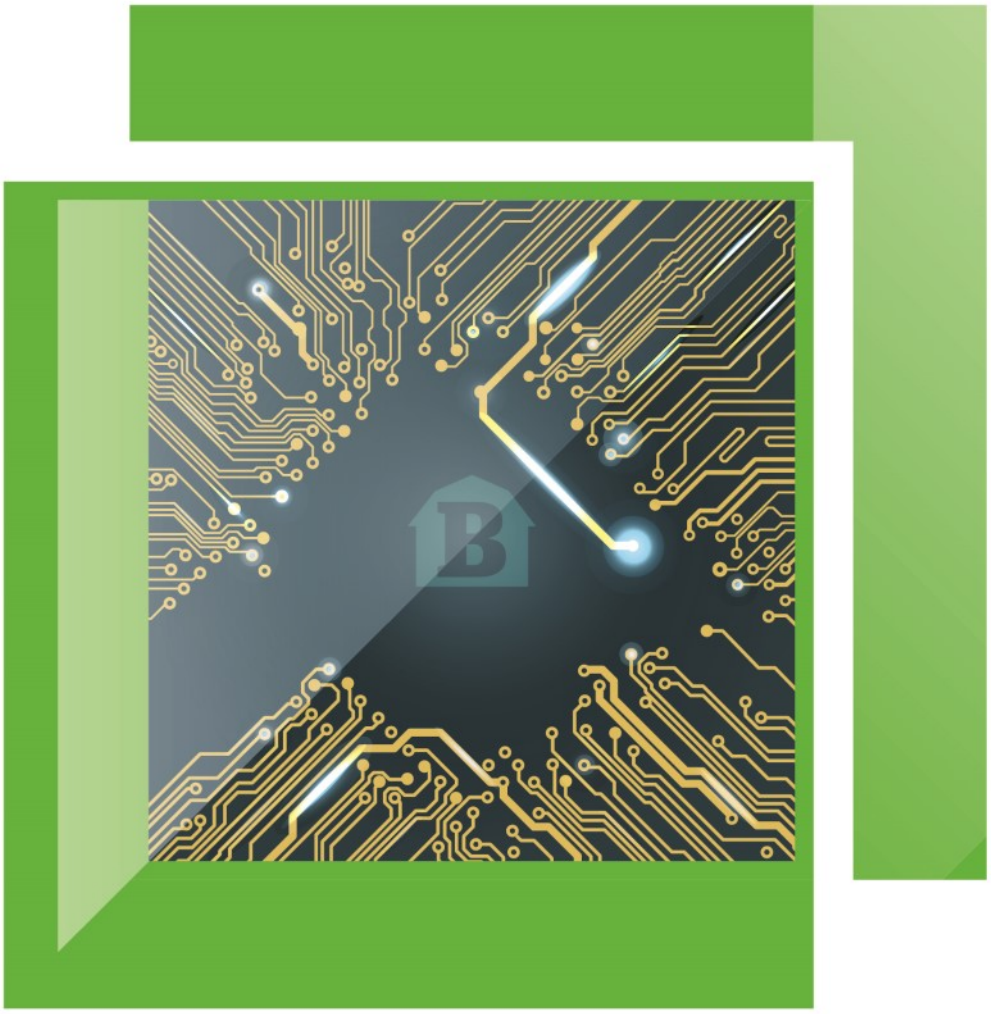
BarnfindTechnologies®



BarnGuide

Version 3.0

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BarnCare

Barnfind offers 2-YEAR standard warranty for all products. For BarnOne series (Frame, PSU, Fan Cassette), we offer an extra 3-YEAR warranty that can be purchased on request. For even longer warranty requests or other support agreements, please ask! See also **Business Partner Agreement (BPA)** for further information.

Note that the warranty and guarantee handling is to be done via the Business Partner that are seen as Barnfind's local preferred partner. It is the Business Partner that is responsible for the first line service/ support to the End Users in the Territory. Barnfind will act accordingly after first line service/support is done by the Business Partner and the outcome is reported to Barnfind.

Support packages that the Business Partner offers are between the Business Partner and its client.

Barnfind will need the Business Partner to administer the warranty and support packages. This means in practice that the customer must forward defective equipment to the Business Partner. If the Business Partner cannot fix the problem the Business Partner forwards to Barnfind at its expense and Barnfind fixes the problem. Barnfind pays postage back to the Business Partner and the Business Partner forwards to its customer. This is a non- discountable service.

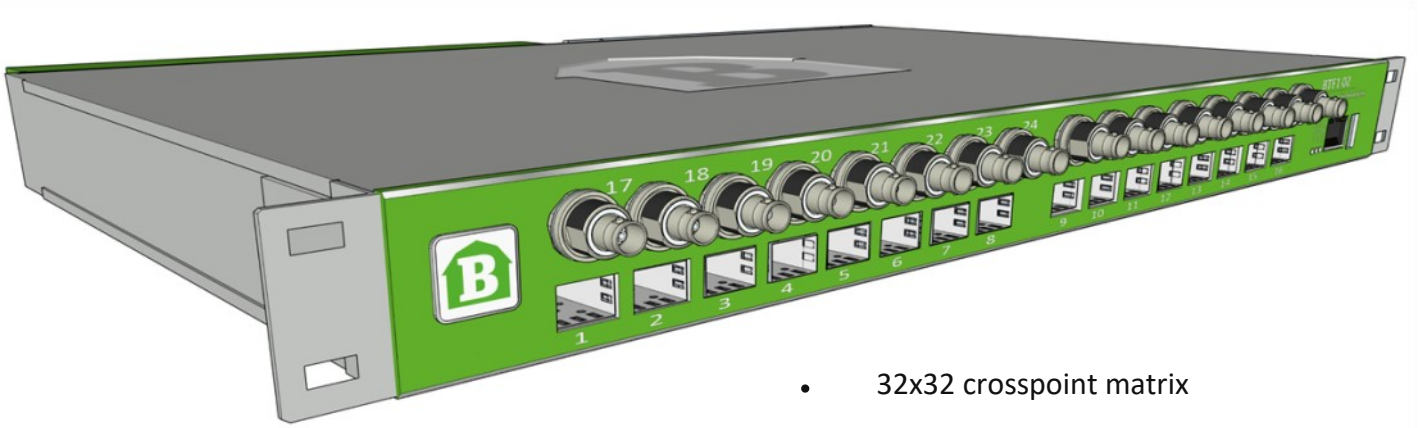
The Warranty covers repairs and fixes due to equipment faults that have occurred attributable to Barnfind. Warranty issues not attributable to Barnfind are not covered by this 24+ Warranty Plan. Barnfind shall have full and final jurisdiction in assessing the nature of its liability with regards to Warranty return. All costs related to sending equipment to Barnfind shall be borne by the Business Partner. All costs for sending equipment back to the Business Partner shall be borne by Barnfind.

Barnfind reserves the right to change its repair plan tariffs and terms at the end of each calendar year.

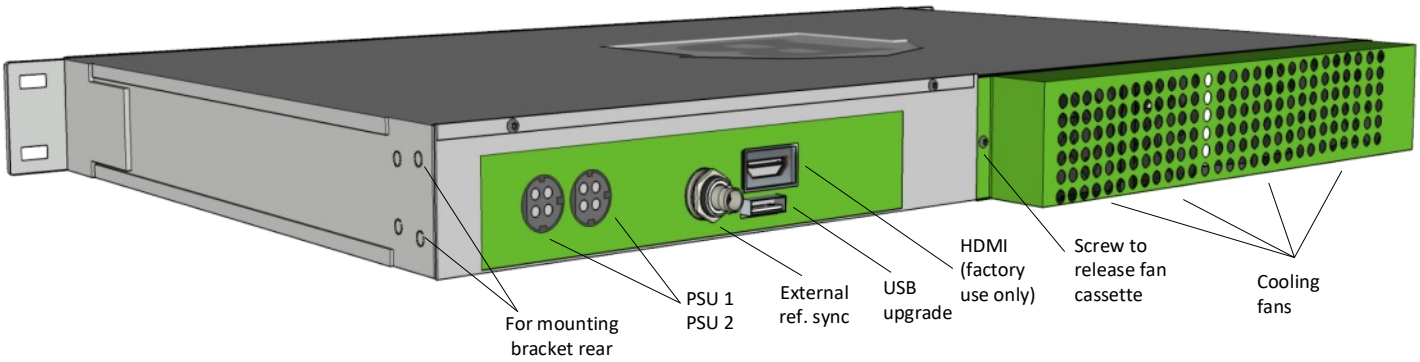
All Barnfind products
come with standard 2 years warranty,
but can be extended to 5 years.
Please ask your local distributor or directly contact Barnfind HQ.

BarnOne Series

BarnOne - general information

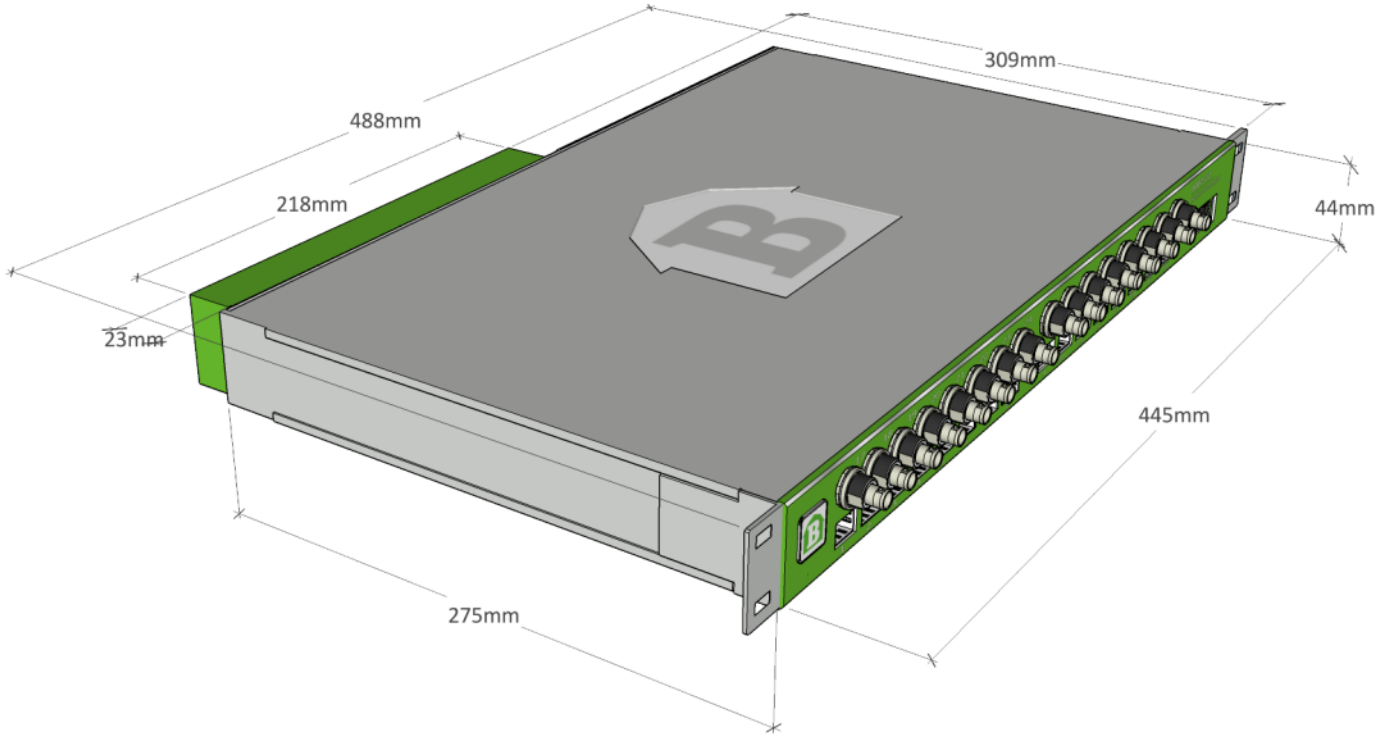


- 32x32 crosspoint matrix
- All SFP ports are bi-directional
- All BNC ports are inputs or outputs
- All outputs are reclocked
- Handles any MSA compliant SFP



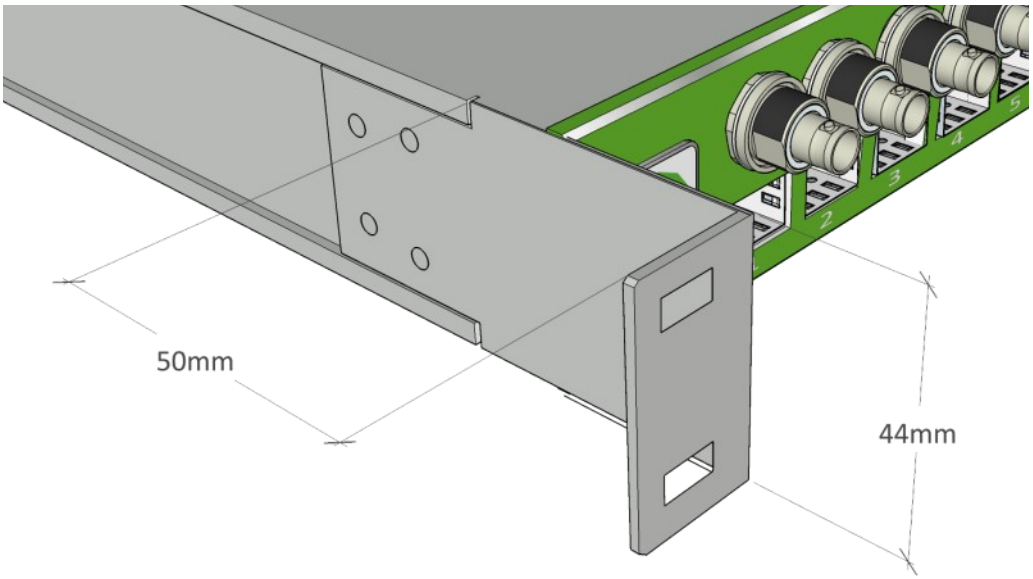
- Replaceable fan cassette
- Sync from external or internal source
- Redundant powersupply
- Front or rear mount in rack
- BarnStudio included

Physical dimensions and mechanical accessories

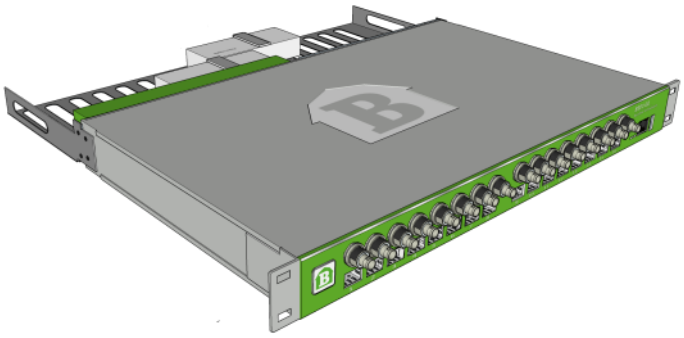


Extension Brackets (optional)

Mod nr: **BT-EXT-EARS-5CM**

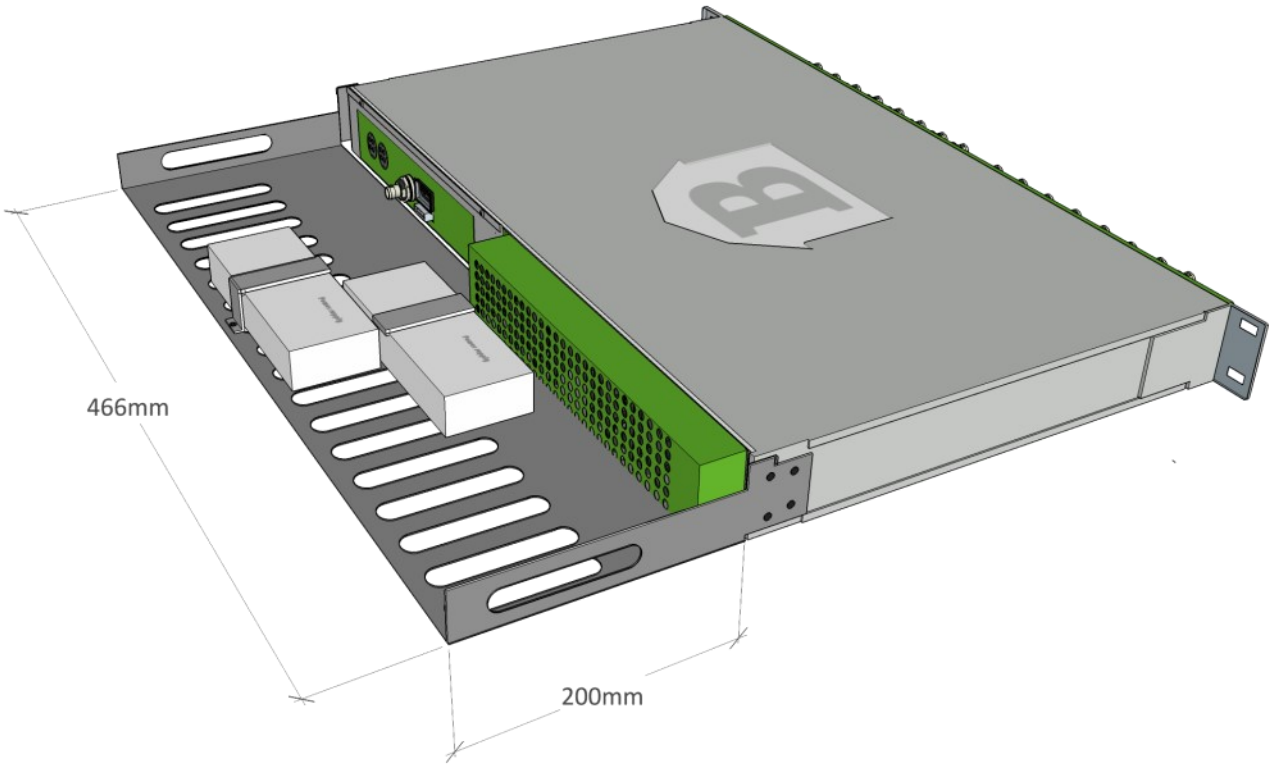


PSU-Tray (optional)



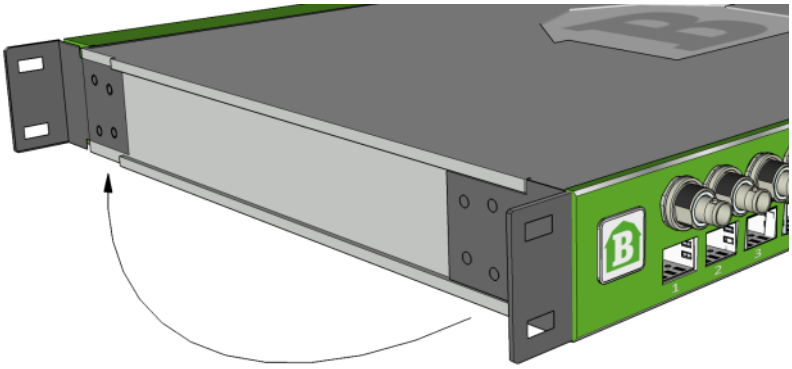
Mod nr: **BT-TRAY-PSU**

Barnfind PSU tray can be mounted at the rear end of the frame and can secure 2X standard PSU.



Turn-Brackets (standard)

The mounting brackets (rack ears) can be moved from front to rear side of the frame in order to turn the connectors and SFP direction.



Technical Specifications

BNC Ports

- BNC port 75Ω switchable input or output
- SMPTE 259M, 292M, 372M, 424M, DVB-ASI, AES10 (MADI), AES3
- Automatic multirate reclocking of outputs 270Mbit/s - 3Gbit/s
- Automatic cable EQ (Belden 1694A) 270Mbit/s-250m, 1,5Gbit/s140m, 3Gbit/s-80m

SFP Ports

- Port for Small Form-Factor Pluggable (SFP), supports MSA-compliant (multi source agreement) transceivers
- Suitable for optical transceivers (singlemode/multimode), SFP media converters
- SMPTE 259M, 292M, 372M, 424M, 372M, DVB-ASI, AES10 (MADI), AES3
- Hot pluggable/swappable

Power Supply

- 12V DC power supply included
- PSU Input 100-240V AC 50/60Hz
- PSU Output 12V DC 8,5A
- redundant PSU optional

Physical Size

- 445mm x 280mm x 43,5mm (17.5" x 11.0" x 1.7")
- 3,8kg

Temperature

- Storage temperature -40°C - +70°C
- Operating temperature -20°C - +45°C
- Internal temperature depends on the selection of SFPs inserted. Some SFPs consume more power and are more sensitive to higher temperatures.
- ***Barnfind Technologies recommend to operate BTF1-xx frames in room temperature environment to ensure long lifetime and high performance.***

Power Consuption

- A BarnOne frame has an average power consumption of 28-30W without SFPs inserted. The total power consumption is frame plus SFPs.
- A standard optical SFP has an average power consumption of 1.5W. See data sheet for the specific SFP to calculate an accurate power consumption.

Power Consumption Example:

1x BTF1-02

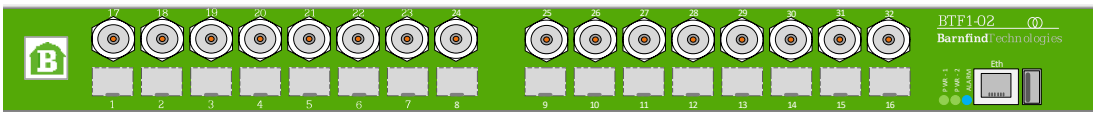
8x BTSFP-CWDM-10-3GXX (see data sheet chapter 'SFPs')

W= Voltage (V) **X** Current (A)
0.2A x 3.3V = 0.66W

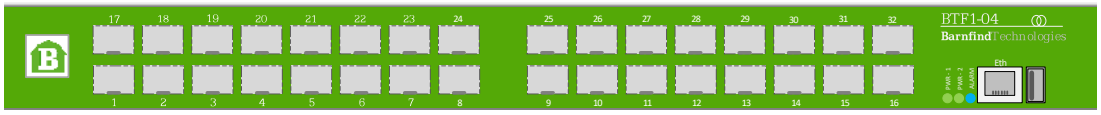
28 + (0.66x8) = 32.8 W_{tot}

BarnOne - the variations for 3G applications

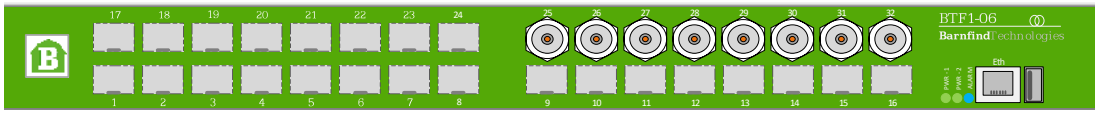
BTF1-01



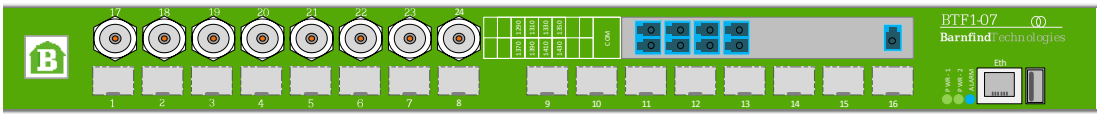
BTF1-02



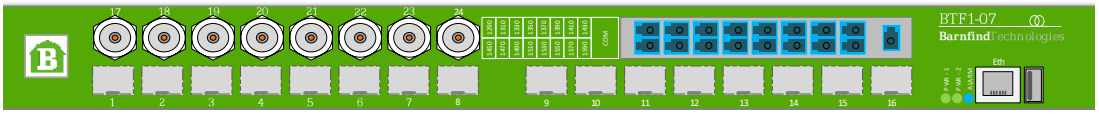
BTF1-04



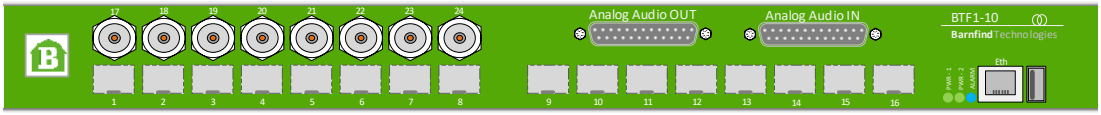
BTF1-06



BTF1-07-08



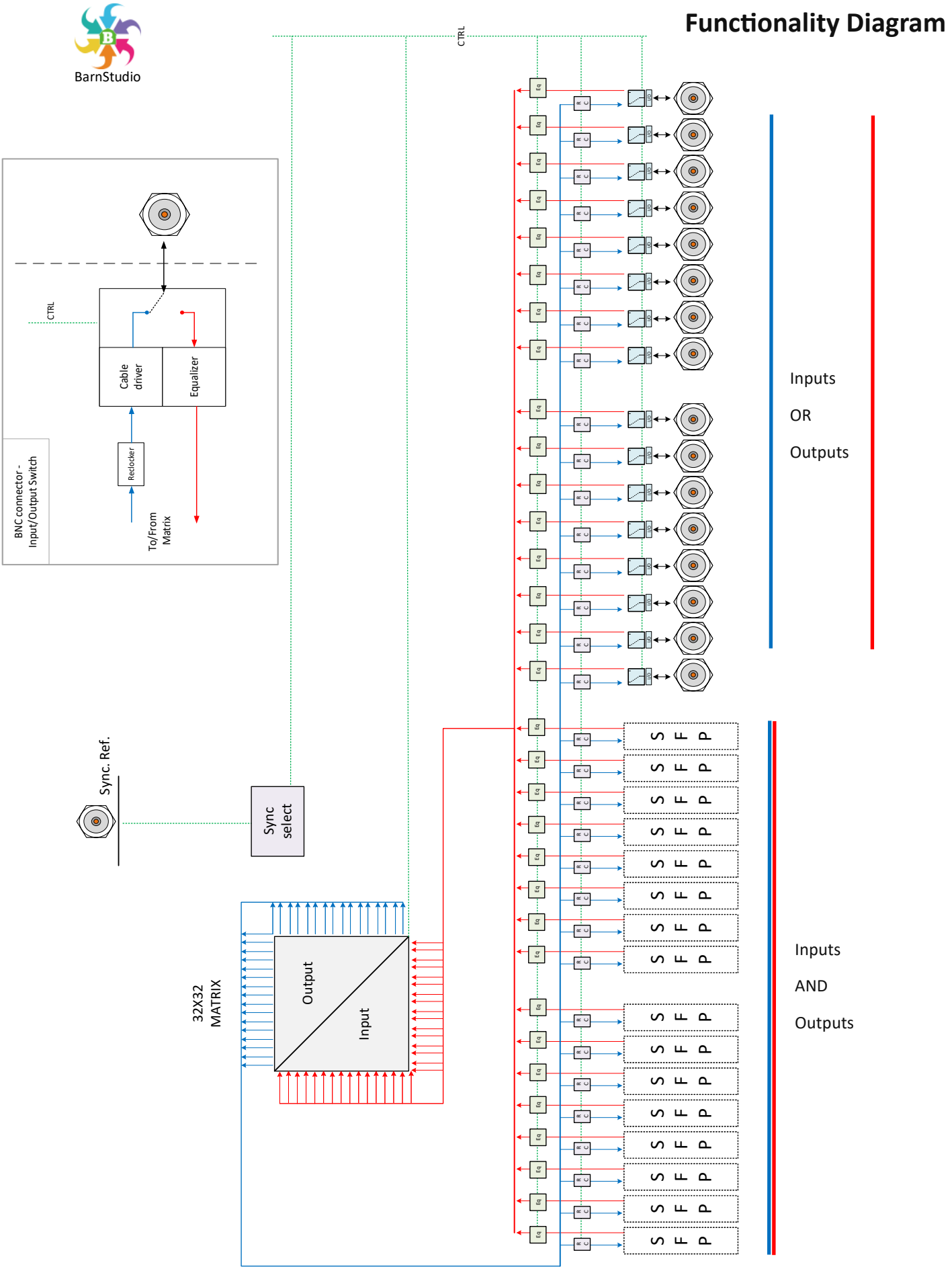
BTF1-07-16



BTF1-10AA

	BTF1-01	BTF1-02	BTF1-04	BTF1-06	BTF1-07-08	BTF1-07-16	BTF1-10-AA
SFP ports	16	16	32	24	16	16	16
Bi-directional BNC	-	16	-	8	8	8	8
CWDM channels	-	-	-	-	8	16	-
Analog Line I/O							8

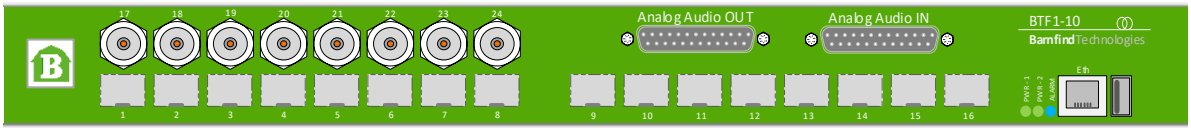
Functionality Diagram

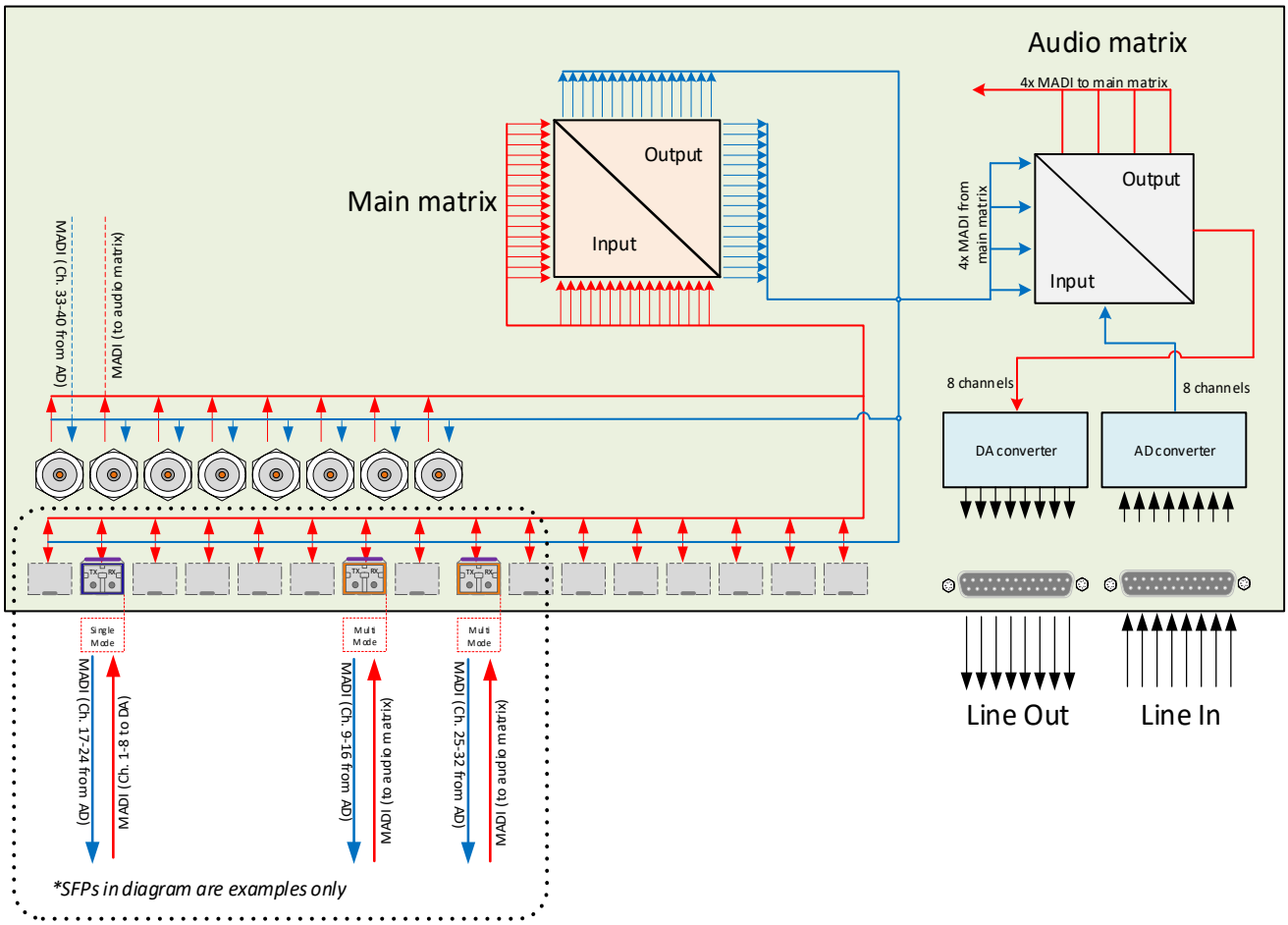


BarnOne frame with extended functionality

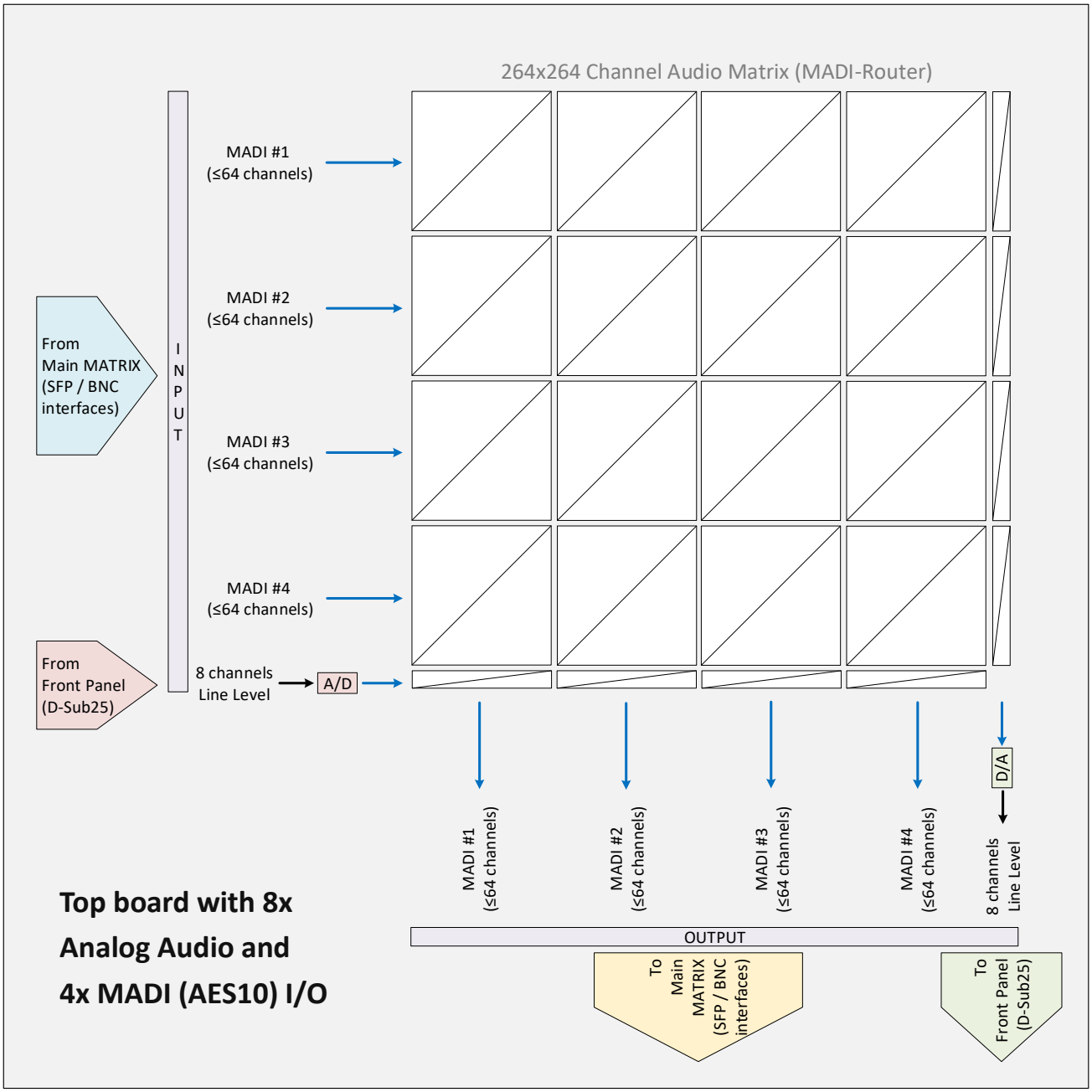
BTF1-10 AA - featuring 8x analog audio I/O with integrated MADI-Router

BTF1-10-AA houses a top board with AD/DA converters for 8x balanced analog line level audio. A 264x264 channel audio matrix with 4 bi-directional MADI interfaces connects the audio board to the main matrix of the BarnOne frame. The audio matrix offers single channel routing between all 4 MADI interfaces and the 8 analog ports. This makes the card a powerful MADI-Router on a per channel base with analog interfaces. In conjunction with the main matrix of BTF1-10AA it can be used for MADI electrcial-optical conversion and/or distribution. You can as well simply use it to connect analog audio equipment directly to an audio console or matrix. Hereby the interface to the console can be optical by singlemode or multimode fiber or electrical by coax cable (BNC).





