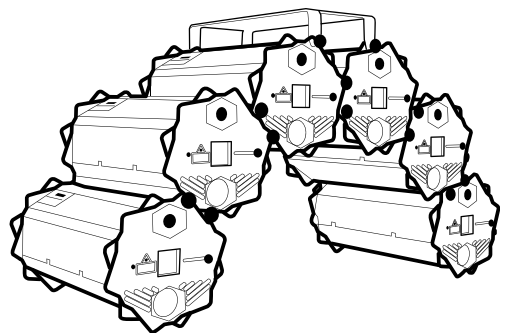


MODEL SPECIFIC OPERATION MANUAL



Burstberry



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Introduction

Thank you for purchasing this KVANT product.

To ensure proper operation, please read this manual carefully before using the product.

After reading it, keep it in a safe place for future reference.

General information



The following chapters explain important information about lasers in general, basic laser safety and some tips about how to use this device correctly. Please spend some time reading these information as some of them are critical for safe and efficient operation of this laser display system.



Caution



This laser entertainment system is rated as a **Class IV laser product** and manufactured in accordance to **EN 60825-1:2014**. Avoid eye or skin exposure to direct or scattered radiation. Wear protective goggles of suitable optical density if necessary.



If the laser is operated in a situation where health or property injury may occur the operation must be stopped immediately.



The manufacturer and its distributors cannot be held responsible for any damages caused by improper use or misuse of this KVANT laser system. The owner/user is fully responsible for using this product in accordance to laser safety regulations of the country or state where the system is being used.

Please note that some other optical devices such as cameras, camcorders, video projector etc. can be damaged if exposed to excessive laser radiation.

Handling precautions

This laser system is a precision device that contains some sensitive opto-electronics components. DO NOT drop it or subject it to physical shock.

This laser system is not waterproof or dust-proof. Make sure to use an appropriate cover or enclosure if it is used in the rain, snow or similar severe environment conditions.

Do not leave the laser system in excessive heat such as in a car whilst in direct sunlight. High temperatures could cause some serious damage to the system.

The laser system contains precision electronic circuitry. Never attempt to disassemble the laser yourself.

If the laser is suddenly brought in from the cold into a warm room, condensation may form on the laser and internal parts. If condensation forms on the laser body, do not use the laser as this may damage the laser system. If there is condensation, wait until it has evaporated before using it.

What is a laser and how does it work?

What is a LASER?

The laser is a bunch of energy waves (streams of photons called radiation) with the same amplitude and phase that are flowing in the same direction; meaning they are coherent – they stick together and form a laser beam.

The width of a single wave is measured in nano-meters and defines the colour and visibility of the laser beam. The visible spectrum of the human eye is roughly between 400nm and 700nm, going from violet to a dark red colour. A human eye is most sensitive to a green light of around 555nm, meaning that a 1W of green laser will always appear more visible than 1W of any other colour laser. 1W of quality laser light is very powerful and although it doesn't sound like much it can burn eye retinas, skin and clothes or even start a fire!

What makes the laser visible?

Mainly it is the particles of dust in the air that the laser beam hits on its path. That's why we "laserists" use haze or smoke machines to make lasers more visible. Too much of the haze or smoke will kill it, but the right amount will make all the difference between no show and a great show.

When outdoors, lasers mainly reflect off dust and mist in the air but due to unpredictable wind conditions we can never make sure the hazers or smoke machines will be effective enough. And that's why we use high power lasers for outdoor shows – to substitute for the lack of dust, haze and smoke.

How far does it go?

Depending on the power output of the system and weather conditions, the laser can be visible for miles – that is why we need to be cautious about aircrafts when performing outdoor shows. And if you get a system that is powerful enough then yes, it can reach the Moon.

Colours

Standard full colour analogue lasers use three primary colours: Red, Green and Blue. By mixing those together you can pretty much get any secondary colour:

Red + Blue = Magenta

Red + Green = Yellow

Green + Blue = Cyan

Red + Green + Blue = White

Of course the number and precision of the colours is determined by the modulation, stability and linearity of the system. If the system is not stable enough, it will produce different colours every time it is used, making it virtually impossible to match the colours of two systems at any one time. This is very often the case with systems from far east manufacturers and with re-branded lasers that are being presented as European makes.

Scanning System

A scanning system is essentially two tiny mirrors, each moving on X or Y axis. By working together they can “scan” the laser beam in all directions. Once a shape is scanned more than 20 times per second, it appears static to the human eye. So any shape drawn by a laser is actually produced by one single laser beam being moved by these mirrors very quickly. Every scanning system has a mechanical limit of how fast it can move its mirrors and therefore how many points it can display at any one second and that is usually represented in Points Per Second at a certain scanning angle, i.e. 8 degrees.

2.2

Laser Safety First!



Before proceeding any further, please read the following safety page very carefully. It could help you avoid dangerous and hazardous situations which could lead to serious injury or property damage.



Any laser system classified as a **Class 4** laser must be used with caution. If you are an inexperienced laser operator, we strongly recommend that you attend a laser display safety course before you use this laser system in public areas. There are various places in Europe where you can attend quality training and even a one day course will give you a good amount of valuable information to safely start with.

Unless you are very competent with the use of lasers and about the laser safety, make sure you at least follow these basic laser safety rules:

1. Never look directly into a laser beam.
2. Never look directly into laser aperture if the laser system is switched on.
3. Be aware that lasers can burn the eye retina, skin or cause fires if not used correctly.
4. Never perform Audience Scanning – that's when laser beams and effects hit an audience directly. Always project with the laser above audience head level – at least 3m above floor level.
5. When performing outdoors, avoid pointing the laser at aircrafts, buses, trains, etc.
6. Never leave the laser system unattended when it's switched on.
7. Always check for reflective surfaces within the laser range – these can be very dangerous (i.e. mirror behind the bar in a club could bounce the beam into bar attendant's eye).
8. Never hesitate to use the Emergency STOP if you think there's a fault within the laser system or a potential danger to a person/object caused by the laser performance.

2.3

Installation of the System



The manufacturer is not liable for damages or a injury caused by improper installation of the system. The installation should be carried by a qualified installer who should follow the Laser Safety Regulations of respective country.

Please follow these rules during the installation:

1. Do not connect the device to power supply during the installation.
2. Mount the system only to mounting point that is strong, secure and away from places where nonauthorised person could get an access to.
3. Always make sure the system is properly tighten down and that it cannot get loose and move as a result of sound vibrations, cable pull or similar.
4. Always use a safety rope.
5. Ensure that all the cables have enough leverage just in case they get caught.
6. Ensure that the system is placed at least 20cm away from walls or any other objects including drapes etc.
7. Ensure that the system is placed well away from any heat sources including spotlights, moving heads, radiators, etc. Make sure there is a sufficient air-flow around the laser system.
8. It is essential that the fan openings are never covered during the laser operation.
9. Always follow the Laser Safety Regulations of respective country where the laser is being used.

