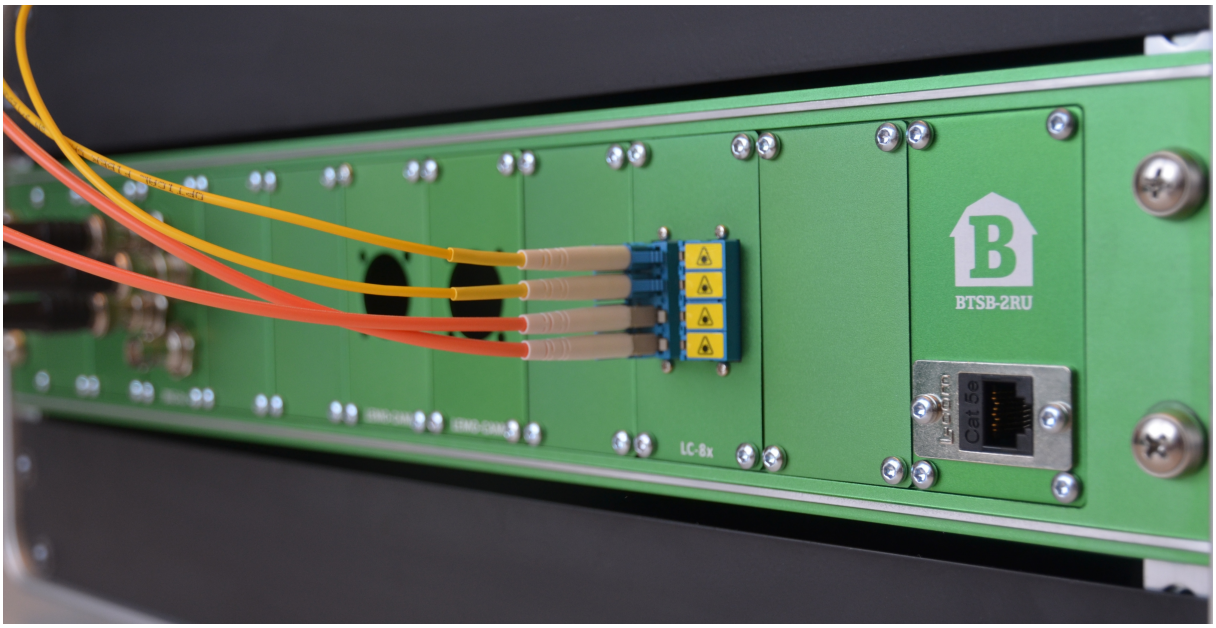
Barnfind Technologies

It's possible!



Stage Box Routing System

Example

Feel free to ask us about any other configuration. You will be amased to see what the new Barnfind Stage Box concept can do for your applications.

Stage Box Example

With this concrete example we do show how Barnfind's Central Stage Box Routing System can distribute all appropriate signals for a broadcast production (such as SDI, Cameras, AES, Ravenna/AES67/MADI, control/Ethernet or any other formats) to several stage boxes by one single fiber strand per unit. Further we show an optional second fiber strand for redundancy. The entire system can be controlled by BarnStudio, VSM, DashBoard, Dataminer, Axon and most other popular control systems.

You will see in this example how each stage box is connected to the main system routers/matrices by an 18 channel CWDM multiplexer. In every stage box the last four wavelengths (channels) of the CWDM spectrum are used for the same signals as Ravenna/AES67 (or MADI), Intercom and Ethernet. The first wavelengths of the spectrum are used for SDI signals, corresponding to the signal count of this stage box. As a result the main system recognizes every stage box even though the stage box might be connected to the wrong cable. Not used CWDM channels (wavelengths) in between SDI and control signals can be used for the connection of cameras from the camera router or for 10G/12G signals.

These additions will enhance Barnfind's flexible, scalable solutions and provide customers with the tools to do more with less gear, in less space and spend less money.

Below you can find a brief description of the following 9 drawings:

Drawing 1: Camera Router

In this example all the camera ports from CCUs/Base Stations are connected to a central BTF1-04 frame, which establishes the connection to the camera either via a camera stage box or a stage box with mixed SDI, Audio etc. camera signals. Whenever a camera changes it's number during/before production, the camera can be reassigned to the correct CCU/Base Station.

Drawing 2: Stage Box SDI Output Router

In this case we show a Barnfind BTF1-04 frame that manages the SDI signal distribution to all stage boxes. Each SDI feed that is to be output at a stage box needs to be handed to the BTF1-04 frame only once as optical SDI. The Stage Box Output Router distributes this signal once to every stage box with a dedicated output for that signal. In this example we show a BTF1-02 frame that converts and distributes it to one or more an electrical SDI outputs (BNC) at the stage box end.

Drawing 2: Stage Box SDI Input Router

Any SDI signal from any BNC stage box input can be handed as optical SDI signal to the main system always at the same port. E.g. a remote camera or graphics key/fill will always appear at the same synchronizer, no matter at which stage box it enters the system.

Drawing 3: Ravenna/AES67 Router

In this user case Ravenna/AES67 is used for connecting audio devices to the main audio core. Each Ravenna/AES67 stream is converted to a single CWDM wavelength (TX and RX on the same CWDM channel) by a BTF1-04 frame. The same wavelength is used for each stage box in order to guarantee a connection of the audio frame to the main core even if the stage box is connected to a different port than the one preconfigured. In case you want to run the stage box at a different port than preconfigured, you can route the bidirectional stream to any other port of the main audio core.

Drawing 4: CWDM Mux/Demux

Here you can see all signals connecting to multiplexers.

Drawing 5: Ethernet/MADI Router

The BarOne frame at a stage box end (in this case BTF1-02) needs an Ethernet connection for control. Inside this Ethernet stream the GPIOs for this stage box are transported. Ethernet is utilised to recognise the stage box with the main control system (e.g. VSM, Dashboard etc.).