- Same basic functionalities as all other members of the BarnOne family
- Integrated A-D/D-A converter for analog line level audio signals
- Built-in audio matrix with single channel routing for up to 4 MADI streams and 8x analog line signals

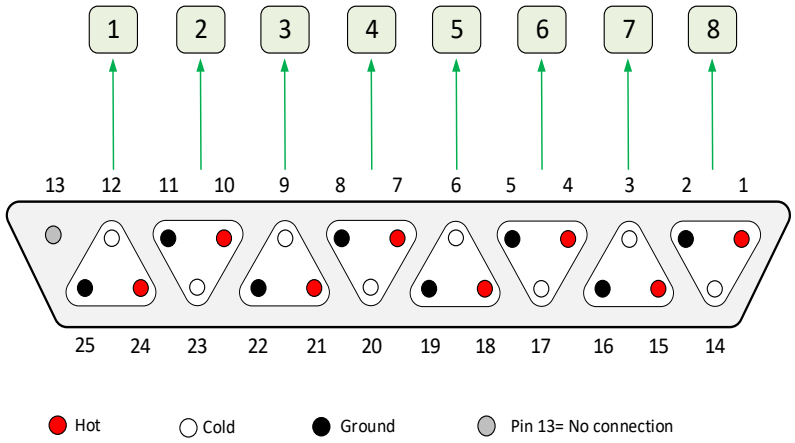


Technical Specifications

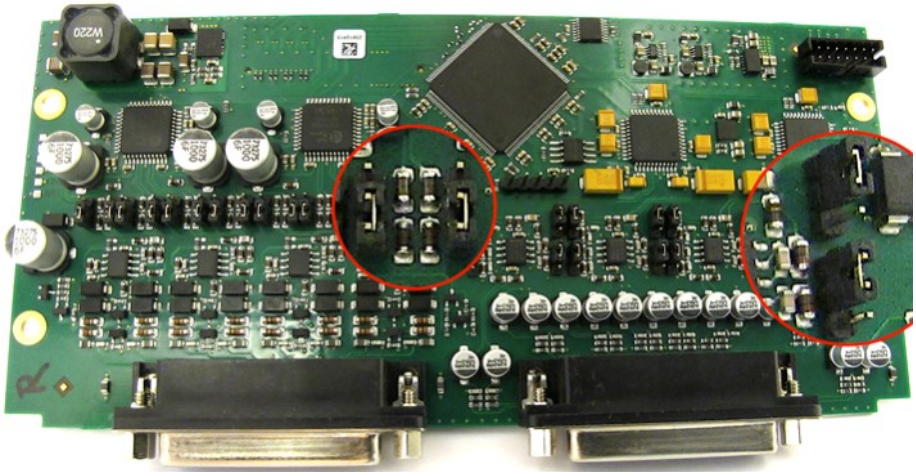
Internal ports	A/D converter
• 4x internal MADI (AES10) I/O connected to main matrix	• THD -115dB
• Sample rate 44.1kHz/48kHz (1FS), 2FS and 4FS also supported	• SNR -115dB unweighted
• Synchronisation to one of the MADI ports or internallly 44.1kHz/48kHz (2FS and 4FS also supprted	• THD+N -108dB
	D/A converter
• Single channel routing for all MADI analog I/O	• SNR -115dB
Analog ports	• THD+N -107dB
• 8x balanced analog line inputs (DB25), individually configurable +18dBu/+24dBu (default setting: +18dBu)	
• 8x balanced analog line outputs (DB25), individually configurable +18dBu/+24dBu (default setting: +18dBu)	

Pinout and Jumper settings BTF1-10AA analog line inputs and outputs

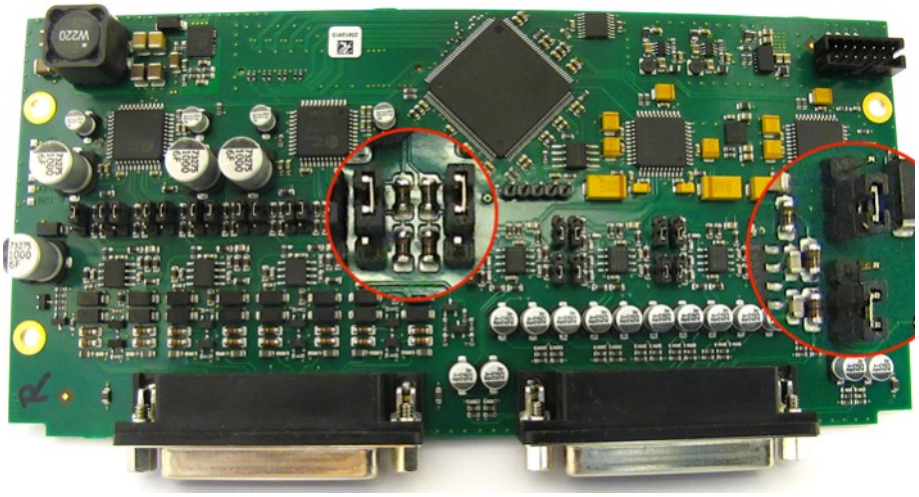
Pin-out for DB25 8 Channel Balanced Connector (TASCAM[1] pinout applies)



To change the jumper settings from +18dBu (default) to +24dBu, open the top lid of the BTF1-10AA frame with a Torx #15. The magnification in the pictures shows the settings for Input8 and Outptut8. You can change the settings for each input and output individually.



Jumper setting +18dBu (default)



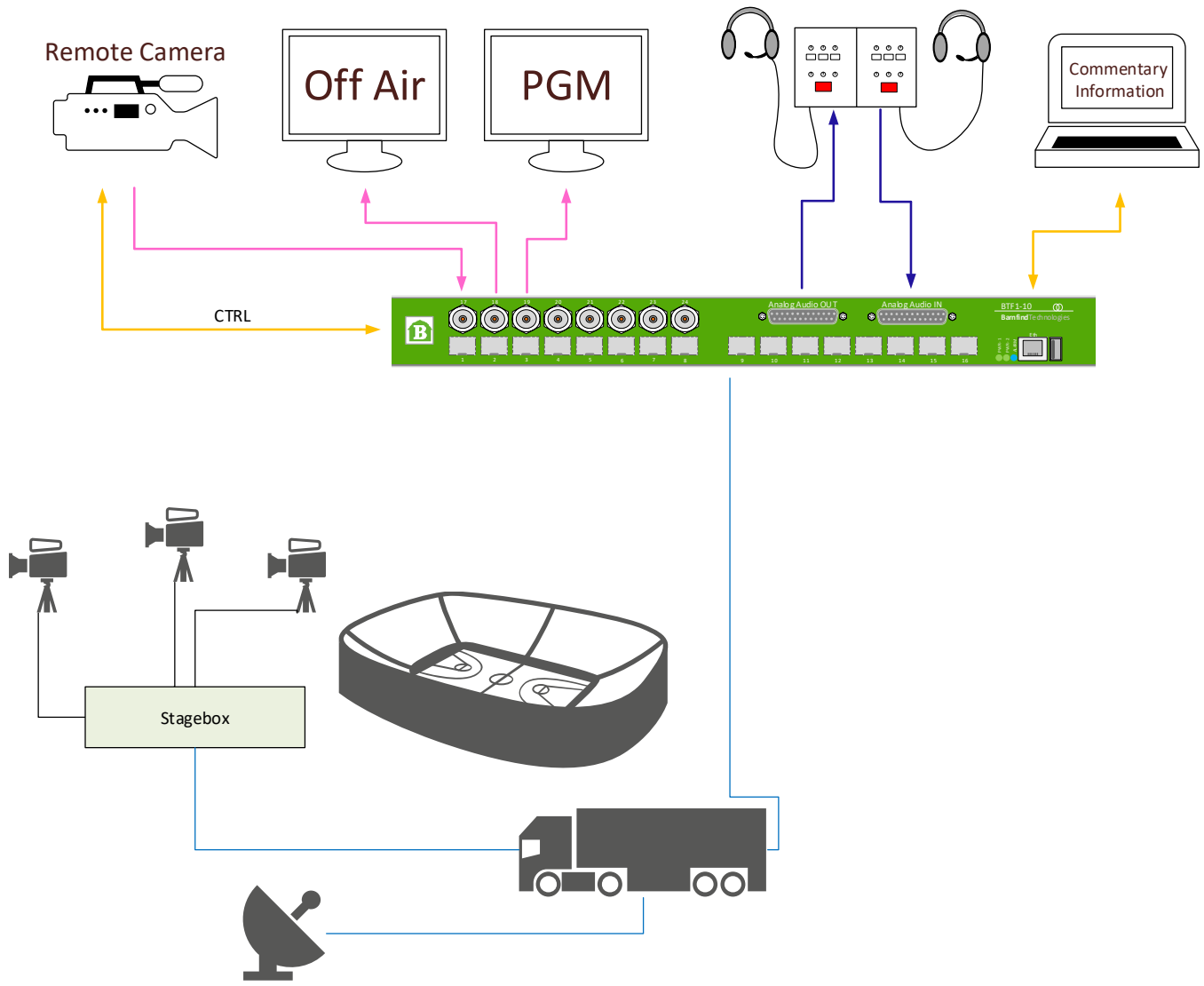
Jumper setting +24dBu

[1] *TASCAM is a registered trademrk of TEAC corporation*

Application example for BTF1-10AA

A commentators booth connecting to the OB Van by only one single mode fiber using BTF1-10AA.

All signals such as SDI or HDMI for monitors, Ethernet for commentary information system and internet access, SDI and control data for remote cameras or even native CAM-CCU connections, analog audio for commentary units etc. Are managed in their native format and optically multiplexed into one fiber.



BarnOne for UHD/4K applications - BTF1-41

BTF1-41 was designed to serve Ultra High Definition (UHD) and 4K-DCI applications. Together with the transition to 12Gbps bandwidth per matrix port, the basic layout of the BarnOne series changes to a more flexible and user friendly and flexible design.

BTF1-41 is always equipped with 16x SFP+ cages connecting to the first set of the internal 32x32 crosspoint matrix. Next to the SFP+ cages, which are arranged in two rows of 8 cages, is an open slot which is in the basic version covered with a blind panel. This slot can house an user exchangeable expansion board with 16 bi-directional matrix connections, each handling a bandwidth of 12Gbps.

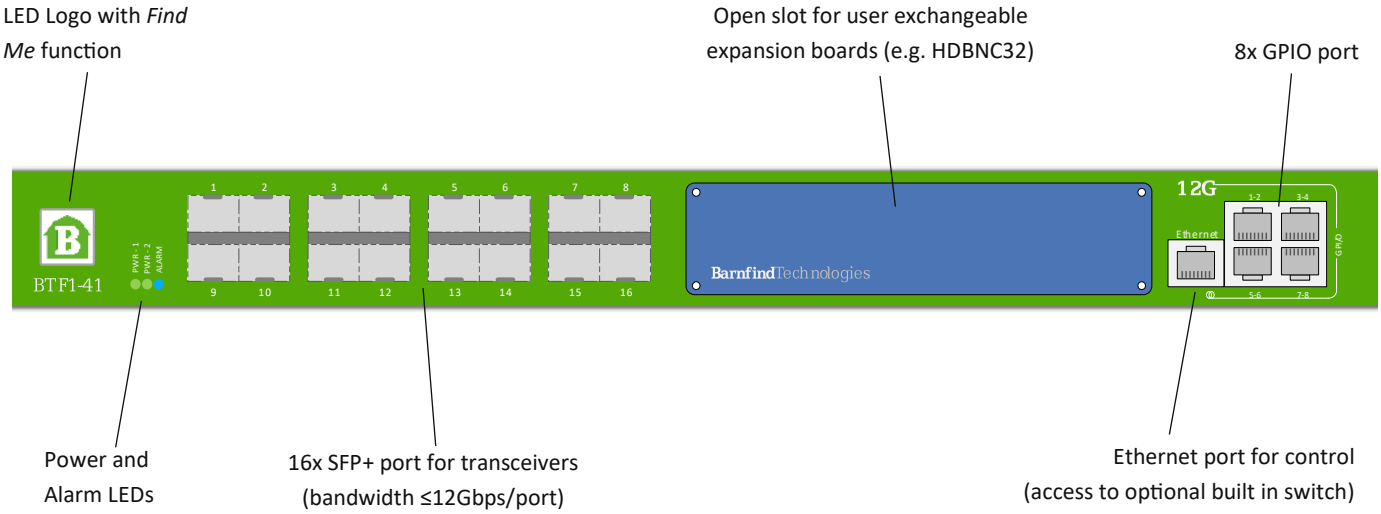
Next to the control port on the front panel locate 8x GPIO interfaces. GPOs can be driven by matrix changes, Loss Of Service of a SFP module or by a GPI which is received via the front panel or the control network (TSL protocol). GPIs are converted to an IP protocol (TSL Tally/UMD) which is available through the control network.

The fans of BTF1-41 are controllable in their speed depending on temperature inside the frame.

Optionally BTF1-41 can house a 1Gbps Ethernet switch which internally connects to the matrix, not reducing the 32 bi-directional ports which are be dsiplayed to the outside. Another port of the switch connects to the CPU, one to the open slot for control of future implementations.

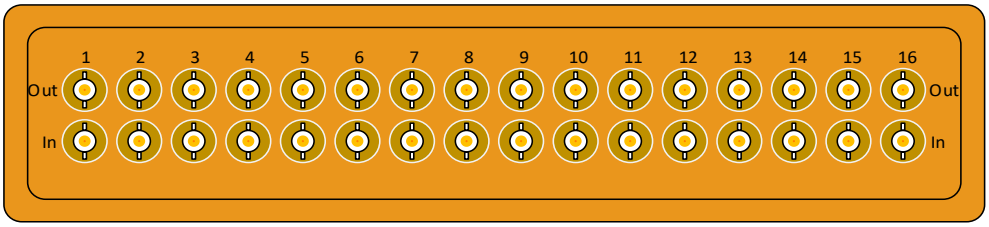
Another option is the sync transport, extracting analog sync signals from SDI or converting Blackburst and TriLevelSync to SDI in order to transport it. The sync option houses the signal analyser for SDI and ASI signals.

Physical dimensions and power supplies are identical to the already established BarnOne series.



HDBNC32

HDBNC32 is an expansion board for BTF1-41 which slides into the open slot. It adds 16 BNC input ports and 16 BNC output ports to the 32x32 matrix of the main frame. All ports are equipped with user controllable reclockers, respectively cable equalizers.



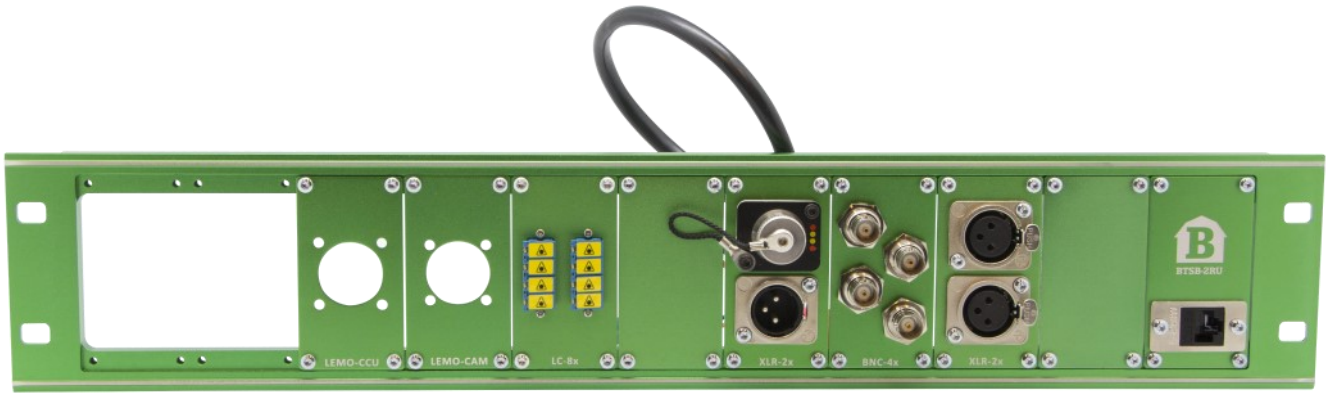
Pinout RJ45 BTF1-41 GPIO

Technical Specifications

SFP+ Ports	Temperature
• Port for Enhanced Small Form-Factor Pluggable (SFP+), supports MSA-compliant and non-MSA transceivers	• Storage temperature -40°C - +70°C
	• Operating temperature -20°C - +45°C
• Suitable for optical transceivers (singlemode/multimode), SFP electrical processors	• Internal temperature depends on the selection of SFPs inserted. Some SFPs consume more power and are more sensitive to higher temperatures.
• SMPTE ST 2081, ST 2082, 258M, 292M, 372M, 424M, 372M, DVB-ASI, AES10 (MADI), AES3	• ***Barnfind Technologies recommend to operate BTF1-xx frames in room temperature environment to ensure long lifetime and high performance.***
• Hot pluggable/swappable	
Power Supply	**Power Consuption**
• 12V DC power supply included	• A BarnOne frame has an average power consumption of 28-30W without SFPs inserted. The total power consumption is frame plus SFPs.
• PSU Input 100-240V AC 50/60Hz	
• PSU Output 12V DC 8,5A	
• redundant PSU optional	• A standard optical SFP has an average power consumption of 1.5W. See data sheet for the specific SFP to calculate an accurate power consumption.
Physical Size	
• 445mm x 280mm x 43,5mm (17.5" x 11.0" x 1.7")	
• 3,8kg	

Stage Box
Break-Out

Module-based break-out panel

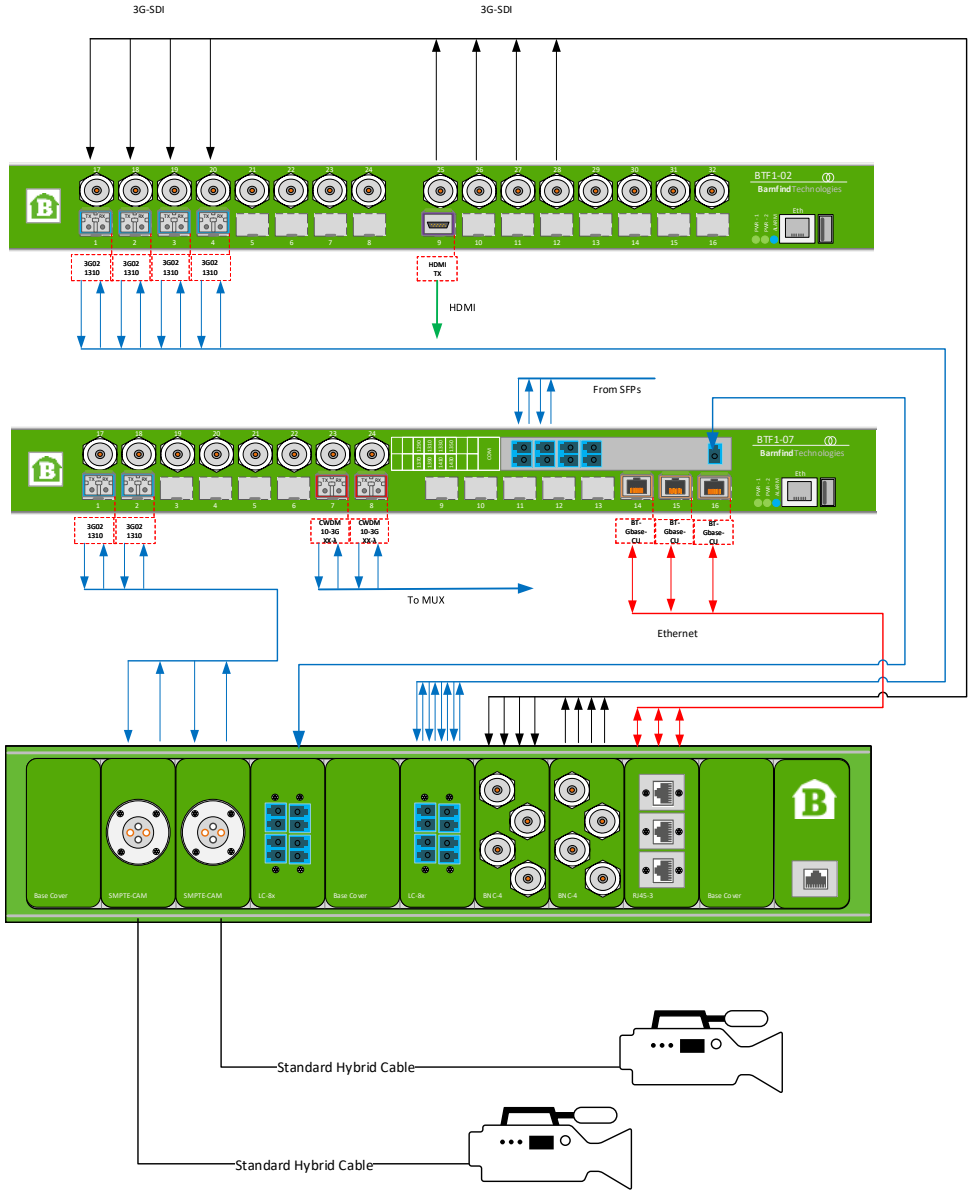


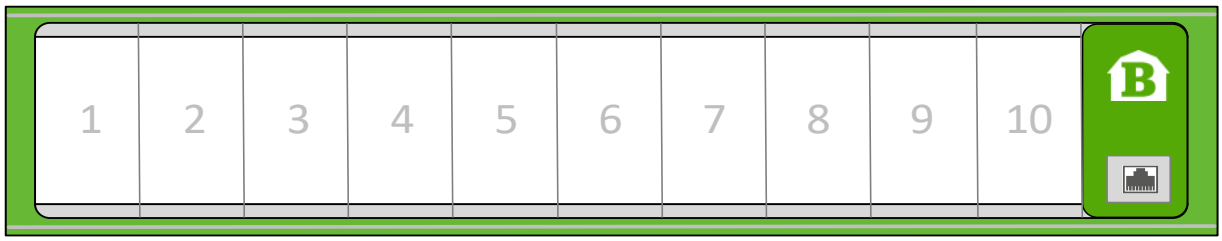
The Barnfind Stagebox break-out panel allows you to customize your own front panel based on the required connectors. The various selection of modules will be the connection points to one or more frames.

All modules are made of solid alluminium, with high performance connectors.

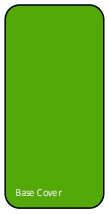
Note!

- The BTSB-BASE blind cover can be customized to fit any other connector outside the Barnfind selection.
- Cables between break-out panel and frames are not included.





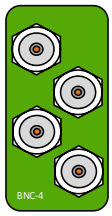
BTSB-2RU



BTSB-BASE

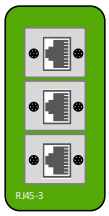
Blind cover to fill up unused slots in BTSB-2RU.

Note, can also be used to customize for a special preferred connector.



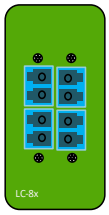
BTSB-BNC-4x

Panel mounted BNC connectors.



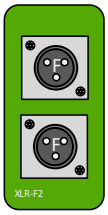
BTSB-RJ45-3x

Panel mounted RJ45 connectors.



BTSB-LC-8x

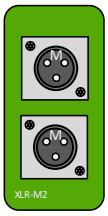
Panel mounted LC connectors. Metal enclosure



BTSB-XLR-F2x

Panel mounted XLR (female) connectors.

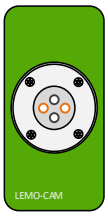
Also available without connector, suitable for Neutrik panel mount connectors.



BTSB-XLR-M2x

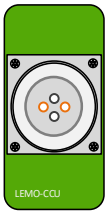
Panel mounted XLR (male) connectors.

Also available without connector, suitable for Neutrik panel mount connectors.



BTSB-LEMO-CAM

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



BTSB-LEMO-CCU

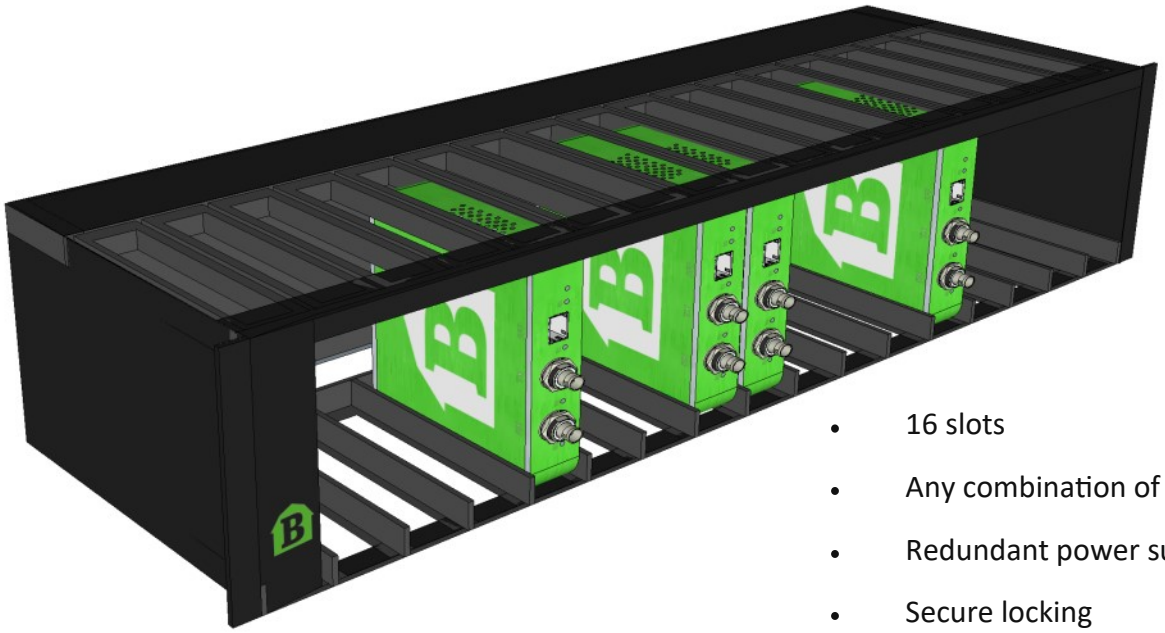
Panel mounted LEMO EDW.3K SMPTE connector. Used as standard on many hybrid fiber cameras. **CCU connector (not included)****

*LEMO 3K.93C SMPTE PANEL PLG, FXW with LC fibre

**LEMO 3K.93C SMPTE PANEL SKT, EDW with LC fibre

BarnMini Series

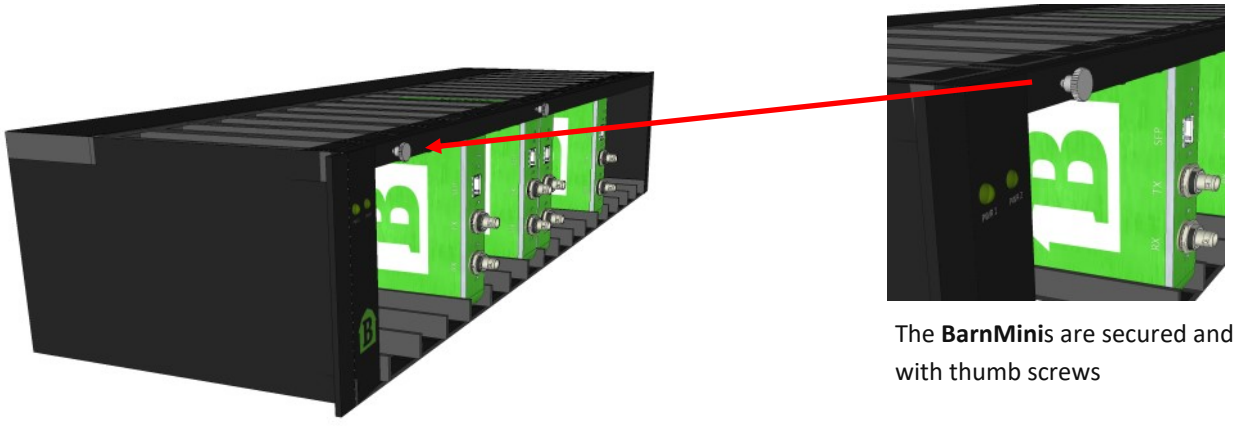
BTF-Mini-16



- 16 slots
- Any combination of BarnMinis
- Redundant power supply (optional)
- Secure locking

The **BTF-Mini-16** comes with 2 x LEDs in the front to indicate which PSU are connected

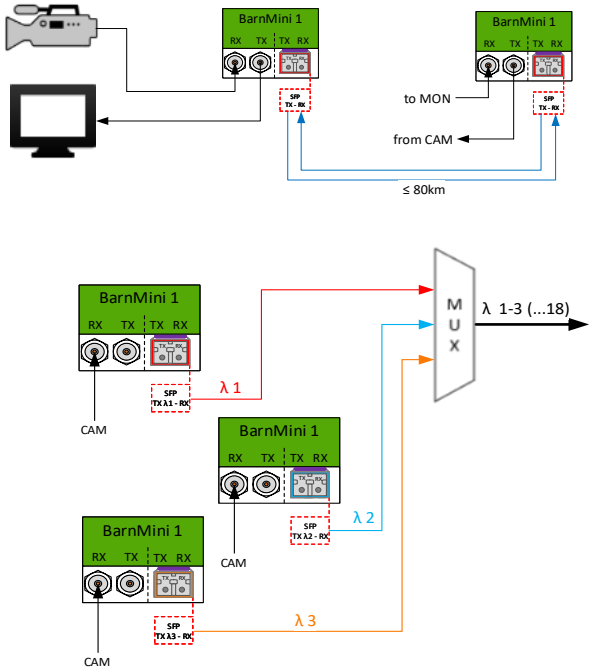
The BarnMini frame, **BTF-Mini-1**6, is a housing with space for up to 16 x BarnMini modules of any kind. The BarnMini frame uses the same PSU as the BarnOne family, BTF1-XX. Note that the **BTF-Mini-16** comes with one standard single PSU (redundant PSU is optional mod nr: **BT-PSU-100-240AC**)



The **BarnMini**s are secured and released with thumb screws

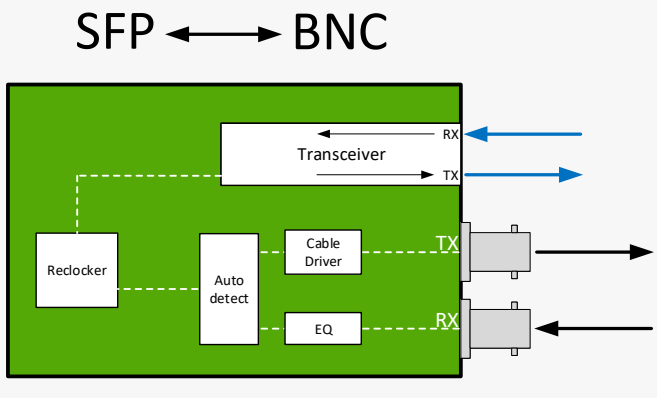
BarnMini-01 - Coaxial to SFP Converter

This is the most popular BarnMini. It gives a unique platform to take in most video electrical signals and convert it to optical. The BarnMini-01 handles also SDTI signals from e.g. EVS. It comes with a second BNC that could be used for monitoring and other redundancy applications. Any optical SFPs can be used and even we can house a HDMI SFP for converting to HDMI or even coming in HDMI and convert back to electrical SDI. All outputs are re-clocked. BarnMini-01, can rightly claim to be the most flexible electrical to optical converter in the market.