2.4

Control System

The overall performance of any KVANT laser system is also dependent on the control system that you use for operating the laser as well as the correct device configuration in the laser control software.

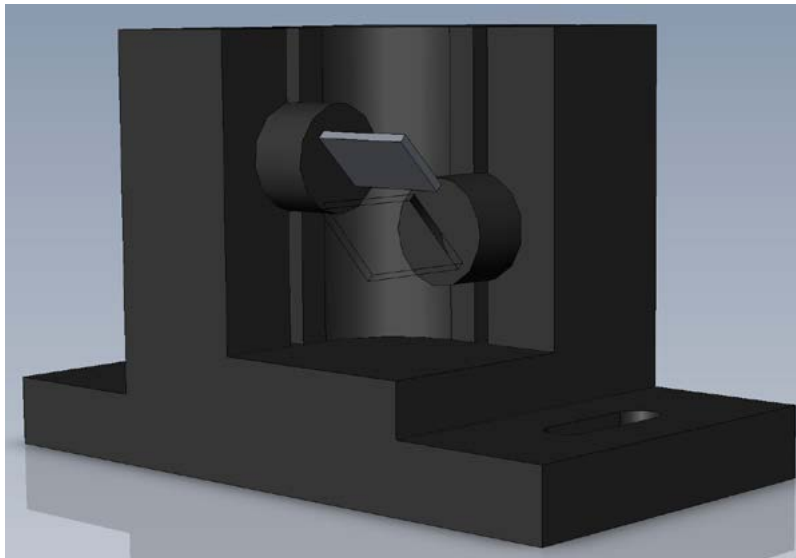
Please make sure all the laser settings in your control system are set correctly before you start using your Kvant laser display system.

2.5

Scanning System

The product warranty does not cover the damages to the scanning system caused by improper use of the scanning system or by incorrect programming. Therefore it is essential to understand how the scanning works and where are the limits of it. In this manual we will explain only the basics of it but it is the responsibility of every user to educate themselves so they can avoid damage being caused to the scanning system and costly repairs.

A laser beam comes from a laser module and hits the two moving mirrors of the scanning system. These mirrors are mounted on the scanner shafts and are moved by the scanner rotors, one on X and one on Y axis.



An effect such as tunnel (circle) is displayed by a repetitive mechanical movement of the scanners. For each scanning system and effect, there's a maximal scan rate that is defined by mechanical load, scanner mirror size and weight, complexity of displayed picture and size of the projection (an angle under the laser beam is being projected). A different scanning systems have different scan- rate limits. It is essential to operate the scanning system at scan-rates within its maximal limit at all times to prevent it from overload damage.

How to establish correct Scan-rate and maximal number of points in an effect

Each effect (picture) contains a different number of graphical points which defines the actual shape of the effect. The more points an effect contains, the lower the maximum scan rate will be in relation to the scanning angle.

As an example we'll work with the star effect shown below and with the parameters of quality scanning system:

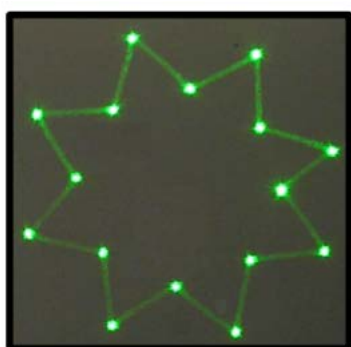
Let's say the star effect is made of 300 graphical points (including non-visible blanking points) and we know that the maximal scan-rate of our scanning system is 35kpps @ 8 degrees (= 35.000 points per second at 8 degrees projection angle). We also know that we display the star 35 times per second which is a default frame rate of the control software we are using.

So we need to display 300 points 35 times per second = 10.500 pps. This means that we could display 3 of these stars beside each other within one single laser effect and that it would be quite close to the scanner limit ($3 \times 10.500 = 31.500$ pps). This however applies ONLY if the scanning angle is not more than 8 degrees on both axes! If we start to increase the size of the projection (scanning angle) it is necessary to either lower the number of points within the effect or drop down the scan-rate in the control software (FPS) to a safe level – which may result in flicker.

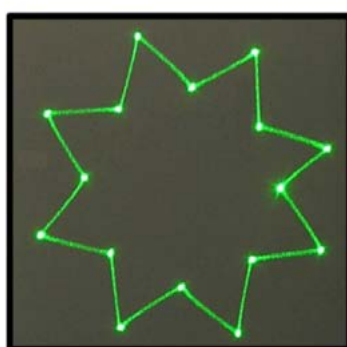
From the example above we can also determine how many points this scanning system is able to project if the scanning angle is not more than 8 degrees:

$35.000 \text{ points} / 35 \text{ Frames Per Second} = 1.000 \text{ pps}$. This is the absolute maximum of how many points we should be using when programming an effect if the scanning angle is not more than 8 degrees.

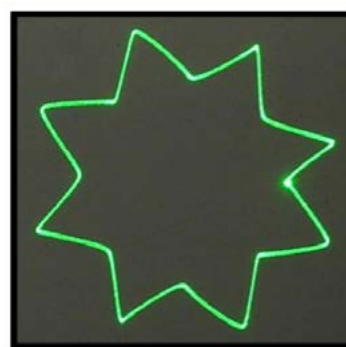
In the following pictures you see the same star effect scanned at different scan rates at full scanning angle (60 degrees).



picture 1



picture 2



picture 3

Picture 1: the scan rate and/or number of points is too low. The corner points are more visible than the lines between them and the whole effect flickers. The scan-rate and/or number of points needs to be increased.

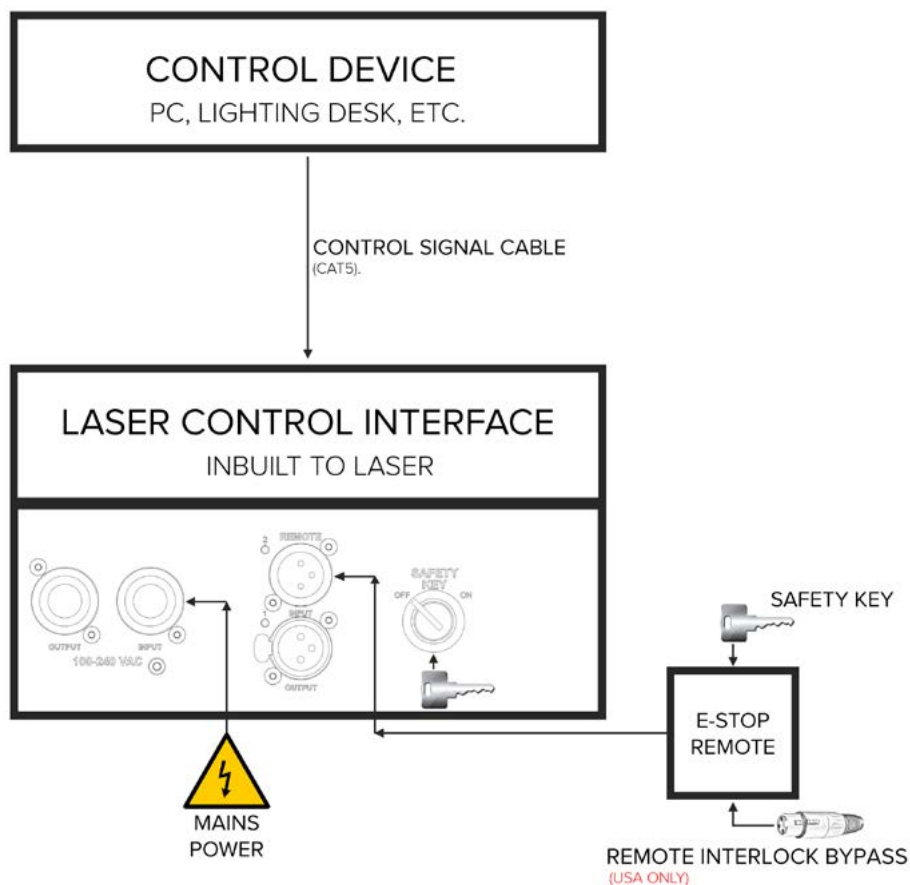
Picture 2: the scan-rate and/or number of points is about right. The whole effect has more or less the same intensity and does not flicker.

