light is set for both variants, one is initially surprised: the TW+ is brighter
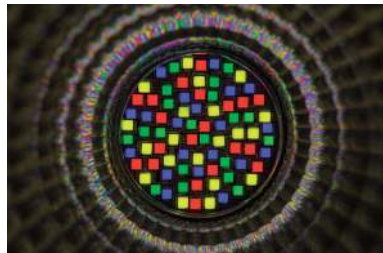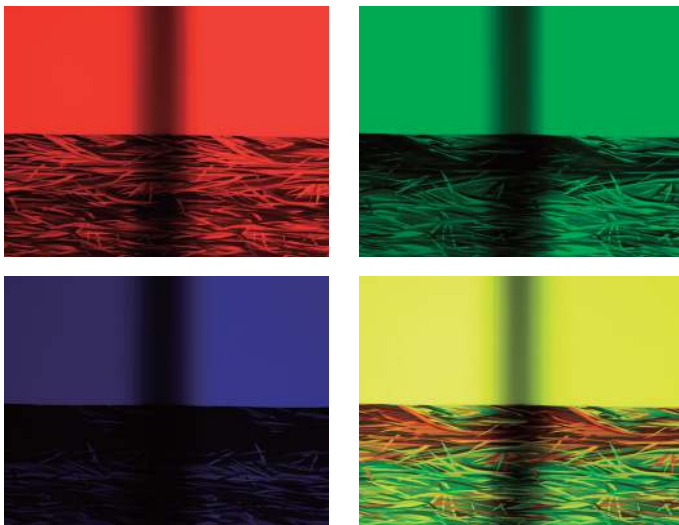


**FC (Full Color) of 20 red, 20 green, 20 blue and 20 lime LEDs** and their associated spectra
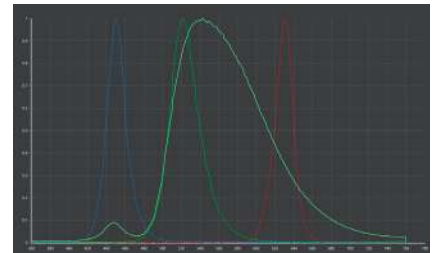


**LEDs in TW+** 10 red, 10 green, 10 blue, 20 amber, 10 cyan and 20 lime and the corresponding spectrum
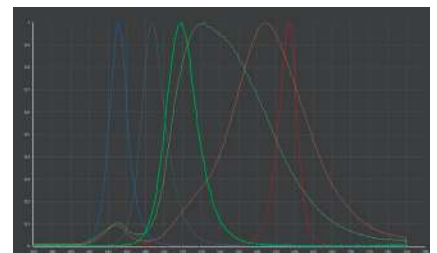
**Left TW+, right FC** You can clearly see the greater luminous intensity of the FC with the basic colors RGB. In addition, the chromaticity coordinate of the green LED is different.

than the FC. If you look at the specs and the distribution of the LEDs, it's actually clear why. The FC has twice as many red, green and blue LEDs as the TW+ version. Where the TW+ has 10 green LEDs, the FC has 20. Logically, this means that it is clearly superior to the TW+ in the saturated primary colors. The 30 LEDs that the TW+ lacks in the primary colors of the additive system are replaced by 20 amber and 10 cyan LEDs. This fills the white light spectrum gaps very well, which explains the excellent color quality and also the higher light output with white light.

The power consumption is about the same for both versions. Furthermore, the FC uses different green LEDs than the TW+, as can be seen from the color locations in the color triangle. The reason for this is that the TW+

version focuses on the best possible color rendering and therefore uses a different green LED chip than the FC version, which is intended to provide a maximum bright, saturated color, according to Michael Herweg.

## Refreshing menu operation

The advantage of a new series is undoubtedly that you don't have to deal with the compatibility of previous series or products. You can fall back on proven patterns and enrich them with your own ideas. The operation of the ROXX E.Show is accordingly refreshing. The four key buttons and a graphics-capable display are standard. The backlighting of the sensor keys is nice. The keys are also assigned with distinctive shortcuts. If you press Enter for three seconds, the E.Show goes into a quicklight mode. This means that after activating it, you only have to set the dimmer value and it gets bright without having to torture through the menu. For the light to appear in the desired brightness, you still have to confirm with Enter. It would be easier to set the brightness if the light changed immediately according to the dimmer value.