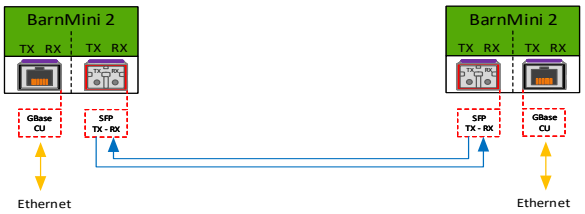
Technical Specifications

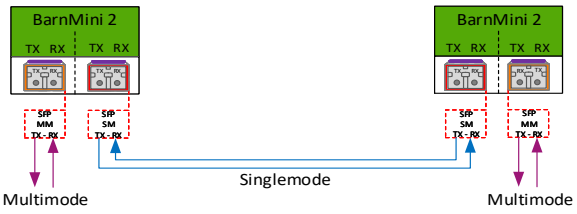
BNC ports	Power Supply
• 1x BNC port 75Ω TX	• 12-24V DC power supply included
• 1x BNC port 75Ω RX	• redundant power supply available with BTF-Mini-16
• SMPTE 259M, 292M, 372M, 424M, DVB-ASI, AES10 (MADI), AES3	**Physical Size**
	• 92mm x 98mm x 22mm
• Automatic multirate reclocking of outputs 270Mbit/s - 3Gbit/s	• 200g
	Model Name
• Automatic cable EQ (Belden 1694A) 270Mbit/s - 250m, 1,5Gbit/s - 140m, 3Gbit/s - 80m	• BM-01
SFP port	
• Port for Small Form-Factor Pluggable (SFP), supports MSA-compliant (multi source agreement) transceivers	
• Suitable for optical transceivers (singlemode/multimode), SFP media converters (HDMI, SDI, CVBS etc.)	
• SMPTE 259M, 292M, 372M, 424M, 372M, DVB-ASI, AES10 (MADI), AES3	
• Hot pluggable/swappable	



BarnMini-02 - SFP to SFP Converter

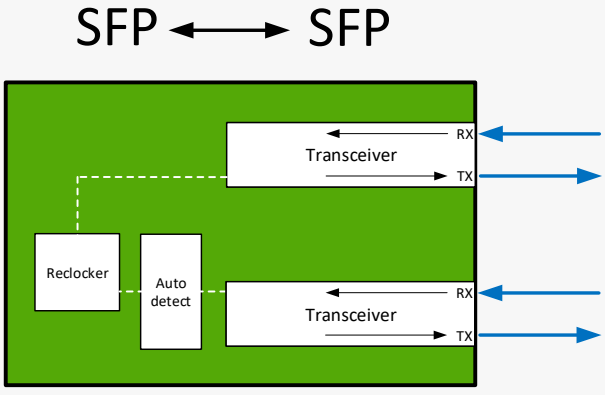
You can use any SFP from Barnfind or any other SFP as long as they are MSA compatible. BarnMini-02 is also popular due to the flexibility it brings. Imagine you need to go from multimode to single mode, taking an Ethernet signal into the fiber, using it as an affordable optical repeater etc. BarnMini-02 is our "Swiss army knife" and the great thing is that you can change your application by changing SFPs. As any of the BarnMini modules the BarnMini-02 can be used as a standalone box or in advanced systems with BarnOne or any 3rd party solution.



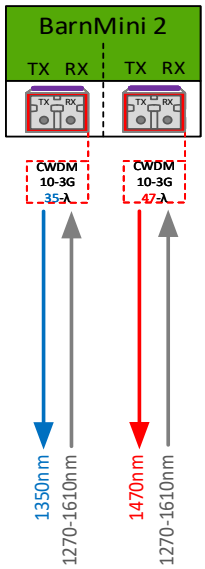


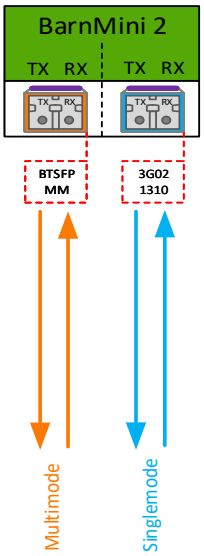
Technical Specifications

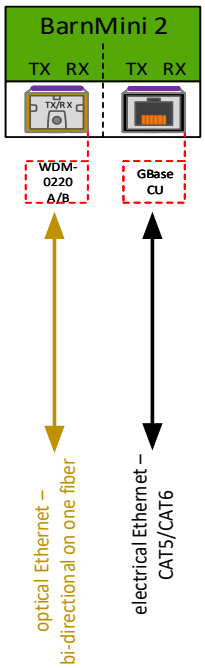
SFP ports
• 2x Port for Small Form-Factor Pluggable (SFP), supports MSA-compliant (multi source agreement) transceivers
• Suitable for optical transceivers (singlemode/multimode), SFP media converters (HDMI, Ethernet, SDI, CVBS etc.)
• SMPTE 259M, 292M, 372M, 424M, 372M, DVB-ASI, AES10 (MADI), AES3, Ethernet, proprietary protocols
• Hot pluggable/swappable
Power Supply
• 12-24V DC power supply included
• redundant power supply available with BTF-Mini-16
Physical Size
• 92mm x 98mm x 22mm
• 200g
Model Name
• BM-02

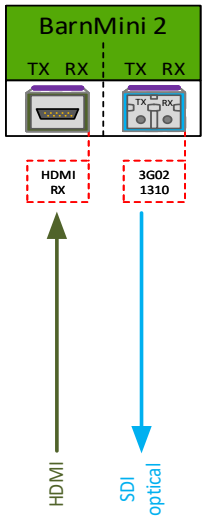


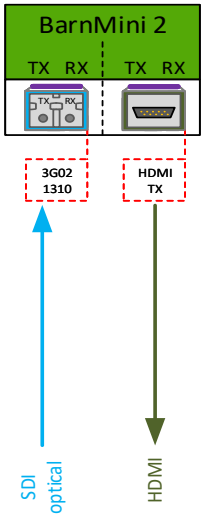
BarnMini-02 is equipped with 2x SFP cages, the SFP cages are connected TX to RX and RX to TX. The functionality will depend on the kind of SFPs which are inserted. A signal conversion does not take place inside BarnMIni-02, it happens inside the SFP. The examples below only show a selection of typical user setups.

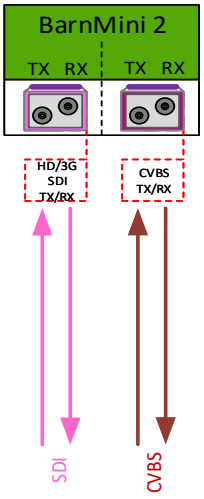












BarnMini-03 / BarnMini-04 - HDMI to SFP Converter

BarnMini-03

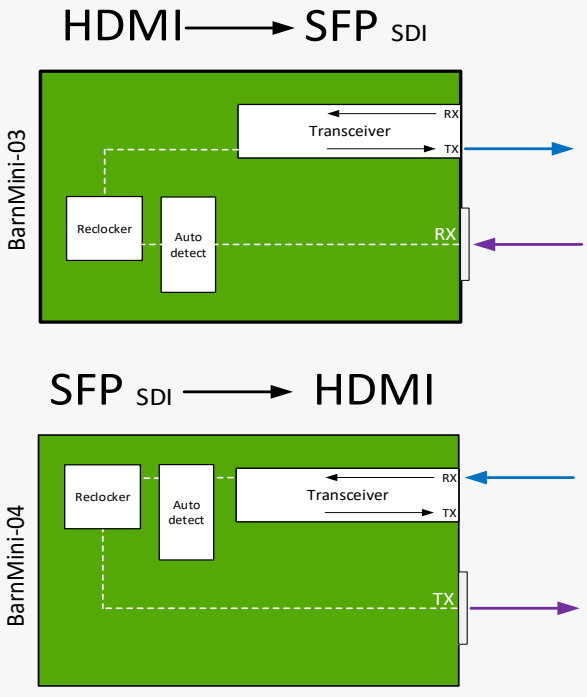
BarnMini-03 takes your HDMI signal to any optical fiber SFPs. This gives you a great flexibility how far and into what part of the value chain you wish to take your HDMI signal. If you have a mux to transport any other signals you can use one of our CWDM SFPs and directly transport it with other signals. The BarnMini-03 is very often used as a standalone unit for your monitor signals.

BarnMini-04

BarnMini-04 takes your optical SDI signal and convert it to a HDMI signal. This gives you a great flexibility in designing different monitoring solutions. The BarnMini-04 is very often used as a standalone unit. As any of our other BarnMini modules, the BarnMini -04 is also operational from 5V to 24V. As any of our other BarnMini modules, the BarnMini-04 brings unparrelled flexibility and it can serve several tasks.

Technical Specifications

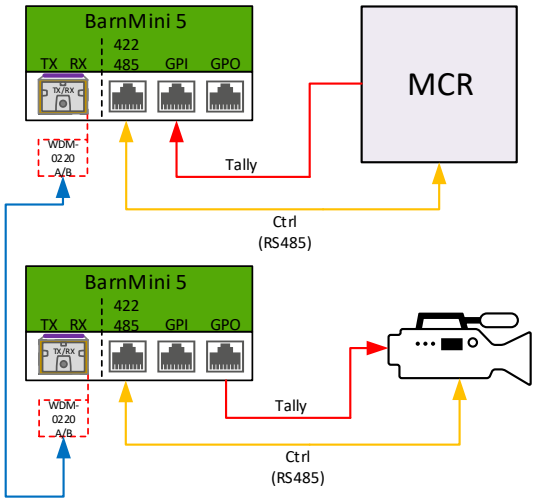
HDMI port
• supports HDMI version 1.4
SFP port
• Port for Small Form-Factor Pluggable (SFP), supports MSA-compliant (multi source agreement) transceivers
• Suitable for optical transceivers (singlemode/multimode), SFP media converters (SDI, CVBS etc.)
• SMPTE 259M, 292M, 372M, 424M
• Hot pluggable/swappable
Power Supply
• 12-24V DC power supply included
• redundant power supply available with BTF-Mini-16
Physical Size
• 92mm x 98mm x 22mm
• 200g
Model Name
• BM-03 / BM-04



BarnMini-05 - GPIO and Serial Data (RS422/RS485) Interface

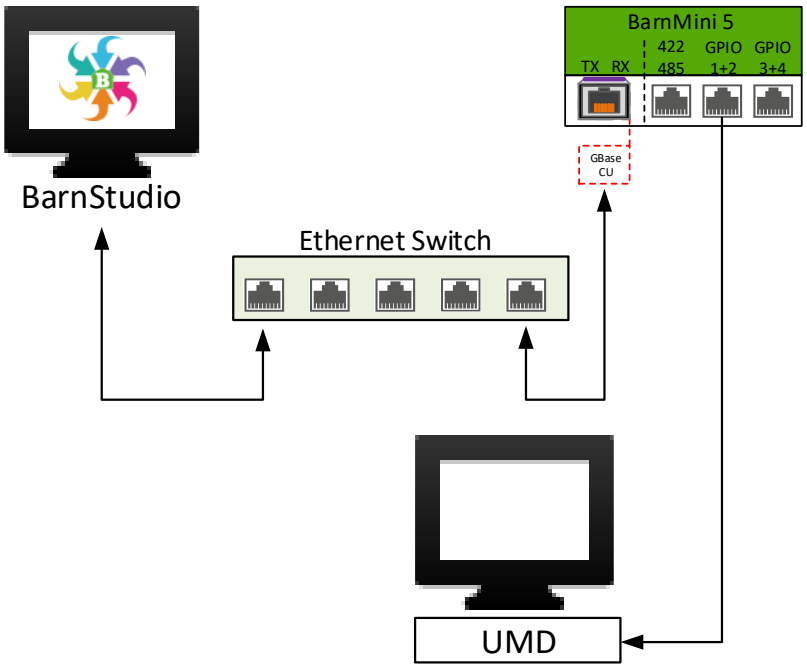
The BarnMini-05 is our most advanced BarnMini module. This is a compact way to combine serial data RS422/RS485, 4x GPI and 4x GPO, controllable via an Ethernet/SFP port. The unit can serve as an intelligent bridge between many third-party devices, for example transferring an RS422 signal or tally between two locations, or it can control an external optical changeover switch (BarnMini-06) in a redundancy setup. Triggers are easily set. BarnStudio, Barnfind's control software, can be used to configure and monitor BarnMini-05.

- 4x GPI
- 4x GPO
- RS422/485
- adjustable BAUD rate
- Supports TSL protocol for UMDs and Tally
- SFP port for optical or electrical interface
- BTSFP-GBase-CU required for configuration with BarnStudio



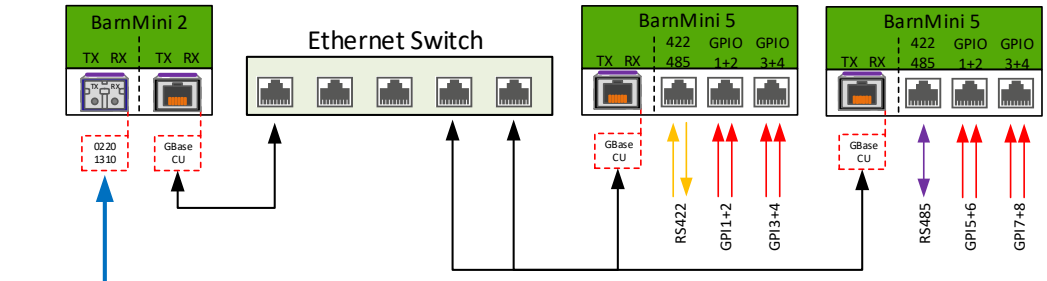
Technical Specifications

Serial Data Port	Power Supply
• RJ45 connector	• 12-24V DC power supply included
• selectable RS422 or RS485	• redundant power supply available with BTF-Mini-16
GPIO ports	**Physical Size**
• 2x RJ45 connector with 2x GPI and 2x GPO per connector	• 92mm x 98mm x 22mm
• 4x GPI - optocoupled; common floating 5V reference; 240? resistor in series; connect to 0V reference to trigger	• 200g
	Model Name
• 4x GPO - Relays; max. 50V AC/DC; max 100mA	• BM-05
SFP port	
• Port for Small Form-Factor Pluggable (SFP), supports MSA-compliant (multi source agreement) transceivers	
• Suitable for optical transceivers (singlemode/multimode), SFP media converters (Ethernet)	
• Hot pluggable/swappable	

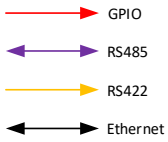


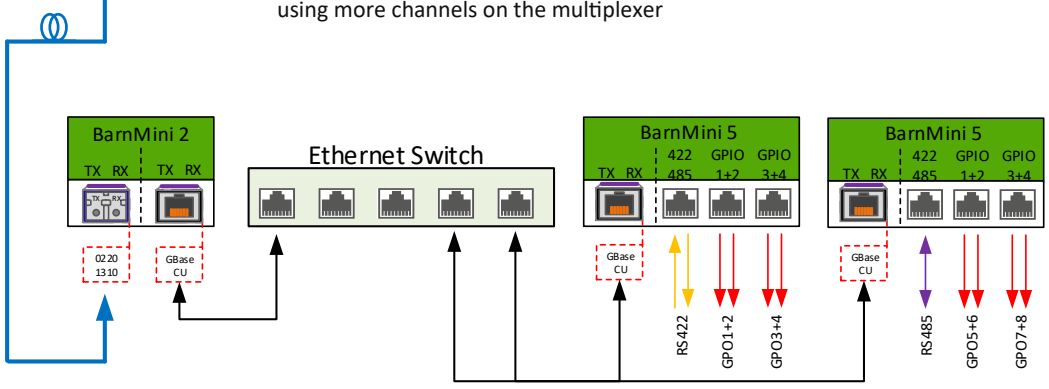
Use BarnStudio (free software) to access all the great functionalities and configurations in BarnMini-05 and frames in BarnOne family.

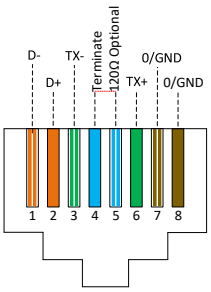
A complete and free version of BarnStudio can be downloaded from: https://www.barnfind.no/downloads/



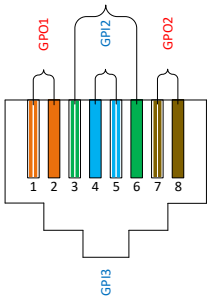
- Connect several BarnMini-05 for more GPIO and RS485/422 channels on the same Ethernet connection
- later upgrade for more GPIO and RS485/422 channels possible without using more channels on the multiplexer



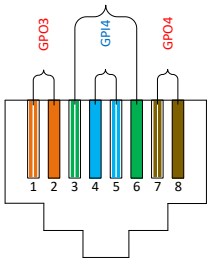




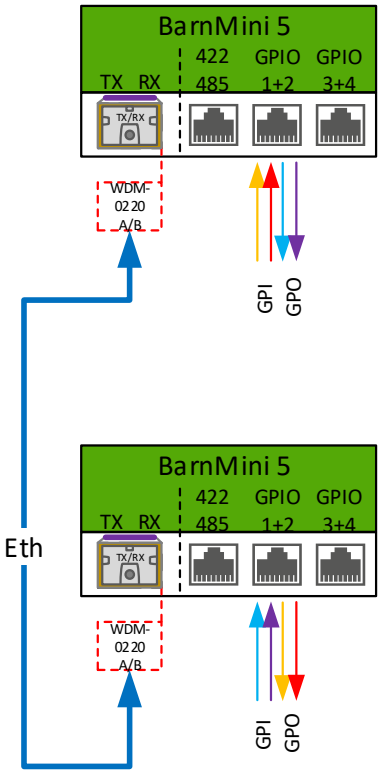
RS422/485 pinout (RJ45)



GPIO 1+2 pinout (RJ45)



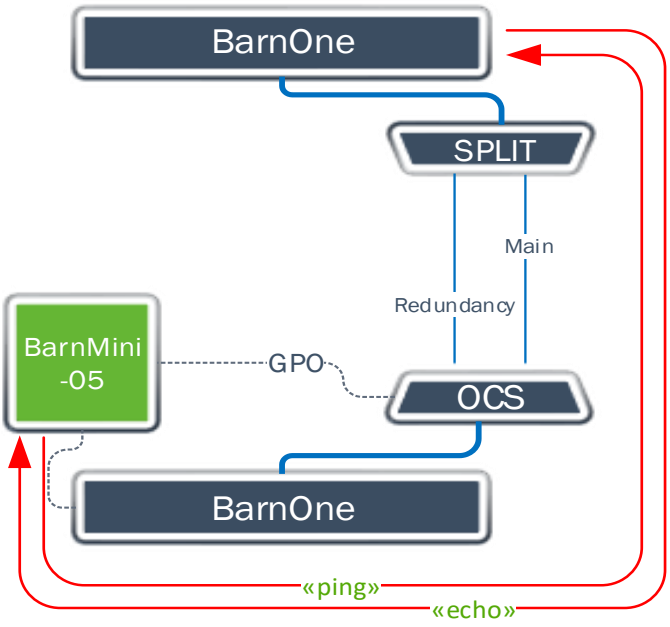
GPIO 3+4 pinout (RJ45)



Automatic redundancy switching

BarnMini-05 can be configured to generate ping requests to a selected remote peer, e.g a computer, another BarnMini 05 or a BarnOne frame, and will expect an echo to validate the connection between them. If the requested echo is missing, the BarnMini-05 will activate one or more GPO connection.

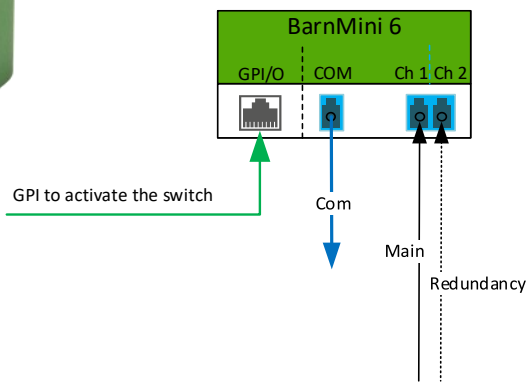
In practical use, this can be used to toggle between main and redundant fiber lines.



BarnMini-06 - Optical Change-Over

The BarnMini-06 is the optical changeover switch, which is very easy to integrate with the GPO devices that are found in many broadcast applications. A great advantage is the ability to provide its own power needed to drive the switch either as a stand alone or in the BarnMini frame with common PSU. The BarnMini-06 is often used in conjunction with the BarnMini-05. This is a great combination to create advanced signal redundancy solutions.

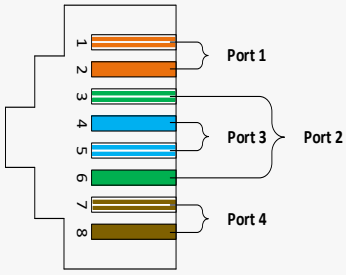
*example



Technical Specifications

Optical Ports	**GPI port**
• LC/PC connectors	• RJ45 connector with 4x GPI wired parallel, non latching
• Operating Wavelength 850-1620nm	
• Fiber type Single Mode	**Power Supply**
• Insertion Loss <1,2dB	• 12-24V DC power supply included
• Wavelength dependant loss <0,3dB	• redundant power supply available with BTF-Mini-16
• Polarisation dependant loss 0,05dB	**Physical Size**
• Crosstalk >35dB	• 92mm x 98mm x 22mm
• Return loss >35dB	• 200g
Optical Switch	**Model Name**
• Switching time <10ms (typically 4ms)	• BM-06
• Max. switching cycles 10.000	

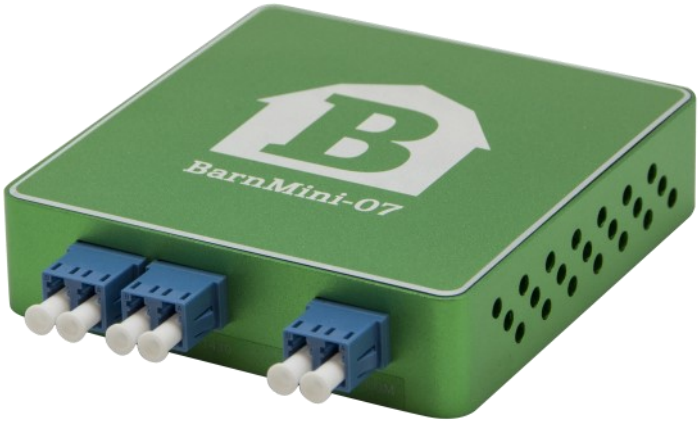
GPI pinout (RJ45)

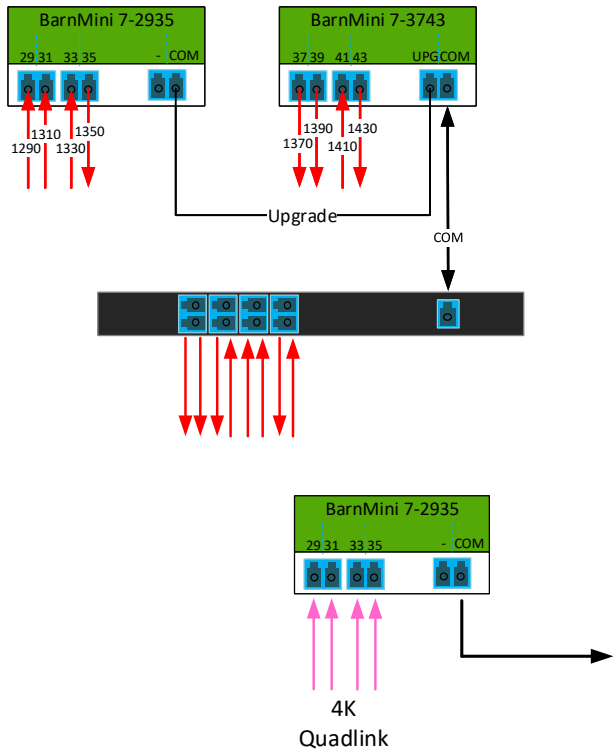


Note: A contact closure on any of the GPI ports will trigger the switch!

BarnMini-07 - Optical Multiplexer

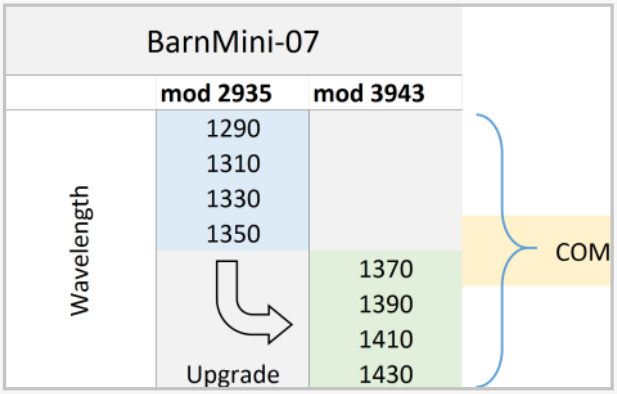
The BarnMini-07 is a 4-channel CWDM mux that can be used e.g. for transportation of 3G-quad over different mediums. This is a compact, efficient and affordable mux. It fits into the BarnMini BTF-Mini-16 frame. The BarnMini-07 saves you both rack space and money. For growing up to 8 channels, we can offer optional upgrade.





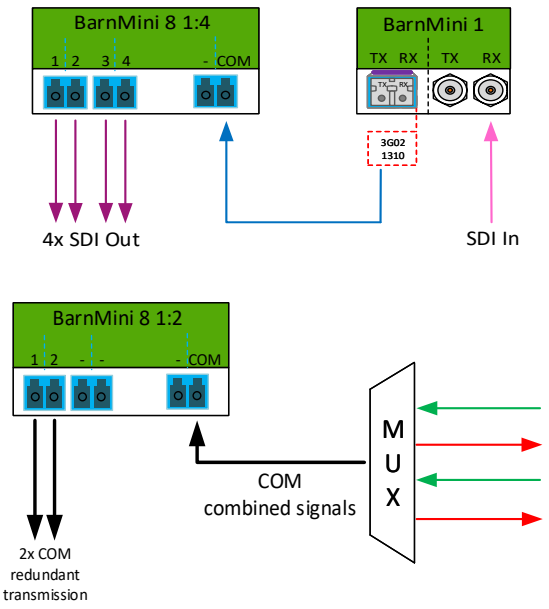
Technical Specifications

Optical Ports
• LC/PC connectors
• Center Wavelength BM-07 2935 1290, 1310, 1330, 1350nm
• Center Wavelength BM-07 3743 1370, 1390, 1410, 1430nm
• Channel clear passband +/- 6,5nm
• Insertion Loss <1,2dB
• Passband ripple <0,5 dB
• Adjacent Channel Isolation >30dB
• Non-Adjacent Channel Isolation >45dB
• Polarisation dependant loss 0,02dB
• Directivity >50dB
• Return loss >45dB
• Polarisation Mode Dispersion <0,2ps
Physical Size
· 92mm x 98mm x 22mm
· 200g
Model Name
• BM-07 2935 / BM-07 3743



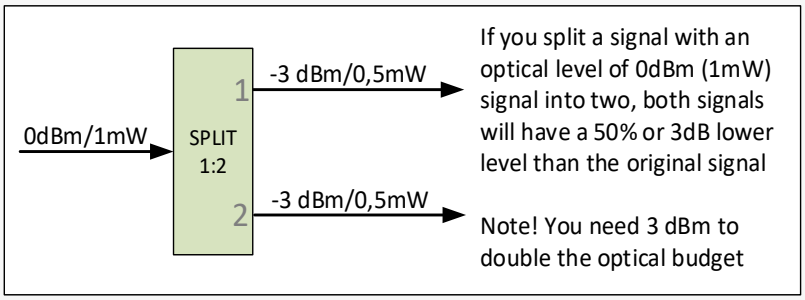
BarnMini-08 - Optical Splitter

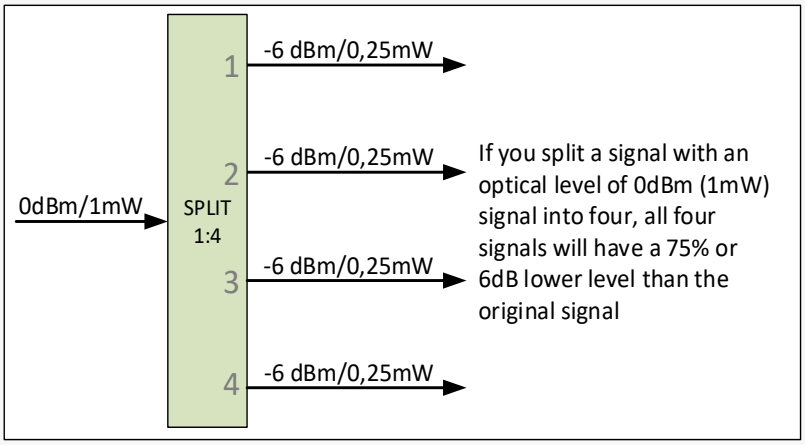
This BarnMini unit comes in two optical splitter versions; either as BarnMini-08-1:2 or BarnMini-08-1:4. It is a great supplement in smaller BarnMini systems, but can also be used in more advanced BarnOne configurations. As with any of our other BarnMini modules; the BarnMini-08 has rock solid mechanics and technology and it can work in harsh environments.



Technical Specifications

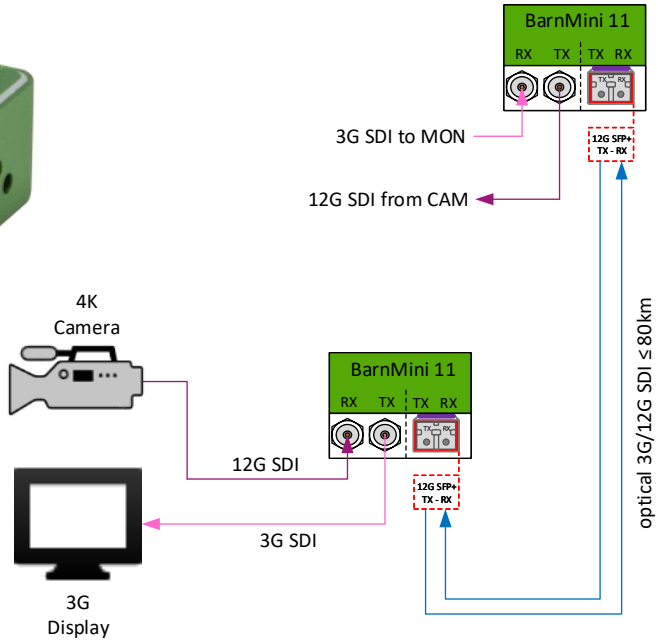
Optical Ports
• LC/PC connectors
• Insertion Loss <1,2dB + 3 or 6, see figures
• Adjacent Channel Isolation >35dB
• Non-Adjacent Channel Isolation >45dB
• Polarisation dependant loss <0,10dB
Physical Size
· 92mm x 98mm x 22mm
· 200g
Model Name
· BM-08 1:2 / BM-08 1:4





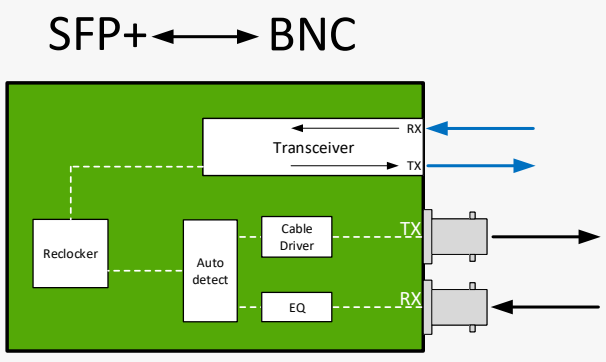
BarnMini-11 - Coaxial to SFP/SFP+ Converter 12G

The BarnMini-11 is the big brother to the popular BarnMini-01 solution that delivers simple and reliable point-to- point digital extension. BarnMini-11 offers support for up to 12Gbit/s bandwidth. It can handle 12G, 10G, 6G and any other video/data format with a lower data rate than 12Gbit/s. BarnMini-11 is equipped with a re-clocker. And as any other BarnMini module it is flexible and with comprehensive video specifications.



Technical Specifications

BNC ports	Power Supply
• 1x BNC port 75Ω TX	• 12-24V DC power supply included
• 1x BNC port 75Ω RX	• redundant power supply available with BTF-Mini-16
• SMPTE 259M, 292M, 372M, 424M, ST-2081, ST-2082, DVB-ASI, AES10 (MADI), AES3	**Physical Size**
	• 92mm x 98mm x 22mm
• Automatic multirate reclocking of outputs 270Mbit/s - 12Gbit/s	• 200g
	Model Name
• Automatic cable EQ (Belden 1694A) 270Mbit/s - 250m, 1,5Gbit/s - 140m, 3Gbit/s - 80m, 12Gbit/s - 60m	• BM-11
SFP/SFP+ port	
• Port for Small Form-Factor Pluggable Plus (SFP+) and SFP, supports MSA-compliant (multi source agreement) transceivers	
• Suitable for optical transceivers (singlemode/multimode), SFP media converters (HDMI,	
• SMPTE 259M, 292M, 372M, 424M, 372M, ST-2081, ST-2082, DVB-ASI, AES10 (MADI), AES3	
• Hot pluggable/swappable	

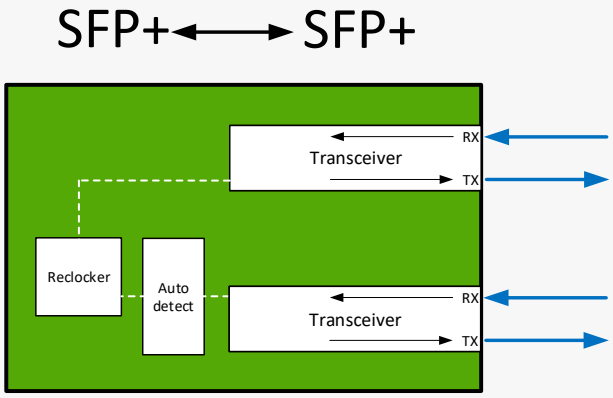


BarnMini-12 - SFP+ to SFP+ Converter 12G

BarnMini-12 supports data rates up to 12Gbit/s. It can handle 12G, 10G, 6G and any other video format with a lower data rate than 12Gbit/s. It is equipped with a re-clocker. As any BarnMini module it is available as a standalone unit with a separate PSU or mounted into the BarnMini BTF-Mini-16 frame that houses any combination of 16 x BarnMini modules with a common PSU.