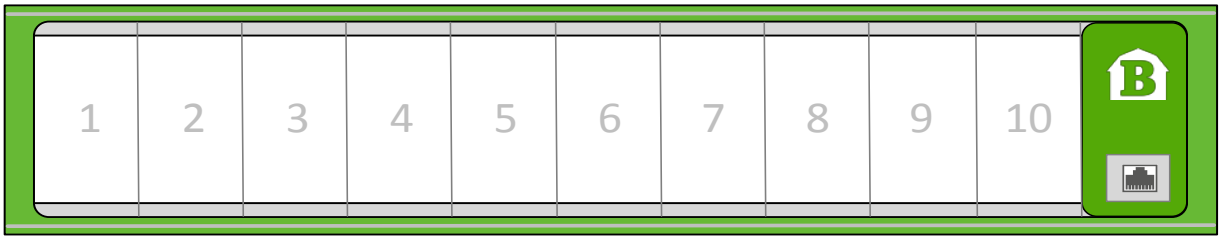
In this example MADI is used to transport 8 AES signals to/from the stage box for intercom (e.g. Riedel Artist). A third party AES to MADI converter takes care of this function.

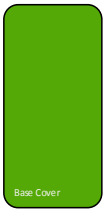
Each bi-directional Ethernet and MADI signal is converted to a single CWDM wavelength (TX and RX on the same CWDM channel) by the BTF1-04 Ethernet/MADI Router. The same wavelength is used for each stage box in order to guarantee a connection of the BTF1-02 at the stage box end to the main control system and to the intercom matrix even if the stage box is connected to the wrong cable.

Drawing 6: Stage Box

Each stage box is connected to the main system (e.g. studio or OB van) by a single mode fiber strand with a redundant fiber strand as an option. For each stage box an 18 channel CWDM multiplexer is used with (in our example redundant) Ravenna/AES67 stream, Intercom and Ethernet always on the last 4 wavelengths. This assures that the stage box "wakes up" even if gets connected to the wrong cable. The first wavelengths are used for SDI signals, corresponding to the amount of signals needed at this particular stage box. If the stage box is connected to the "wrong" cable there are still some SDI signals available. Wavelengths that are not used for SDI, Audio stream, control etc. could be used for the connection of cameras to the camera router or 3rd party 10G/12G signals, which are converted to the correct wavelength by BarnMini-11 or BarnMini-12.

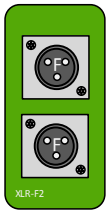
Redundancy is realised by an optical 1:2 split on the stage box end, and a BarnMini-06 optical change over unit, which is controlled by GPI. This GPI can be triggered by BarnMini-05.





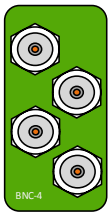
BTSB-BASE

Blind cover to fill up unused slots in BTSB-2RU. Note, can also be used to customize for a special preferred connector.



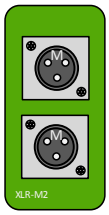
BTSB-XLR-F2x

Panel mounted XLR (female) connectors.



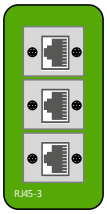
BTSB-BNC-4x

Panel mounted BNC connectors.



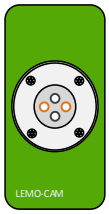
BTSB-XLR-M2x

Panel mounted XLR (male) connectors.



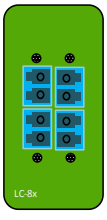
BTSB-RJ45-3x

Panel mounted RJ45 connectors.



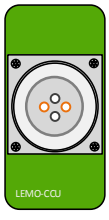
BTSB-LEMO-CAM

Panel mounted LEMO FXW.3K SMPTE connector. Used as standard on many hybrid fiber cameras. **CAM connector (not included)***



BTSB-LC-8x

Panel mounted LC connectors. Metal enclosure



BTSB-LEMO-CCU

Panel mounted LEMO EDW.3K SMPTE connector. Used as standard on many hybrid fiber cameras. **CCU connector (not included)****

Drawing 7 and 8: Camera Stage Box Examples

These drawings show several native CCU/camera signals that are transported to a camera stage box without touching the camera manufacturers protocol, assuring full exchange of all signals between camera and CCU/base station. Inside the camera stage box a BTF1-01 frame converts the signals from the transport fiber back to familiar wavelength @1310nm. The camera is connected to the stage box by its standard hybrid cable. The power supply for the camera can be placed inside the stage box.

Rather than using a BTF1-01 frame at the camera stage box end, it is also possible to use several BarnMini-02 mounted inside a BTF-Mini-16 with redundant power supply.

