The FB4 SE Manual

- This manual consists mainly of explanations of hardware functionality. For detailed instructions on operation QuickShow or BEYOND, see the corresponding software manuals on http://pangolin.com.

- In this manual, menu option of the FB4 are enclosed in square brackets (**[ ]**) (e.g. Set [**Operation Mode**] to [**BEYOND/QS**], Change [**Artnet Settings**] >> [**Timeout**] to **3.0)**.

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# Index

1. FB4 Features and options

- 100Mbit Ethernet Port
- SDXC card reader which supports up to 1TB SDXC card
- 12-bit color lines (up to 6 colors)
- 12-bit X and Y axes control for up to 80K scan speeds
- Direct connection for shutters
- Rotary encoder for 1 hand operation
- Full Color OLED Display
- Stand Alone operation
- Controllable through DMX and Artnet

2. FB4 Operation Mode

The FB4 has various operation modes. These operation modes determine which functions the FB4 will perform. Operation modes are explained below, however it's important to know when the FB4 stores settings and what will happen after a power failure or power cycle.

When starting up the FB4 the first time, the default [**Operation Mode**] is [**BEYOND/QS**]. Once you change the [**Operation Mode**] of the FB4, the FB4 will store this change after two seconds of inactivity. The new settings will directly become the new default and will stay active, even after a power cycle.

Settings are stored / saved on the SD card. Settings are stored when performing a "clean" [**exit menu**] through the main menu or two seconds of inactivity after making a change.
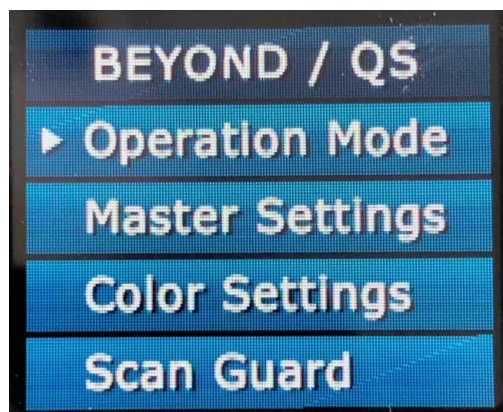
2.1.   [BEYOND/QS]

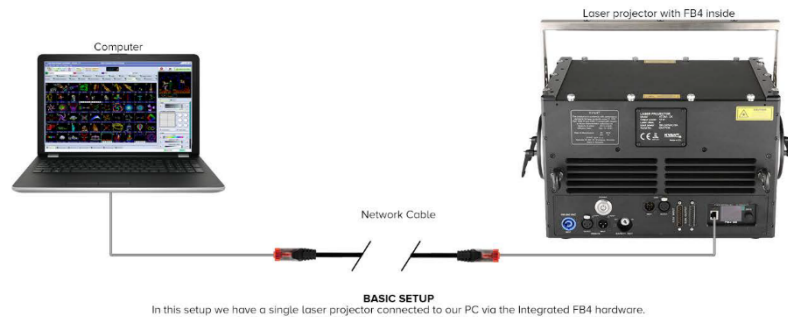In operation mode [BEYOND/QS], Pangolin's QuickShow and BEYOND software platforms are able to connect to the FB4 and control these directly through an ethernet network. For more information how to setup the FB4 through QuickShow or BEYOND, see the corresponding software manuals on http://pangolin.com.

During this operation mode, the following menu options will be available. [**Master settings**] (See page 12)

[**Geo Correction**] (See page 14)
[**Color Settings**] (See page 14)
[**Scan Guard**] (See page 14)
[**Network Setup**] (See page 15)
[**FB4 Device Info**] (See page 15)

BASIC SETUP
In this setup we have a single laser projector connected to our PC via the Integrated FB4 hardware.

2.2. [DMX-512]

[**DMX 512**] is only available when the DMX daughter board is connected. This daughterboard has two XLR-5 connectors for DMX in and through. The XLR 5 ports are meant to control the laser as "DMX fixture". Laser frames can be stored on the SD card and playback can be controlled by DMX. Laser frames can be uploaded by Pangolin's QuickShow or BEYOND its FB4 Export wizard through an ethernet connection.