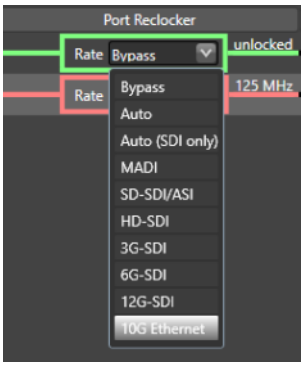
Technical Specifications

SFP+ ports
• 2x Port for Enhanced Small Form-Factor Pluggable (SFP+), supports MSA-compliant and non-MSA transceivers
• Suitable for optical transceivers (singlemode/multimode), SFP/SFP+ media converters (HDMI, Ethernet, SDI, CVBS etc.)
• SMPTE 259M, 292M, 372M, 424M, 372M, ST-2081, ST-2082, DVB-ASI, AES10 (MADI), AES3, proprietary protocols
• Hot pluggable/swappable
Power Supply
• 12-24V DC power supply included
• redundant power supply available with BTF-Mini-16
Physical Size
• 92mm x 98mm x 22mm
• 200g
Model Name
• BM-12



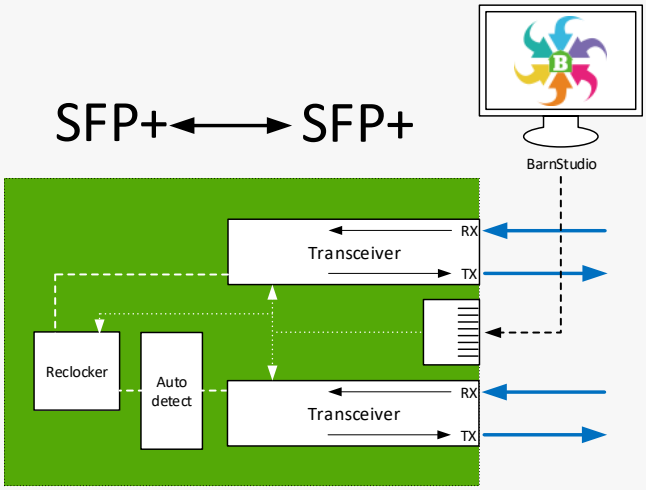
BarnMini-22 - Controllable SFP+ to SFP+ Converter 12G

BarnMini-22 is the predecessor of BarnMini-12. Additionally to all features of BarnMini-12 it is equipped with a control port for monitoring of SFP diagnostics and reclcocker control. The significant difference is the reclocker, which features deidcasted control options for each sigfnal type, especially for 10Gbps Ethernet. BarnMini-22 supports data rates up to 12Gbit/s. It can handle 12G and 6G SDI, 10G Ethernet and any other digital signal with a data rate lower than 12Gbit/s. It is equipped with a re-clocker which can be manually controlled via the control port. Inserted SFPs can be monitored and controlled with BarnStudio like any Barnone unit. As any BarnMini module it is available as a standalone unit with a separate PSU or mounted into the BarnMini BTF-Mini-16 frame that houses any combination of 16 x BarnMini modules with a common PSU.



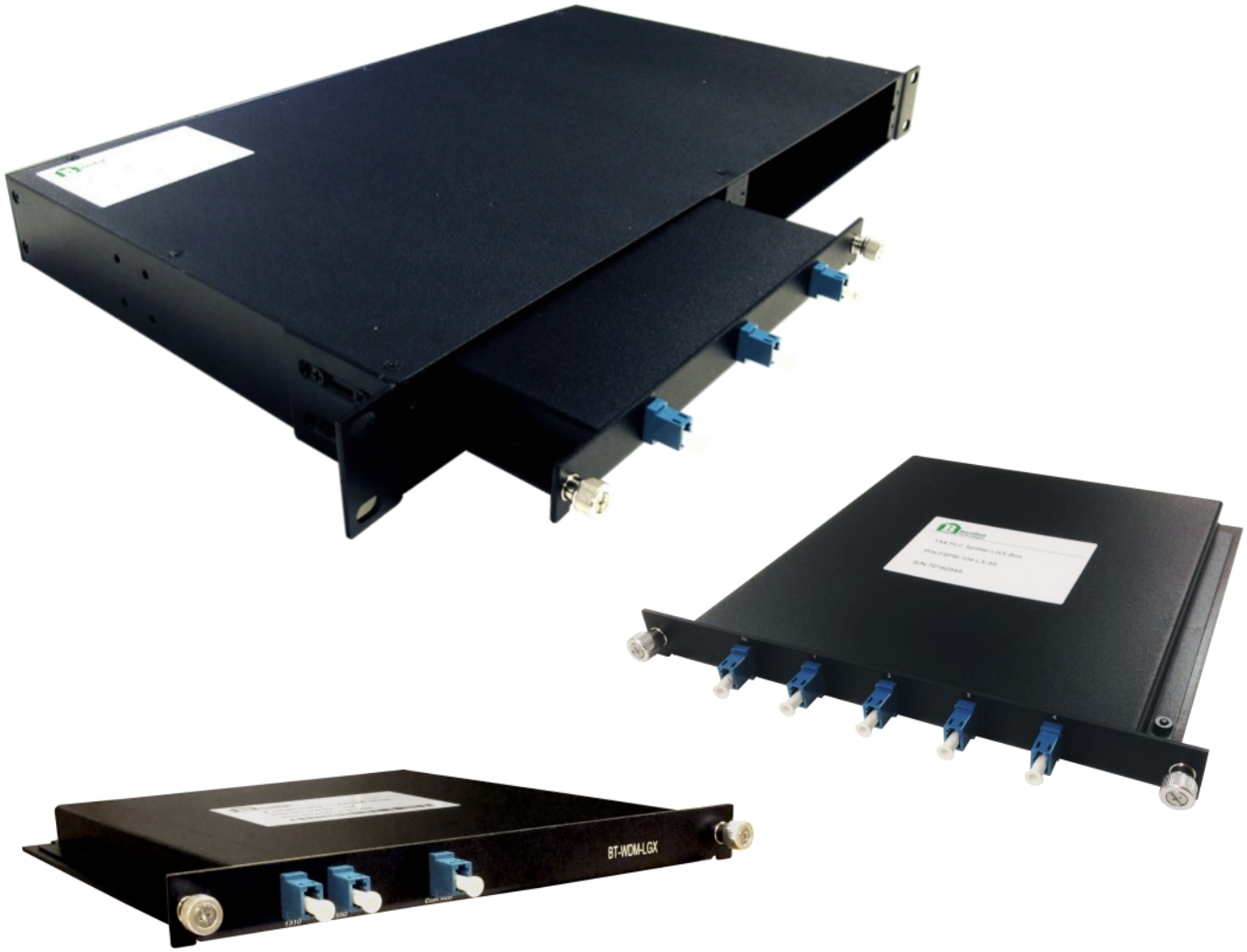
Technical Specifications

SFP+ ports	Physical Size
• 2x Port for Enhanced Small Form-Factor Pluggable (SFP+), supports MSA-compliant and non-MSA transceivers	• 92mm x 98mm x 22mm
• Suitable for optical transceivers (single mode/multi mode), SFP/SFP+ media converters (HDMI, Ethernet, SDI, CVBS etc.)	• 200g
• SMPTE 259M, 292M, 372M, 424M, 372M, ST-2081, ST-2082, DVB-ASI, AES10 (MADI), AES3, IEEE 802.3ae (10GE), proprietary protocols	**Model Name**
• Hot pluggable/swappable	• BM-22
Control Port	
• 1x Port RJ45 connector	
• 10/100 Mbit/s Ethernet	
Power Supply	
• 12-24V DC power supply included	
• redundant power supply available with BTF-Mini-16	



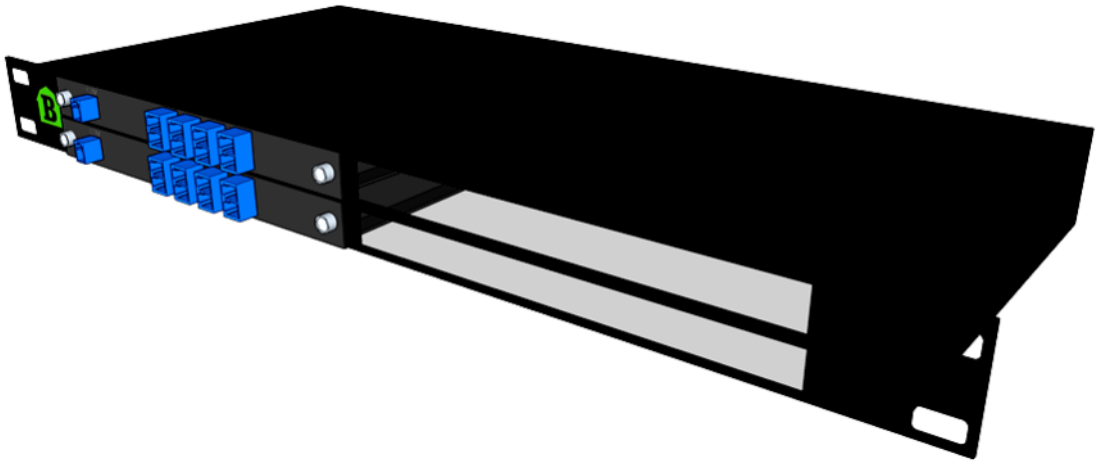
LGX Series

Passive Optical Products



BT-HOUS-LGX-1RU

BT-HOUS-LGX-1RU is a 1 rack unit housing for passive optical products. It can accomodate up to 4 pcs. of modules, eg. CWDM multiplexers, splitters. Each module is secured with two thumbscrew for easy and quick replacement.



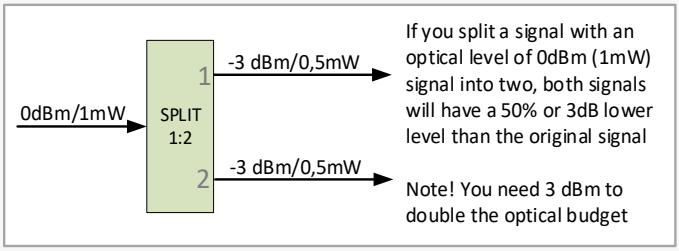
BT-SPLIT-X:X-LGX - Optical Splitter (Passive Distribution)

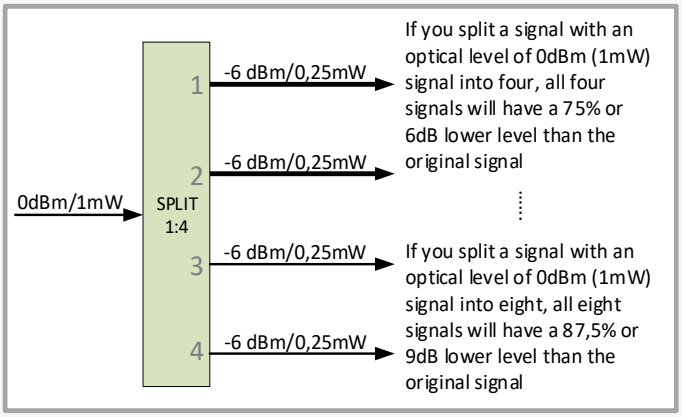
BT-SPLIT-1:2-LGX

BT-SPLIT-1:4-LGX

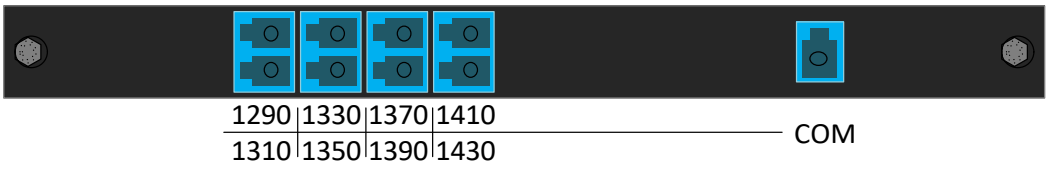
Technical Specifications

Optical Ports
• LC/PC connectors
• Insertion Loss <1,2dB +3dB (Split1:2)
• Insertion Loss <1,2dB +6dB (Split1:4)
• Adjacent Channel Isolation >35dB
• Non-Adjacent Channel Isolation >45dB
• Polarisation dependant loss <0,01dB
Model Name
• BT-SPLIT-1:2-LGX
• BT-SPLIT-1:4-LGX

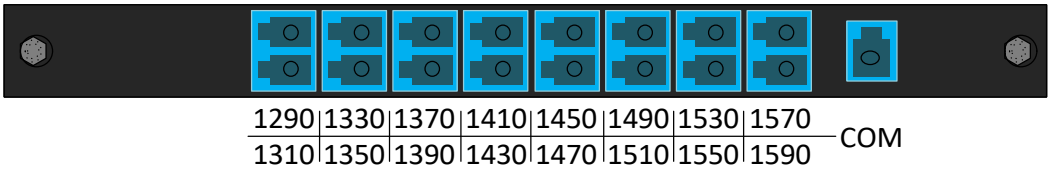




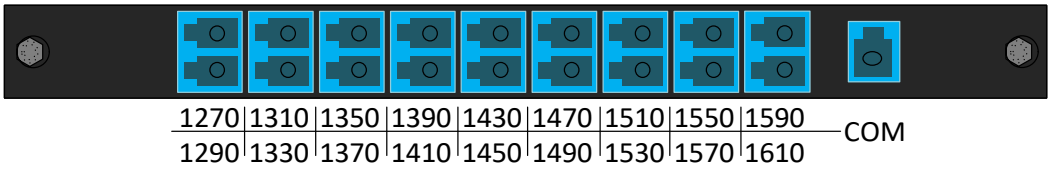
CWDM - (De)Multiplexer



BT-CWDM-MUX-08-LGX



BT-CWDM-MUX-16-LGX

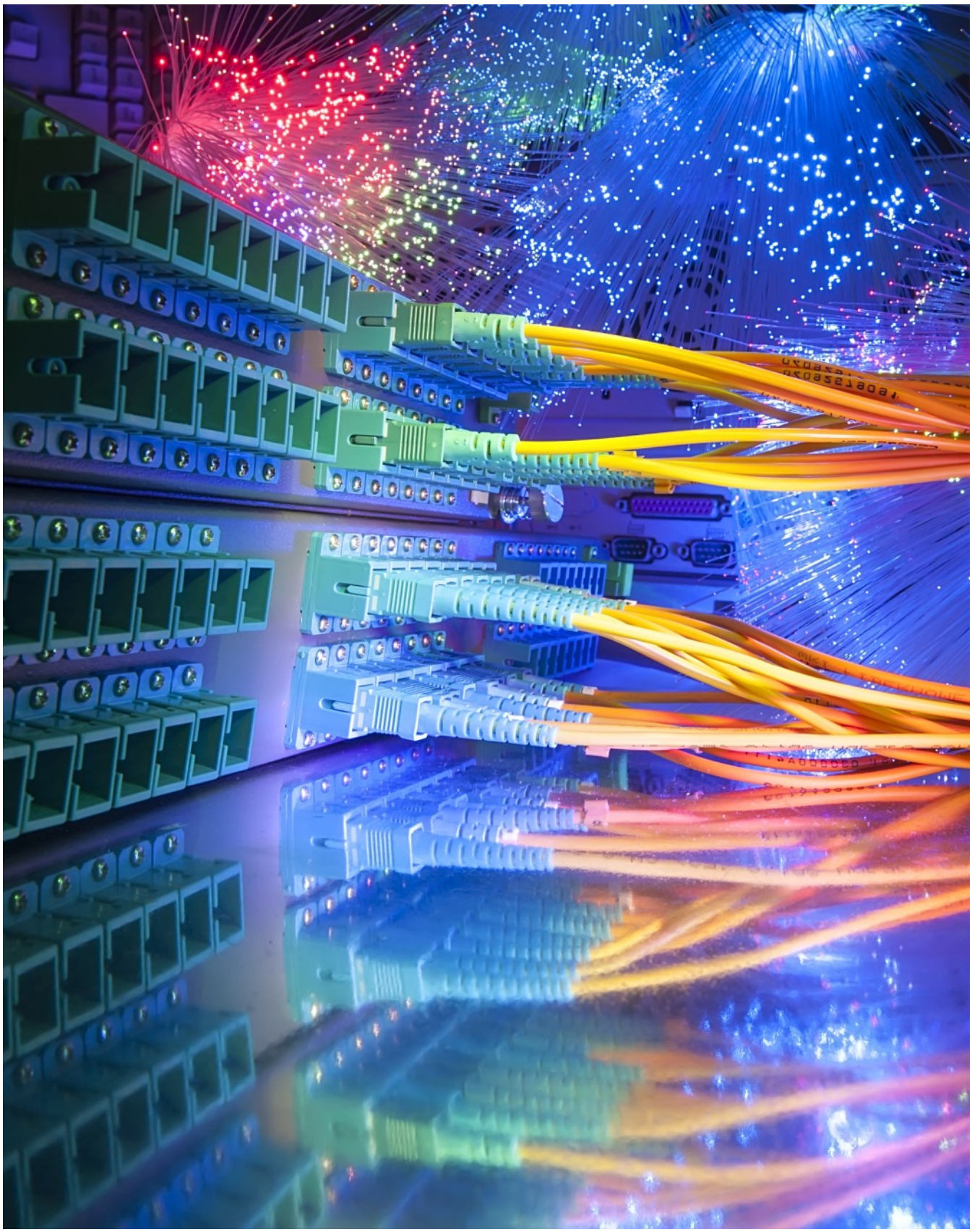


BT-CWDM-MUX-18-LGX

Technical Specifications

Optical Ports
• LC/PC connectors
• Center Wavelengths according to ITU-T G.694.2
• Channel center wavelengths 1270 ~ 1610nm
• Channel clear passband +/- 7nm
• Insertion Loss 8-ch: -2,5dB; 16-/18-ch: -3,5dB (max.)
• Passband ripple <0,5 dB
• Adjacent Channel Isolation >30dB
• Non-Adjacent Channel Isolation >45dB
• Polarisation dependant loss <0,1dB
• Directivity >45dB
• Return loss >45dB
• Polarisation Mode Dispersion <0,2ps
Model Name
• BT-CWDM-MUX-08-LGX / BT-CWDM-MUX-16-LGX / BT-CWDM-MUX-18-LGX

	CWDM Channels	Wavelength
18 CH.	1	1270
16 CH.	2	1290
8 CH.	3	1310
	4	1330
	5	1350
	6	1370
	7	1390
	8	1410
	9	1430
	10	1450
	11	1470
	12	1490
	13	1510
	14	1530
	15	1550
	16	1570
	17	1590
	18	1610



SFPs

SFP [Small Form-factor Pluggable]

is a compact, hot-pluggable transceiver used for both telecommunication and data communications applications. The form factor and electrical interface are specified by a multi-source agreement (MSA). It interfaces a network device motherboard (for a switch, router, media converter or similar device) to a fiber optic or copper networking cable. It is a popular industry format jointly developed and supported by many network component vendors. SFP transceivers are designed to support SONET, Gigabit Ethernet, Fibre Channel, and other communications standards.

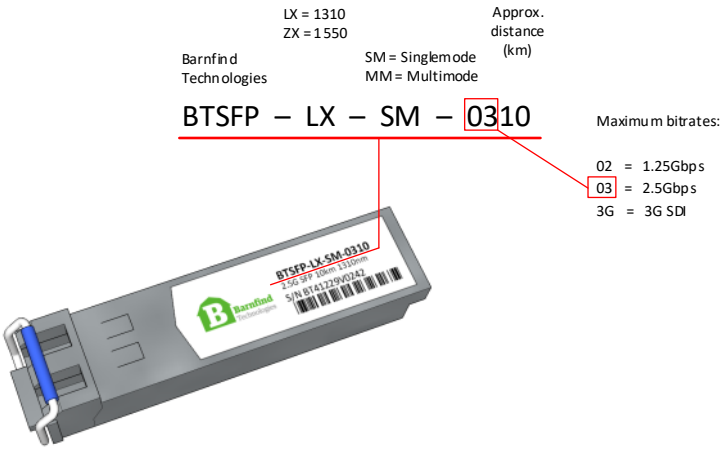
Source, Wikipedia

How to read Barnfind's SFPs

Standard SFPs

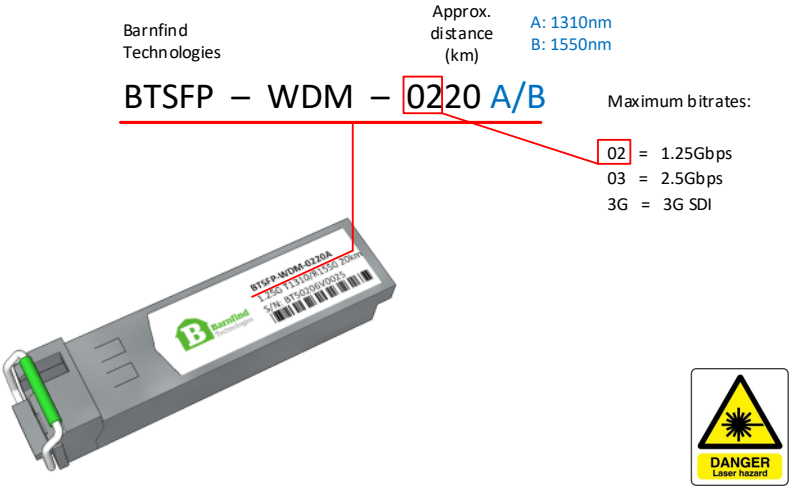
A transceiver SFP is normally used point to point over short, meduim and long distances. The most significant information is; the maximum distance and the maximum data rate.

Note! The RX (receiver) can read all wavelengths, even CWDM wavelengths. See aplication 'Color converting'



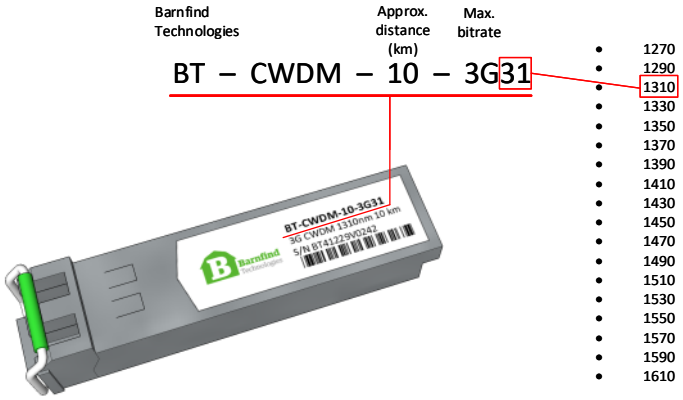
BIDI SFPs

BIDI SFPs has a WDM multiplexer integrated to transmit and receive on the same port. Normally used for a point to point transmission with only one (1) single fiber.



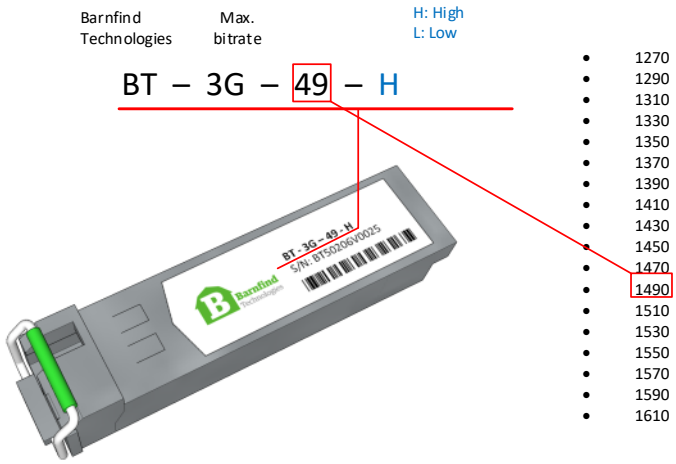
CWDM SFPs

To be able to multiplex a number of signals in one optical fiber, each CWDM channel must have an unique wavelength (frequency). The label of a Barnfind SFP describes the approximate distance, maximum data rate and wavelength. *Due to a limitation of characters, the wavelength is shorten down to the two middle digits.*



HiLo SFPs

The HiLo SFPs are BIDI SFPs with CWDM transmitter. The SFPs are using a narrow channel spacing, and allows you to transmit 2 channels into 1 standard CWDM wavelength. Can be used with a standard CWDM optical multiplexer. They are labeled with **H** (high) or **L** (low) and work as pair in the link.



Other SFPs

Any SFP transceiver following the MSA pinout can be used inside Barnfind's BarnOne or BarnMinis. Barnfind does accept SFPs from other manufacturers and welcomes customers to use

SFP - Media Converter

Some SFPs offer integrated media conversion:

- RJ45 connector for Ethernet
- HDMI converting to SDI
- HD-BNC for SDI
- HD-BNC for CVBS converting to SDI

Data Sheet - Example

BTSFP-LX-SM-3G10

Single-Mode Video SFP (MSA), Optical transceiver with DDM.

3G-SDI Medium Reach, λ1310nm

The **BTSFP-LX-SM-3G10** 3G-SDI optical dual-fiber transceiver perfectly converts from SDI electrical signal at SMPTE 424M, SMPTE 292M, SMPTE259M and DVB-ASI to optical signal. It supports data rate 3Gbps and handles pathological patterns.

FEATURES

- Support SMPTE 424M, SMPTE 292M, SMPTE 259M, DVB-ASI
- Handles pathological patterns for 3G-SDI, HD-SDI and SD-SDI
- 3Gbps transmission for 10km over single mode fiber
- Digital diagnostics function to measure temperature, supply voltage, TX bias current, TX output power, received optical power and to show flag status
- Pluggable and hot-swappable, LC connector
- Single +3.3V power supply
- Low power consumption- Typical 200 mA
- Laser disable pin
- Pb-free and RoHS compliant
- Operating temperature: 0° C to 70° C Application

LASER SAFETY

This single mode fiber module is a Class 1 laser product. It complies with IEC 825 and FDA 21 CFR 1040.10 and 1040.11. The fiber module must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

OPTICAL PERFORMANCE SPECIFICATIONS

Parameter		Min	Typ	Max
Transmitting part				
Transmitting Optical Power (dBm)		-8	-5	-3
Laser Wavelength (nm)		1260	1310	1360
Linear Extinction Ratio		5.0	8	-
Total Jitter (P-to-P Filter) (ps) *PRBS 2^{23}-1 test pattern*	2.97Gb/s	-	45	80
	1.485Gb/s	-	45	80
	270 Mb/s	-	45	80
Optical Signal Rise Time (ps)	2.97Gb/s	-	-	135
	1.485Gb/s	-	-	270
	270 Mb/s	-	-	400
Optical Signal Fall Time (ps)	2.97Gb/s	-	-	135
	1.485Gb/s	-	-	270
	270 Mb/s	-	-	400
Receiving part				
Receiver Wavelength (nm)		1260	-	1620
Receiver Sensitivity (dBm) (Measured with pathological pattern; BER<10^{-12})	2.97Gb/s	-18	-	-
	1.485Gb/s	-18	-	-
	270 Mb/s	-18	-	-
Receiver Overload (dBm)		-	-	-1.0
Receiver Loss of Signal Asserted (dBm)		-35	-	-
Receiver Loss of Signal De-asserted (dBm)		-	-	-18
Receiver Loss of Signal Hysteresis (dB)		0.5	2	-

ELECTRICAL SPECIFICATIONS

Parameter	Min	Typ	Max
Operating case temperature range (°C)	0	-	70
Storage temperature range (°C)	-40	-	85
Power supply voltage (V)	3.1	3.3	3.5
Power consumption (mA)	-	200	300

Contact your local Barnfind partner for more information about Barnfind products.

Visit our web page for application examples and downloads. **www.barnfind.no** *Please contact us by* **support@barnfind.no** *for technical support and services.*

BT-CWDM-10-3GXX

3G CWDM Video SFP Single-Mode 1270-1610nm 10KM DDM

The **BT-CWDM-10-3GXX** is a single mode transceiver module designed to transmit/receive optical serial digital signals as defined in SMPTE 297-2006. It supports from 50Mbps to 3 Gbps and is specifically designed for transmitted the SMPTE 259M, SMPTE 344M, SMPTE 292M and SMPTE 424M SDI pathological patterns. It is with the SFP 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I2C. This module is designed for single mode fiber and operates at a nominal wavelength of CWDM wavelength. There are eighteen center wavelengths available from 1270 nm to 1610 nm, with each step 20 nm. A guaranteed minimum optical link budget of 20 dB is offered. The transmitter section uses a multiple quantum well CWDM DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

Features

- SMPTE 297-2006 Compatible
- Hot-Pluggable SFP Footprint LC Optical Transceiver
- Small Form-Factor Pluggable (SFP) MSA compatible
- Speed from 50Mbps to 3Gbps with up to 10km Singlemode Fiber
- Support Video Pathological Patterns for SD-SDI, HD-SDI and 3G-SDI
- Power Budger > 20 dB
- 18-CH CWDM: 1270 nm to 1610 nm
- SFF-8472 Digital Diagnostic Function
- Single +3.3 V Power Supply
- RoHS-6 Compliant
- 0 to 70oC Operation
- Hot Pluggable
- Class 1 Laser International Safety Standard IEC-60825 Compliant

Application:

- SMPTE 297-2006 Compliant Electrical-to-Optical Interfaces
- High-density Video Routers

Absolute Maximum Ratings

CWDM* Wavelength (0 to 70°C)

Central Wavelength	Min. (nm)	Typ. (nm)	Max. (nm)	Clasp Color Code	Central Wavelength	Min. (nm)	Typ. (nm)	Max. (nm)	Clasp Color Code
-C270	1264.5	1270	1277.5	Light Purple	-C450	1444.5	1450	1457.5	Yellow Orange
-C290	1284.5	1290	1297.5	Sky Blue	-C470	1464.5	1470	1477.5	Gray
-C310	1304.5	1310	1317.5	Yellow Green	-C490	1484.5	1490	1497.5	Violet
-C330	1324.5	1330	1337.5	Yellow Ocher	-C510	1504.5	1510	1517.5	Blue
-C350	1344.5	1350	1357.5	Pink	-C530	1524.5	1530	1537.5	Green
-C370	1364.5	1370	1377.5	Beige	-C550	1544.5	1550	1557.5	Yellow
-C390	1384.5	1390	1397.5	White	-C570	1564.5	1570	1577.5	Orange
-C410	1404.5	1410	1417.5	Silver	-C590	1584.5	1590	1597.5	Red
-C430	1424.5	1430	1437.5	Black	-C610	1604.5	1610	1617.5	Brown

CWDM*: 18 Wavelengths from 1270 nm to 1610 nm, each step 20 nm.

Absolute Maximum Ratings					
Parameter	**Symbol**	**Min**	**Max**	**Units**	**Notes**
Storage Temperature	Tstg	-40	85	°C	
Operating Case Temperature	Tc	0	70	°C	
Power Supply Voltage	Vcc	0	4	V	
ESD Tolerance on all pins			1	KV HBM	
Relative Humidity	---	5	95	% RH	non-condensing

Recommended Operating Conditions					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units / Notes**
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Operating Case Temperature	Tc	0		70	°C
Baud Rate		50		3000	Mb/s
Power Supply Current	Icc		200	300	mA

Transmitter Specifications (0°C < Tc < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Optical						
Optical Transmit Power	Po	-8		-3	dBm	1
Output Center Wavelength	λ	λc –5.5	λc	λc +7.5	nm	2
Output Spectrum Width	Δλ	---		1	nm	-20 dB width
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	5	7.5		dB	
Relative Intensity Noise	RIN			-120	dB/Hz	
Optical Rise Time / Fall Time	tr / tf			135	ps	3, SMPTE 424M
				270	ps	3, SMPTE 292M
				800	ps	3, SMPTE 344M
				1.5	ns	3, SMPTE 259M
Electrical						
Differential Input Voltage	V_{IH} - V_{IL}	200		1200	mVp-p	AC coupled input
Disable Input Voltage -- Low	$V_{TDIS,L}$	0		0.8	V	TX Output Enabled
Disable Input Voltage -- High	$V_{TDIS,H}$	2.0		Vcc+0.3	V	TX Ouput Disabled
SCL, SDA	V_{OH}	2.5		Vcc+0.3	V	
	V_{OL}	0		0.5	V	

Receiver Specifications (0°C < Tc < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Optical						
Wavelength of Operation		1260	---	1620	nm	
Sensitivity for SMPTE 424M 2.97 Gb/s	Sen	0	---	-18	dBm	Pathological
		0		-20	dBm	PRBS 2^{23}-1, BER=1E-12
Sensitivity for SMPTE 292M 1.485 Gb/s	Sen	0	---	-20	dBm	Pathological
		0		-21	dBm	PRBS 2^{23}-1, BER=1E-12
Signal Detect -- Asserted	Pa	---	---	-20	dBm	Transition: low to high
Signal Detect -- Deasserted	Pd	-29	---	---	dBm	Transition: high to low
Signal detect -- Hysteresis		1		6	dB	
Optical Return Loss			-27		dB	

All statements, technical information, and recommendations related to the products herein are based upon information believed to be reliable or accurate. However, the accuracy or completeness thereof is not guaranteed, and no responsibility is assumed for any inaccuracies. Please contact Barnfind Technologies AS for more information.