Picture 3: further increasing of the scan-rate and/or number of points results in the effect starting to distort, firstly around corners only. This indicates that you are exceeding the maximal scan rate of the scanning system! If you operate the scanning system at scan-rates higher than the maximum scan-rate of the scanning system the scanners will get damaged irreversibly due to overheated coils damaging rotor magnets.

2.6

Connection Diagram

Please check that all the signal and power leads are correctly installed and that the safety keys are inserted in all necessary positions.



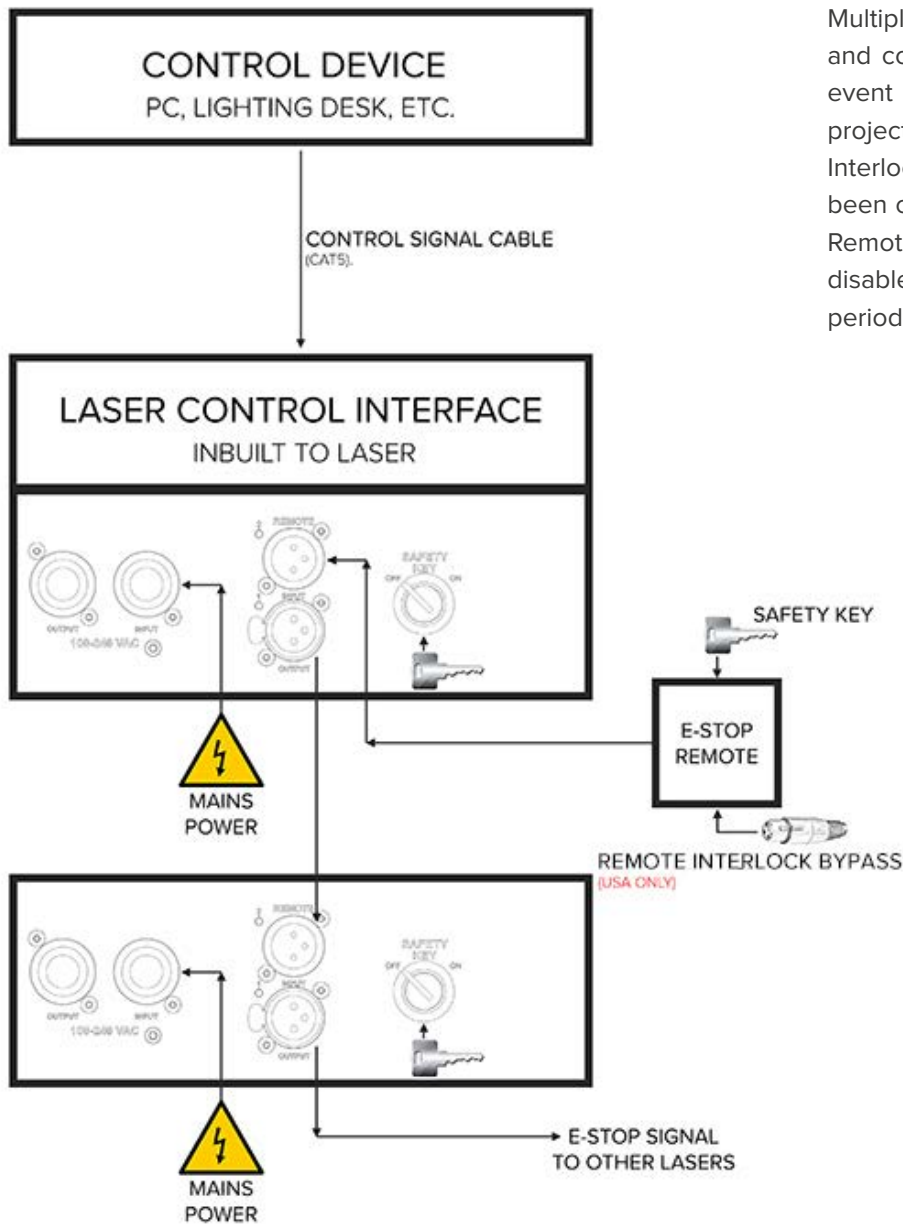
Both E-STOP Remote safety key and laser system safety key must be inserted and switched to ON position in order to disable the interlock.



USA ONLY: Remote Interlock Bypass must be inserted in the E-STOP Remote as well in order to disable the interlock.

2.7

Multiple System Interlock



Multiple laser projectors may be daisy chained and controlled by a single E-STOP Remote. Any event which enables the Interlock on any laser projector in the daisy chain will trigger the safety Interlock for all the systems. After the event has been corrected the START button on the E-STOP Remote must be pressed by the operator to disable the Interlock. After an Emission Delay period the laser projectors will be ready for use.

2.8

Switching ON sequence and User Interlock



Please make sure that all laser display safety requirements are fulfilled in accordance with laws of the country where this KVANT laser system is being used before switching the system ON.

1. Connect the system as showed on [Connection Diagram](#).
2. Turn both E-STOP Remote and laser system safety keys to ON position.
3. Release the E-STOP button by pulling it upwards.
4. Open the aperture window by loosening the bolt at the right of the aperture, adjust the masking plate to desired position and tighten the bolt to secure it.
5. Press the START button on the E-STOP Remote.
6. After an Emission Delay Period the laser projector will be ready for use.