The FB4 has two separate fixture profiles. A 16-channel and a 39-channel fixture profile. More information about both profiles can be found on page 20.

During this operation mode, the following menu options will be available.
[**DMX settings**] (See page 12)
[**Master settings**] (See page 11)
[**Geo Correction**] (See page 14)
[**Color Settings**] (See page 14)
[**Scan Guard**] (See page 14)
[**Network Setup**] (See page 15)
[**FB4 Device Info**] (See page 15)

Note: The XLR 5 ports cannot be used to generate DMX output.
Note: It is not possible to send content from QuickShow or BEYOND through the XLR cables connections.

CONSOLE SETUP
In this setup we have a single laser projector connected to a dmx console via the integrated FB4 oem hardware through DMX or Ethernet. This example requires the FB4 DMX or FB4 MAX. The FB4 has been pre-populated with frames and can operate without computer.

2.3.   [Artnet]

Artnet mode provides you access to the FB4's fixture profile by DMX over ethernet.

The FB4 can be controlled by two separate fixture profiles. A 16-channel and a 39-channel fixture profile. As soon as the laser is being controlled through DMX, Content that is stored on the SD card of the FB4 can be played, limited by the functionality of the fixture profiles.

More information about both profiles can be found on page 20.

During this operation mode, the following menu options will be available.
[**Artnet Settings**] (See page 12)
[**Master settings**] (See page 11)
[**Geo Correction**] (See page 14)
[**Color Settings**] (See page 14)
[**Scan Guard**] (See page 14)
[**Network Setup**] (See page 15)

2.4.   [Autoplay]

The Autoplay mode allows one or more lasers to start and play content at specific predefined times or when the power of the laser is turned on. Autoplay requires that content is prepared through the FB4 export Utility inside QuickShow or BEYOND. This wizard will also allow you to schedule the shows that are stored on the SD card. Preparing content for automatic playback requires an ethernet connection with QuickShow or BEYOND. The actual playback does not require any cable connection.

During this operation mode, the following menu options will be available.
[**Autoplay Setup**] (See page 8)
[**Master Settings**] (See page 11)
[**Geo Correction**] (See page 14)
[**Color Settings**] (See page 14)
[**Scan Guard**] (See page 14)

Note: When scheduled content needs to be played on specific date and times, installation of a battery is needed. As delivered, FB4 comes without battery. A battery can be installed to enable the real-time clock. Date and time can be setup through the QuickShow or BEYOND FB4 Export utility. The battery type required for this purpose is "CR1220". The battery can be

installed by pointing the negative side of the battery towards the circuit board.

2.5.   [Slave Mode]

[**Autoplay**] allows for scheduling shows across multiple projectors. When setting up a show which uses multi FB4's, one laser will need to act as master. This laser will need to be set in operational mode [**Autoplay**]. Other FB4's that need to perform in the same show, must be placed in operation mode [**Slave mode**] so that they will follow the master FB4.
For the master/slave functionality to work, all FB4's needs to be connected to the same ethernet network.

During this operation mode, the following menu options will be available.
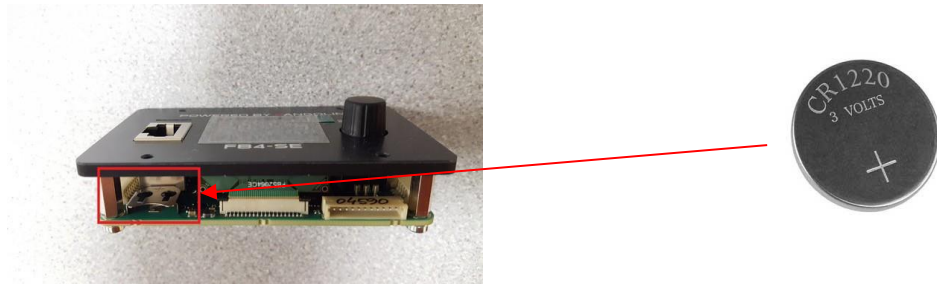[**Master Settings**] (See page 11)
[**Geo Correction**] (See page 14)
[**Color Settings**] (See page 14)
[**Scan Guard**] (See page 14) [**FB4
Device Info**] (See page 15)

2.6.   [Time Code]

The [**Time code**] mode allows you to start the FB4 to play based on an incoming Artnet Time code signal (ATC for short). The content that will be played, will need to be prepared through QuickShow or BEYOND. This requires an ethernet connection.