A timer function is also interesting: Here you can set a fade-in time, dwell time and fade-out time that starts counting when the power supply is switched on. This is interesting for theme parks, where the lighting is connected centrally with power, but the fixture should not immediately shine at 100%, but should slowly fade up and then slowly fade down again in the evening. Speaking of switching on the power: There is also a setting for what the device should respond to after booting. Meaning to DMX or different stand-alone modes. For example, if you have selected DMX as the startup and then selected an autoprogram for the booth party again in the evening, the machine will jump back to the DMX program of the booth the next morning. In the stand-alone functions, color jumps, color changes, but also blue light, candlelight, fireworks, strobe light or welding light simulations are pre-programmed under "Auto", which can still be adjusted in brightness and speed.

In addition, extensive settings for static light are also available, such as a large color filter selection, CCT white light with tint or five presets for user-defined colors. Of course, the E.Show also has a



**The TW+ fills the gaps in the spectrum** with a broadband cyan and amber LED
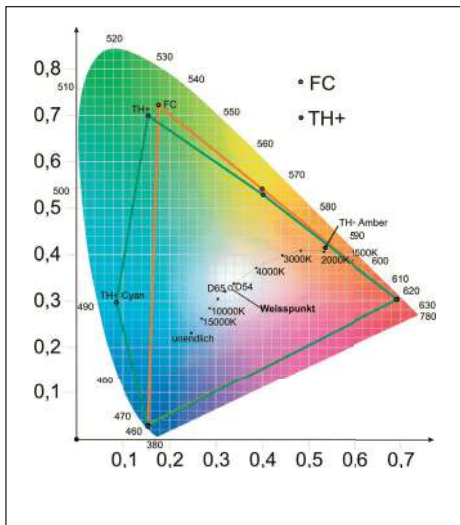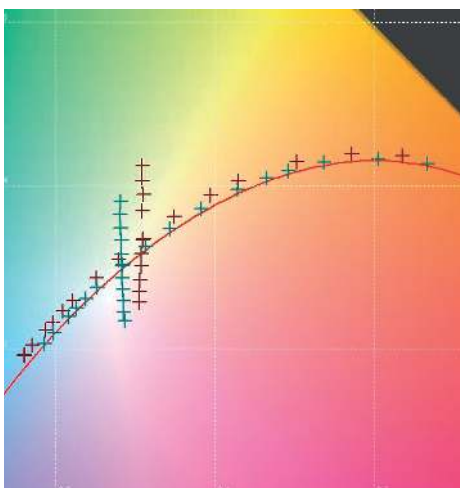
**Color spaces of the TW+** (greenish line) with 6-color LED engine versus the FC (orange line) with the four-color LED engine.
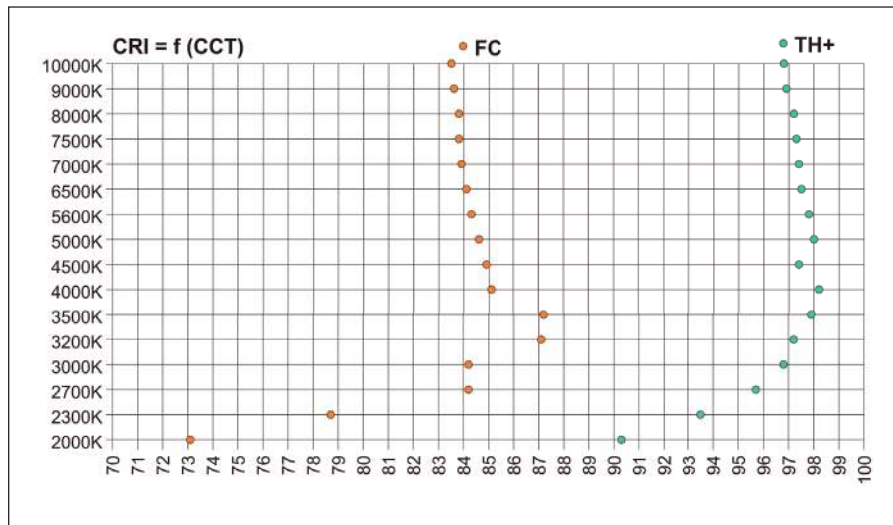