Interlock Enabled, Laser Output Terminated

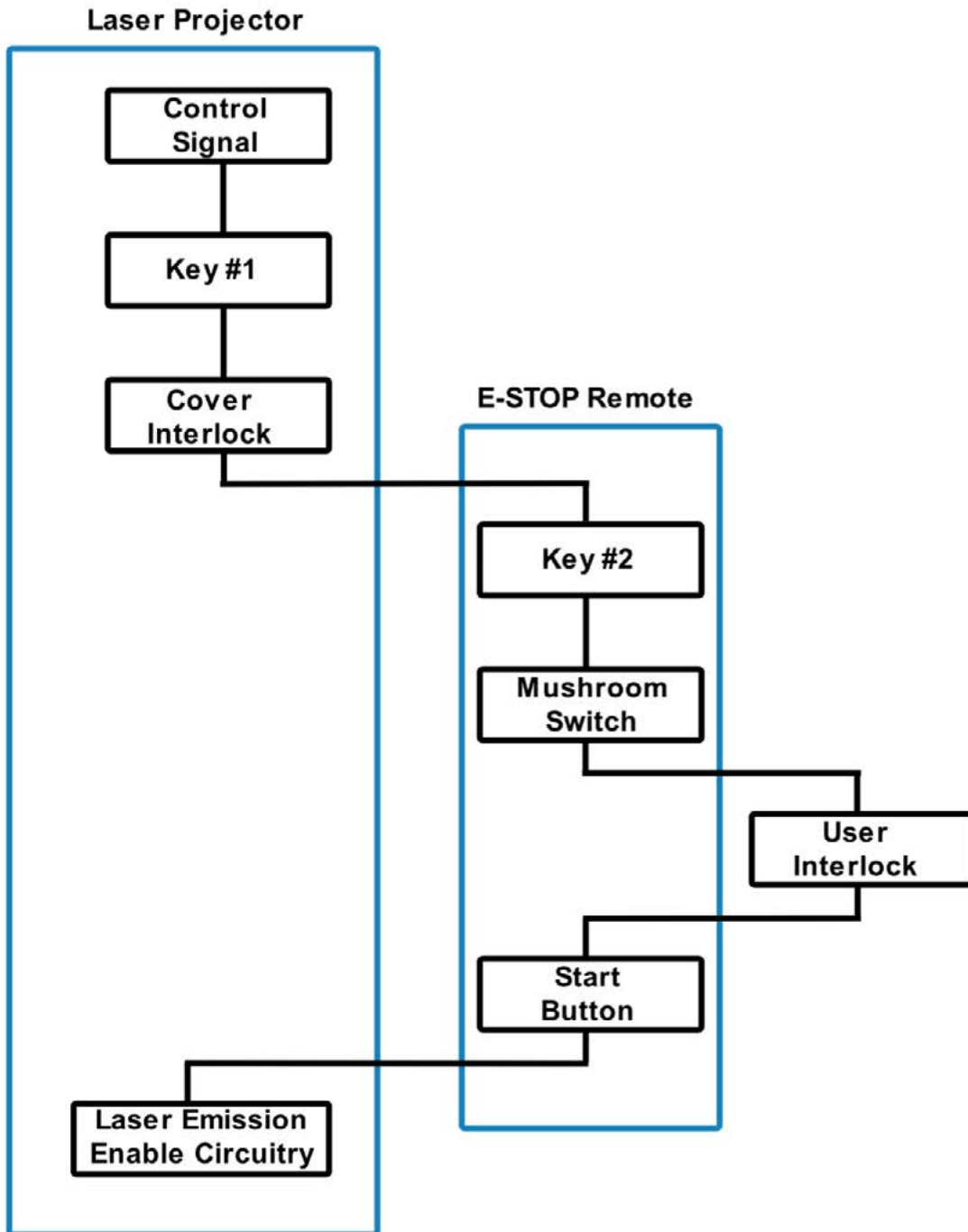
The Interlock is latched enabled and the laser projector's beam output will be terminated if any of the following events happen:

1. Power loss lasting greater than 2 seconds.
2. Mushroom emergency switch depressed.
3. #2 Key Switch on E-STOP Remote turned to OFF position.
4. #1 Key Switch on laser projector turned to OFF position.
5. Any other interruption to line No.1 of the cable leading to the E-STOP Remote. This includes any user interlocks connected in series in the line No. 1 of this cable. Refer to Connection Drawing below.

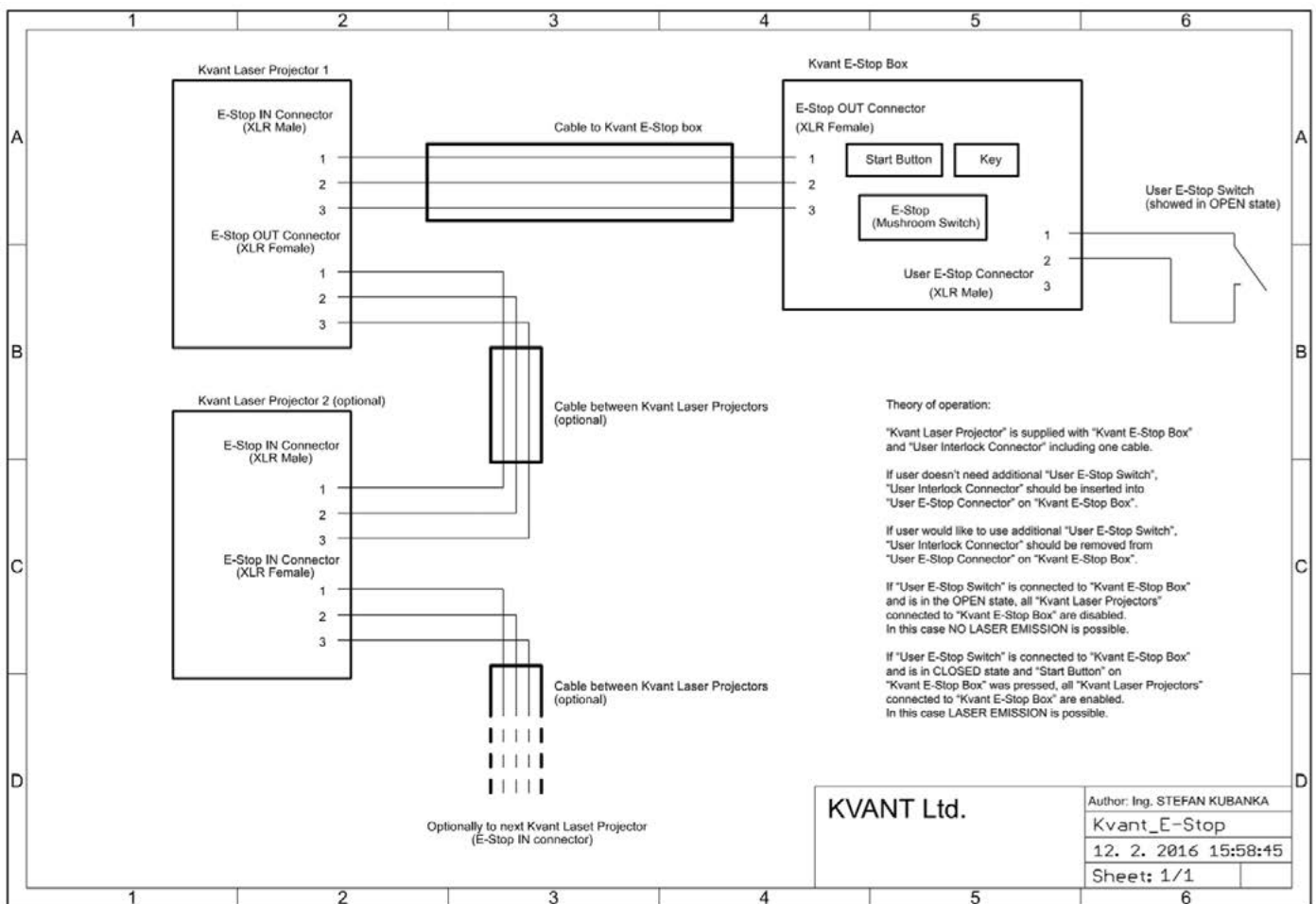
Restarting Laser After Interlock or Power Failure Event