During this operation mode, the following menu options will be available.
[**Operation Mode**]
[**Time Code Setup**] (See page 13)
[**Master Settings**] (See page 11)
[**Geo Correction**] (See page 14) [**Color Settings**] (See page 14)
[**Scan Guard**] (See page 14) [**FB4 Device Info**] (See page 15)

2.7.   [Test Mode]

The [**test mode**] has been created to give you the ability to open up a test frame without the need to connect other equipment. Test frames will need to be prepared and uploaded through Pangolin's QuickShow or BEYOND its FB4 Export Utility. During preparation of the test frames an ethernet cable is required. Once the test frames are located on the SD card of the FB4, there is no cable connection needed to activate [**test mode**].

During this operation mode, the following menu options can be controlled.
[**Operation Mode**]
[**Master Settings**] (See page 11)
[**Test mode Setup**] (See page 13)

[**Geo Correction**] (See page 14)
[**Color Settings**] (See page 14)
[**Scan Guard**] (See page 14)
[**FB4 Device Info**] (See page 15)
[**Exit Menu**] (See page 15)

3. FB4 Settings

Menu options will become available depending on the operation mode the FB4 is working on. E.g. in [**BEYOND/QS**] mode, [**Geo correction**] is not available.

3.1.　　[MASTER SETTINGS]

The [**master settings**] determine the range and the limits of the FB4 scan angle. It determines where the projector may send laser light. Adjustments made below influence the Maximum scannable region, limited by the scanner performance inside the laser projector. All master settings are applied before software or DMX fixture modifications take place. The alterations of the master settings do not affect the output resolution of the software applications. [**Master settings**] will be saved when powering down the laser.

[**Brightness**]	Determines the maximum output brightness of the laser.
[**Master size**]	Determines the overall size of the projection area.
[**X Scale**]	Determines the horizontal size of the projection image
[**Y Scale**]	Determines the vertical size of the projection image
[**Invert X**]	Inverts the complete output area on the X ax.
[**Invert Y**]	Inverts the complete output area on the Y ax.
[**Swap XY**]	Inverts the complete output area on the X and Y axes.
[**Rescan time**]	Allows you to raise the error threshold by allowing the FB4 to repeat the last part of a frame when it expects a frame and does not receive one. This can happen when experiencing bad network conditions. The default value is 500.

Note: Changing sizing inside QuickShow or BEYOND, modifies the resolution of the output image. When using master size on FB4 (ether through the QuickShow or Beyond FB4 settings editor or on the back of the FB4) the image will always maintain the highest resolution.

3.2.　　[Artnet settings]

The Artnet protocol allows you to control the FB4 as DMX fixture over ethernet directly

from a console or other application using a network cable. When the FB4 is in operation mode [**Artnet**], the [**Artnet Settings**] menu allow you to adjust the fixture presets. The FB4 offers two Fixture profile layouts. A 16-channel and a 39-channel layout. Artnet settings will be saved when powering down the FB4. More information about the different fixture layouts on page 20

[**Universe**]   Determines the universe the FB4 fixture is operating on
[**Start Address**]   Determines the start address of the FB4 Fixture
[**Profile**]   Determines which Fixture profile is active.
                          [**FB3**] 16-channel DMX/Artnet fixture profile is active
                          [**FB4**] 39 channel DMX/Artnet fixture profile is active
[**Timeout**]   The FB4 has an adjustable timeout period for Artnet. If no Artnet frames where received within the specified period, output will stop. This value should be adjusted so that output does not stop too early, when the ArtNet framerate is low, but still in a timely manner when the ArtNet source disappears. (the default value is 3.0)

3.3.　　[DMX settings]

The DMX settings menu allows you to control the FB4 as DMX fixture over XLR DMX Cables directly from a console or other DMX equipment. When the FB4 Is on operation mode [**DMX-512**], the menu [**DMX-settings**] becomes available and allows you to adjust the fixture presets. The FB4 offers two different fixture profile layouts. A 16-channel and a 39-channel layout. DMX settings will be saved when powering down the FB4. More information about the different Fixture layouts on page 20.