**Good color quality of the TW+** only below 3000K the high color quality fades away
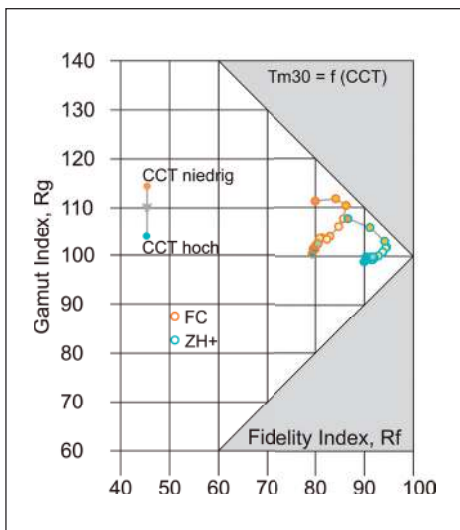


**TM-30 color rendering for vividness** marked in orange = FC and dots in cyan = the TW+, each in the color temperatures we also set for CRI.



**Color locations from the TM30 measurement** as well as perpendicular to it the tint curve at 5600K; the TW+ (shown in cyan) is clearly closer to the black body curve

calibration chip so that the colors remain the same across many fixtures. While this is activated or deactivated depending on the DMX mode, in stand-alone mode the color is mixed under Quick-Color (not to be confused with Quick-Light) depending on the set mode via RGB (calibration chip) or RGBL (version FC) or RGBALC (version TW+). On the home screen you can see which DMX, W-DMX or Bluetooth control is currently active. In addition, the mode and the next free DMX address help users to keep a quick overview of the most important settings, especially when things get hectic on the construction site. Otherwise, the menu is oriented like a drop-down selection list and is very intuitive to use.

## Instead of IR remote control: ROXX.APP for iOS

ROXX was not satisfied with the distinctive stand-alone functions of the fixture. Especially with regard to architectural applications such as in clubs, retail or for the many trade fair applications where no lighting technician is on site, they came up with another control option – one that has it all. Besides, the control via smartphone, instead of supplying IR remote controls with every fixture (which mainly cause more electrical waste), is also more ecologically sensible. The app runs with iOS on iPad/iPhone, an Android version is not currently planned.

The connection between the app and the fixture is implemented via Bluetooth. The control becomes
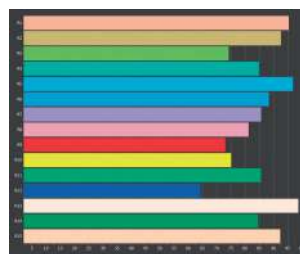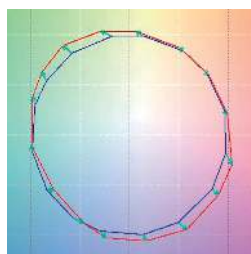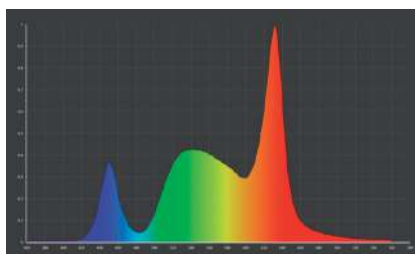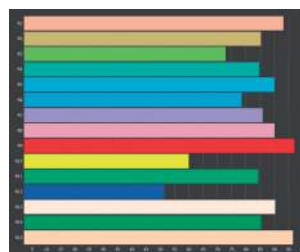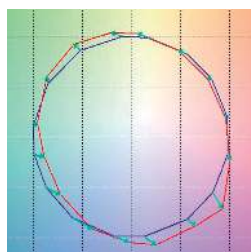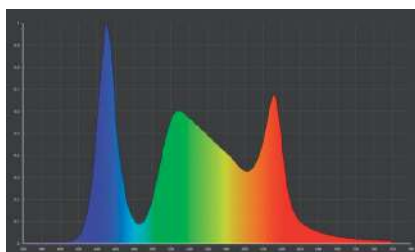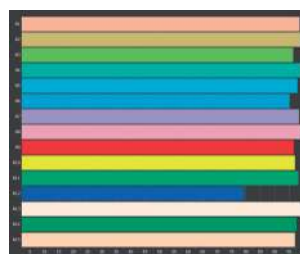
**Spectrum FC version** at 3200K (camera white balance constant at 6500K)
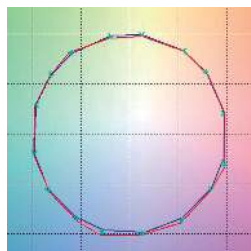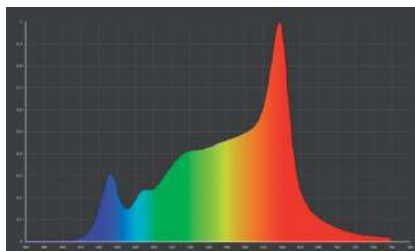