EB30HDRT-LMR-BAR001
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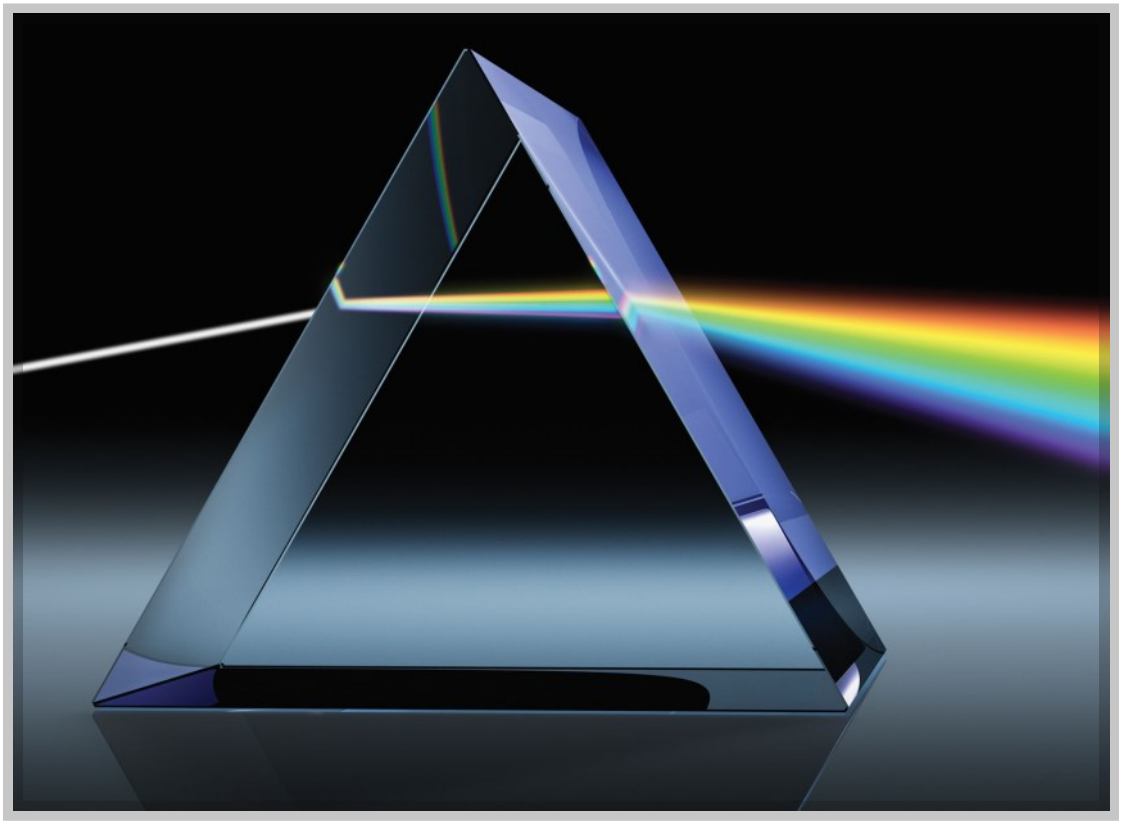
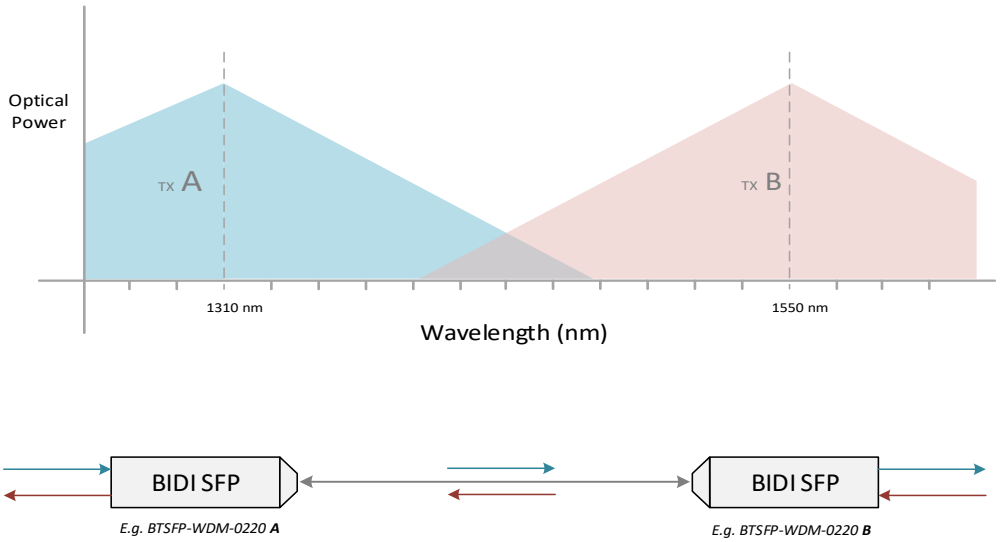
Barnfind

BarnAcademy

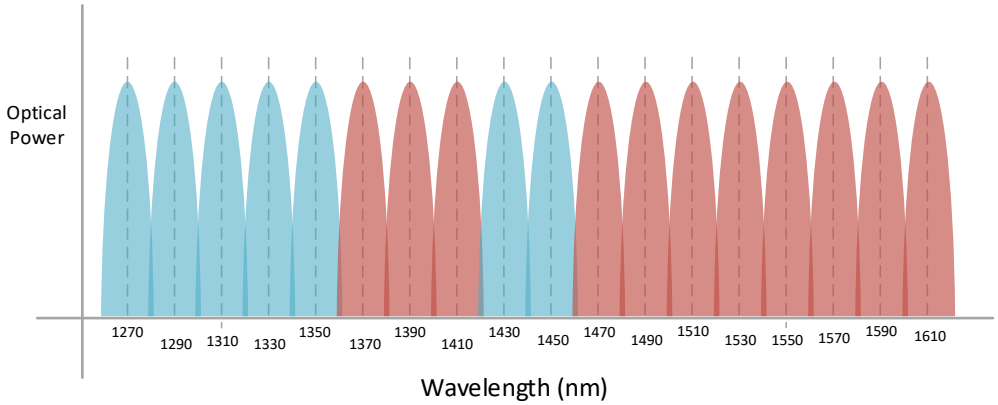


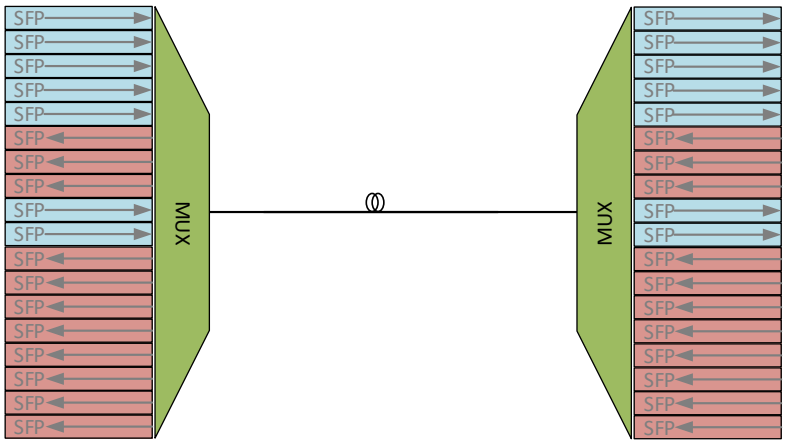
WDM - Wavelength Division Multiplexing

Wavelength Division Multiplexing is a way to transmit two (2) individual signals in one fiber. The BIDI SFP modules are specially made for this purpose. Those SFPs are always working as a pair (A/B) using two different transmitting wavelengths (A:1310nm and B:1550nm) . The multiplexer is integrated in the SFP. With a stand alone WDM mux at either end of the fiber, it is possible to have 2 signals traveling the same direction on the fiber.



CWDM - Coarse Wavelength Division Multiplexing





Coarse Wavelength Division Multiplexing (ITU-T G694.2) allows up to 18 signals to travel on one fiber strand. Any protocol can travel beside another over the same link, as long as it is a specific wavelength. (e.g. HD-SDI @1570nm can be transported alongside 3G-SDI @1590nm and MADI @1510nm). This allows for longterm proofing of the infrastructure, because the multiplexers simply refract light at any speed/bitrate, regardless of the protocol being deployed. Channel spacing is 20nm.

HiLo-Technology

offers the possibility to double the signal count traveling on one fiber using standard CWDM multiplexers in combination with bi-directional HiLo-SFPs

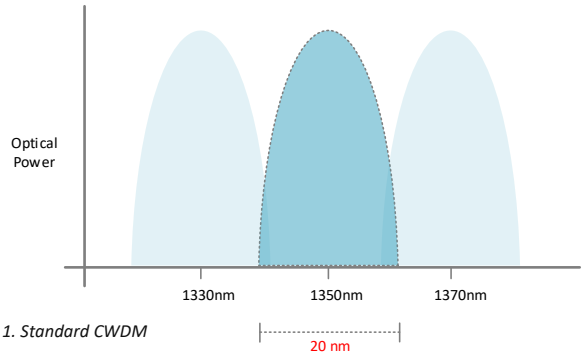


Fig 1. Standard CWDM

Figure 1. shows the standardized channel spacing for use with CWDM (ITU-T G.694.2). It allows totally 18 channels between 1270nm and 1610nm with 20 nm spacing. Due to this limitation of channels deployed in one (1) fiber, system integrators must always prioritize the signals in order to fit a single fiber transmission architechture. *Keep in mind that some signals are bi-directional (e.g. ethernet), and will occupy 2 channels in your CWDM multiplexer*

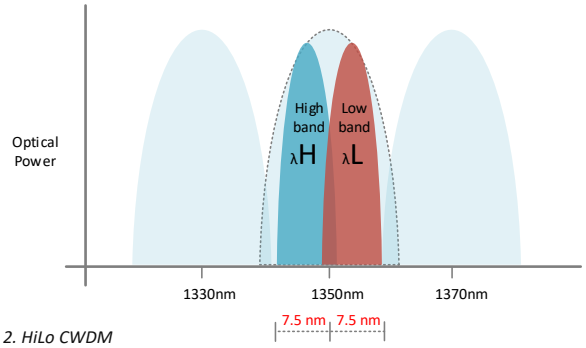


Fig 2. HiLo CWDM

Figure 2. Barnfind HiLo SFPs are designed to meet a need for higher density of signals in one single fiber. By using half of the spacing in each wavelength, *HiLo SFPs can double the capacity of the traditional CWDM bi-directional transmission*.

This enables totally 18 bi-directional links (totally 36 channels).

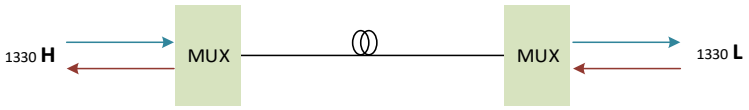
Note!, the HiLo SPFs are designed to be used with a standard optical multiplexer.

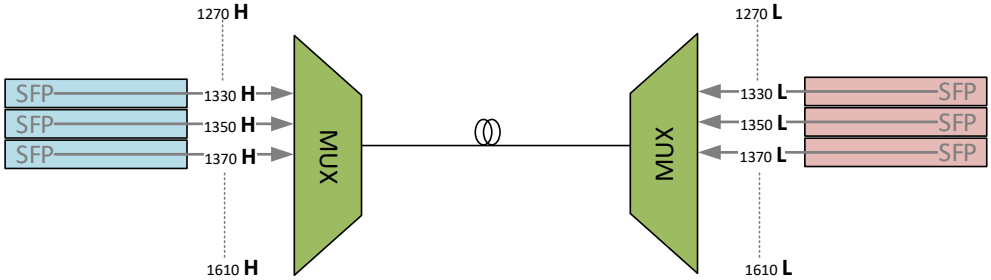
Benefits of using HiLo SFP:

- Up to 18 bi-directional channels in one (1) fiber.
- Can be used with standard optical multiplexer
- Can work along with standard CWDM SFPs to increase the number of channels
- Handles bitrates up to 3Gbps.

Typical aplications:

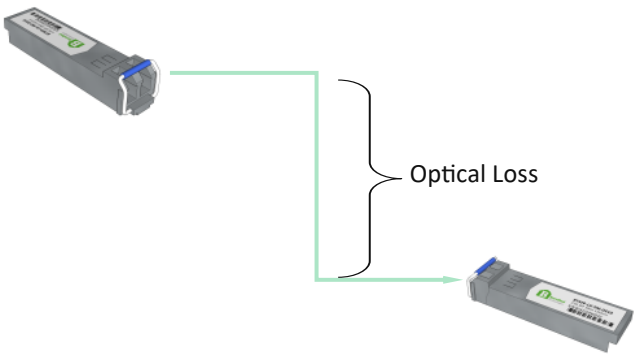
- Ethernet transmissions
- Camera to CCU
- Video workflow with return
- Add Drop





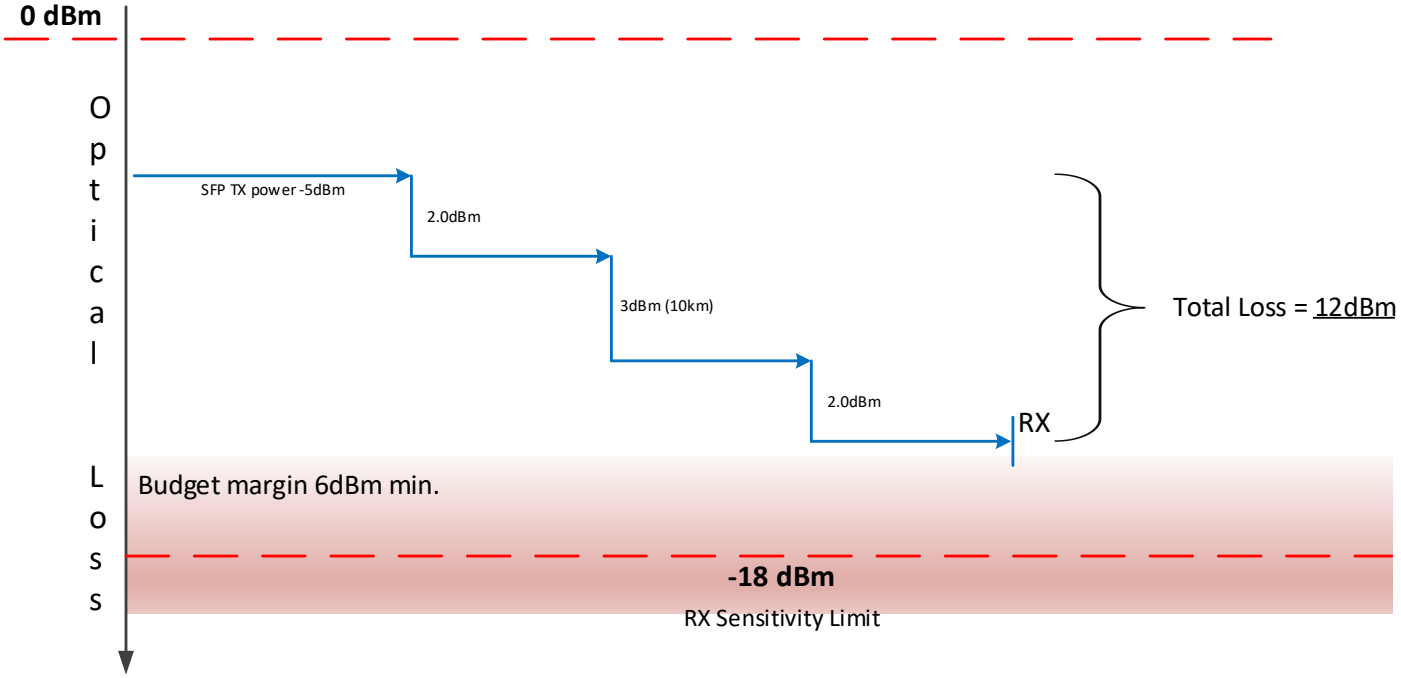
Optical budget calculation

Prior to designing or installing a fiber optic cabling system, a loss budget analysis is recommended to make certain the system will work over the proposed link. That same loss budget will be used as to compare test results after installation of the cabling to ensure that the components were installed correctly. Both the passive and active components of the circuit have to be included in the loss budget calculation. Passive loss is made up of fiber loss, connector loss, and splice loss. Don't forget any couplers or splitters in the link. Active components are system gain, wavelength, transmitter power, receiver sensitivity, and dynamic range. Prior to system turn up, test the circuit with a source and optical power meter to ensure that it is within the loss budget.



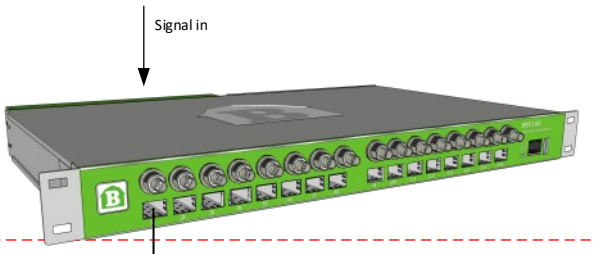
Example:

- BTSFP-CWDM-10-3Gxx
- 10 km



Example shows a simple and very common transmission of a signal from A to B. The numbers refer to maximum values.

Figure on next page shows the same scenario with Barnfind products

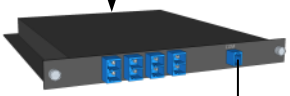


SFP:
BTSFP-CWDM-10-3Gxx

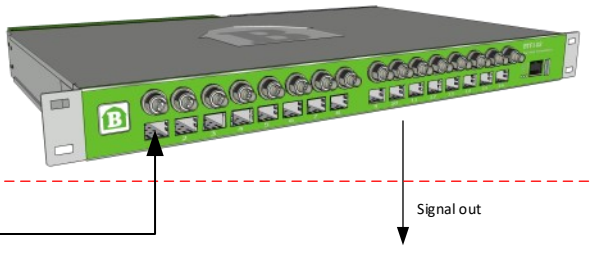
Optical Transmit Power (typ) **-5dBm**

CWDM Multiplexer:
Insertion loss:
- **8ch: 2.0dBm** (max)
- **16ch: 3.2dBm** (max)

Single Mode fiber:
Attenuation:
Typically **0.3dBm** per km



CWDM Multiplexer:
Insertion loss:
- **8ch: 2.0dBm** (max)
- **16ch: 3.2dBm** (max)



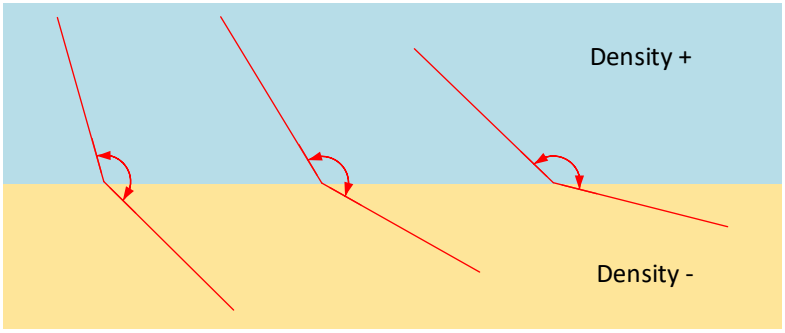
SFP:
BTSFP-CWDM-10-3Gxx

RX Sensitivity (3G-SDI) **-18dBm**

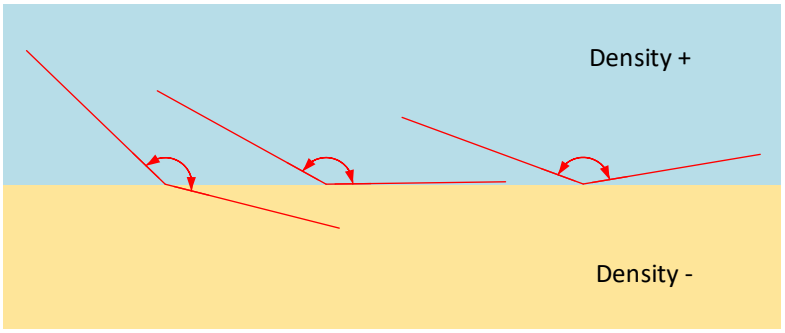
Light travelling through fiber

There is normally not a requirement for a system designer, installer or an operator to know the fundamental physics in how the light can travel such long distances in a tiny fiber, but it is definitely a fascinating and interesting phenomena.

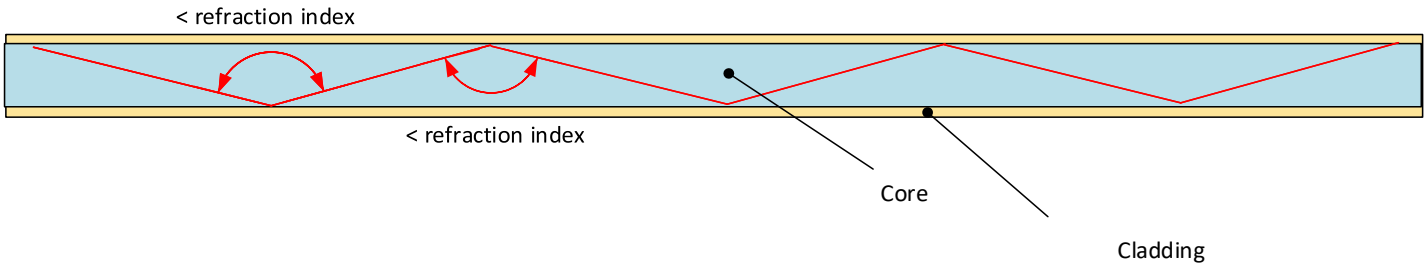
Light travels through a fiber-optic cable by bouncing repeatedly off the walls. You might expect a beam of light, traveling in a clear glass pipe, simply to leak out of the edges. But if light hits glass at a really shallow angle (less than 42 degrees), it reflects back in again—as though the glass were really a mirror. This phenomenon is called total internal reflection. It's one of the things that keeps light inside the pipe.

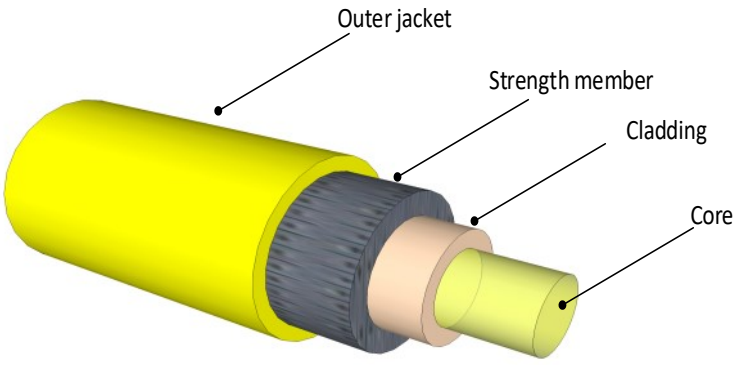


The light is «bending» when it hits a material with lower density. The incoming angle is too sharp, and light will leak.



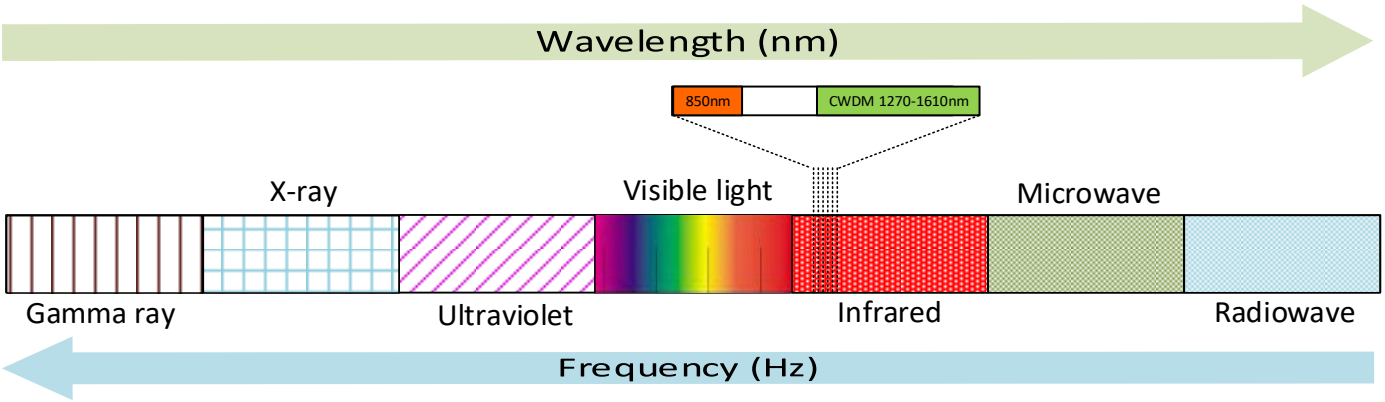
Light always reflects with the same angle as it enters a surface, but when the angle is shallow enough, it will bounce back into the material with higher density again. This sequence repeats when hitting the «roof». See illustration below.



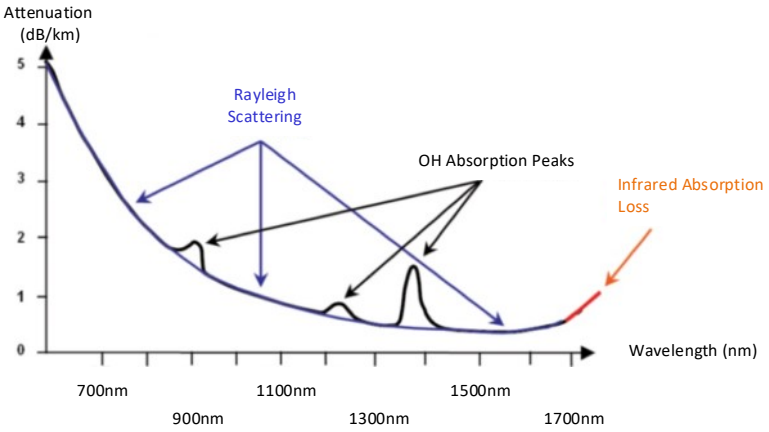


The second factor keeping light in the pipe is the structure of the cable, which is made up of two separate parts. The main part of the cable - in the middle - is called the **core** and that is the part the light travels through. Wrapped around the outside of the core is another layer of glass called **cladding**. The cladding keeps the light signals inside the core, because it is made of a different type of glass than the core itself. More technically, the cladding has a lower refractive index.

The electromagnetic spectrum



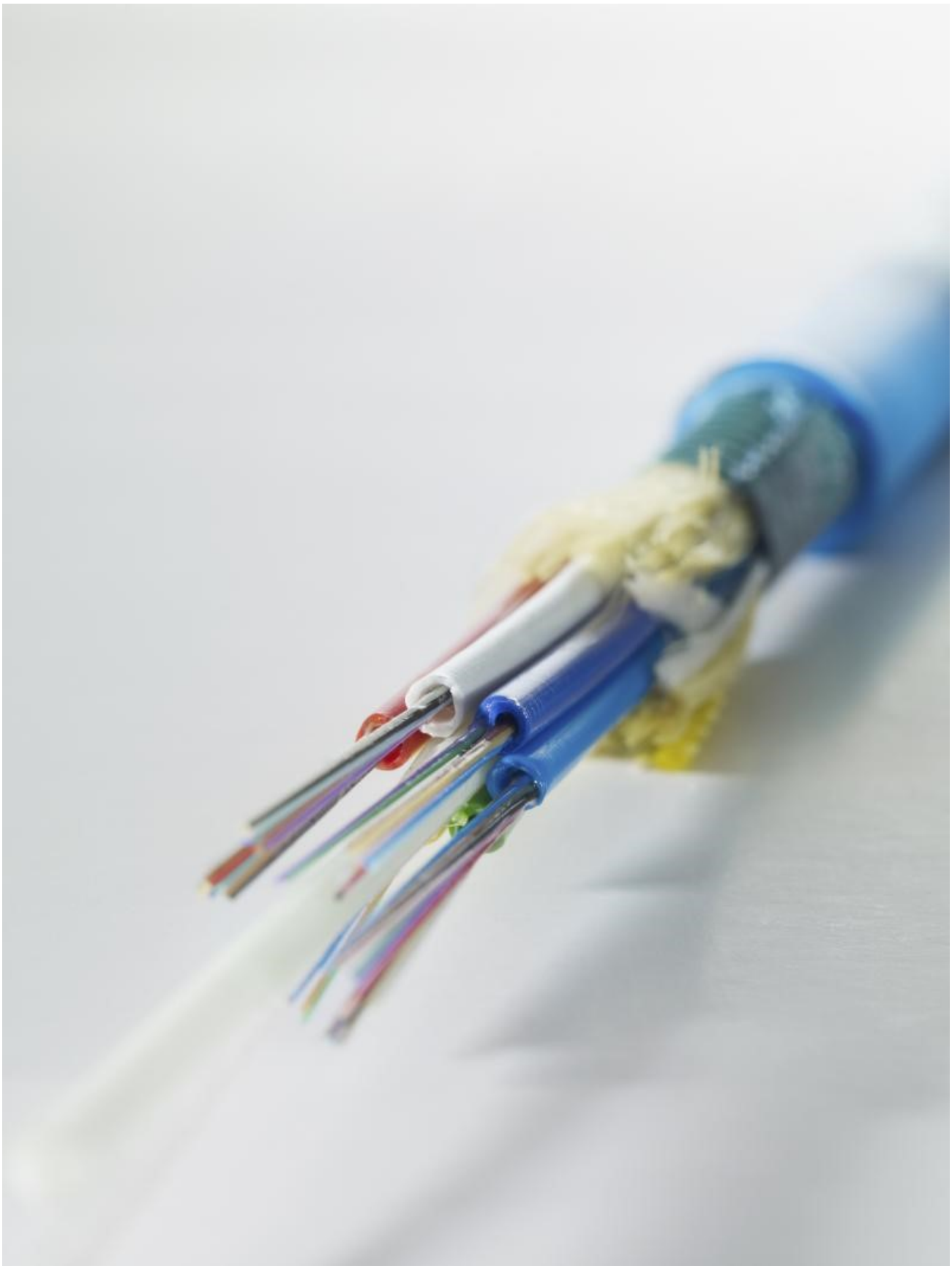
The attenuation/wavelength graph, would suggest that all transmission is best done in the 1550nm window, where the Rayleigh scattering losses are lowest. However, LED and VCSEL (vertical cavity surface emitting laser) sources can currently be manufactured in high volume at very low cost in the 850nm window (multi mode). The higher attenuation due to scattering limits will reduce the transmission distance. Long distance applications (50km+) are owned by transceivers utilizing the 1550nm window. Achieving these distances comes at a price. Sources such as Distributed FeedBack (DFB) and Externally Modulated Lasers (EML) are not easily fabricated in anything but an edge-emitting semiconductor structure, greatly increasing the manufactured cost of these devices. On the receiving side, sophisticated receivers such as Avalanche Photo-Diodes (APDs) also drive up cost. There is a middle ground…the 1310nm window. The availability of inexpensive Fabry-Perot laser sources and simple Positive Intrinsic Negative (PIN) receivers to provide reliable transmission covering a range of 1km to about 50km has made the 1310nm window the third alternative.



Laser precautions:

One should exercise the same kinds of safety precautions around lasers as with any other power tool or electrical device paying special attention to eye safety.

Do never look directly into a SFP, multiplexer or fiber-end! It may cause severe damage to your eye!



Software & Control

BarnStudio

BarnStudio is a management and configuration tool to be used with BarnOne and BarnMini units which offer a control interface. It is a great tool for general monitoring of signal flow and diagnostic of SFPs, BNCs, many different optical parameters, fans, reclockers, equalizers etc.

You can run BarnStudio on a PC running Windows (Windows 7 and higher). For users with other operating systems all BarnOne frames run a web server offering the same functionality as BarnStudio.

This chapter explains the functionalities and possibilities in BarnStudio.

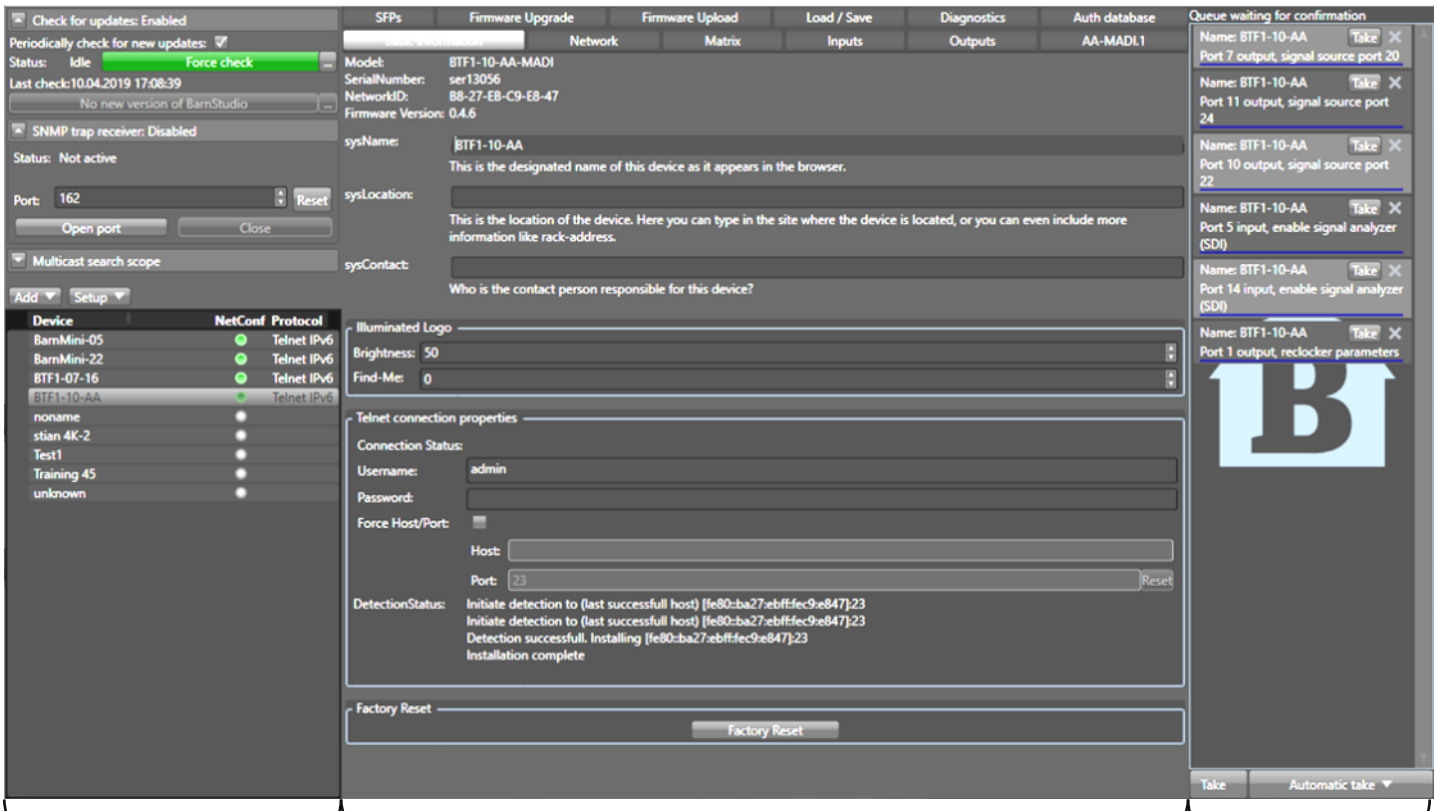
Installation

Download latest version of BarnStudio for free, directly from the website. and run «BarnStudio...setup.exe»

https://www.barnfind.no/downloads/

Overview

The main window is divided into three columns:



Connections

connection properties and device list

Frame Operations

detailed information about the frame which was selected in the connections column

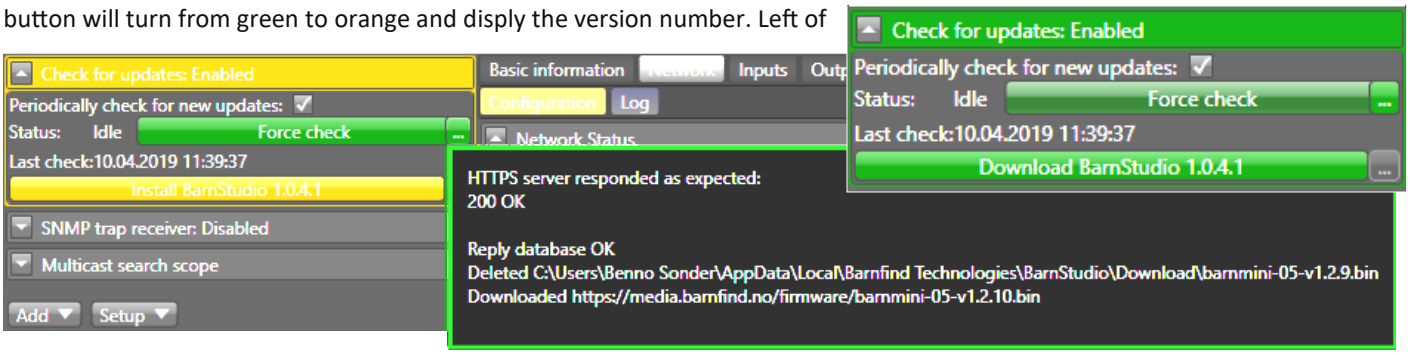
Take List

All changes have to be acknowledged in the take list

Software Updates

As from version 1.0.4.0 on BarnStudio can be coonfigured to automatically check for updates of software and firmware.

Open the window *check for updates* at the top left corner: If the check box *Periodically check for updates* is activated, BarnStudio will automatically download the latest firmware for BarnOne and BarnMini and inform about available software updates for BarnStudio. *Force check* can be used to manually check for updates. Once an update is available the *Download BarnStudio x.x.x.x* button will turn from green to orange and disply the version number. Left of



the *Force check* button you can find a -button, clicking on it will show the directory where the related firmware files have been stored (C:\Users\User Name\AppData\Local\Barnfind Technologies\BarnStudio\Download\). The BarnStudio setup file has to be downloaded actively, it is an executable file which might trigger a virus scanner. If the *Install BarnStudio x.x.x.x*-button is selected, the installer will be opened and guide through the installation process.