[**Start Address**]   Determines the DMX start address of the FB4 Fixture.
[**Termination**]   Determines if the FB4 will terminate the DMX cable after the DMX signal comes in. Termination is done at 120Ω
                          [**Auto**] - The FB4 determines itself if termination is needed
                          [**On**] - Termination is always enabled
                          [**Off**] - Termination is always disabled.
[**Profile**]   Determines which Fixture profile is active.
                          [**FB3**] - 16 channel DMX/Artnet fixture profile is active
                          [**FB4**] - 39 channel DMX/Artnet fixture profile is active
[**Timeout**]   The FB4 has an adjustable timeout period for DMX. If no DMX frames where received within the specified period, output will stop. This value should be adjusted so that output does not stop too early, when the DMX framerate is low, but still in a timely manner when the DMX source disappears. (the default value is 3.0)

3.4.　　[Timecode Setup]

[**Time code setup**] offers the ability to start a show based on an incoming Artnet timecode signal. The FB4 will execute the file once the offset time mark has been received. The file that is executed needs to be prepared through Laser Show Designer QuickShow or BEYOND its FB4 export Utility.

[**TC Type**]   ATC
[**File Index**]   The actual file that will be executed as soon as the offset has been reached.
[**Offset Hrs**]   The hour mark the FB4 should respond on.
[**Offset Min**]   The minute mark the FB4 should respond on.
[**Offset Sec**]   The second the FB4 should respond on.
[**Offset mS**]   The millisecond the FB4 should respond on.

3.5.   [Test mode Setup]

Test mode setup lets you test and setup your laser without the need to connect additional equipment. Once operation mode [**test mode**] has been enabled, the [**test mode setup**] becomes available. Test frames need to be uploaded through Laser Show Designer QuickShow or BEYOND its FB4 Export Utility.

[**Enable laser**]   Enables laser output
[**Test pattern**]   Determines which test frame will be displayed
[**Brightness**]   Determines the maximum brightness used during display of the test
                 frames
[**Master size**]   Determines the X and Y size of the projection output. *

*Changing this value also changes [**master size**] in menu [**master settings**]*
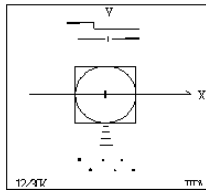
3.6.   [Geo Correction]

Geometric correction allows you to apply corrections on the output of the FB4 scannable regions with the purpose to give you exact control. Master settings take precedence, so the settings below will be "stacked" on top of the master settings. Geometric corrections are saved when powering down the FB4. Settings are saved on the SD card.

[**X Scale**]   Adjusts the horizontal size of the output area from 100% to -100%
[**Y Scale**]   Adjusts the vertical size of the output area from 100% to -100%
[**X Position**]   Adjusts the horizontal position of the output once the scale is below 100%
[**Y position**]   Adjusts the vertical position of the output once the scale is below 100%
[**Z Rotation**]   Adjusts the Rotation of the output area from 0 to 360 degrees seen from the
                center of the frame
[**X Shear**]   Allows horizontal adjustments of the output area without losing any surface
                area
[**Y Shear**]   Allows vertical adjustments of the output area without losing any surface area
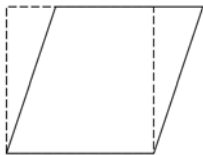
3.7.   [Color settings]

Color settings allow you to limit the maximum output range of the colors. Color settings are saved when powering down the FB4. Settings are saved on the SD card.