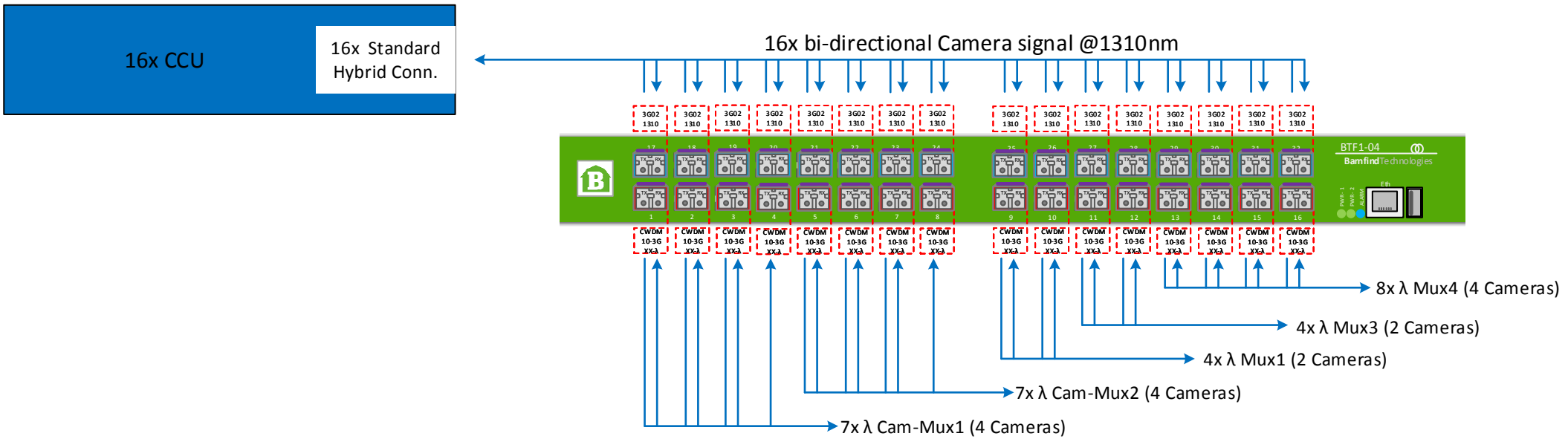
Drawing 9: Main System Overview

With it's modular architecture Barnfind's Stage Box Routing System can adapt to all kinds of signals and to your already existing infrastructure or to newly planned studios or OB vans.

Please feel free to ask your Barnfind team in Norwav or your local partner about any other configuration and how to implement the Stage Box solution.

You will be amazed to see what Barnfind can do for you.

Camera Router



- A BTF1-04 frame connects to a total of 16 CCUs collecting all bi-directional camera signals to it's internal 32x32 matrix
- Each bi-directional Camera signal is routed to/ from either a pure Camera Stage Box or to/ from a Stage Box with mixed signals
- For Cam-Mux 1 and 2 one of 4 bi-directional camera signals is converted to a single CWDM channel by Barnfind's HiLo SFPs in order to keep one channel free for Ethernet (control) transport

Barnfind Stage Box System – Camera-Router	
	Drawing 1 of 9
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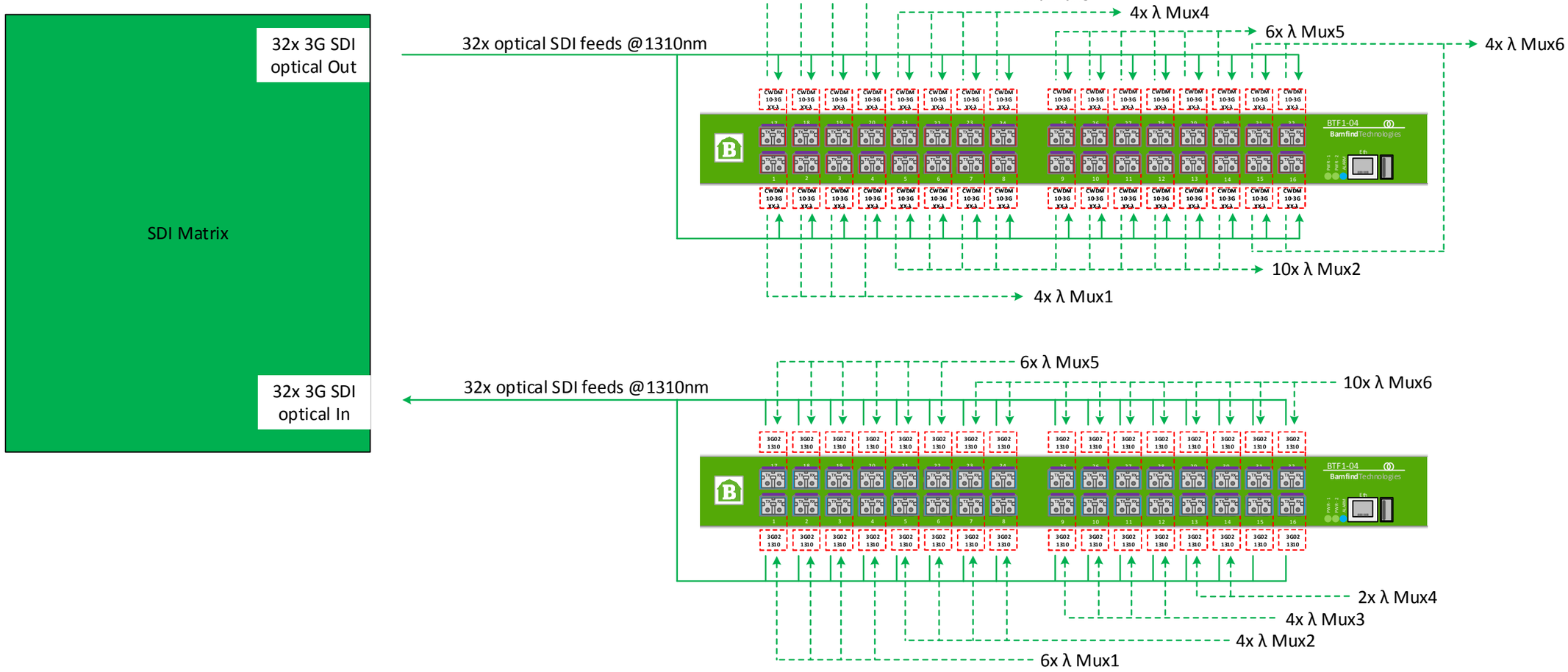
SDI-Router Stage Box O/P



SDI-Router Stage Box I/P

- 32 optical SDI feeds are fed from a SDI matrix into a BTF1-04 frame, which distributes each feed to the stage boxes via CWDM multiplexer. At the stage box each feed can be distributed to several outputs saving output count at the SDI matrix.
- 32 optical SDI feeds are collected from BTF1-02 frames at the stage boxes and fed into the SDI matrix or other equipment e.g. frame synchroniser, deembedder etc. Each signal type can be routed to the same port of the main operating system, no matter at which stage box input the signal enters the system.