After the event has been corrected the START button on the E-STOP Remote must be pressed by the operator to disable the Interlock and after an Emission Delay period the laser projector will be ready for use.

Interlock Connection Diagram



E-STOP Connection Drawing including User Interlock option



The E-STOP Remote is an integral part of the laser projector. It is there for the safety of the public as well as the operator. Modifying or using anything other than the E-STOP Remote provided, in the manner it was intended, may invalidate your laser projector's variance.

2.9

Maintenance

Aperture Window

To clean the aperture output window use a soft cloth and medical grade isopropyl alcohol.

Cooling Fans

Use compressed air for cleaning the bottom part of the laser system. There are cooling fans located behind the slots and they are vital for correct operation of the laser system. Please always ensure that they are spinning freely.

You should perform this service every 2 months if the laser is used regularly or even more often if it is used in dusty conditions.

Internal Optics

The cleaning of the internal optical components should be performed by an authorised technician only. Incorrect techniques or wrong choice of chemicals used for cleaning could cause serious damage to the laser system. Due to the fact that the optical compartment is split and sealed from the rest of the laser system it shouldn't be necessary to perform this procedure more often than once a year.

Drying agent cartridge

Drying agent cartridge (silica gel desiccant) helps to prevent water condensation inside the optical compartment of the laser system, which is much needed in high temperatures and high humidity environments. The desiccant cartridge is installed on the inside of [the optical compartment cover](#).



It is essential to regularly inspect the condition of the silica gel granules inside the cartridges. That can be done through the opening in the middle of the cartridge. If the colour of the granules inside the cartridge is green, instead of brown (brown is when they are dry), it means they are soaked, and they must be dried out. Inspect the cartridge every time you open the optical compartment, or at least once a month.

The drying out process is pretty simple:

1. Detach the cartridge from the cover and place it into the conventional oven - do not use microwave!!!
2. Heat the oven to 120°C (250°F) and leave the cartridge inside for about 2-3 hours, until all the moisture is released.
3. Insert the cartridge back into its place and close the optical compartment cover as soon as the cartridge cools down. That way, it will absorb the maximum amount of moisture from the inside of the optical section.















If the granules don't turn brown during this process, they must be replaced with new ones.

3

Item Checklist

Before starting, check that all the following items have been included with your laser system. If anything is missing, contact your supplier.





Item	Number of units	Description
	2 / 6	KVANT Burstberry FB4 Laser Display System
	2 / 6	Hanging bracket for any placement
	1	Emergency STOP Remote
	1 / 5	3-pin XLR Emergency STOP Remote cable
	1	Remote Interlock Bypass (for USA only)

Item	Number of units	Description
	1	AC Power cable with powerCON TRUE1 connector
	1 / 5	powerCON TRUE1 Extension Cord
	2 / 6	Set of 2 Safety Keys
	1	Network Signal Cables (cat5) – 10m
	1 / 5	Network Signal Cables (cat5) – 0,6m
	1	User manual USB drive
	1	Heavy duty flight case

4

Optional Accessories

Here is a list of optional accessories that are compatible with Atom laser system.

Item	Description
	Intersection/Connector plate – allows you to set individual Burstberries further apart if necessary.
	Diffraction Grating lens
	Main aperture Diffraction Grating set
	SafetyScan lens bracket

System Overview

KVANT Burstberry is a full colour, semiconductor diode laser system designed for professional laser displays. The system is designed to work as a multi-head laser system and can be assembled into virtually any geometrical formation. Individual units can be physically clipped together from 6 different directions.

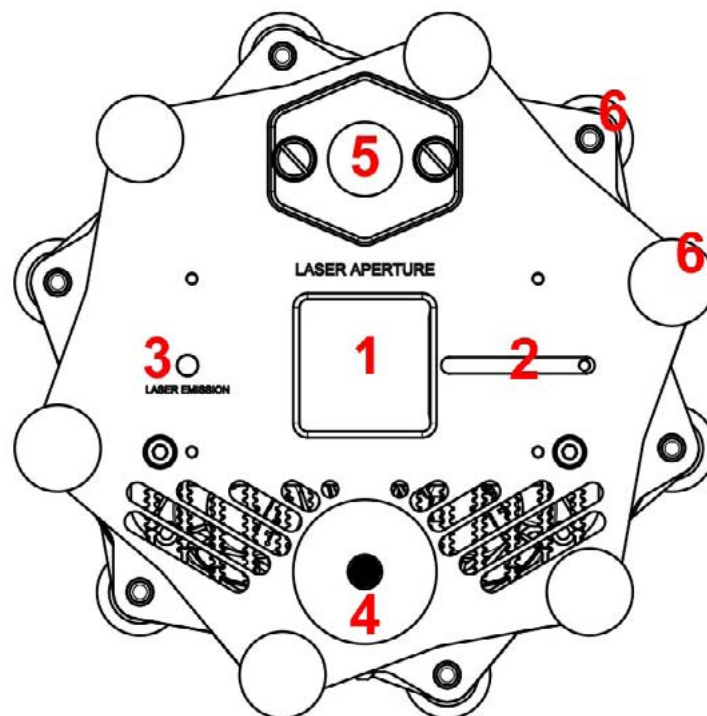
When operated correctly and in the right conditions the Burstberry laser system is able to deliver a strong performance in venues with up to 2000 people, but also at large outdoor stages, depending on given setup. The Burstberry can display virtually any colour within the basic RGB palette and its secondary mixed colours including white.

The system is air-cooled and designed so that there is no airflow going through the optical compartment of the system. This ensures that all important optical parts of the system stay clean for longer, keeping the maintenance time down to a minimum. This is a real advantage for all the venues where lots of smoke or haze is used on a daily basis.

The Burstberry laser system was designed for indoor use and therefore it must not be exposed to rain, snow or excessive amounts of dust.