[**Color shift**]   Allows adjustment of the overlay of end points of colors for optimal line
                results.
[**Red**]   Allows you to adjust the maximum voltage output
[**Green**]   Allows you to adjust the maximum voltage output
[**Blue**]   Allows you to adjust the maximum voltage output

[**Deep Blue**]   Allows you to adjust the maximum voltage output
[**Yellow**]   Allows you to adjust the maximum voltage output
[**Cyan**]   Allows you to adjust the maximum voltage output

3.8.   [Scan Guard]

[**Scan guard**] provides an additional method of safety so that static beams will be blanked as soon as the output meets the defined settings below. The Scan guard is available in all operation modes. Settings are saved on the SD card.

[**Enable Guard**]   Enables and disables the Scan Guard function
[**Horizon level**]   Determines the horizon level from where the scan guard will be active
[**Horizon Angle**]   Allows you to change the angle of the horizon in case the fb4 output
                       area under an angle.
[**Min. Velocity**]   Defines how slow a beam may move before it will trigger the
                       scanguard system.
[**Dwell Time**]   Defines how long a beam may be on when the beam speed is below
                       [**Min. Velocity**].
[**Invert Y**]   Easily invert the area where the scan guard is active.

3.9.   [Network Setup]

[**Network setup**] allows you to change the IP configuration of the FB4. The IP address is the address where the FB4 can be found on an ethernet network. An IP address can be predefined in the configuration of the FB4, it can be received from the DHCP server or generate a APIPA IP address on its own.

The FB4 can operate with and without a DHCP server on the network. If no DHCP server is detected, the FB4 will generate an IP address on its own witch will allow the FB4 to operate with QuickShow or BEYOND.

The Subnet Mask defines the range where the FB4 can be found. The default settings for the FB4 [**Auto IP**] is on and the subnet mask is 255.255.255.0. Settings are saved on the SD card.

[**Auto IP**]   When enabled, the FB4 will search for a DHCP server and when none is found it
                   will allow for generation of an APIPA address.
[**Address 1**]   Allows you to change the first part of the IP address (e.g. **XXX**.168.0.10)
[**Address 2**]   Allows you to change the second part of the IS address (e.g. 192.**XXX**.0.10)
[**Address 3**]   Allows you to change the third part of the IP address (e.g. 192.168.**XXX**.10)
[**Address 4**]   Allows you to change the forth part of the IP address (e.g. 192.168.0.**XXX**)

[**Mask 1**]   Allows you to change the first part of the subnet mask (e.g. **XXX**.255.255.0)
                   The default value is 255
[**Mask 2**]   Allows you to change the first part of the subnet mask (e.g. 255.**XXX**.255.0)
                   The default value is 255
[**Mask 3**]   Allows you to change the first part of the subnet mask (e.g. 255.255.**XXX**.0)
                   The default value is 255
[**Mask 4**]   Allows you to change the first part of the subnet mask (e.g. 255.255.255.**X**)
   The default value is 0

3.10.   [FB4 Device Info]

The [**FB4 Device info**] menu shows the serial number of the FB4. The firmware version that is installed and the build number of the firmware. This menu has no further function other than informational.

3.11.   [Exit Menu]

The Exit menu allows you to close the menu, turning the display off again.
This is also the moment that all settings and values are saved on the SD card.
Especially handy when replacing an SD card.

4. FB4 status indicator LEDs
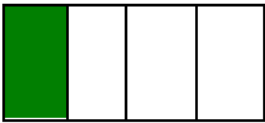
Power & SD card status (Green)

Off	Device is not powered
Steady pulse	No SD Card
Solid on	SD Card Present

Network status (Yellow)

|	
OFF	Network is not detected
Double pulse every second	Obtaining IP Address
Steady pulse	IP Address Obtained
Solid on	Connected to QS or BEYOND

Multipurpose (Orange)
This LED indicates the reception of a DMX or ArtNet signal

In [**Artnet**] mode:
Off	No active ArtNet signal detected
Steady pulse	ArtNet signal detected

In all other modes:
Off	No active DMX signal detected
Steady pulse	DMX signal detected
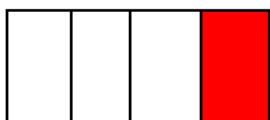
Laser Emission status (Red) (All modes)
OFF	No laser output
Steady pulse	Software connection established
Blinking	Laser output enabled