Barnfind Stage Box System – SDI-Router	
	Drawing 2 of 9
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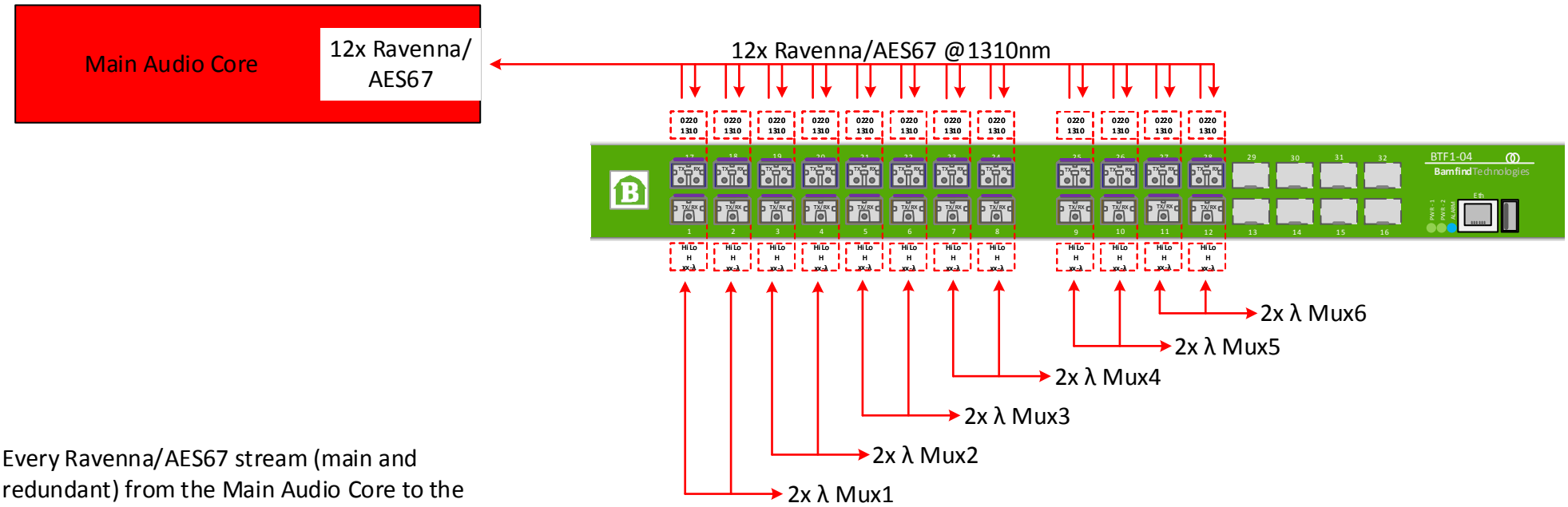
Ravenna/AES67-Router



- Every Ravenna/AES67 stream (main and redundant) from the Main Audio Core to the audio I/O unit at the stage box is connected to a BTF1-04 frame. Here it is converted to a single CWDM channel using Barnfind's HiLo SFPs. For each stage box the same channels are used to establish a connection even if the stage box gets connected to the wrong cable.
- In case one intends to run the stage box on a different cable than in standard configuration, the connection to the audio I/O unit can be routed to the correct Ravenna/AES67 port at the Main Audio Core.

Barnfind Stage Box System – Ravenna/AES67-Router	
	Drawing 3 of 9
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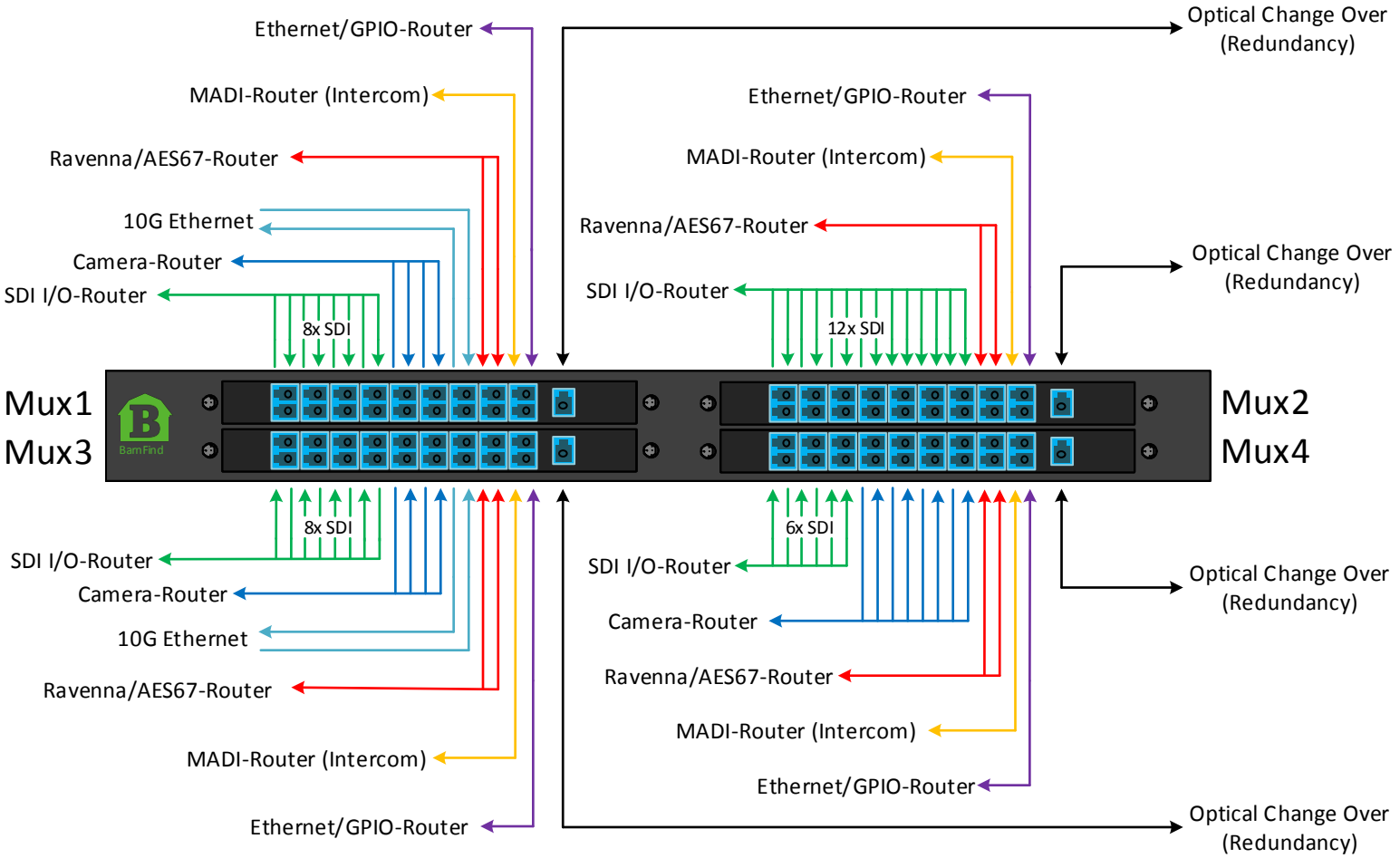