**Spectrum TW+** at 3200K



**Spectrum FC version** at 5600K
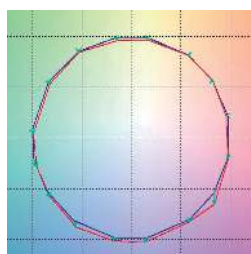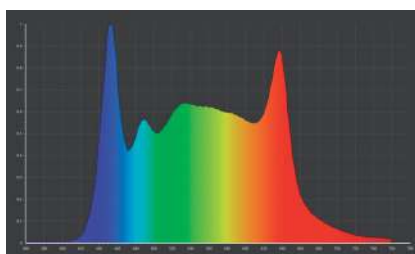


**Spectrum TW+** at 5600K

interesting in connection with the possibility that the E. Show also generates DMX-out signals. This is also where the usefulness of the built-in W-DMX transceiver becomes apparent. A "transceiver" is the combination of receiving and transmitting, i.e., "receive" and "transmit". In this context, the possibility to transmit DMX means that you only connect to one fixture via Bluetooth. This fixture establishes a connection to further wired or wireless DMX devices. In this way, entire groups or complete systems can be controlled remotely with the app.

In the beginning, we had a hard time establishing a connection without the manual. For example, you have to set the E.Show to 9ch mode because the other modes are not supported and thus no connection is established. But once you go through it, it becomes second nature. One selects the devices one has patched and can comfortably adjust intuitively via color circle, color gradient area, a selection of color palettes or color filters or a white light color temperature.
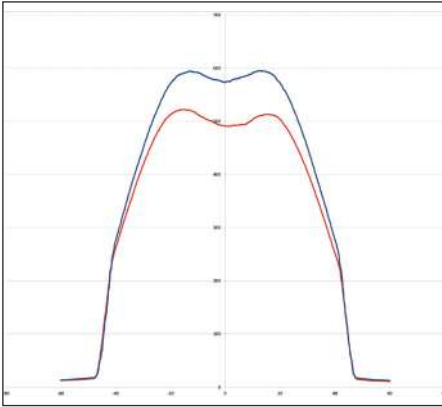
**Light distribution without a lens at 5600K** The FC version (red) is not as light-intense as the TW+ (blue) for white light



**Menu operation** Illuminated touch keys and clear graphic display



**App for iPhone/ iPad replaces the remote control** via Bluetooth a device is connected that controls other devices via DMX or W-DMX

| 17 | Identify | [0x00] No | [0x1000] Get:IdentifyDevice |
|----|----------|-----------|------------------------------|
| 18 | DMX Universe | 1 | |
| 19 | DMX Start Address | 17 | [0x00F0] Get:DmxStartAddress |
| 20 | DMX Personality | [0x0A] 20CH (DMX Footpri... | [0x00E0] Get:DmxPersonality [0x00E1] Get:DmxPersonalityDescription |
| 21 | Lamp Hours | 9 | [0x0401] Get:LampHours |
| 22 | Device Hours | 22 | [0x0400] Get:DeviceHours |
| 23 | Fan | 1 | [0x8010] Get:Manufacturer-Specific Parameter |
| 24 | DMX HOLD | 1 | [0x8011] Get:Manufacturer-Specific Parameter |
| 25 | Display Backlight | 1 | [0x8012] Get:Manufacturer-Specific Parameter |
| 26 | CRMX Operating Mode | 0 | [0x8018] Get:Manufacturer-Specific Parameter |
| 27 | CRMXReceive Reset | 1 | [0x8019] Get:Manufacturer-Specific Parameter |
| 28 | CRMX Transmit Link | 0 | [0x801A] Get:Manufacturer-Specific Parameter |
| 29 | CRMX Pass to DMX out | 1 | [0x801B] Get:Manufacturer-Specific Parameter |
| 30 | Bluetooth | 0 | [0x801C] Get:Manufacturer-Specific Parameter |
| 31 | Bluetooth Link | 1 | [0x801D] Get:Manufacturer-Specific Parameter |
| 32 | Factory Reset | 0 | [0x801E] Get:Manufacturer-Specific Parameter |
| 33 | User Reset | 0 | [0x801F] Get:Manufacturer-Specific Parameter |
| 34 | Dimmer Curve | 1 | [0x8030] Get:Manufacturer-Specific Parameter |
| 35 | Dimmer Response | 1 | [0x8031] Get:Manufacturer-Specific Parameter |
| 36 | Redshift | 0 | [0x8032] Get:Manufacturer-Specific Parameter |
| 37 | LED Frequency | 2 | [0x8040] Get:Manufacturer-Specific Parameter |