In [**Timecode**] mode:
Off	No Art-net Timecode signal detected
Double flash every second	Preparing data for timecode management
Steady pulse	FB4 is ready to receive Timecode

In [**Slave mode**] mode:
Off	No master detected
Steady pulse	master device detected

In [**ILDA mode**]
Off	Shutter Closed
Steady Pulse	ILDA cable connected
Blinking	Laser output enabled

Note: During a firmware update of the FB4 all four indication leds will be fully on.
Note: If all four LEDs are blinking together, the FB4 has no valid firmware loaded and there is no valid firmware on the SD card.
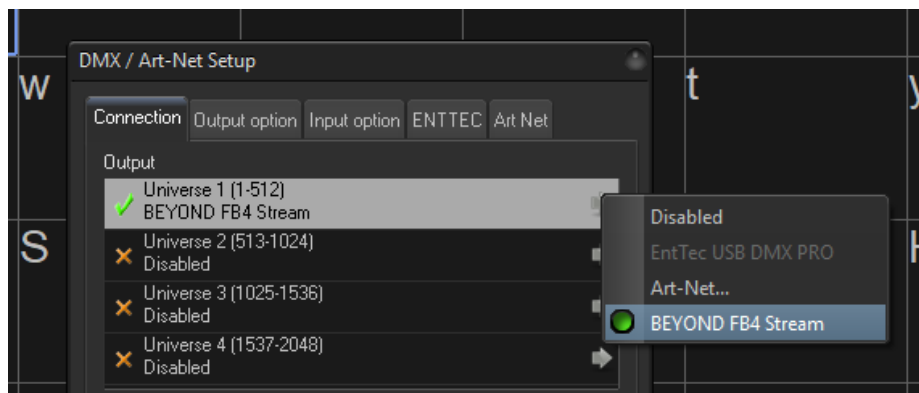

5. Onboard DMX out

The FB4 hardware is equipped with a serial port that is capable of generating DMX output for control of DMX controllable hardware inside Laser Projectors. This DMX function does not require the FB4 DMX daughter board to operate. You can use this serial port for control for diffraction gratings and other hardware internal to the laser projector. This means that when the

in the software DMX is enabled, the FB4 is able to forward incoming DMX signals through the serial port.

BEYOND internally has 4 universes for "DMX OUTPUT". In total this will allows you to output 2048 DMX channel values. A part of this array can be sent through the FB4 its serial port.

For example, QuickDMX can be used for creating DMX sequences. Additionally, in BEYOND Ultimate Fixtures and the Object Animator can be used to generate a DMX signal. The DMX signal will only be sent when the "Enable Laser Output" button inside QuickShow or BEYOND is activated. Secondly. at least one of the four DMX Universes of BEYOND must be enabled. If all 4 outputs are disabled, BEYOND will not generate any DMX signal.
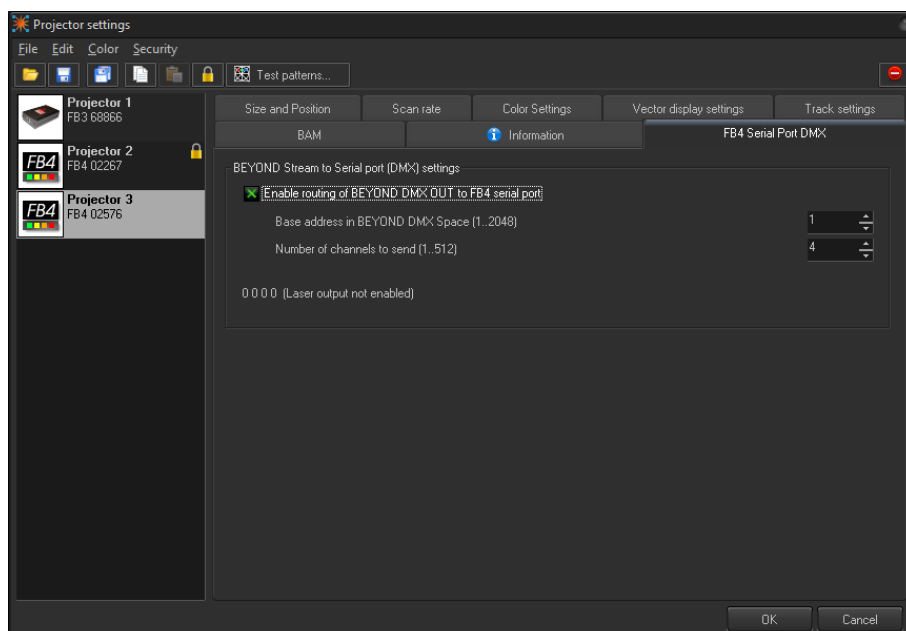
Note, if no additional DMX output is required, use mode "BEYOND FB4 stream" mode to enable DMX output through the serial port on the FB4 as shown in the image below.