- Every stage box is connected via a 18 channel CWDM unit. The last 4 channels of the CWDM spectrum are always used for Ethernet, Intercom and audio to ensure the stage box gets recognised by the main system even if connected to a different connection point than preconfigured .
- The first channels of the CWDM spectrum are used for SDI signals. If the stage box is run on a different cable than in standard configuration it can still handle some signals.
- All channels between SDI and Audio, Intercom and Control are free to be used for Camera signals, 10Gbps Ethernet or any other required signal.

Barnfind Stage Box System – Mux 1-4	
	Drawing 4 of 9
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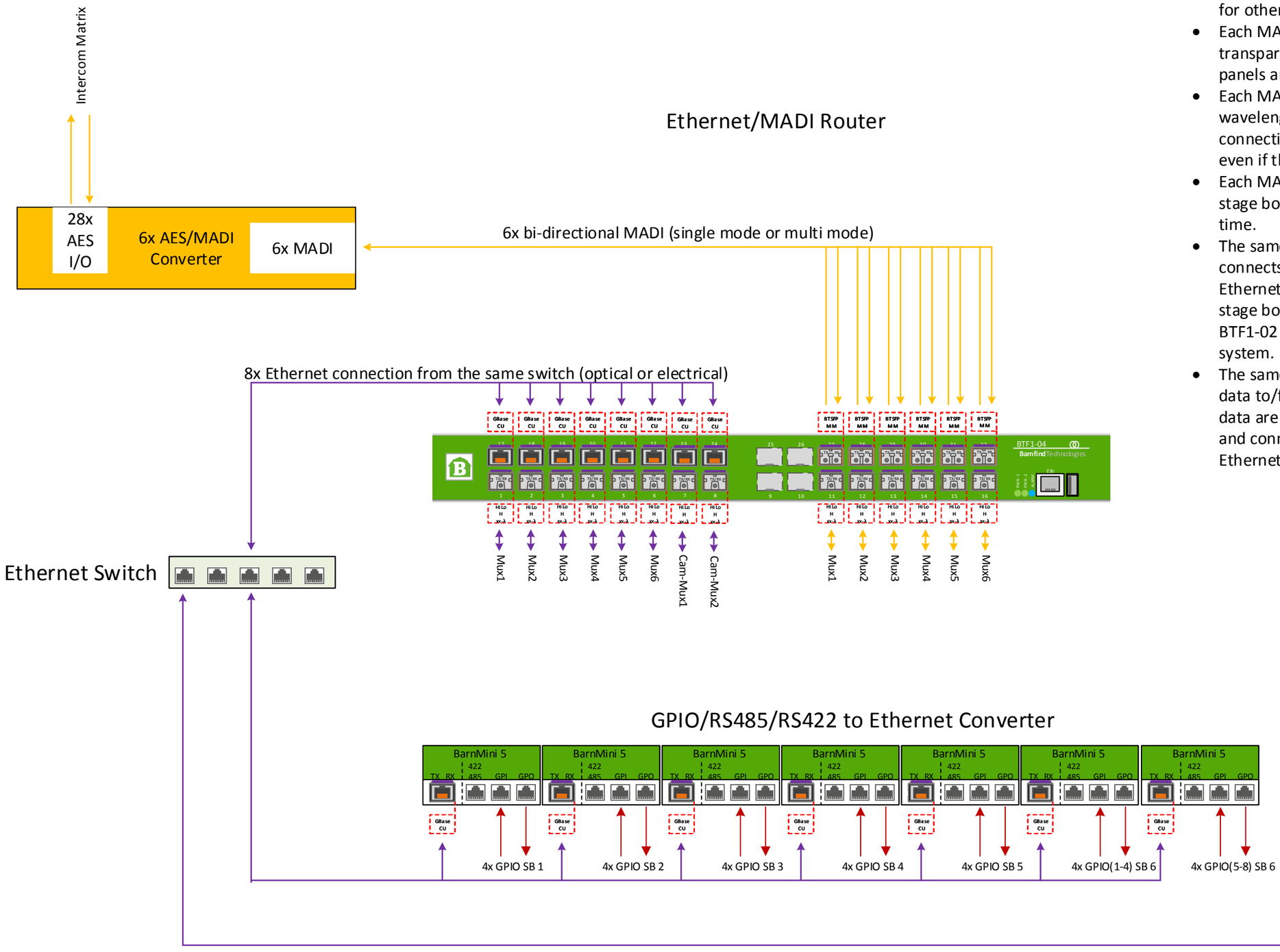

- A BTF1-04 frame converts 6 bi-directional MADI streams (multi mode or single mode) to one CWDM channel utilising Barnfind's HiLo-SFPs, saving channels for other signals.
- Each MADI stream contains 8 bi-directional bit-transparent AES signals for 8 dual channel Intercom panels and embedded control signals.
- Each MADI stream is converted to the same wavelength for every stage box guaranteeing a connection from intercom panel to intercom matrix, even if the stage box is connected to the wrong cable.
- Each MADI stream can be reallocated to a different stage box moving all 8 Intercom panels at the same time.
- The same BTF1-04 frame responsible for MADI signals connects 8 times to one Ethernet switch to establish Ethernet connections to each stage box and camera stage box. The Ethernet connection enables control for BTF1-02 frames at the stage box end to central control system.
- The same Ethernet transports GPIOs and RS422/RS485 data to/from the stage boxes. GPIO and RS422/RS485 data are converted by several BarnMini-05 to Ethernet and connected to the same switch which feeds the Ethernet/MADI Router.