5.1

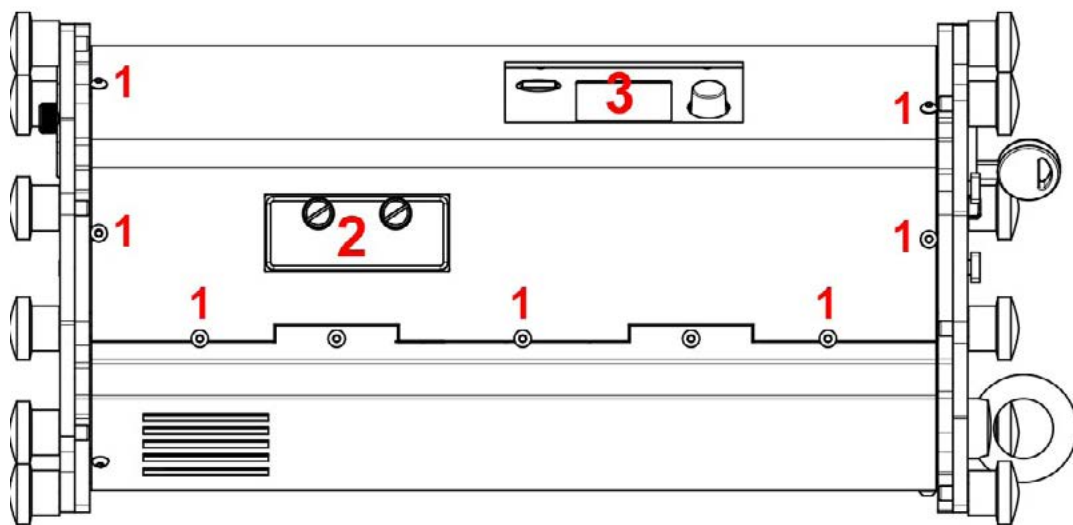
Front View



- 1. Laser aperture.** To clean the aperture output window use a soft cloth and medical grade isopropyl alcohol.
- 2. Aperture masking plate.** This metal masking plate can be moved left and right when the locking bolt is loosened. This feature protects the aperture glass during transport.
- 3. Laser emission indicator.** When this indicator is lit up the laser system is ready to emit the laser radiation as soon as it receives instructions from control software.
- 4. 3W White LED Blinder.**
- 5. Inbuilt optical bench with burst/line effect.** You can replace the effect by loosening the 2 silver bolts.
- 6. 12 Locking holes with bolts.** Use them to join individual units together.

5.2

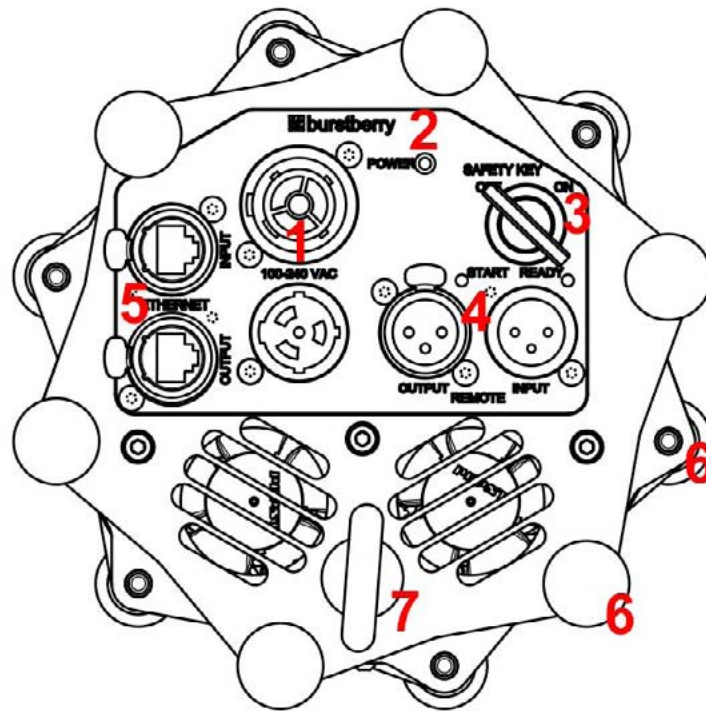
Side View



- 1. Optical compartment cover bolts.** To access the optical compartment of the laser system undo 14 button hex bolts and carefully remove the cover.
- 2. RGB colour alignment mechanism.** To access the colour alignment mechanism undo 2 silver bolts and remove the cover.
- 3. FB4 laser control interface.** The inbuilt control interface allows you to control the laser via Ethernet, but it also handles all the basic settings of the laser system (master size and positions, method of control, colour settings etc.). All of these settings can be accessed through the menu using the endless rotary knob and once saved, they are stored on included mini SD card.

5.3

Rear View



- 1. Mains power INPUT/OUTPUT.** Use supplied Neutrik powerCON TRUE1 power cable to connect the laser system to mains power supply using the INPUT connector. The OUTPUT connector is used to daisy chain power between multiple laser systems for quick and easy installation.
- 2. Power ON indicator.** The powerCON TRUE1 is a connector with breaking capacity (CBC), i.e. it can be connected or disconnected under load or live.
- 3. Safety key switch.** The Safety key must be inserted and turned to ON position in order to enable the system to operate.
- 4. E-STOP Remote connector, Interlock status indicator and User Interlock.** In order to use the laser system, the Interlock must be closed circuit. This is done by connecting the Emergency STOP Remote to the XLR REMOTE INPUT socket on the projector using the supplied cable. The US version of the Emergency STOP must also have the Remote Interlock Bypass inserted into it.



The E-STOP Remote is an integral part of the laser projector. It is there for the safety of the public as well as the operator. In most countries it is required by law to have a fully working Emergency STOP in place for every laser system used. Modifying or using anything other than the E-STOP Remote provided, in the manner it was intended, may invalidate your laser projector's variance.

The Remote Interlock Bypass may be replaced by the user's own interlock system using a switch or dry relay closure to connect pins 1 and 2. With pins 1 and 2 shorted, Laser Emission is possible, provided all other interlocks are closed circuit. With pins 1 and 2 open, NO Laser Emission is possible.

The projector's REMOTE Output is used to daisy-chain the Remote signal when you want to use a single Emergency STOP Remote to control multiple systems.

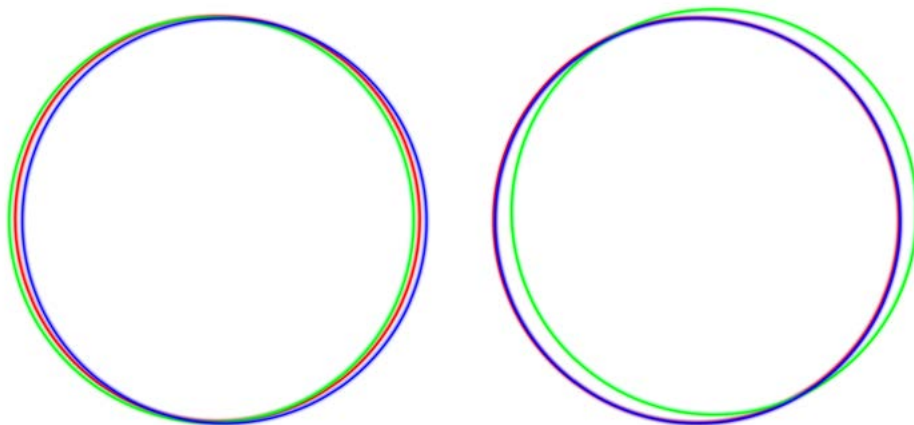
After a power failure or interlock failure (open circuit) has occurred and been corrected you need to manually reset laser emission by pressing the START button on the E-STOP Remote.