The 3.3Volt serial port connections can be found on page 31.

6. How-to Enabling Onboard DMX out

Click the "Enable routing…" checkbox to enable output of DMX through the FB4.

The "Base address" defines the positions of the 1st channel in BEYOND's output DMX array. "Number of channels" defines how many DMX channel values are passed through to the serial port, so in the example above we choose base address 1 with 4 channels to send, so BEYOND will send to the channels 1, 2, 3 and 4 through the FB4.

7. How to calculate the "base address"

To convert 4 DMX universes to a Base address, a simple calculation can be done.

Calculate 512 addresses for each universe.

The base address for universe 1, DMX address 1 is   1
The base address for universe 2, DMX address 1, is   513
The base address for universe 3, DMX address 1, is   1025
The base address for universe 4, DMX address 1, is   1537

The base address for universe 2, DMX address 128, is   640

(512 + 128 = 640)

8. Fixture mode FB3 - 16 channel DMX

Below the layout of the 16-channel fixture profile. The 16 and 32 channel fixture profile are not available at the same time.

Channels	Value		Description		Width
1	0-255	DMX Modes	0-31 33-95 97-159 161-232 225-255	Blackout Four channels Eight channels Twelve channels Sixteen channels	8 Bit
2	0-255	Page index (9 pages in total)	0-15 17-31 33-47 49-63 65-79 81-95 97-111 113-127 129-255	Page 1 Page 2 Page 3 Page 4 Page 5 Page 6 Page 7 Page 8 Page 9	8 Bit
3	0-255	Cue Index (48 cues in total)	0-32 33-35 37-39 .. - .. 221-223 225-255	None active Cue 1 Cue 2 .. Cue 48 Repeat	8 Bit

4**	0-255	Cue Speed	0-15 Full Speed 17-31 Pause 33-255 25 till 200%	8 Bit
5	0-255	Dimmer	0 till 100%	8 Bit
6	0-255	Zoom	0 till 100%	8 Bit
7	0-255	Size X	-100 till 100%	8 Bit
8	0-255	Size Y	-100 till 100%	8 Bit
9	0-255	Angle Z	0 till 360 degrees	8 Bit
10	0-255	Position X	0 = left, 128 = Center, 255 = Right	8 Bit
11	0-255	Position Y	0 = top, 128 = center, 255 = bottom	8 Bit
12	0-255	Visible points	Zero Points till 100% of points visible	8 Bit
13***	0-255	Scan Rare	0-31 Cue speed 33-223 6K till 29K 225-255 30K	8 Bit
14	0-255	Cue release	0-31 Default 33-95 Hold 97-159 Loop 161-223 Next 225-255 Stop	8 Bit
15	0-255	Color Scroll	0-31 Original cue color 33-223 Color Scroll 225-255 White	8 Bit
16	Reserved		Reserved	8 Bit

9. Fixture mode FB4 - 39 channel DMX

The 39-channel fixture mode is meant to be used as follow;

1. Place the FB4 in "Setup mode". (Note that there is a two second delay before "setup mode" will initialize). Now limit the area where the laser may project.
2. Place the FB4 in "playback mode".
   Do the actual show performance and have the ability to use shape generators.

During "Setup mode", channels 14 till 39 will ignore DMX/Art-net changes.