Barnfind Stage Box System – Ethernet/MADI-Router	
	Drawing 5 of 9
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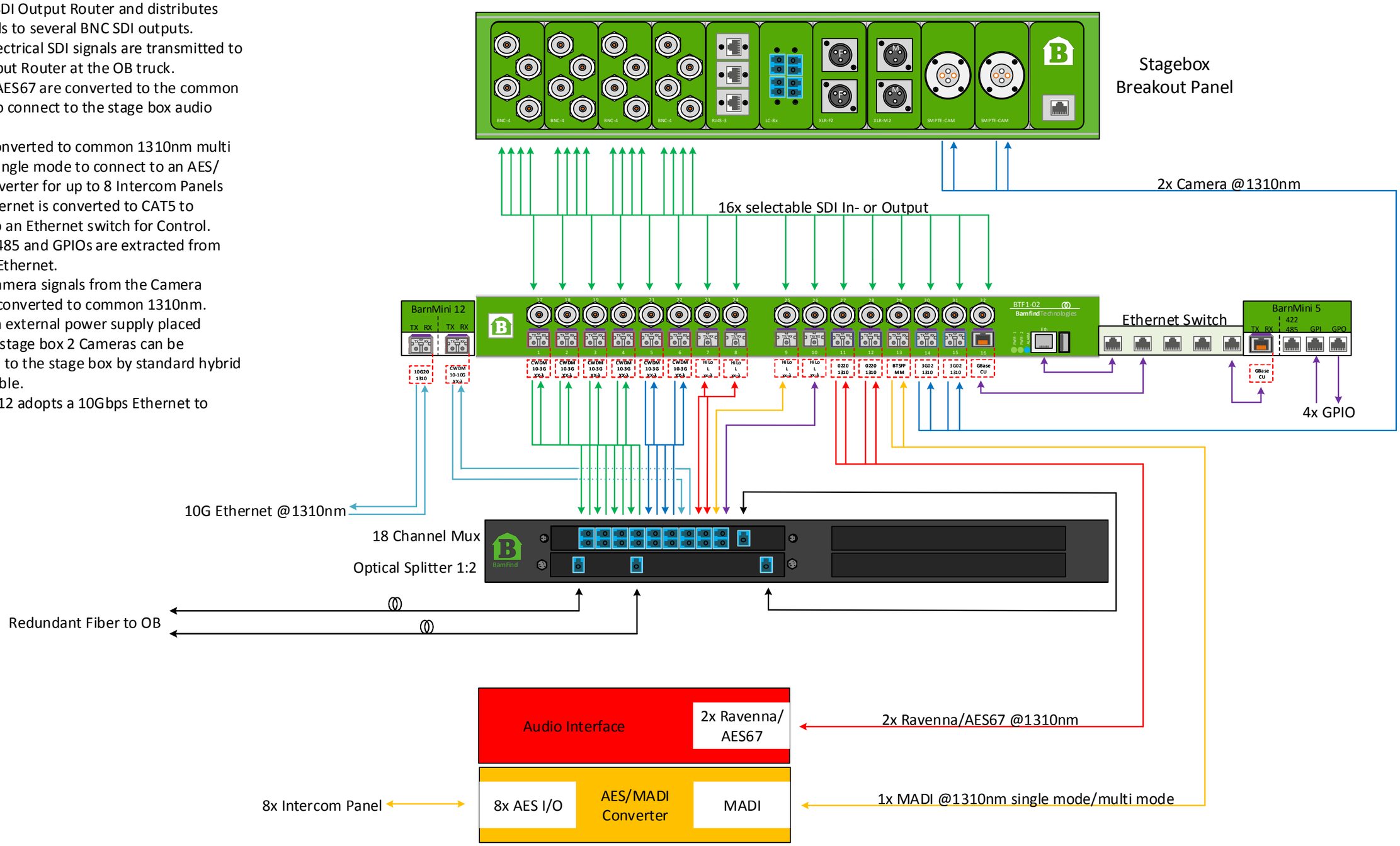
- A BTF1-02 frame receives 4 different SDI feeds from the SDI Output Router and distributes those feeds to several BNC SDI outputs.
- Up to 4 electrical SDI signals are transmitted to the SDI Input Router at the OB truck.
- Ravenna/AES67 are converted to the common 1310nm to connect to the stage box audio frame
- MADI is converted to common 1310nm multi mode or single mode to connect to an AES/ MADI Converter for up to 8 Intercom Panels
- 1Gbps Ethernet is converted to CAT5 to connect to an Ethernet switch for Control. RS422/RS485 and GPIOs are extracted from the same Ethernet.
- 2 native camera signals from the Camera Routeare converted to common 1310nm. Along with external power supply placed inside the stage box 2 Cameras can be connected to the stage box by standard hybrid camera cable.
- BarnMini-12 adopts a 10Gbps Ethernet to 1310nm.