▌ **Many menu settings** can also be set via RDM

Once you have put together your scene, you save it as a cue, which you can make memorable with an icon and colored background and small text. Then you can simply call up the appropriate lighting mood for the part of the event such as break, dinner, social gathering, without having to operate a lighting console or be a technician. The service provider can email the programs or the show to the customer, who can then access them on his cell phone along with the desired scene.

## ROXX-Controlling

In general, we can say that the E.Show's controls are well-rounded. A password for Bluetooth has also been thought of, so that third parties cannot simply hijack the system. Interesting in the increasingly important security concepts is the activatable function "Emergency Light", via which the spotlight shines on 5600K white light if the DMX fails. Changeable dimmer curves, PWM, Redshift and Response time can also be expected in a fixture of this class. The user also has the option to create his own reset setup. The dimming behavior over 16 bits is impeccable. Even the lowest DMX control values - from 0 upwards - are suitable
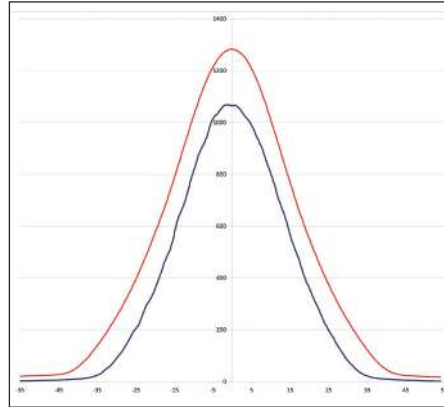





▌ **E.Show Accessories** Left without lens, then with lens snapped in, with filter frame holder attached and honeycomb inserted.

**Slight grating structure visible**
when using the Honeycomb and
wide-beam lens



**Influence of a honeycomb**
(shown in blue) using the middle
lens (red) as an example.



**Insert with 8-way barndoor**
and wide-beam lens



**With 8-way barndoor**
and accessory holder

for use in theaters. Likewise, fading from one color to the next occurs without any noticeable jumps. When considering how many menu items can be controlled remotely via RDM, you simply have to take your hat off. The selection of DMX modes is also very pleasing and stands out from the crowd with functions such as a control channel for a crossfade time to switch from one color macro to another. The ability to change Duration Time when strobing

is also a pleasant surprise. 34 Lee colors as well as the single LED colors sorted chromatically as color macros round out the palette along with a CCT/DMX mapping table.

## Mechanical details

The case is not only stylish - it is also practical. The yoke has a 13 mm hole in the center, so that M12 screws can also fit through it. To the left and right of it, there are camlock



**Central focus** Pendant suspension or eyelet for safety ropes
with connecting link. Version long - fits



**Convenient base** Multifunctional as a bracket or
omitted as a pendant lamp

**ROXX-Team** Michael Herweg (Director of Finances & Marketing SGM Germany), Daniel Garcia (Managing Director ROXX), Thorsten Sattler (Director of Sales SGM Germany)

mounts, so that you can also switch between coupler suspension and floor stand without tools for rental. The bracket has been drawn wide as a stand and four applied rubber feet towards the edge ensure that no scratches are left on sensitive floors.

For all its beauty of form, the first thing you miss is the holder for accessories such as gate flaps, tophat, etc. A clever solution has also been found in this area: If you want to attach accessories, a filter frame holder is slipped on. There are two recesses on the left and right for this purpose, in which spring-loaded pins fix the accessory holder. With the filter frame clipped on, additional accessories such as an eight-blade barn door, Honeycomb, Softbox can also be attached with Snapgrid or Tophat. If you use the Honeycomb with the wide-beam lens, you can see a slight rasterization in the light field, which decreases more and more when using narrower-beam lenses. The imaging of the barndoor, on the other hand, is flawless, although the demarcation does not form a drop shadow, but tapers off rather softly.