5. **Ethernet.** Use these ports to connect PC control signal or to daisy chain the control signal between multiple laser display systems.
6. **12 Locking holes with bolts.** Use them to join individuals units together.
7. **Safety eyelet.** Use this together with appropriate safety wire to secure the system against unexpected fall.

Beam Alignment

It is possible that due to transportation, rigging, moving around or vibrations caused by various elements during a set up or laser performance some of the internal optical parts can move slightly resulting in colour misalignment.

The colour misalignment is when two or more colours (red, green and blue) physically do not overlay each other properly like on the picture below. This makes it impossible to get nicely mixed colours like yellow, cyan, magenta and white (including all their shades). If this occurs it is necessary to carry out the beam alignment procedure.



Be cautious when aligning the beams and wear sufficient laser safety protection to avoid accidental exposure to Class 4 laser radiation.

Beam alignment principle

There are three laser modules within this system where each module produces one of the basic RGB colours (red, green or blue).

The goal of the alignment procedure is to align all three beams (colours) so they overlay each other nicely while they hit exact centre of the bottom scanning mirror.

An easiest way to do the alignment is to project a full size circle onto a wall (or any another suitable projection surface), change its colour as necessary and check the alignment of individual colours on both X and Y axes.



Remember that greater is the distance between the laser system and the projection surface during the alignment, more precise the alignment will be.

When doing the alignment on long distances it is always good to have someone with you who can point you in the right direction. Alternatively you can use binoculars.

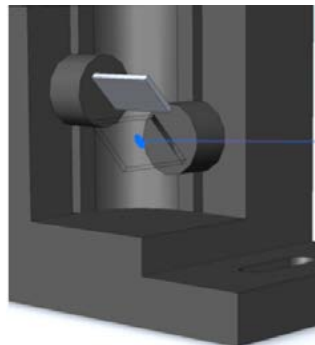
6.1

Beam Alignment

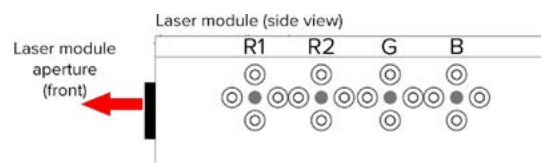
1. Loosen 2 silver bolts that hold down [the colour alignment mechanism cover](#) and remove the cover.



2. Power up the system as normal.
3. Firstly, it is necessary to align a colour with the longest beam path between the laser module output and the scanning system in a way so it hits the exact centre of the bottom scanning mirror – in this case it is the blue laser beam.



Create a blue beam effect (point) and check visually whether the beam hits the exact centre of the bottom scanning mirror. If not, follow the diagram below to adjust the beam path accordingly (step 1 on the diagram).



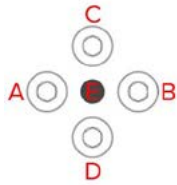
Correct order of the colour (beam) alignment:

- 1) B : blue beam hits the centre of the bottom scanning mirror
- 2) G : align green beam to blue beam for unified cyan beam
- 3) R1 : align red (R1) beam to green beam for unified yellow beam
- 4) R2 : align red (R2) beam to red (R1) beam for unified red beam



Always loosen one of the screws in the pair first, before tightening the 2nd one down.

How to use the beam alignment mechanism (to align each beam)



A + B | Adjusters for moving the beam LEFT & RIGHT

- To move the beam LEFT: loosen screw A and then tighten screw B
- To move the beam RIGHT: loosen screw B and then tighten screw A

C + D | Adjusters for moving the beam UP & DOWN

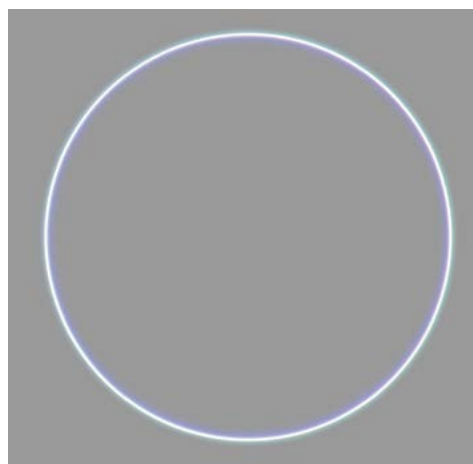
- To move the beam UP: loosen screw C and then tighten screw D
- To move the beam DOWN: loosen screw D and then tighten screw C

E - fixed position pivoting bolt - DO NOT USE!



All alignment screws A,B,C and D must be fastened at the end of each beam alignment procedure. Even if only one of them is loose, there will be not enough internal pressure on the pivoting bolt (E), which may result into misalignment of respective colour.

4. Create a full size cyan circle (static tunnel effect) and check whether the green circle overlays the blue circle all the way around the shape. If not, adjust the beam path of the green circle accordingly (step 2 on the diagram above).
5. Create a full size yellow circle (static tunnel effect) and check whether the red circle overlays the green circle all the way around the shape. If not, adjust the beam path of the red circle accordingly (step 3 on the diagram above).
6. Create a full size red circle (static tunnel effect) and check whether the 2nd red circle overlays the 1st red circle all the way around the shape. If not, adjust the beam path of the 2nd red circle accordingly (step 4 on the diagram above).
7. Finally create a full size white circle (static tunnel effect). If the alignment procedure was done successfully you can see all the colours nicely overlaying each other, resulting in even, bright and sharp circle like the one on the picture below.





Operation Instructions

Burstberry is based on FB4 and can be controlled in three ways. Art-Net, Autoplay and Beyond/QS.

Art-Net

FB4 uses for its functionality maximum 39 DMX channels (FB4 mode). There is also blinder LED and grating wheel installed in Burstberry. Currently there are 4 channels which controls blinder LED intensity, grating wheel On/Off, grating wheel rotation direction, grating wheel rotation speed. Specification for 43 DMX channels (FB4 mode) is below.