Stage Box example using Barnfind's unique BarnOne and BarnMini family as signal neutral transport platform.
Any other combination of signals is possible, please ask you local Barnfind Partner or contact Barnfind Technologies
www.barnfind.no

Barnfind Stage Box System – Stage Box Example	
	Drawing 6 of 9
13.07.2016	BS

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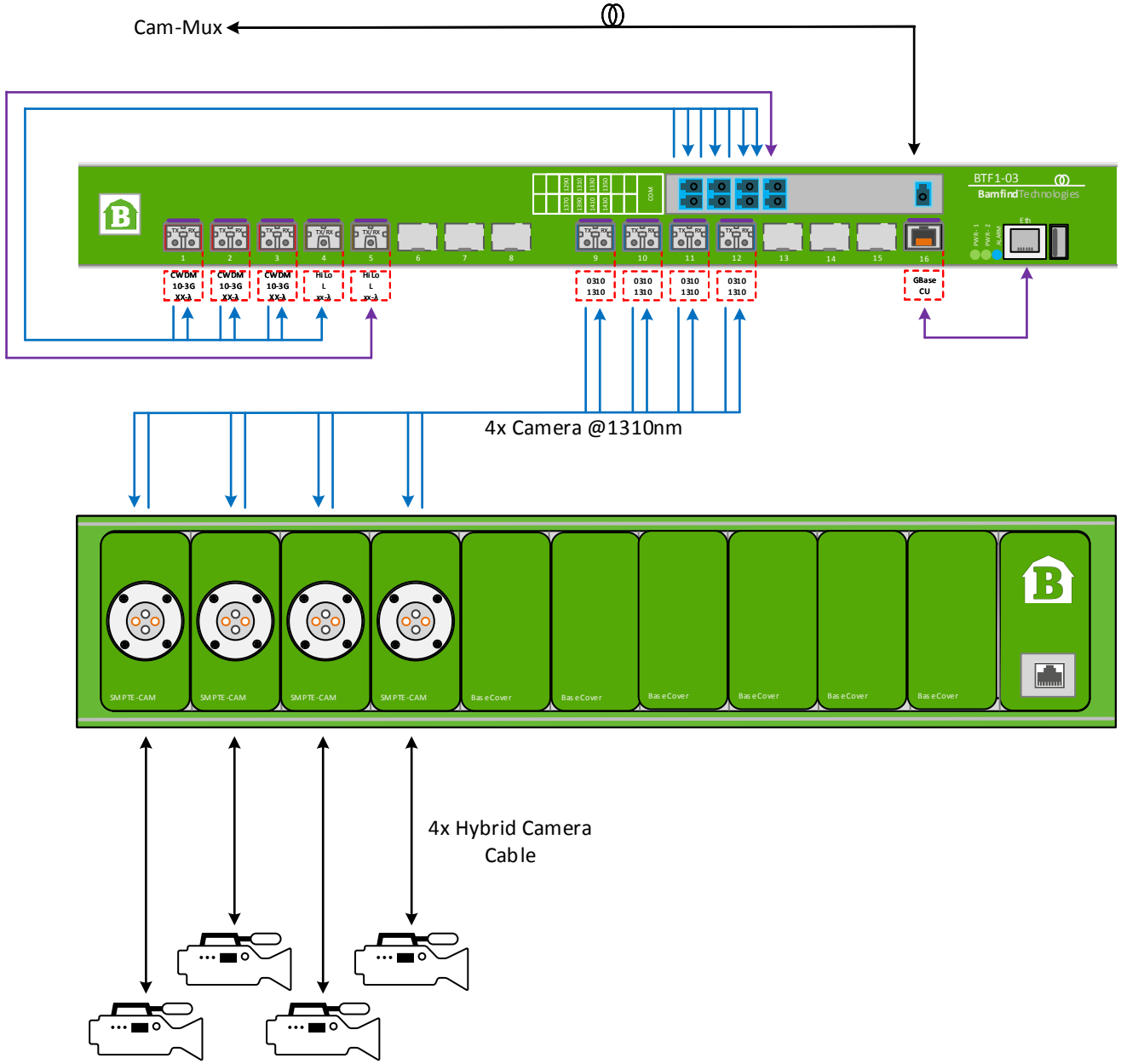

Stagebox Breakout Panel

- A BTF1-03 frame converts 2 native camera signals from the Camera Router at the OB truck to standard 1310nm. Along with external power supply placed inside the stage box 2 Cameras can be connected to the stage box by standard hybrid camera cable.
- 1Gbps Ethernet is converted to CAT5 for control of the BTF1-03 frame.
- Redundant transmission via a second fiber possible

Example of a Camera Stage Box using Barnfind's BarnOne frameas signal neutral transport platform.
Any other combination of signals is possible, please ask you local Barnfind Partner or contact Barnfind Technologies
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Barnfind Stage Box Sytem – Camera Stagebox (BarnOne)	
	Drawing 7 of 9
2016	BS