The tilt scale is also practical. You can easily tell the assistant the distance and angle at which the spotlights should illuminate the wall.

## Summary

In halogen times, products like the ETC Source Four PAR were an all-rounder. Today, the ROXX E.Show is something like the matching counterpart - but in LED, modern and outdoor-capable. All the latest technologies have been incorporated into the fixtures. In addition, there are also a few delicacies such as the iOS app, with which you (or the staff of the venue) can control the system comfortably even without a lighting control desk. Many detailed solutions such as the lens holder, the floor stand base with blind plugs for pendant operation, tilt scale or the accessory holder, make the E.Show simply round, universal and also beautiful to look at. The light field is flawless, and the color quality is in the top league for the TW+, while the saturated colors shine around the FC. The fact that there are no German instructions for a lamp developed in Germany may well change over time. For the first product of a new brand, one would also have expected more teething troubles. But this is not the case, which simply confirms the years of experience of the ROXX team. Conclusion: the E.Show rocks. ∎

## Technical data (manufacturer's data)

| Type | E.Show TW+ | E.Show FC |
|---|---|---|
| Manufacturer | ROXX | |
| Distribution | ROXX GmbH | |
| Power class | 200 W | 230 W |
| LED colors | RGBACL | RGBL |
| LED assembly | 10 × red, 10 × green, 10 × blue, 20 × amber, 10 × cyan, 20 × lime | 10 × red, 10 × green, 10 × blue, 10 × lime |
| Optics | Reflector with optional attachment lenses | |
| 1/2- and 1/10 value angle, luminous Intensity | 19° and 36°: 42.250 cd<br>36° and 72°: 11.775 cd<br>59° and 88°: 6.275 cd<br>17° x 24° and 35° x 46°: 29.775 cd<br>19° x 57° and 43° x 57°: 12.250 cd | 17° and 34°: 35.975 cd<br>35° and 70°: 8.725 cd<br>59° and 88°: 4.575 cd<br>16° x 24° and 34° x 45°: 21.900 cd<br>18° x 57° and 42° x 80°: 9.300 cd |
| Luminous flux | 9.049 lm | 9.219 lm |
| CCT Color temperatures | 2.000 – 10.000 K | |
| CRI | > 97 | > 85 |
| TLCI | 98 | 77 |
| Green/Magenta-Shift | ja | |
| Color control | CTC with Tint / RGB / HSI / RGBACL (Direct) / Color filter | CTC with Tint / RGB / HSI / RGBL (Direct) / Color filter |
| PWM frequency | 800 Hz, 1,2 kHz, 2 kHz, 3,6 kHz, 12 kHz, 25 kHz | |
| Dimmer control | 8 Bit, 16 Bit | |
| Dimmer curves | Linear / Expo. / Log. / S-curve | |
| Halogen simulation Redshift | Yes | |
| Halogen simulation Response time | Yes | |
| Protocol | DMX512, RDM, W-DMX, Bluetooth (Low Energy) | |
| Control sircuits | 3, 3, 3, 6, 6, 9, 10, 11, 12, 13, 14, 20 | 3, 3, 3, 4, 6, 8, 9, 10, 11, 11, 14, 16 |
| Stand Alone / Effects | 10 autoprogram, 34 color filters, CCT, 5 user color | |
| Master / Slave | Yes | |
| IP | 65 | |
| Fan | Max, Auto, Silent, Studio, Off | |
| Voltage range | AC: 100 – 260 V, 50/60 Hz | |
| Power consumption | Max. 220 W; Typ. 153 W | Max. 230 W; Typ. 154 W |
| cos | > 0,92 (230V) | |
| Connection | Powercon True One In/Out compatible, DMX XLR 5pin input/output | |
| Dimensions | 261 × 311 × 258 mm | |
| Weight | 5,7 kg | |
| Instruction | English – Download | |
| Special feature | Bluetooth and iOS-App | |
| Accessories, optional | 8-way barndoor, honeycomb, color filter frame, softbox, eggrade, tophat | |
| Optics, optional | Narrow, Medium, Wide, Elliptical Narrow, Elliptical Wide | |
| List price | 1.079 € plus VAT. | 1.039 € plus VAT. |