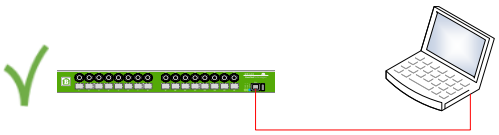
Factory Reset:

Restoring factory settings will have effect on the IP and password configuration:

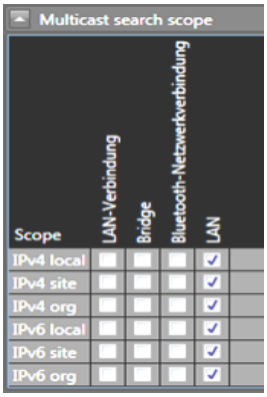
- DHCP activated
- Password for Administrator is reset to *no password*

Discover BarnOne and BarnMini

Note: BarnOne and BarnMini units are shipped with no IP address set by default, but with DHCP enabled.

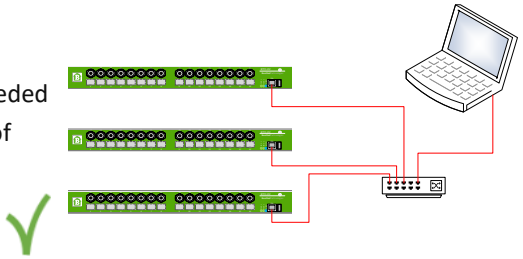


BarnStudio uses multicast for discovering and configuring network parameters for any connected units. The reason is that multicast always works regardless of the current IP address/status.



Multicast search scope:

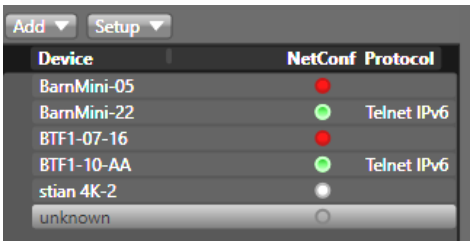
You can select of which network interfaces you want to search for frames on. Each network interface represents one column. *Note! text appears in your local language*. The Multicast search scope offers you multiple different search addresses: local, site and organization search scope, at both IP version 4 and 6. But only one is needed to be selected at any given time for auto discovery of frames to function. Once all frames are detected, the multicast can be turned off, to reduce traffic.



Device List:

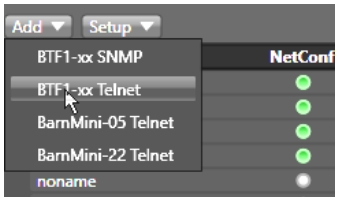
All Barfind units that are discovered in the network or manually configured will appear in alphabetic order in the Device List. The devices can be renamed under the Basic Information tab.

NetConf status:



- If you add a new frame and it is not connected, it shows grey color.
- Frame is no longer visible by Multicast autodetection.
- Valid, in operation

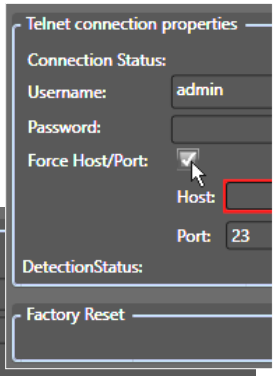
Note! If you connect remotly, it might appear as red or grey even if you have a valid connection.

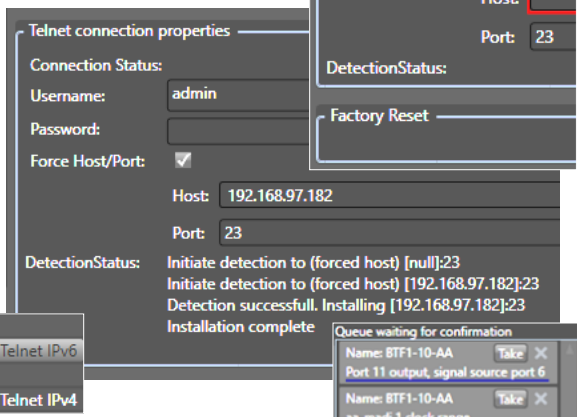


Manually Add units to the device list:

Push the Add button to manually add more devices. From a drop down menu you vcan select the device type and for BarnOne units the connection type (Telnet or SNMP). BarnMinis only connect via Telnet. Once you have selected one of the options, the device will show up as *noname* in the device list with a grey *NetConf* led.

As next step you need to manually enter the IP of the unit you whish to connect to. Select the device named *noname* and navigate on the *Basic Information* tab to the section *Telnet* or *SNMP connection properties*, check the box *Force Host/Port* and enter the IP address of the unit. The port number is pre-configured (Port 23 for Telnet, Port 161 for SNMP), please change according to your network specifications. After you have confirmed the changes in the *Take List*, *Detection Status* will inform you if BarnStudio was able to connect to the unit. Next to the *NetConf* indication the connection protocol (Telnet/SNMP) is shown.



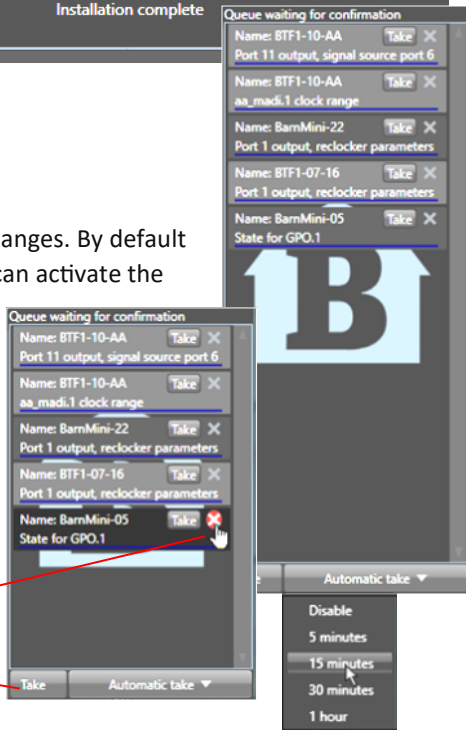


Remove:

If you right click on a given device you can you will get a Pop up menu where you can select to remove that device.

Acknowledgement (*Take*) of configuration changes

You can protect the setup/configuration against unwanted accidental configuration changes. By default you need to acknowledge the configuration changes that you want to perform/. You can activate the changes on the right hand side of the screen one by one or *take* them all at once. If you wish to undo/discard a configuration chnage, you click the "X" button for each of



Automatic Take:

The acknowledge feature can be temporary disabled for given time periods: *Automatic take 5 mins*, *15 mins*, *30 mins* and *1 hour*. The *Automatic take* can as well be *disabled* again at any time.

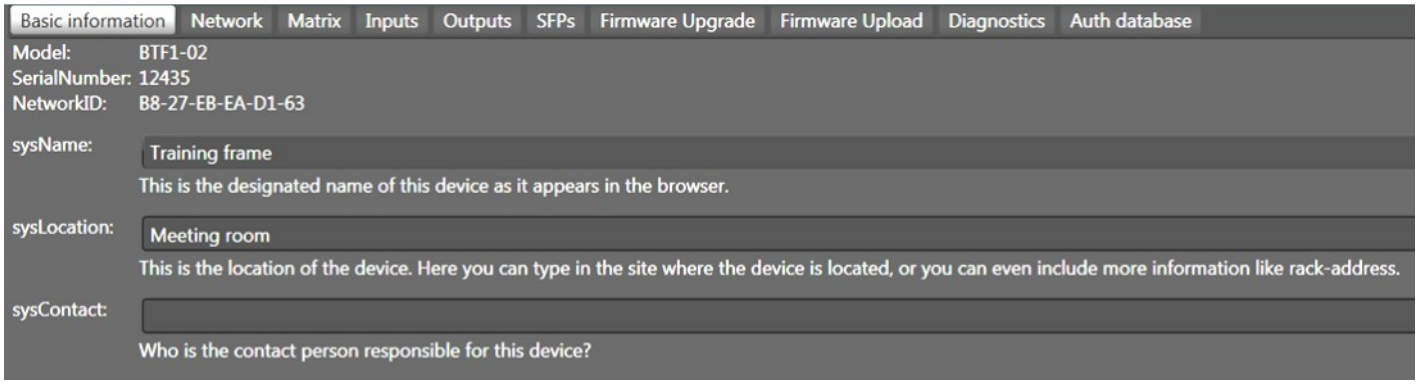
This is typically a function used if you preconfigure a device or where multiple settings need to be performed.

Undo / discard

Take all

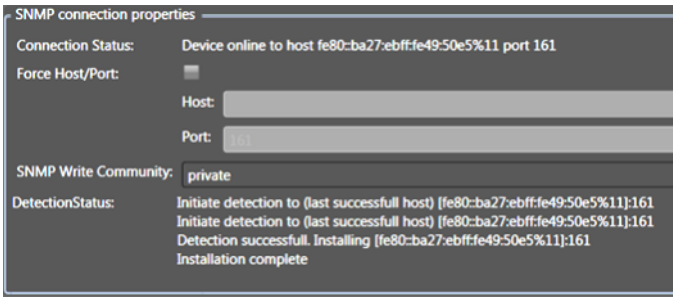
Basic Information

- **sysName**: Set the name of each BTF1-XX frame (this name will appear in the Device List). Note! Only Latin characters and numbers allowed (ASCII).
- **sysLocation**: Where the device is located
- **sysContact**: Who is responsible for the operation or service of the frame



SNMP connection properties:

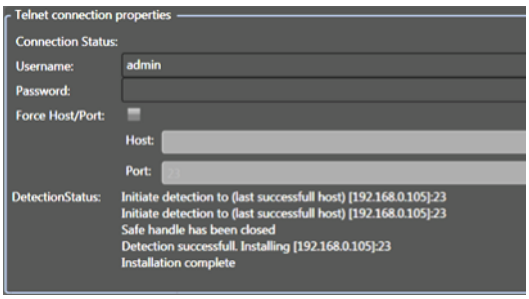
This section can be used if you want to connect by SNMP to a remote device that can not be auto discovered.



- **Connection status:** If the device is connected, you can read out IP and port information.
- **Force Host/Port:** This enables the possibilities to write in Ip and port number to connect.
- **Host:** The remote IP address you want to connect e.g. 192.168.0.2
- **Port:** Normally this should be 161
- **SNMP Write Community:** This is normally set to private.
- **Detection Status:** This shows the last log lines of connecting status.
- **Download BarnOne MIB :** https://media.barnfind.no/20171201%20Barnfind%20MIB.zip

Telnet connection properties:

This section can be used if you want to connect via Telnet to a remote device that can not be auto discovered.



- **Connection status:** If the device is connected, you can read out IP and port information.
- **Force Host/Port:** This enables the possibilities to write in Ip and port number to connect.
- **Host:** The remote IP address you want to connect e.g. 192.168.0.2
- **Port:** Normally this should be 23
- **Detection Status:** This shows the last log lines of connecting status.
- **Download BarOne Telnet documentaion:**

  https://media.barnfind.no/BTF1%20Telnet%20Documentation%20revision%201.0.pdf

Network

The purpose of this section is to see the current network status. Here you can also download, change and upload the network configuration file.

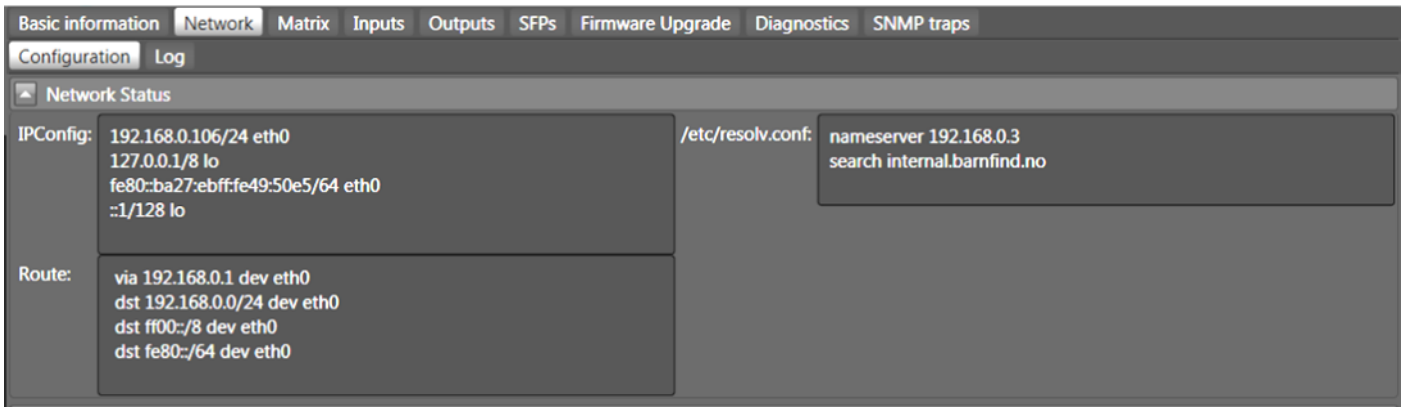
Note! BarnStudio use prefix length for both IPv4 and IPv6 instead of the traditional netmask. This is due to netmask can only be used for IPv4.

Examples:

Netmask 255.255.255.0 is equal to prefix length 24.

Netmask 255.255.0.0 is equal to prefix length 16.

Netmask 255.0.0.0 is equal to prefix length 8.



Network Status:

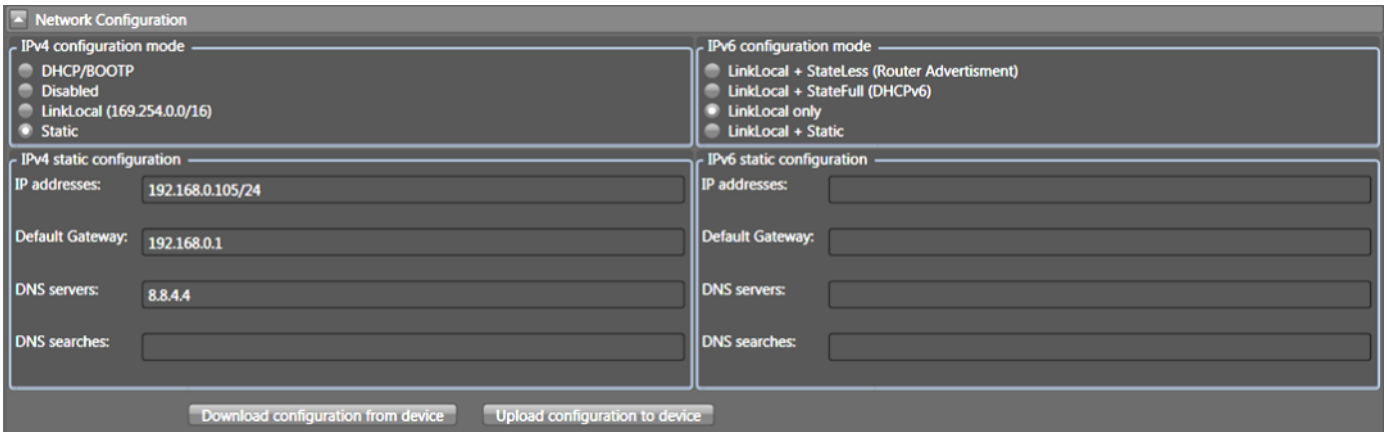
- **IPConfig:** The currently assigned IP addresses.
- **Route:** The currently active routing table.
- **/etc/resolv.conf:** The current DNS resolving configuration file. *This is only used for software upgrades.*

Network Configuration:

This section is for download, change and upload the current configuration file. This section will not be populated until you click “download configuration from device”.

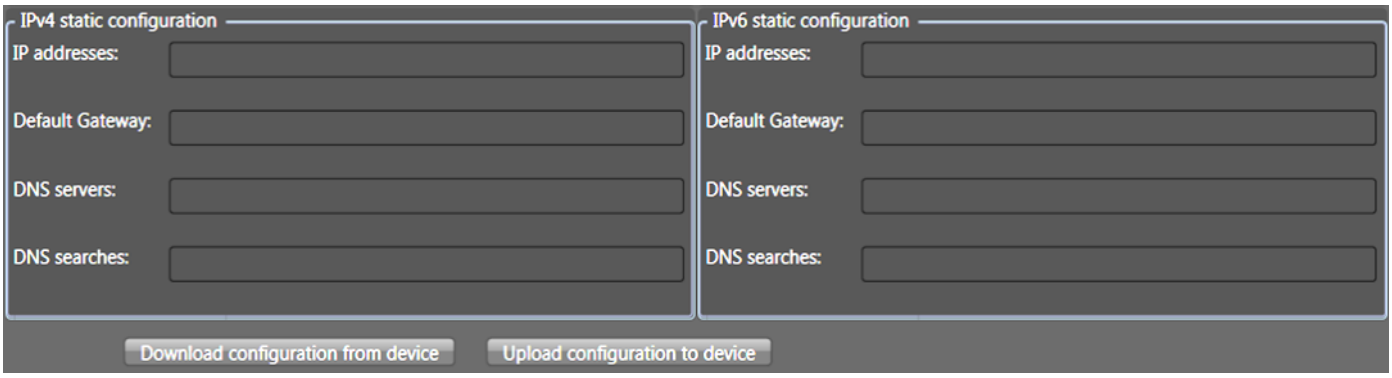
IP v.4 configuration mode: Here you can select which configuration mode that should be used. The options are;

- **DHCP/BootP:** This is what the frames are configured with from factory. This is to automatically configure the IP address using a DHCP server.
- **Disable:** Do not configure an IPv4 address.
- **Linklocal (169.254.0.0/16):** To automatically configure the IP address using a Link Local Address.
- **Static:** Use this to manually configure an IP address. This is the recommended setting for the deployment. Get your IP address from your local network administrator.
  - **IP addresses:** Up to 4 different IP addresses. Each address is written with a prefix length (netmask). Each address is separated with a space. Example: 192.168.0.2/24 10.100.10.2/8
  - **Default Gateway:** Default Gateway if any.
  - **DNS Servers:** IP addresses for resolving DNS. This is only used for software upgrades.
  - **DNS Searches:** This feature is for setting the DNS search, normally left blank.



IP v.6 configuration mode: Here you can select which configuration mode that should be used. The options are;

- **LinkLocal + StateFull (DHCPv6):** This is to automatically configure the IP address using a DHCPv6 server.
- **LinkLocal + StateLess (Router advertisement):** This is the factory default. This is to automatically configure the IP address using the new Router advertisement Protocol. This is normally the replacement for DHCP in IPv6.
- **Linklocal only:** To automatically configure the IP address using a Link Local Address only.
- **Linklocal + Static:** Use this to manually configure an IP address. This is the recommended setting for the deployment. Get your IP address from your local network administrator.
  - **IP addresses:** Up to 4 different IP addresses. Each address is written with a prefix length (netmask). Each address is separated with a space. Example: 2001::2/64 2002:1234::4321/64
  - **Default Gateway:** Default Gateway if any.
  - **DNS Servers:** IP addresses for resolving DNS. This is only used for software upgrades.
  - **DNS Searches:** This feature is for setting the DNS search, normally left blank.



Download Configuration from Device – button

Click this button to download the current configuration file from the device into BarnStudio.

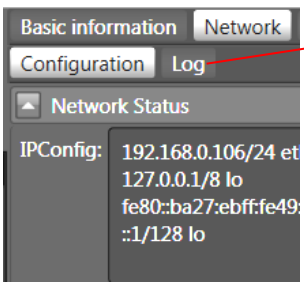
Upload Configuration to Device – button

Click this button to upload the configuration from BarnStudio into the device.

Beneath the Download and Upload buttons, you can see a log of the current transfer (upload/download status).

Note! Download/Upload will first attempt to use Telnet for the transfer. If this fails; the multicast search protocol will be used. It uses the settings from the "multicast search scope" dialog for this.

Log:



Log: This is a live log from the network configuration software running on the device. Currently it shows information from the DHCP clients.

Matrix

The purpose of this section is to configure the BTF1-XX frames routing of signals. The rows going from top to bottom(Y) are the signal sources. The columns going from left to right (X) are the possible signal destinations. A signal can be routed to as many destinations as you may want, but a destination can only be subscribed to one source at any given time.

Outputs

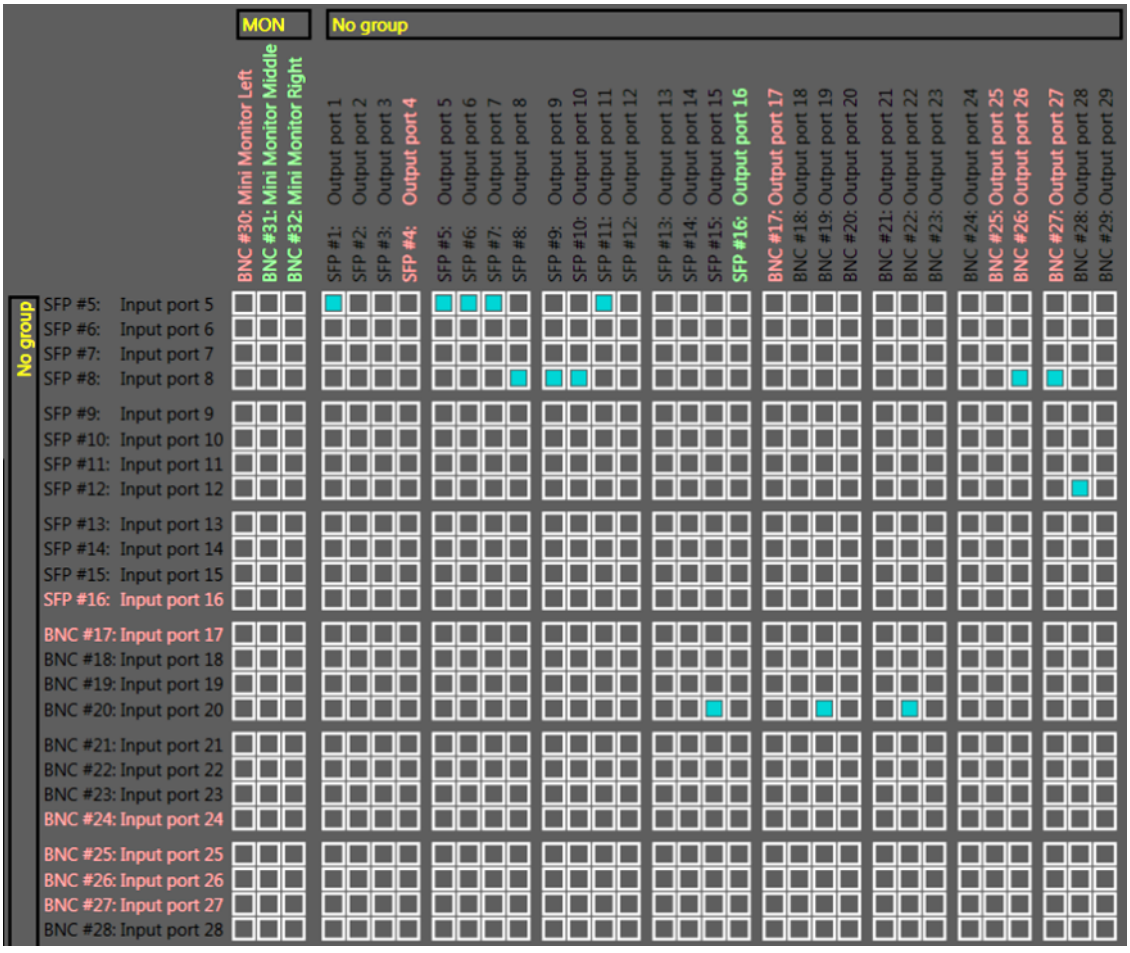
The color indication are as following:

- **Black:** Not able to detect a signal presence.
- **Red:** No signal detected/loss of signal.
- **Green:** Signal is detected (reclocker is locked).

Inputs

The color indication are as following:

- **Black:** Not able to detect a signal presence.
- **Red:** No signal detected/loss of signal.
- **Green:** Signal is detected.



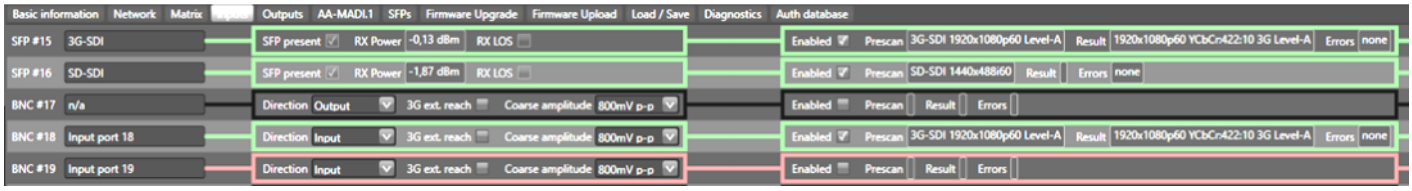
By default the ports are sorted by channel number. This can be changed to alphabetically order using the **setup button**.

Groups can be defined using the input and output tabs.

Inputs

Configure the signal input ports.

Each input port is represented by one row in the table.



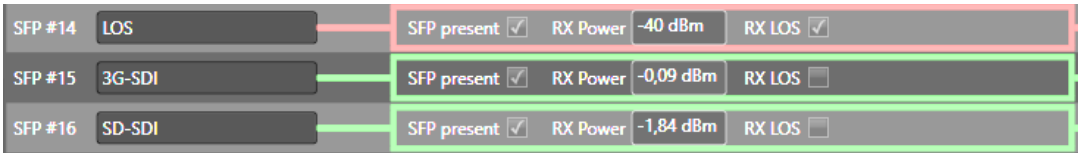
- **Name:** This name of the port is matching the silk print on the front of the BTF1-XX.
- **Label:** This name you may change as you may wish.
- **Groups:** If you want to have grouping of ports in the Matrix tab, you can prefix each label with the name of the group by adding a \ (backslash).

Source \DVD player

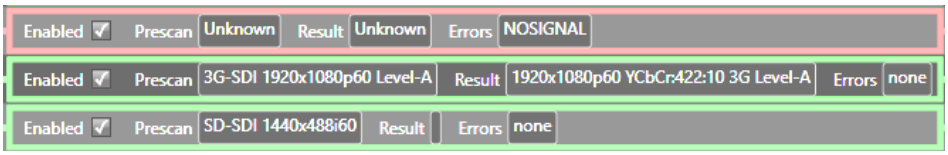
Source \PC

Source \Ani player

- **Direction:** Changes the signal direction for this BNC port. Each port can individually be defined to be either an input or an output.
- **Equalizers:** BNC ports feature a cable equalizer that can be fine-tuned here.
  - **3G ext reach:** Extends the cable length that the Belden standard allows for a 3G signal.
  - **Coarse amplitude:** The expected input voltage of the signal. Normally it should be 800mV.
- **SFP ports** show instead of the Equalizer information if an **SFP** is **present,** optical **RX power** and **RX LOS,** a great feature for trouble shooting**.**



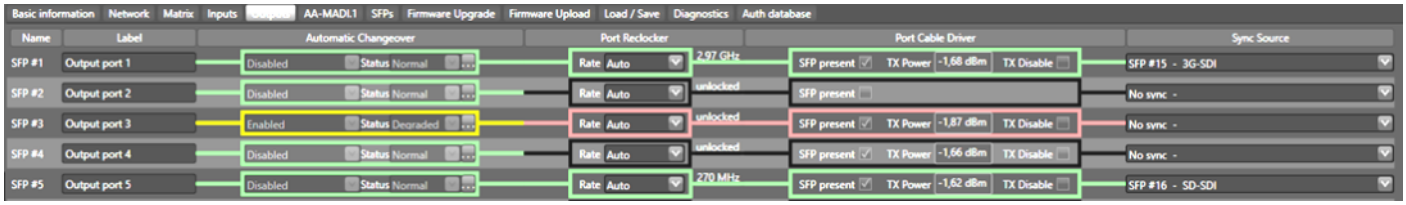
- **Signal analyzer:** Internally in theBTF1-XX frames, there is a SDI deserializer chip that can provide diagnostic information. There is an internal timer that rotate which of the subscribed channels that are sent to the deserializer chip. It will provide information about video resolution detected, if it complies with the an SDI video standard and checking for signal faults like check-sum (CRC).



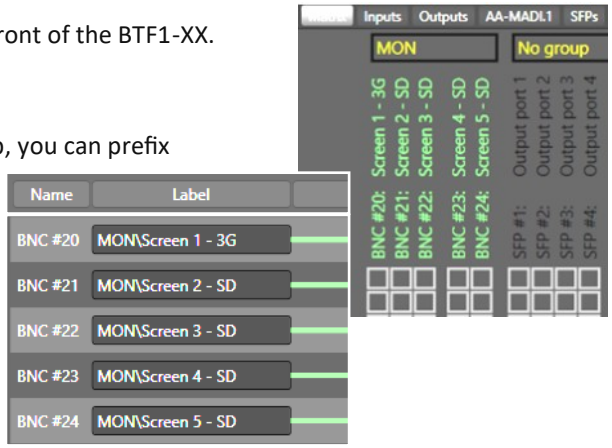
Outputs

Configure the signal output ports.

Each output port is represented by one row in the table.



- **Name:** This name of the port is matching the silk print on the front of the BTF1-XX.
- **Label:** This name you may change as you may wish.
- **Groups:** If you want to have grouping of ports in the Matrix tab, you can prefix each label with the name of the group by adding a \ (backslash).



- **Port reclocker:** Each output port features a SDI re-clocker chip that can re-clock SD (270M), HD (1.5G) and 3G data rates. Each port can be forced to 'Bypassed', 'Power down' or leave at 'Auto'. In most circumstances, it is safe to leave this at Auto for non-SDI signals as well.

  Examples:

  ASI: will be re-clocked as SD-SDI

  SDTI: will be re-clocked as HD-SDI or 3G-SDI

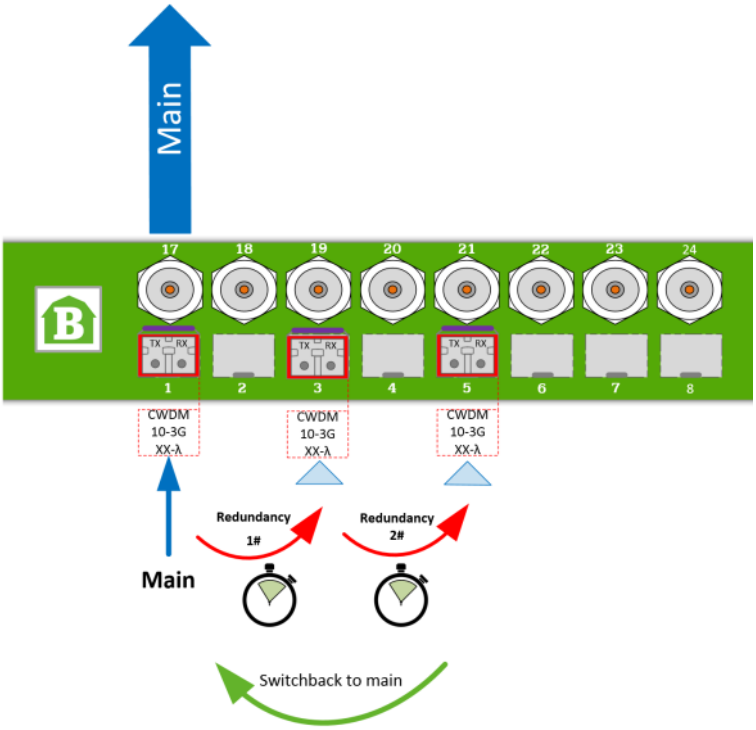
  Ethernet: will be automatically be bypassed

- **Port Cable Driver:** The BNC ports features a port cable driver that can be fine-tuned here. For SFP ports, you can see if the SFP is inserted and the status of the TX disabled parameter.
  - **Speed:** Adjust the rise and fall time of the signal. For signals above SD (270M) data rate HD should be selected.
  - **Direction:** Changes the signal direction for this BNC port. Each port can be defined to be either an input or an output.

- **SFP ports** show instead of the Port Cable Driver information if an **SFP** is **present,** optical **TX power** and information if the optical output is en-/disabled **TX Disable,** a great feature for trouble shooting**.**

- **Sync Source:** You can select if a given output signal is going to have a reference or not. The reference is only used when changing the signal source for this given destination. If you have selected a source and it is not valid; the change will still happen, but will be delayed approx. 50ms before the change is forced.

Signal redundancy switch



As a great-added functionality of Barnfind's latest release, an integrated signal redundancy switch can be configured to all the BarnOne's outputs.

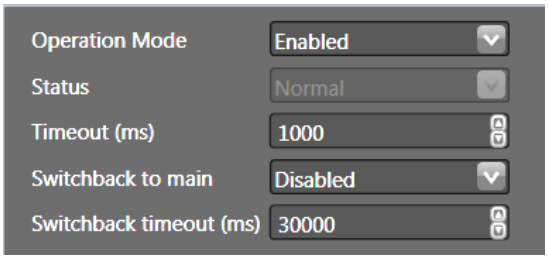
Regardless of signal format, bandwidth, optical or electrical; each individual output can be configured with "alternative" inputs, and they all run in parallel individuality.

The change-over function is activated by 3 different validations:

- *Signal LOS*
- *signal analyzer Lock (SDI only)*
- *signal analyzer errors (SDI only)*

Barnfind's Redundancy Switch functionality gives the user full control of signal presence, quality and status. From being a simple converter/router/ distributer, the range of BarnOne frames have transformed to be a complex and advanced redundancy system. Even with this complexity, the redundancy functions can easily be configured and monitored in the new released BarnStudio web interface.

Click here to access the redundancy configuration table.



Operation Mode - Enable/Disable the redundancy switch function for the selected output.

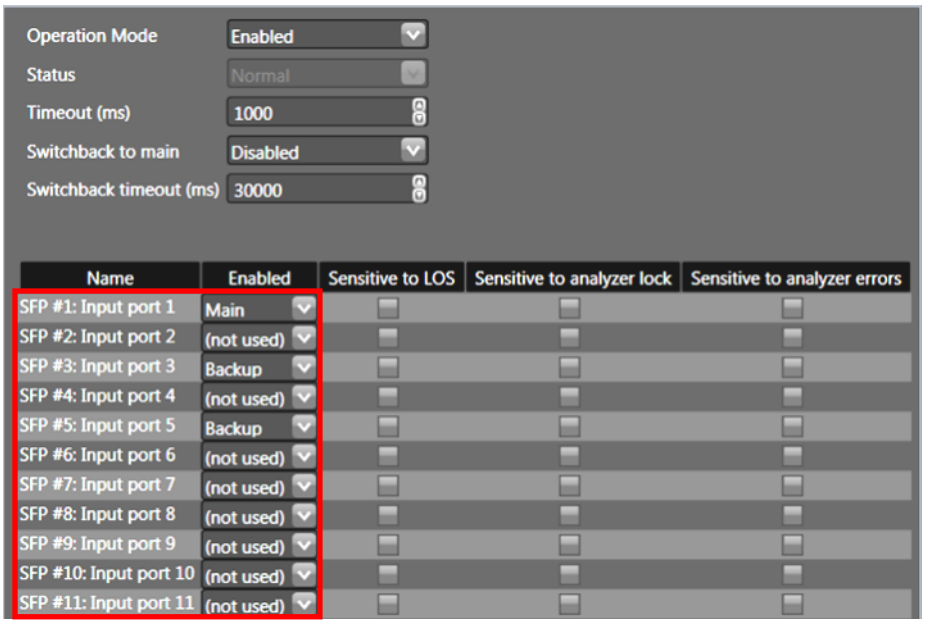
Status - Normal/Degraded

- Normal shows when output is connected to Main signal.
- Degraded shows when output is rerouted to one of the backup inputs.