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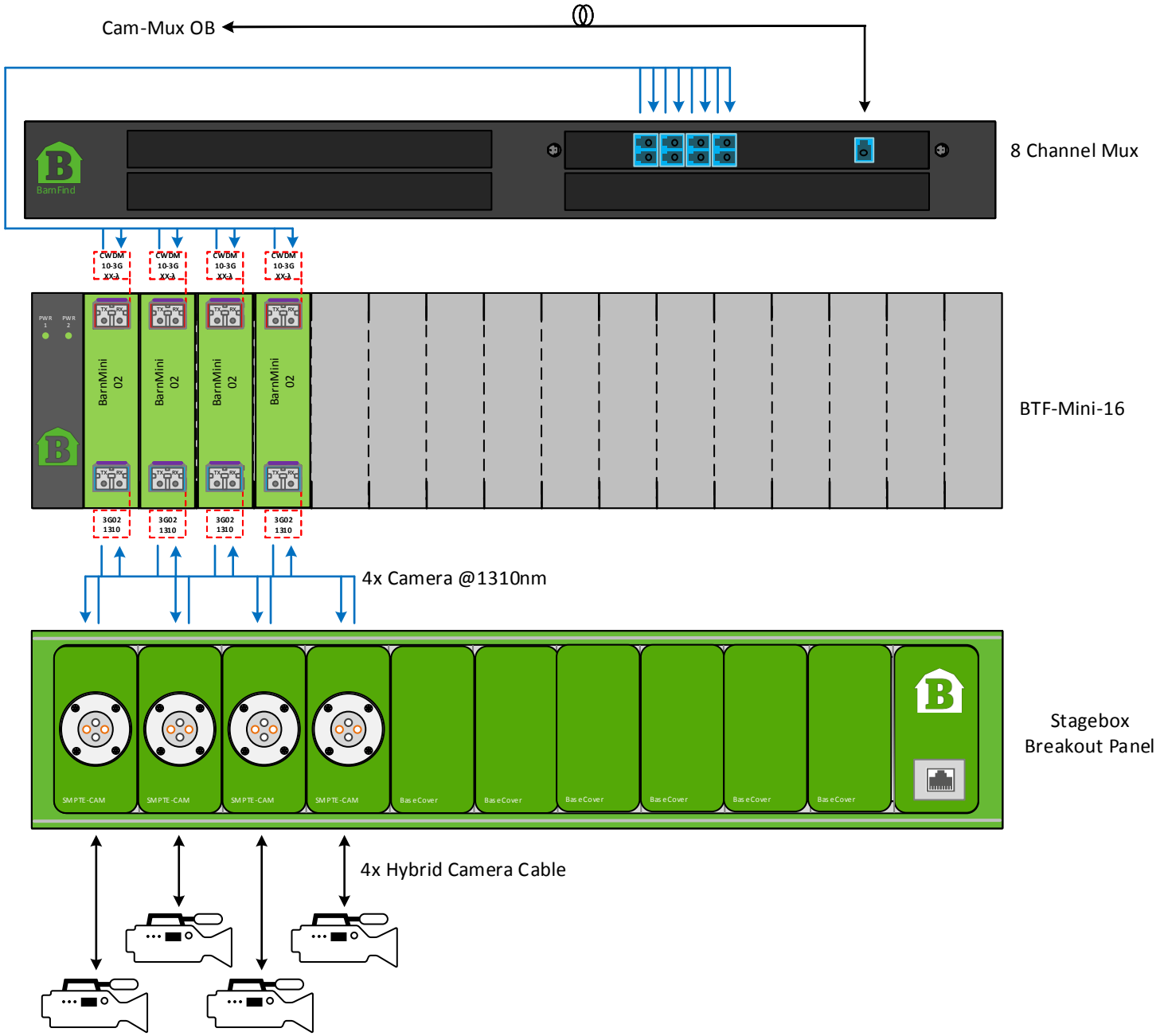

- 4x BarnMini-02 placed inside a BTF-Mini-16 frame with common power supply (optional redundant) for all BarnMinis convert 4 native camera signals from the Camera Router at the OB truck to standard 1310nm. Along with external power supply placed inside the stage box 4 cameras can be connected to the stage box by standard hybrid camera cable.
- Redundant transmission via a second fiber possible

Example of a Camera Stage Box using Barnfind's BarnMinis as signal neutral transport platform.
Other combination of signals is possible, please ask you local Barnfind Partner or contact Barnfind Technologies
www.barnfind.no

Barnfind Stage Box System – Camera Stagebox (BarnMini)	
	Drawing 8 of 9
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16x CCU

16x Standard Hybrid Conn.

Camera Router

8x λ Mux4

4x λ Mux3

4x λ Mux1

7x λ Cam-Mux2

7x λ Cam-Mux1

See detail Camera Router Drawing 1

32x 3G SDI optical Out

SDI Matrix

32x 3G SDI optical In

SDI-Router Stage Box O/P

4x λ Mux3

4x λ Mux4

6x λ Mux5

4x λ Mux6

10x λ Mux2

4x λ Mux1

SDI-Router Stage Box I/P

6x λ Mux5

10x λ Mux6

2x λ Mux4

4x λ Mux3

4x λ Mux2

6x λ Mux1

See detail SDI Router Drawing 2

Main Audio Core

12x Ravenna/ AES67

Ravenna/AES67-Router

2x λ Mux6

2x λ Mux5

2x λ Mux4

2x λ Mux3

2x λ Mux2

2x λ Mux1

See detail Ravenna/AES67 Router Drawing 3

Intercom Matrix

28x AES I/O

6x AES/MADI Converter

6x MADI

Ethernet/MADI Router

Mux1 Mux2 Mux3 Mux4 Mux5 Mux6 Cam-Mux1 Cam-Mux2

Mux1 Mux2 Mux3 Mux4 Mux5 Mux6

See detail Ethernet/MADI Router Drawing 4

Ethernet Switch

GPIO/RS485/RS422 to Ethernet Converter

4x GPIO SB 1

4x GPIO SB 2

4x GPIO SB 3

4x GPIO SB 4

4x GPIO SB 5

4x GPIO(1-4) SB 6

4x GPIO(5-8) SB 6

See detail Ethernet/MADI Router Drawing 4

Control VSM/KSC/Dataminer/ DashBoard etc.

10G/12G O/O Converter

10Gbps Ethernet

10Gbps Ethernet

10Gbps Ethernet

CWDM Multiplexers

See detail Mux 1-4 Drawing 8

Camera Stagebox 1

Camera Stagebox 2

Ethernet/GPIO-Router

Camera-Router

4x CAM

Cam-Mux1

Cam-Mux2

Ethernet/GPIO-Router

MADI-Router (Intercom)

Ravenna/AES67-Router

Camera-Router

SDI I/O-Router

8x SDI

12x SDI

6x SDI

Mux1 Mux3

Mux2 Mux4

Stagebox-SDI-Router

12x SDI

14x SDI

Mux5

Mux6

Redundancy Switches GPI controled

GPI

Redundant Fiber to Stagebox 6

Redundant Fiber to Stagebox 5

Redundant Fiber to Stagebox 4

Redundant Fiber to Stagebox 3

Redundant Fiber to Stagebox 2

Redundant Fiber to Stagebox 1

Please find detailed information in attached system description and detailed drawings 1-8

Barnfind Stage Box System – Main System

Drawing 9 of 9

2016

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Arild Skjeggerud, CTO of Barnfind: *“With our increased popularity by sports arenas, events, OB-van operators, production companies etc. we are pleased to have developed a unique set of sub-modules for our Stage Box concept in close co-operation with the world’s most demanding sports broadcasters”*.