During "playback mode", channels 2 till 13 will ignore DMX/Art-net changes.

Channels	Value		Description	Width
1*	0-255	Fixture Modes	0-239 Blackout / Safe 240-240 Setup Mode 251-251 Playback mode	8 Bit
2	0-255	Max Intensity	Defines the max intensity that can be used during playback mode (Range 0 till 100)	8 Bit
3	0--255	Test frames	Allows enabling test frames during setup mode (1= test frame 1, 255 = test frame 255)	8 Bit

4,5	0-65535	Size X	Defines the maximum width that can be used during playback mode (Range -100 till 100%, 0 = 32768)	16 Bit
6,7	0-65535	Size Y	Defines the maximum height that can be used during playback mode (Range -100 till 100%, 0 = 32768)	16 Bit
8,9	0-65535	Position X	Defines the horizontal position that can be used during playback mode (Range -100 till 100%, 0 = 32768)	16 Bit
10,11	0-65535	Position Y	Defines the vertical position that can be used during playback mode (Range -100 till 100%, 0 = 32768)	16 Bit
12,13	0-65535	Rotation Z	Defines the rotation angle that can be used during playback mode (Range 0 till 360 degrees)	16 Bit
14	0-255	Pages	Page Index, 255 pages in total 1 = page 1, 255 = page 255	8 Bit
15	0-255	Cues	Cue Index, 255 Cues in total (1 = cue 1, 255 = cue 255)	8 Bit
16**	0-255	Cue speed	Cue speed (0 = Original, 1 – 255 = 1% till 255%)	8 Bit
17	0-255	Dimmer	Defines the maximum brightness limited by setup mode (Range 0 till 100%)	8 Bit

18,19	0-65535	Zoom	Allows to zoom the cue limited by setup mode (Range 0 till 100%)	16 Bit
20,21	0-65535	X Size	Defines the maximum width limited by setup mode (Range -100 till 100%, 0 = 32768)	16 Bit
22,23	0-65535	Y Size	Defines the maximum height limited by setup mode (Range -100 till 100%, 0 = 32768)	16 Bit
24,25	0-65535	Z Angle	Defines the rotation angle limited by setup mode (Range 0 till 359 degrees)	16 Bit
26,27	0-65535	Z Rotation	Continues rotation from -60 till 60 Rpm (Range, 0 = Original, 1 till 32767 = -100% till -1% rotation, 32768 = keep angle but do not rotate, 32769 till 65535 = 1% till 100% rotation)	
28,29	0-65535	X Position	Allows for changing the horizontal position of the cue limited by setup mode (Range -100 till 100%, center = 32768)	16 Bit

30,31	0-65535	Y Position	Allows for changing the vertical position of the cue limited by setup mode (Range -100 till 100%, center = 32768)	16 Bit
32***	0-255	Scan Rate	Defines the painting speed of the laser beam. (5k till original 30K)	8 Bit
33	0-255	Red	Intensity range from 0 till 100%	8 Bit
34	0-255	Green	Intensity range from 0 till 100%	8 Bit
35	0-255	Blue	Intensity range from 0 till 100%	8 Bit
36	0-255	Alpha	Allows you to shift between original cue color or RGB control. (Range, 0 = original, 1-255 = 0 till 100% alpha blending)	8 Bit
37	0-255	Points start	Allows you to remove points from the start point of a cue (Range from 100 till 0% visibility)	8 Bit
38	0-255	Points end	Allows you to remove points from the end point of a cue (Range from 1000 till 0% visibility)	8 Bit
39	0-255	Strobe	0 = Strobe disabled 1-255 = Strobe from 1 to 20 Hz	8 Bit

*   Set Channel one at least 2 seconds on DMX value 240 to activate setup mode.
Channel 2 till 12 can only be modified when channel one is in setup mode
During setup the red light on the FB4 will blink.
During playback mode, the red light will burn continuously.

**   If a BPM based effects is exported at 100BPM, and you want to have a cue running on 128 BPM, change the speed to 128.

***   Lowering the scan rate can impact the cue speed of the laser