Timeout (ms) - Select how many milliseconds before switch will activate.

Switchback to main - Enable/Disable a switchback to main signal if main recover.

Switchback timeout (ms) - Select how many milliseconds before switch back to main if it recover (to prevent from toggeling if main is unstabile)

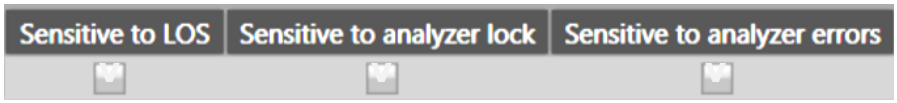


The list will display all inputs available in the BarnOne frame. Select if input should be ***Main*** or Backup.

Note, you can use multiple main or backup inputs. The priority is the input numer

The change-over function is activated by 3 different validations:

- *Signal LOS*
- *SDI analyzer lock*
- *SDI analyzer errors*



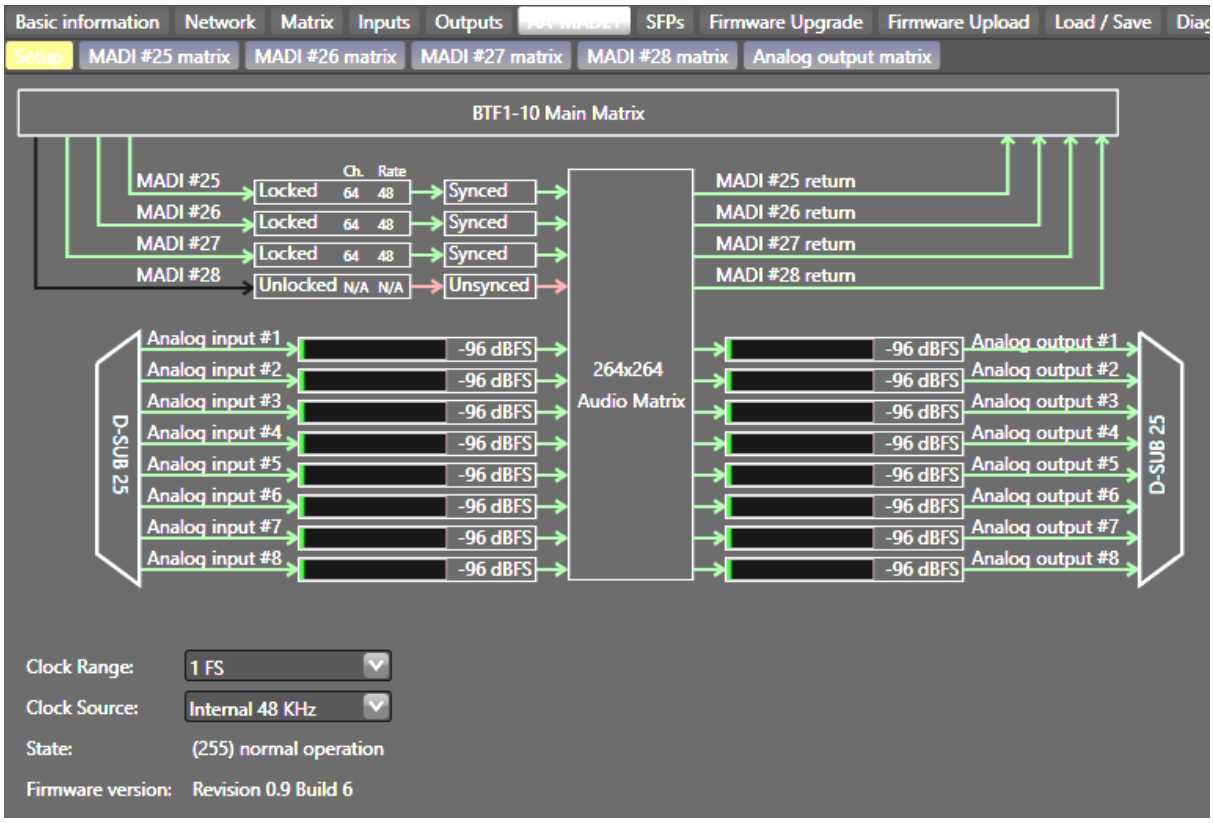
No signal detected at input.	Signal analyzer does not verify the signal as a valid SDI signal.	Signal has too many errors (jitters) and will not be verified as a valid signal.
	Possible cause	
Broken fiber/coax cable. Signal source missing.	Signal source changed to «unknown» format, not SD, HD or 3G-SDI.	Poor cable/connectors.

Note! The two functions *Sensitive to analyzer lock* and *Sensitive to analyzer errors* should not be used with other than SDI signals

AA-MADI - MADI-Router with analog interfaces (only available for BTF1-10AA)

A 264x264 channel audio matrix interfaces to the main matrix with 4 bi-directional MADI connections and 8 balanced analog line level inputs and outputs. The board offers single channel routing for all 4 MADI streams and the 8 analog ports.

Setup:

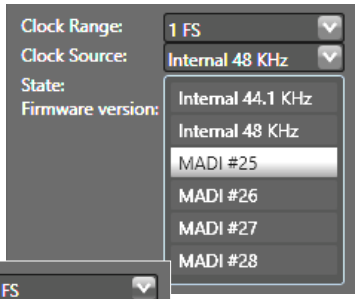


The *Setup* tab gives a quick overview of all incoming and outgoing signals. *MADI#25* to *MADI#28* are incoming MADI streams from the main matrix. *MADI#25 return* to *MADI#28 return* are MADI outputs from the audio matrix returning to the main matrix. Green, red or black lines indicate *valid*, *invalid* or *no signal*. The channel count (56 or 64 channels per MADI) and the sampling rate as well as the sync status are indicated. The returning MADI stream should always be green, the board always generates valid MADI (AES10) signals at it's outputs.

You will find a digital level meter for each single channel for analog input and output channels.

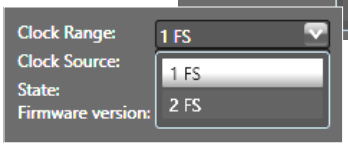
Clock Setup

While the top part of the *Setup* tab is for monitoring purposes only, at the bottom of the tab you will find two drop down menus for clock setup. All MADI streams which connect to the board need to synchronise to the same clock. As a clock source any of the 4 MADI inputs can be used, or you can choose to clock the board internally.



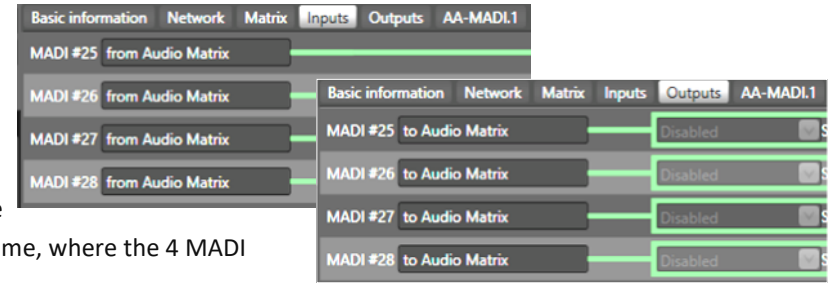
Sampling Rates

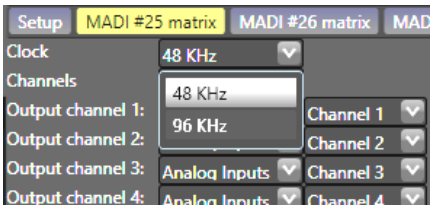
Available sampling rates are 44.1kHz and 48kHz, 88.2kHz and 96kHz are supported by S/MUX. The scaling factor is selected by the drop down menu *Clock Range,* while the selection of the sampling rate for each MADI output can be found on the tabs *MADI #25 matrix* to *MADI #28 matrix.*



Audio Routing:

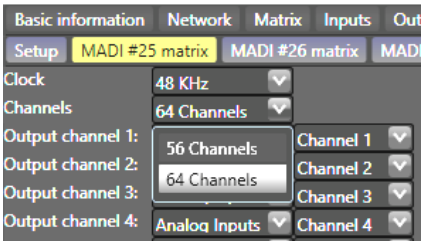
For the 4 MADI interfaces connecting to the main matrix and the eight analog line level interfaces there is an output based routing matrix which is seperated into 5 different tabs, one for each MADI output and one for the analog outputs. The unusual numeration of the MADI inputs and ouputs (25-28) arises from the port numbers in the main matrix of the BTF1-10AA frame, where the 4 MADI ports have the fix port numbers 25-28.



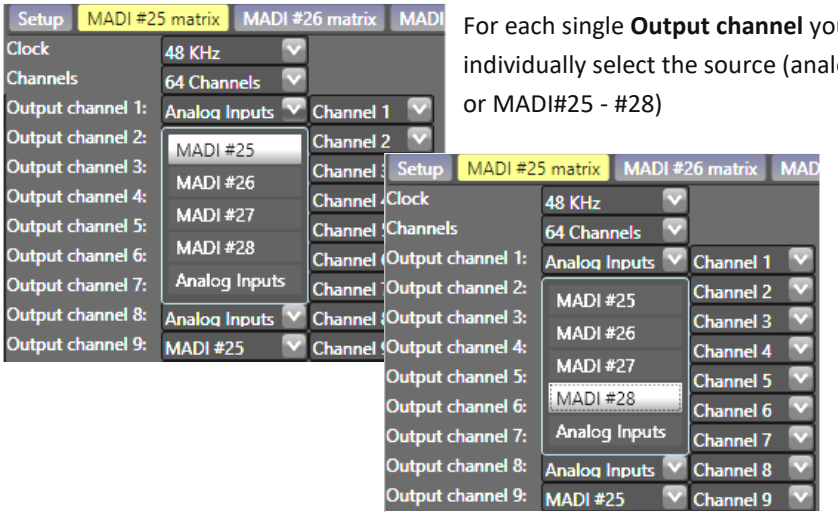


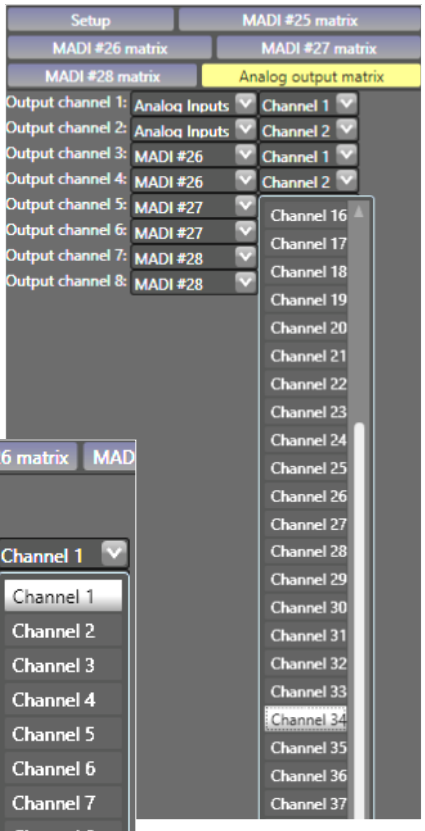
Clock selects the sampling rate for this particular MADI output, 48kHz or 96kHz

Channels selects wether the MADI is operating in 56 or 64 channel mode

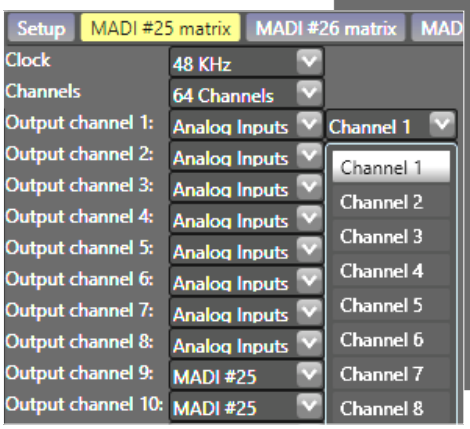


For each single **Output channel** you can individually select the source (analog input or MADI#25 - #28)



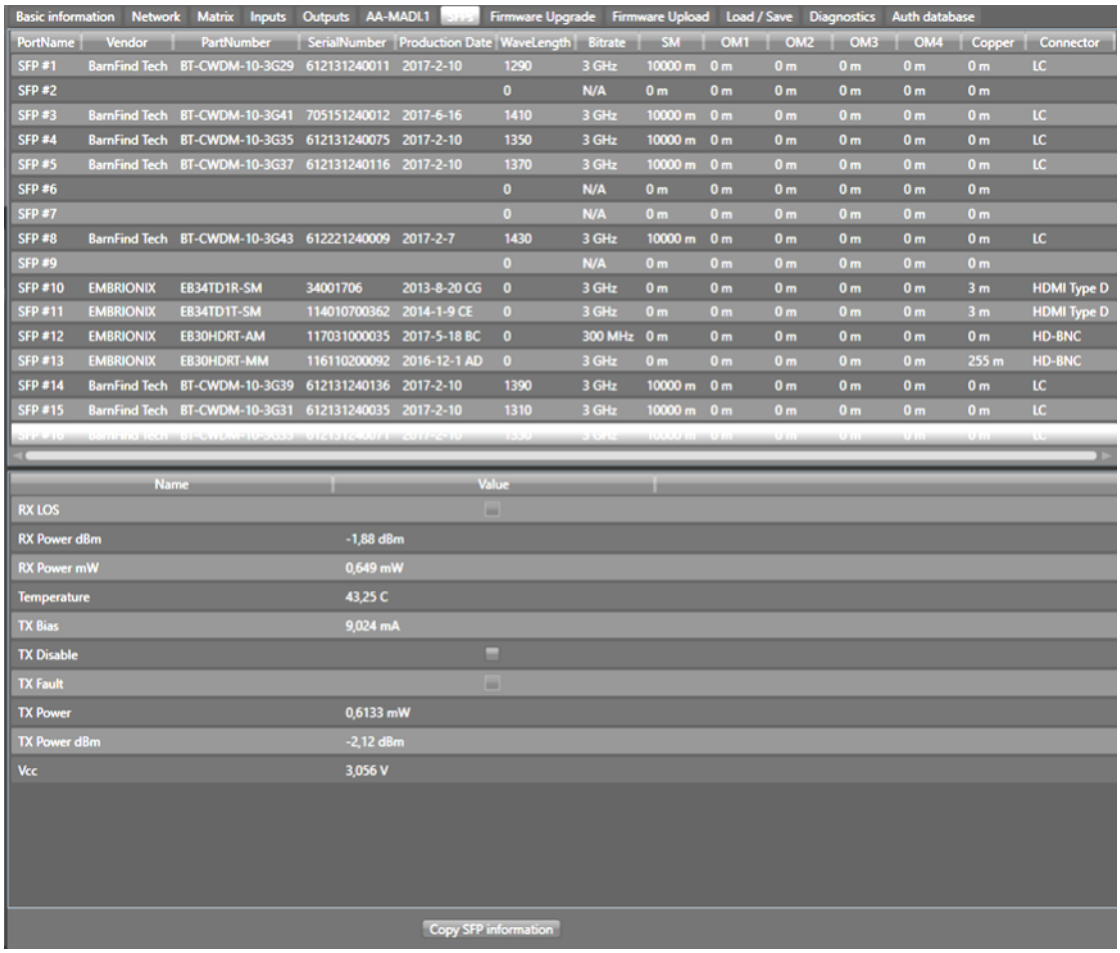


After selecting the source for the output, you select one of the channels (1-64) of that source, which is routed to this particular output channel.



SFPs

Monitor each SFP inside the BTF1-XX frame.



Port Name: Name as given on the silk screen on the front of the BTF1-XX frame.

Vendor: The manufacturer brand for this SFP.

Part Number: the part number for this SFP.

Serial Number: The serial number for this SFP.

Production Date: The production date for this SFP.

Wave Lenght: This is the wave length of the TX (transmitter) if this is a fiber SFP if applicable. This is a good feature if you operate with CWDM or WDM (BiDi) SFPs.

Bitrate: The designed maximum bitrate for the SFP.

SM: The designed operation length for single-mode fiber.

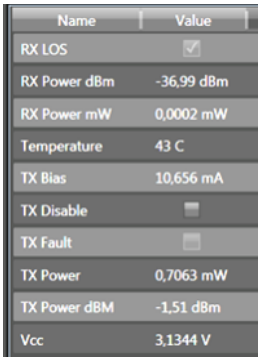
OM1, OM2, OM3 and OM4: The designed operation length for multi-mode fiber.

Copper: The designed operation length for copper cables.

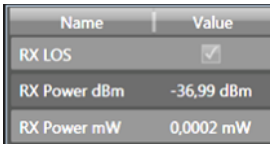
Connector: Display the connector that the SFP has.

BarnFind Tech	BT-CWDM-10-3G29	612131240011	10.02.2017
BarnFind Tech	BT-CWDM-10-3G41	705151240012	16.06.2017
BarnFind Tech	BT-CWDM-10-3G35	612131240075	10.02.2017
BarnFind Tech	BT-CWDM-10-3G37	612131240116	10.02.2017
BarnFind Tech	BT-CWDM-10-3G43	612221240009	07.02.2017
EMBRIONIX	EB34TD1R-SM	34001706	20.08.2013
EMBRIONIX	EB34TD1T-SM	114010700362	09.01.2014
EMBRIONIX	EB30HDRT-AM	117031000035	18.05.2017
EMBRIONIX	EB30HDRT-MM	116110200092	01.12.2016
BarnFind Tech	BT-CWDM-10-3G39	612131240136	10.02.2017
BarnFind Tech	BT-CWDM-10-3G31	612131240035	10.02.2017
BarnFind Tech	BT-CWDM-10-3G33	612131240071	10.02.2017

Copy SFP information copys certain information from the SFP list (Vendor, Model, Serial No., Production Date) to clipboard. You can insert the content into a spread sheet for documentation etc.



Depending on the SFP you have selected by clicking on any SFP in the overview, the bottom table will show more diagnostical information about that particular SFP.



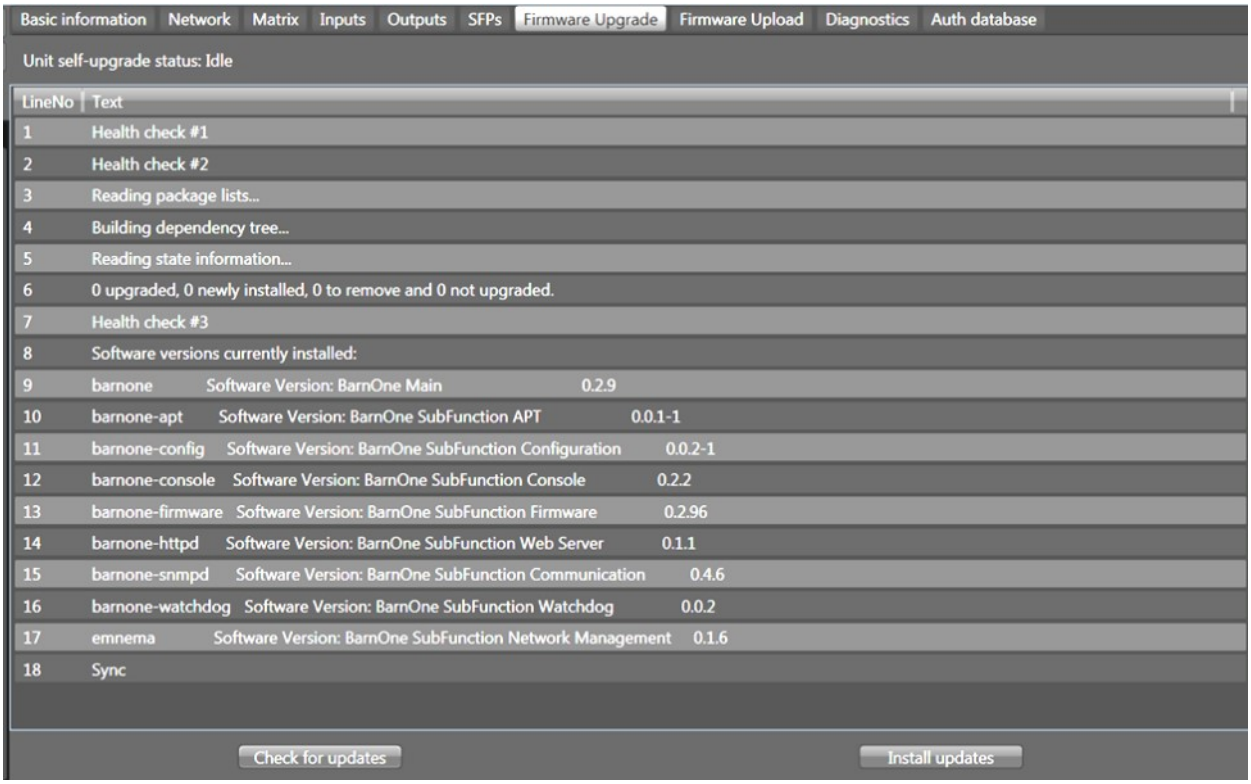
→ An excellent tool to verify, if the optical signal is within a valid range.

→ A value close to –40 dBm will appear (p.ex. -36,99dBm) if the optical signal is missing, or too high. Read the SFP data sheet to find the Rx overload limit (max power)

→ A copy of this information is displayed on the Input respectivly Output tab

Firmware upgrade (online mode)

The purpose of this section is to see the versions of the firmware that is installed, check for new versions and to upgrade the firmware at your convenience. For this purpose the frame needs to connect to the internet.

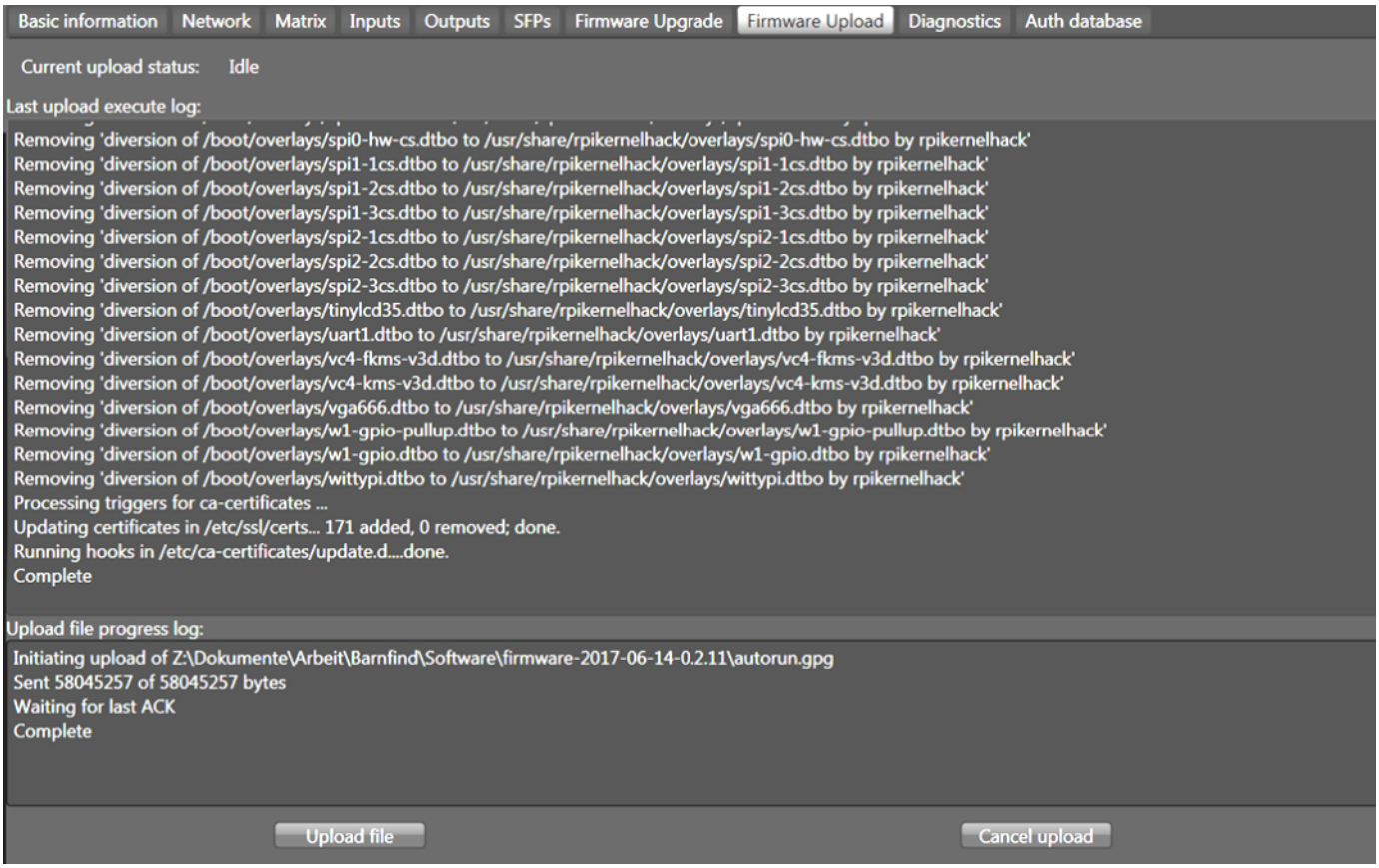


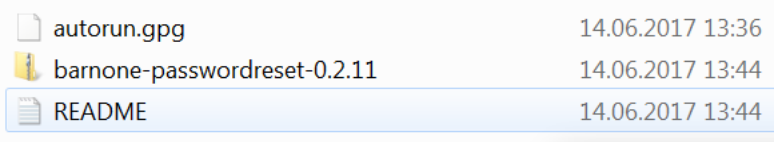
- **Check for Updates:** This button will trigger the frame BTF1-XX to connect to the update server and check for software updates. You can whatch the progress in the log and the status label.

- **Install Updates:** This button will trigger the unit to download upgrade files from the server and install the newest software updates. You can whatch the progress in the log and the status label.

Firmware upload (offline mode)

Instead of connecting the frame via the internet to Barnfind's server, you can download the latest firmware from the Support/ Download section at the website https://www.barnfind.no/downloads/





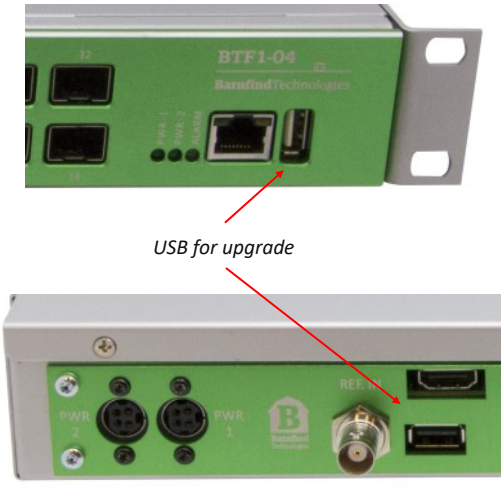
«autorun.gpg» contains the firmware and has to be selected for upload to the frame

«barnone-passwordreset.zip» contains another autorun.gpg file, that can reset the password of the frame in case you lost/ forgot the password.

Firmware upgrade with USB stick (offline mode)

After downloading the firmware upgrade package from our website http://www.barnfind.no/downloads/ extract the autorun.gpg from the .zip file and copy this file onto a USB flash storage device (see Firmware Upload, you use the same file). This file must be named "autorun.gpg" (lower case).

To monitor the upgrade process, you can connect a HDMI display to the HDMI output at the rear of the BarnOne device and a keyboard to one of the USB ports (this is not essential for the upgrade process). If screen is blank, press any key to wake the display up from sleep. Insert the USB flash storage containing "autorun.gpg" into a USB port on the BarnOne device. In the next 10-20 seconds, the BarnOne device will copy the autorun.gpg and verify its content against a cryptographical key. If this goes ok, the software upgrade will start.

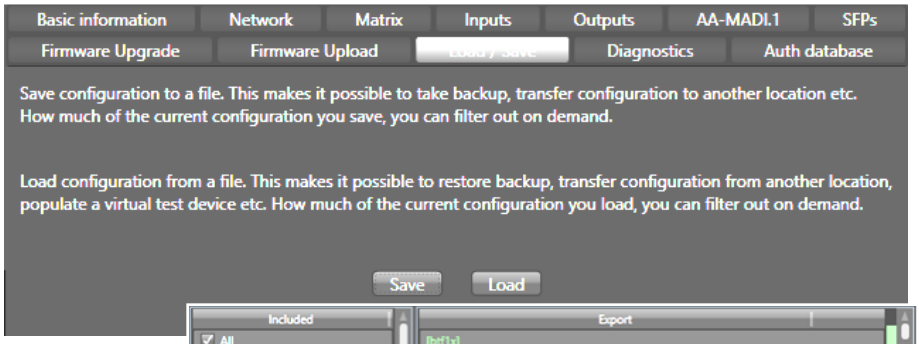


The LED lights will start to blink in a special pattern to show that it is performing the software upgrade. The USB flash storage should now be removed. If the USB flash storage is present after software upgrade is complete, the BarnOne device might start to copy the autorun.gpg file and perform the software upgrade again. When the LED lights stop blinking, the software upgrade is complete and device will return to normal operation.

It is estimated that the software upgrade normally takes about 5 minutes if all of the software components are to be upgraded.

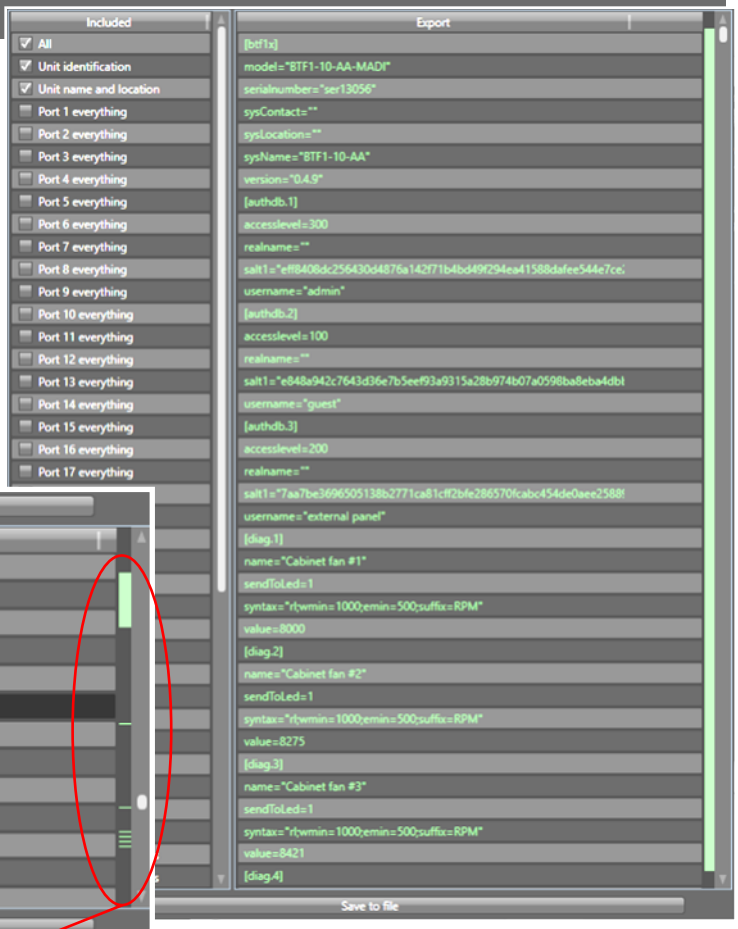
Load/Save

You can save the configuration of a BarnOne unit to file. It is possible to save or load the whole set of parameters or only a partial configuration.



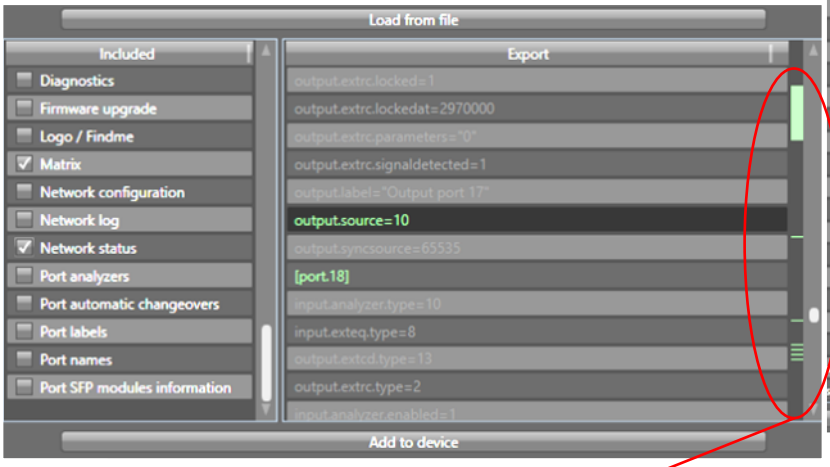
Save

After you selected *Save,* a seperate window will pop up which shows all parameters that are saved to file. By default the check boxes *All, Unit identification* and *Unit name and location* are selected. *All* includes all parameters except *Unit identification* and *Unit name and location,* which have to be (de-)selected manually. Click *Save to file* and you will be prompted for a folder where to store the configuration file.

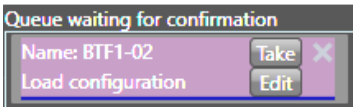


Load

Select *Load,* a new window will pop up, click *Load from file* and select the configuration file you would like to save to the BarnOne unit. Configuration files are stored as **.txt* files. You can select by clicking the check boxes which parameters are uploaded to the unit, e.g. you can select to change the matrix only.



A green bar on the right side of the window indicates where in the list you will find activated data sets. After clicking Add to device, the command to load the configuration will appear in the take list. You can select *Take* or *Edit*. If you select Edit you are taken back to the list of parameters of which you can select which one is loaded to the unit.

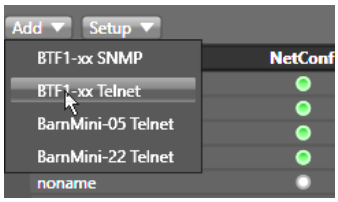


Offline Configuration:

The possibility to save and load configurations to/from file introduces the opportunity to edit the configuration offline without direct connection to a BarnOne unit. To prepare for a later offline editing it is recommended to save a configuration of each type of BarnOne (BTF1-02, BTF1-07-08 etc.) to file.