Channel number(s)	Name	Channel width	Description	Comments
1	Preamble	8-bit	Value should be 251 (0xFB) to enable output Value should be 240 (0xF0) for at least 2 seconds to enter the setup profile. (FB4 will exit setup profile as soon as the value is no longer 240)	
2	Master Brightness	8-bit	0 = 0%, 100-255 = 100%	These channels only work in setup profile. Only changes after entering setup mode to these channels are recorded.
3	Test frame	8-bit	0 = off, 1-255 = "/content/test_XXX.FB4Animation" (XXX = 001-255)	
4,5	Geo: X Size	16-bit	0 = -100%, 32768 = 0, 65535 = +100%	For example: if you enter setup mode and only move X size channel, this is the only parameter that will be changed. Even if the other channels have a different value then what was previously configured in geometric correction.
6,7	Geo: Y Size	16-bit	0 = -100%, 32768 = 0, 65535 = +100%	
8,9	Geo: X Position	16-bit	0 = -100%, 32768 = 0, 65535 = +100%	The "live control" channels are ignored in setup mode
10,11	Geo: Y Position	16-bit	0 = -100%, 32768 = 0, 65535 = +100%	
12,13	Geo: Z Rotation	16-bit	0 = 0°, 65535 = 360°	
14	Page	8-bit	0 = No output, 1-255 = Page 1-255	Content is located at "/content/dmx/PXXXCyyy.FB4Animation" Where XXX is page and yyy is cue (zero padded, so 1 → 001)
15	Cue	8-bit	0 = No output, 1-255 = Cue 1-255	
16	Speed	8-bit	0 = 0%, 100 = 100%, 255 = 255%	
17	Fade	8-bit	0 = 0%, 255 = 100%	
18,19	Zoom	16-bit	0 = -100%, 32768 = 0, 65535 = +100%	
20,21	X size	16-bit	0 = -100%, 32768 = 0, 65535 = +100%	
22,23	Y size	16-bit	0 = -100%, 32768 = 0, 65535 = +100%	
24,25	Z angle	16-bit	0 = 0°, 65535 = 359°	
26,27	Z rotation speed	16-bit	0 = 0% speed, angle reset 1 = -100% speed (-60RPM) 32768 = 0%, keep angle 65535 = 100% speed (60RPM)	
28,29	X position	16-bit	0 = -100%, 32768 = 0, 65535 = +100%	
30,31	Y position	16-bit	0 = -100%, 32768 = 0, 65535 = +100%	
32	Scanrate	8-bit	0-255 = From 5K to cue scanrate	
33	Red	8-bit	Red component for mixing with the original cue	
34	Green	8-bit	Green component for mixing with the original cue	
35	Blue	8-bit	Blue component for mixing with the original cue	
36	Alpha	8-bit	0 = Original color, 255 = RGB color	
37	Visible points start	8-bit	Works together with visible points end	
38	Visible points end	8-bit	<Same as legacy profile "visible points">	
39	Strobe	8-bit	0 = Off, 1 = 1Hz, 255 = 20Hz	
40	LED Blinder intensity	8-bit	0 = Off, 1 ..254 (adjust intensity), 255 = 100%	
41	Grating wheel On/Off	8-bit	0 - 127 = Off, 128 - 255 = On	Burstberry laser system additional channels
42	Grating wheel rotation direction	8-bit	0 - 127 = Clockwise, 128 - 255 = Counterclockwise	
43	Grating wheel rotation speed	8-bit	0 - 3 = speed1, 4 - 7 = speed2, ... 252 - 255 = Max speed	



If we consider 43 DMX channels, then one UNIVERSE (512 channels) can control only 11 Burstberry projectors. That's why standard DMX connector is not available. DMX control will be just using Art-Net (DMX over Ethernet). Using Art-Net is it possible to select and play cue form SD card and also change possible parameters related to playback.

Way how additional Burstberry channels are used is done manually by editing „settings.ini“ file which is located on SD card.

Examples:

FB4 uses 39 channels, there are 4 additional Burstberry channels. Together 43 channels for Burstberry projector, which should be on DMX address 1. We want 4 additional channels to be located “AFTER” 39 FB4 channels. Using FB4 menu we set start address to 1 and file „settings.ini“ will contain few lines so additional Burstberry channels are available on channels 40, 41, 42 and 43:

- serial_mode=1
- dmx_patch_from=40
- dmx_patch_to=1
- dmx_patch_length=4

For next Burstberry projector we need to set next free channel as start address, which is 44. Additional Burstberry channels will be also “AFTER” 39 FB4 channels, but will be located on channels 83, 84, 85 and 86.

- serial_mode=1
- dmx_patch_from=40
- dmx_patch_to=1
- dmx_patch_length=4

So mentioned lines in „settings.ini“ are same for each Burstberry projector. Item „dmx_patch_from=40“ is not changing it's value, because FB4 adapts additional Burstberry channel according its start address.

Autoplay

Additional Burstberry channels cannot be controlled in this mode. In this mode Burstberry plays content according Autoplay settings in FB4 menu and also according special file located on SD card. Details how to setup this mode completely is out of scope of this document.

Beyond/QS

In this mode Burstberry works as standard laser projector with built in FB4. In Beyond it is possible to control more Burstberry projectors. In QuickShow from version 4.0 it is also possible to control more Burstberry projectors. Blinder LED and grating wheel can be controlled in this mode from version „BEYOND 4.0 build 1097“. However in file „settings.ini“ it is necessary to manually change:

- serial_mode=2



Data for SD card (Art-Net or Autoplay content) can be created in Beyond and also in QuickShow. Beyond allow to change SD card content remotely over Ethernet cable. So SD card doesn't need to be removed from Burstberry projector to change anything on it. QuickShow has also available this remote content management from version 4.0. It is not mandatory to own Beyond to create SD card content or remotely change the content.



Technical Specifications

All the technical specifications are subject to change without prior notice.

8.1

Technical Specification Burstberry

KVANT Burstberry – full colour, semiconductor diode laser system

Total Optical Power (installed): 2.1W

Total Optical Power (guaranteed): 2W*

**Due to Advanced Optical Correction technology used in our laser systems the optical power output of each laser colour within the system may slightly differ from the specification of respective laser module(s) installed. This does not affect the guaranteed total power output.*

Colour	Beam size	Beam divergence	Wavelength	Maximum Output
Red	3.5x3.5mm	<0.4mrad (full angle)	637nm	300mW
Green	5x5mm	<0.35x0.1mrad (full angle)	520nm	700mW
Blue	5x5mm	<0.45x0.1mrad (full angle)	445nm	1200mW

NOHD (Nominal Ocular Hazard Distance for guaranteed power output): 306m

Modulation: Analog laser modulation

Module cooling: TEC

Scanning System:

ScannerMAX 506 Compact, up to 27kpps@8°, max. scanning angle 60° on both axes

White LED Blinder:

Optical Power: 3W

Control signal: Ethernet, DMX/ArtNet, SD card (via inbuilt FB4 control interface)

Power requirements: 100-240V/50Hz (±5%)

Consumption: 250VA/100-240V

Operation temperature: 10-40°C

Dimensions (WxHxL): 161 × 161 × 300mm

Weight: 3.8kg

Laser safety features: Keyed interlock, emission delay, magnetic interlock, scan-fail safety, V-RAD 506 mechanical shutter | reaction time <20ms, adjustable aperture masking plate.

This laser system fully complies with the latest EN 60825-1, FDA regulations and TUV Laser Safety.