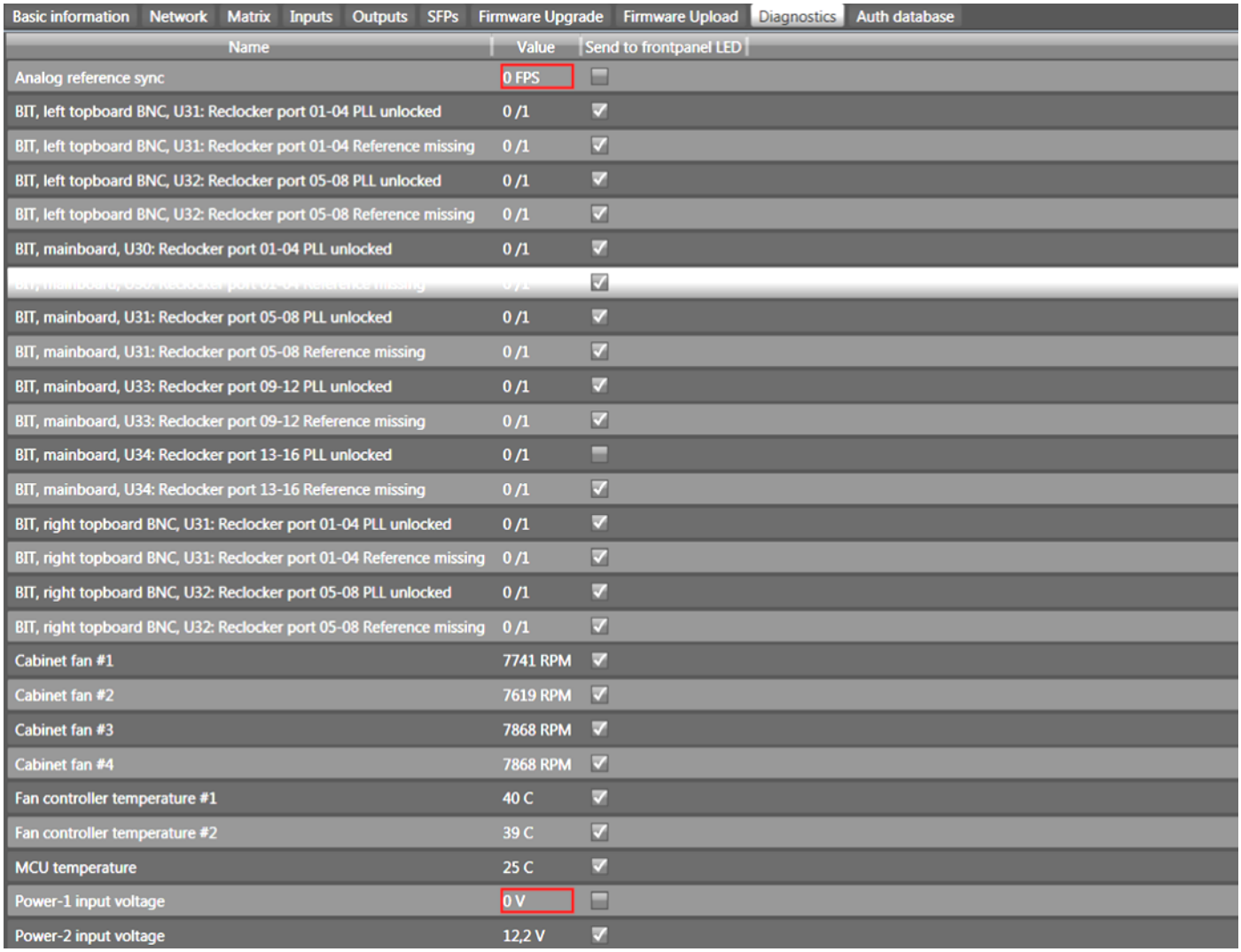
Now you manually add a unit to the device list as described at the start of the chapter *Software & Control* by selecting *BTF1-xx Telnet.* Click on the device in the list called *noname* and jump to the tab *Load/Save,* now follow the steps described previously in this chapter under *Load.* **Do not click *Take* in the take list**, you can start editing offline now.

Please be aware that the IP address was saved from the previous unit, you might want to change it.



Diagnostics

The purpose of this section is to see the generic health and diagnostics of the BTF1-XX frame. Each individual diagnostic entry is represented with a line in the table.



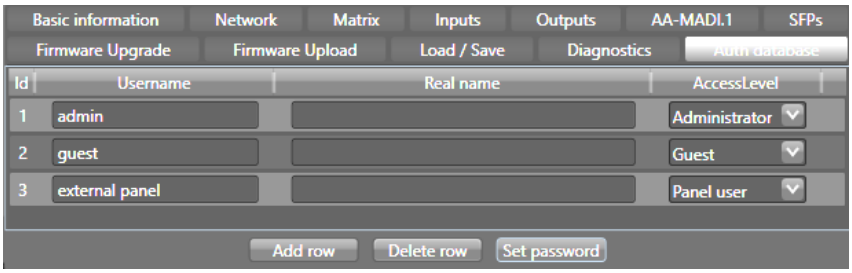
- A yellow frame will appear when the value is above the **warning** threshold.
- A red frame will appear when the value is above the **error** threshold.

Send to front panel LED : If this is checked; a warning or an error will activate the blue alarm-LED on the front of the BTF1-XX to flash.

Authentication Database

User Right Management with three diferent access levels:

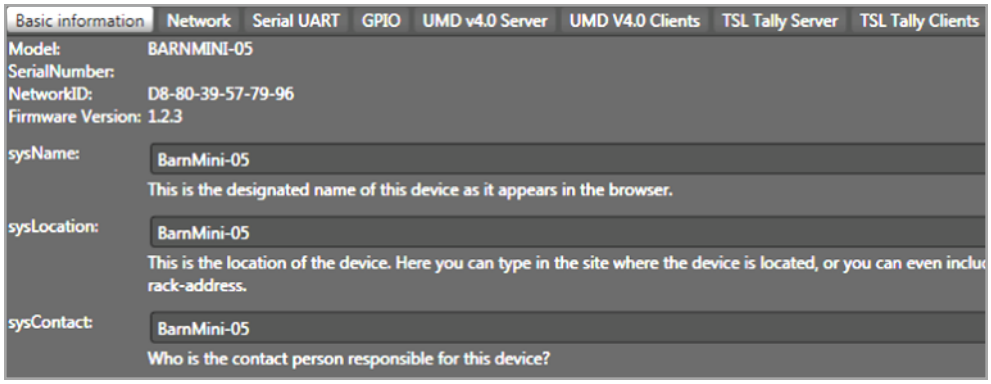
- Administrator: all operations are allowed
- Panel user: (for future implementations)
- Guest: cannot perform any operations, but monitor the system and save a configuration to file



BarnMini-05

BarnMini-05 was the first software controlled device in the BarnMini product line. It supports TSL Tally v4.0 and TSL UMD v4.0 protocols and can be used to transport GPIO and RS422/RS485 control signals via TCP/IP. It can interface with 3rd party products which support the above mentioned protocols. It offers interfaces for 1x RS422/RS485 serial data and up to 4x GPIs and up to 4x GPOs to transport those via an Ethernet network. The Ethernet SFP port of the unit is the control port and úsed for transport (via fiber).

For configuration and use of BarnMini-05 we do recommend to use only *BTSFP-GBase-CU*. Once configured you can replace *BTSFP-GBase-CU* by any other SFP suitable for the transport of 1GE. You can cascade several BarnMini-05 devices to rise the channel count of GPIO or RS422/RS485 signals by connectinfg several units to the same network.



To connect your PC to BarnMini-05 please follow the steps described under the paragraphs *Discover BarnOne and BarnMini* and *Manually add units to the device list* at the start of the chapter *Software & Control.*

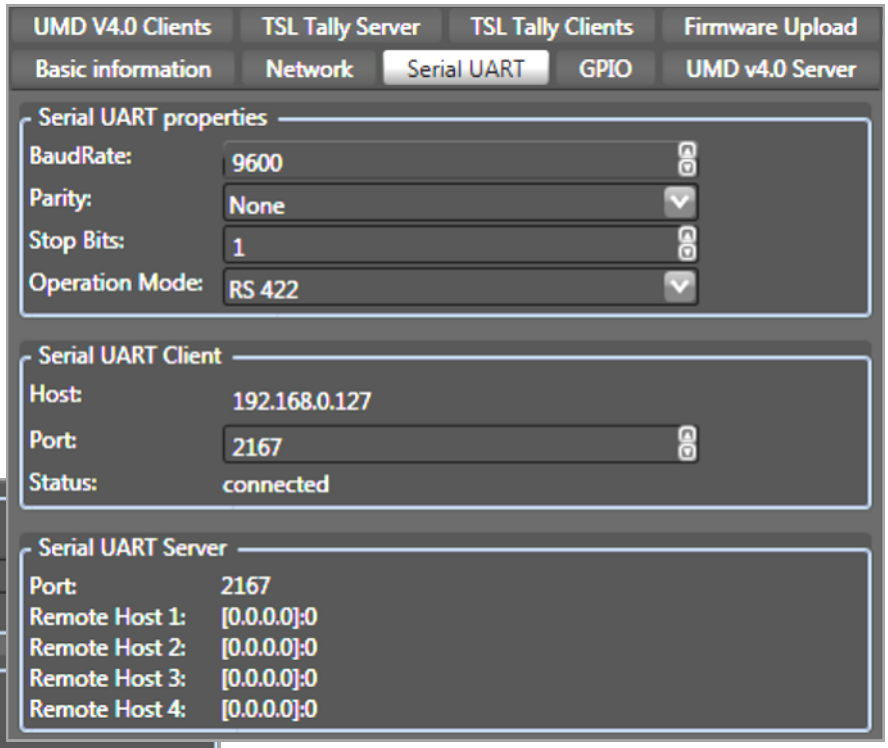
Basic Information and *Network* tabs work accordingly to BarnOne as described earlier in this chapter.

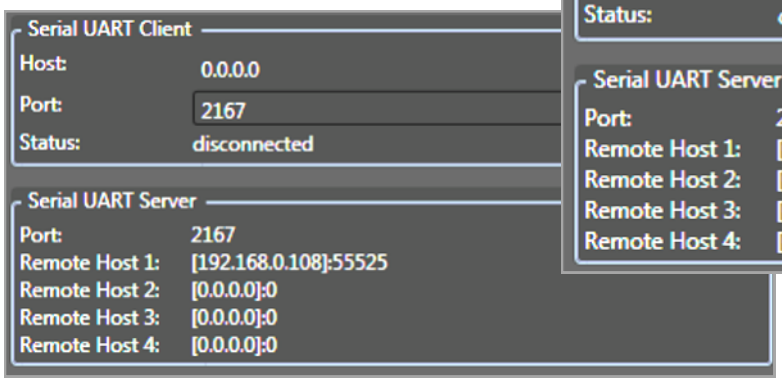
Serial Data Transport (RS422/RS485)

The tab *Serial UART* shows settings for the transport of RS422 or RS485 serial control data. Please check the manual of the device you intend to control for *Baudrate, Parity, Stop Bits* and *Operation Mode.*

If you interconnect 2 BarnMini-05 units to transport serial control data, choose one device to act as server and the other one as client. It does not matter which unit is the server and which one is the client. The client will connect to the server once you entered the server's IP address into the field *Host.*

The standard port is *2167*





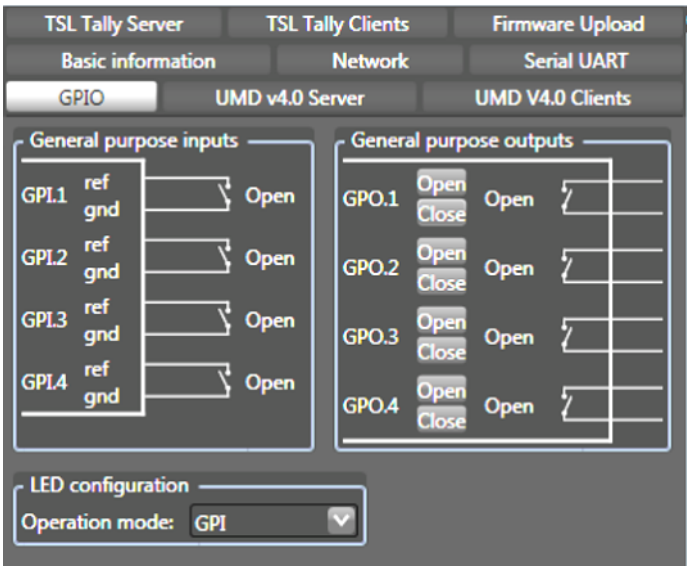
GPIO Transport

The GPIO tab shows the status of the GPI and GPO ports.

GPOs can be switched manually. You can interfere with a remotely controlled GPO manually, but it will switch back to the status wich is pushed by the client. If no client is pushing data to the BarnMini-05 GPO host, you can manually switch the GPOs with BarnStudio.

LEDs placed beside the RJ45 connectors show the status of either GPIs or GPOs, configurable.

To transport GPI signals from one BarnMini-05 to GPO ports of another BarnMini-05 you can use TSL Tally protocol or TSL UMD protocol:

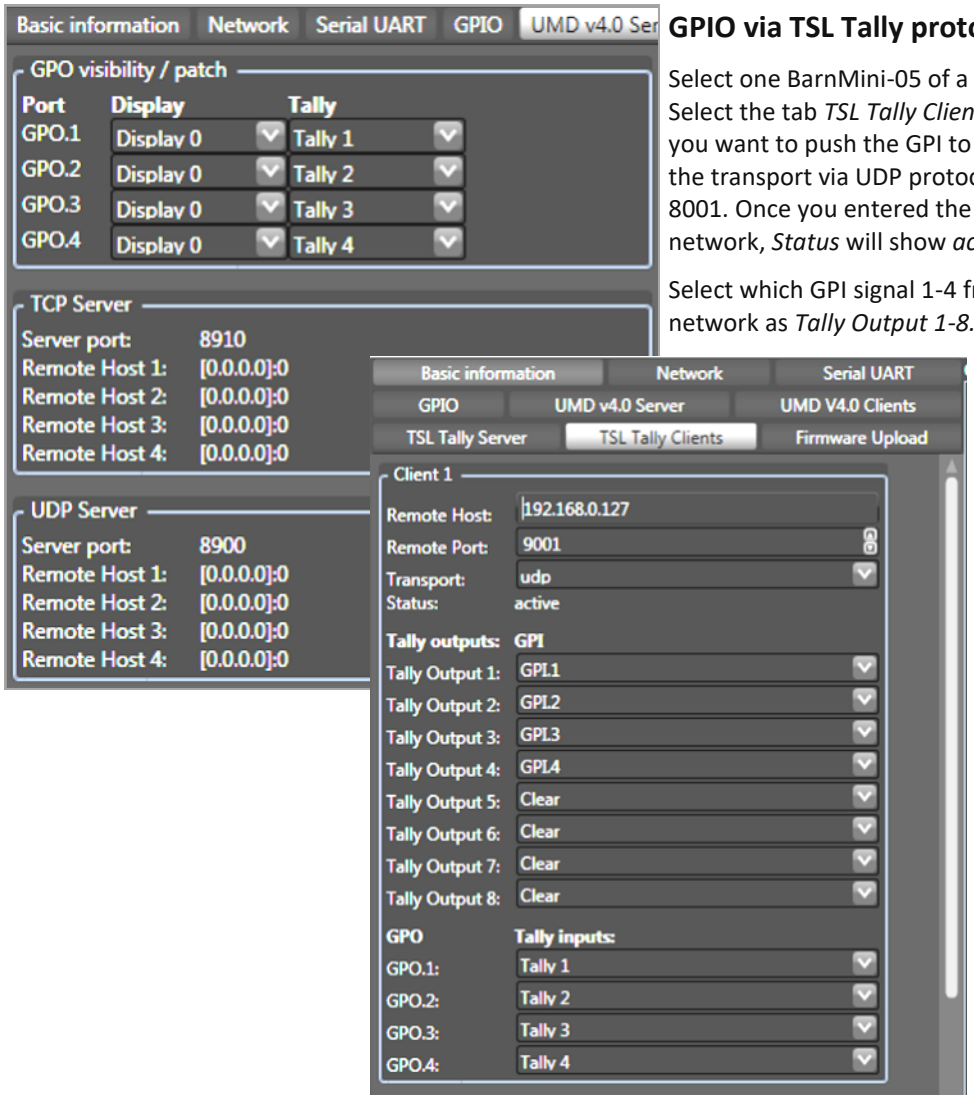


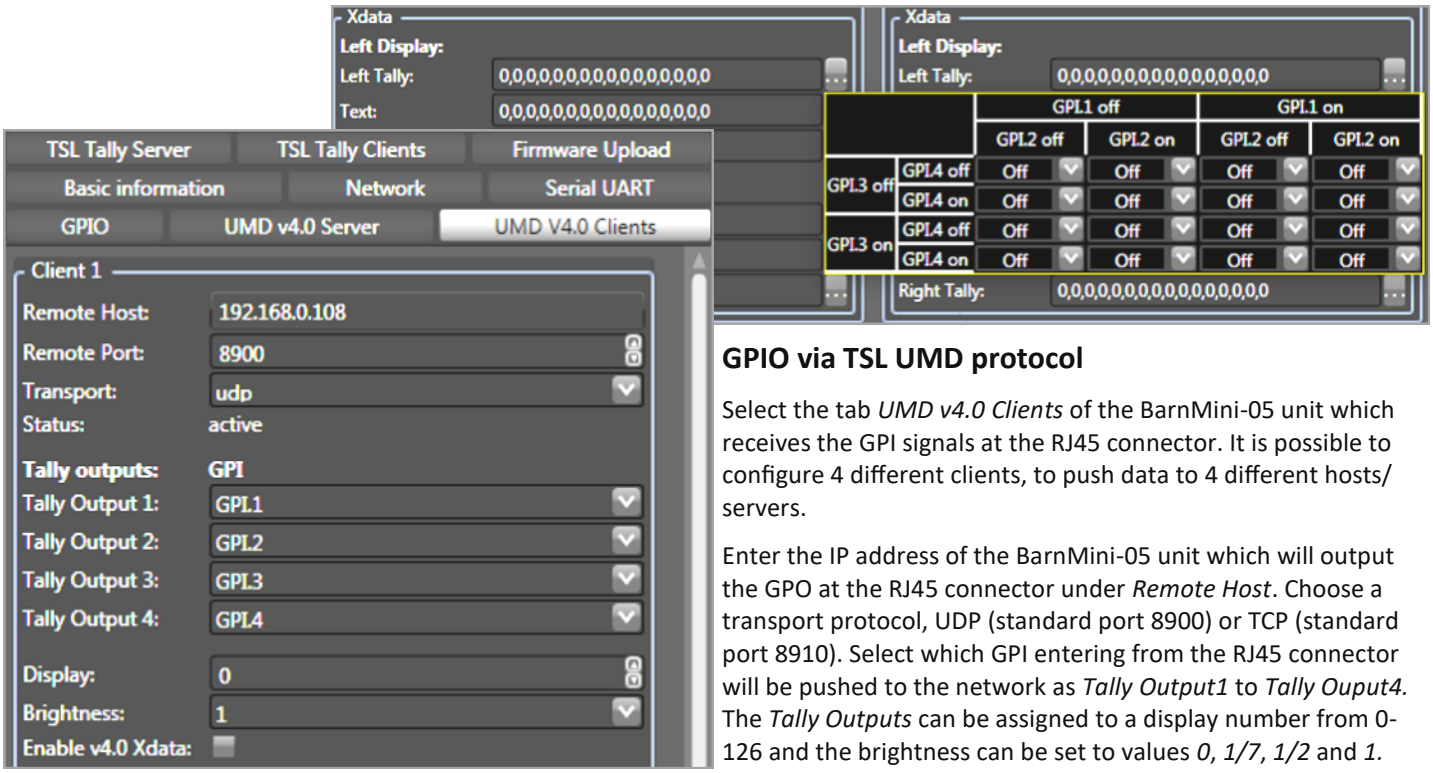
GPIO via TSL Tally protocol

Select one BarnMini-05 of a pair to be the client in the device list. Select the tab *TSL Tally Clients,* enter the IP address of the unit which you want to push the GPI to under *Remote Host.* The standard port for the transport via UDP protocol is 9001, for the transport via TCP is 8001. Once you entered the IP and the host/server is available on the network, *Status* will show *active.*

Select which GPI signal 1-4 from the RJ45 connectors is pushed to the network as *Tally Output 1-8.*

Vice versa you can select which GPO port interfaces which of the*Tally Inputs 1-8* received from the network.





GPIO via TSL UMD protocol

Select the tab *UMD v4.0 Clients* of the BarnMini-05 unit which receives the GPI signals at the RJ45 connector. It is possible to configure 4 different clients, to push data to 4 different hosts/ servers.

Enter the IP address of the BarnMini-05 unit which will output the GPO at the RJ45 connector under *Remote Host*. Choose a transport protocol, UDP (standard port 8900) or TCP (standard port 8910). Select which GPI entering from the RJ45 connector will be pushed to the network as *Tally Output1* to *Tally Ouput4.* The *Tally Outputs* can be assigned to a display number from 0-126 and the brightness can be set to values *0*, *1/7*, *1/2* and *1.*

For the transport of just 4 GPI signals it is not necessary to assign the *Tally Outputs* to a *Display,* But if you cascade serval BarnMini-05 units in the same network this is a very powerful tool.

By enabling the *XData* check box it is possible to control the colours of Tallies and text of Under Monitor Displays.

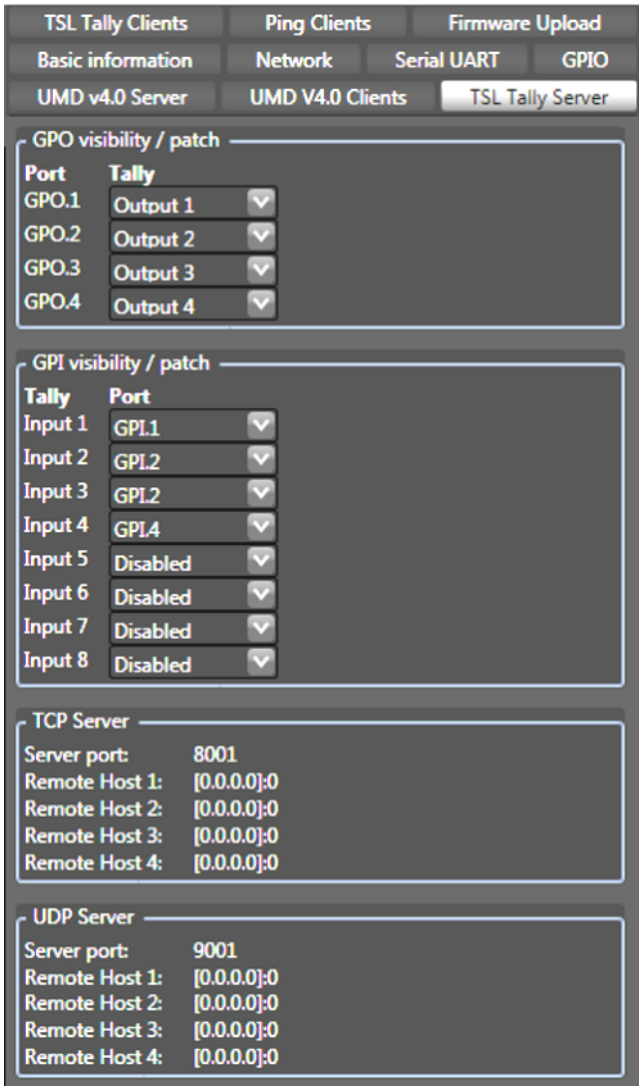
To configure the output ports or the GPOs, select the *UMD v4.0 Server* tab of the BarnMini-05 unit which receives the Tallies from the network and assign the Tallies to GPO ports by selecting *Display No.* and *Tally No.* from the drop down lists.

TCP Server or *UDP Server* show the IP address of remotely connected units.

The tab *TSL Tally Server* shows you the connected TSL Tally clients and which protocol is used (UDP or TCP).

Select the *Tally Output 1-8* and assign it to the physical *GPO 1-4* at the RJ45 connector.

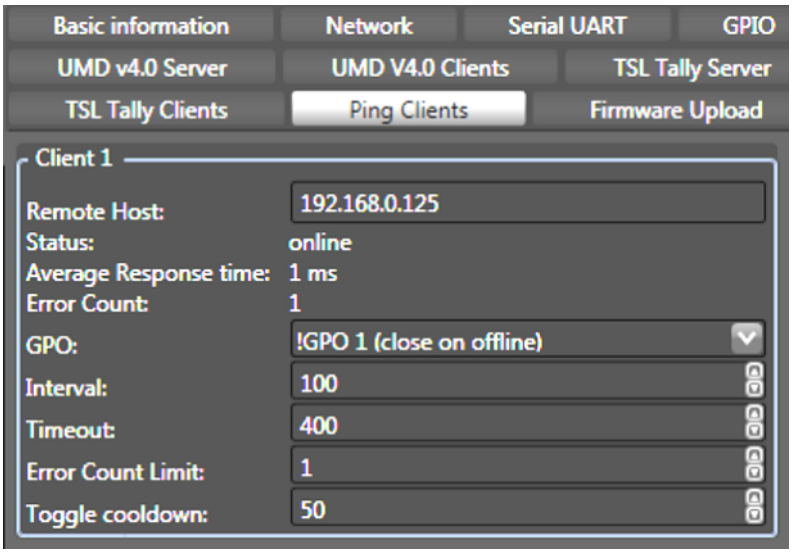
For each *Tally Input 1-8* which are pushed to the network you can select a physical input port *GPI 1-4.* It is possible to assign one physical *GPI* ports to several *Tally* channels



Automatically trigger a change over switch (e.g. BarnMini-06)

You can configure BarnMini-05 to automaticaly trigger e.g. a BarnMini-06 to change over to the redundant fiber strand by GPO.

On the tab *Ping Clients* enter the IP address of any device which is physically located at the other end of the fiber but connected to the same network as Barnmini-05 into thne field *Remote Host.* BarnMini-05 immediately starts to ping the host and tells the *Status*, *Average Response Time* and *Error Count.*



Choose which GPO port you want to react to a loss of the remote host and how to react:

- *close on online*
- *close on offline*
- *toggle while offline detected*

Select the *Interval* between each ping (50-2000ms)

Select the *Timeout* for each ping (min. 5ms; max 4xvalue *of Interval)*

Select the *Error Count Limit* before *Status* is detected as *offline*

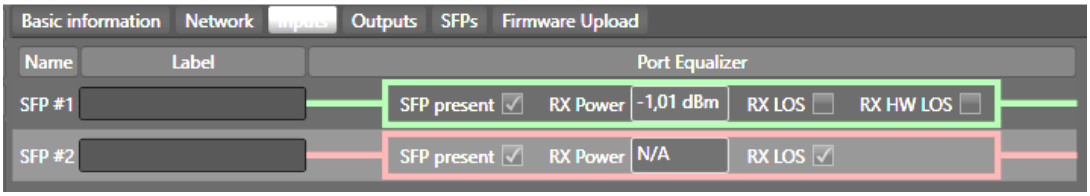
BarnMini-22

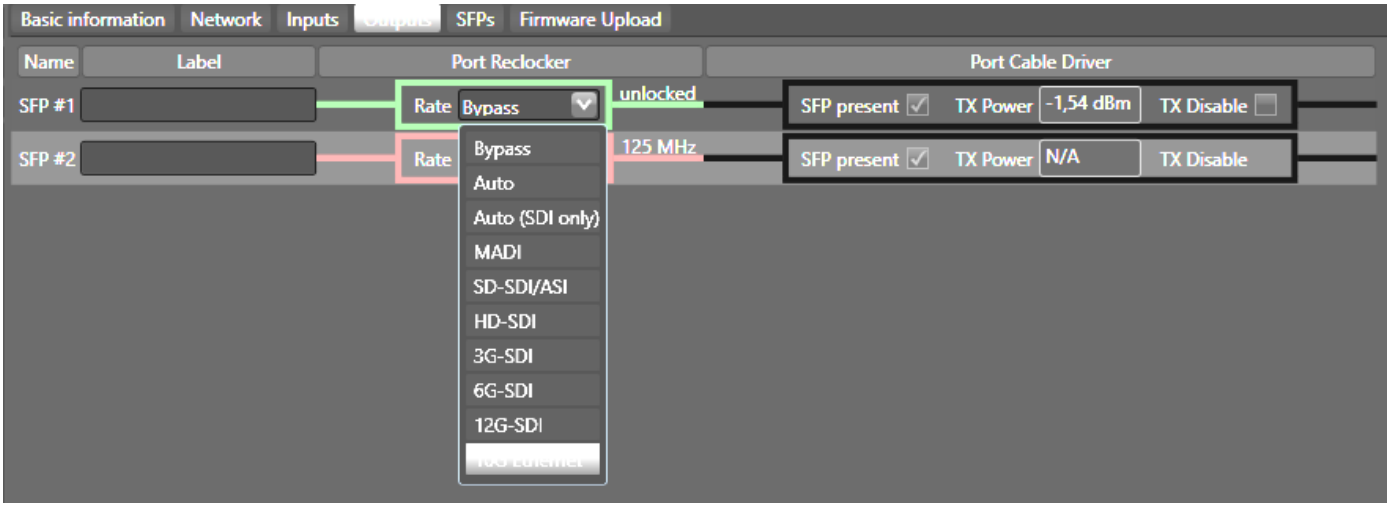
BarnMini-22 is the second BarnMini unit after BarnMini-05 offering control to the user. BarnMini-22 is a protocol agnostic converter with two SFP+ cages transporting the signals between both ports bi-directionally. The control port offers control via BarnStudio or Telnet for SFP diagnostic information and reclocker control.

To connect your PC to BarnMini-22 please follow the steps described under the paragraphs *Discover BarnOne and BarnMini* and *Manually add units to the device list* at the start of the chapter *Software & Control.*

Basic Information, Network and *SFPs* tabs work accordingly to BarnOne as described earlier in this chapter.

The *Inputs* tab displays diagnostic information from the SFP+ port and offers a field for labeling. Present or non-present signals are indicated by red or green lines.





The *Inputs* tab features additionally the control of the reclocker, which can bypassed or fixed to a certain signal type.

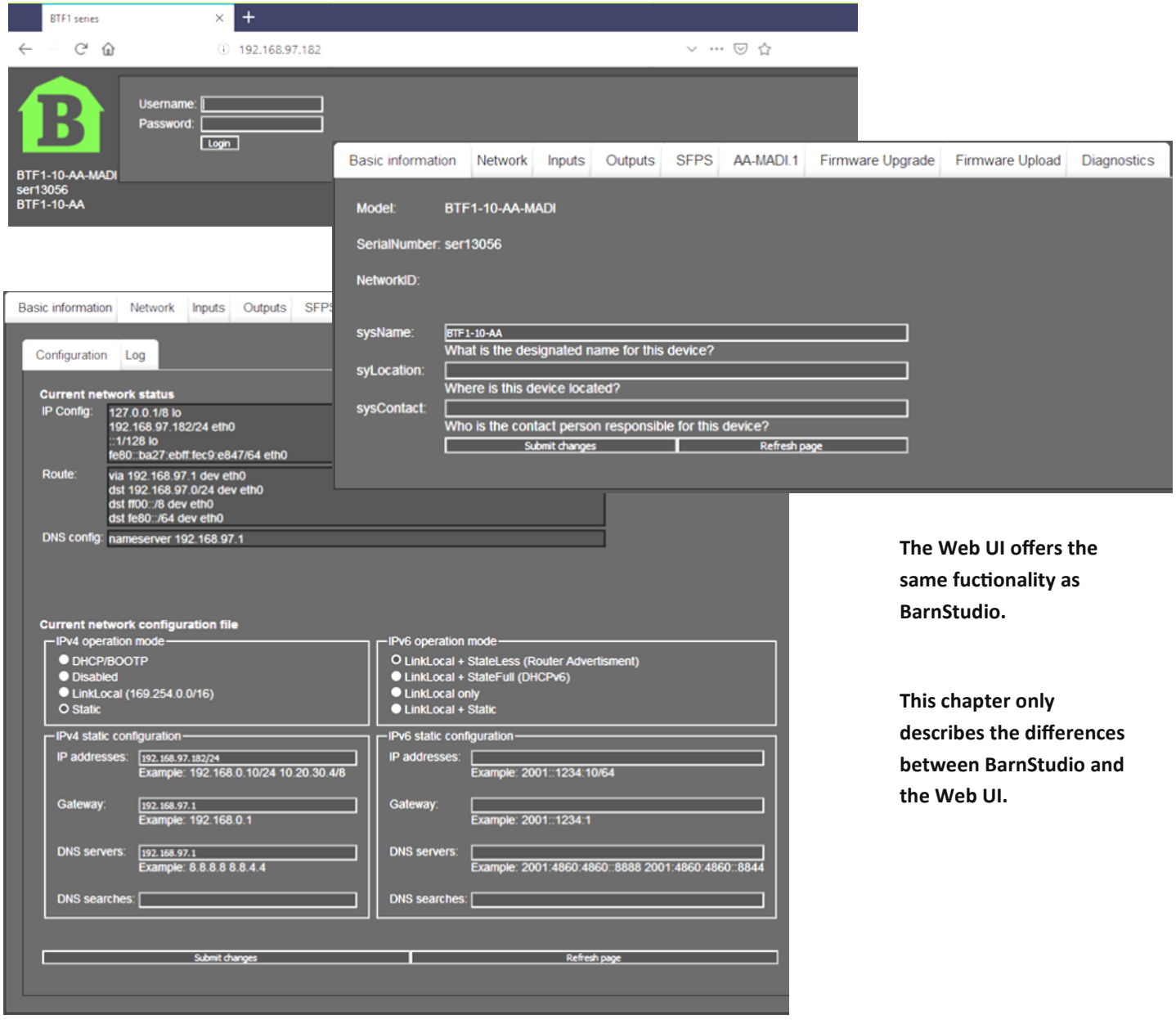
Web User Interface

To give users access to single BarnOne frames in a bigger system without having to install BarnStudio on their PC, or for users who do not run Windows, you can manage all fuctions available in BarnStudio by a web server running on each BarnOne frame.

The work station which needs to connect to a BarnOne frame has to be configured to run in the same network as the BarnOne frame, and you need to know the IP address of the frame to connect.

With a **Username** and **Password** you can enter the frame.

- Default User: *admin*
- Default Password: (no password)



The Web UI offers the same fuctionality as BarnStudio.

This chapter only describes the differences between BarnStudio and the Web UI.

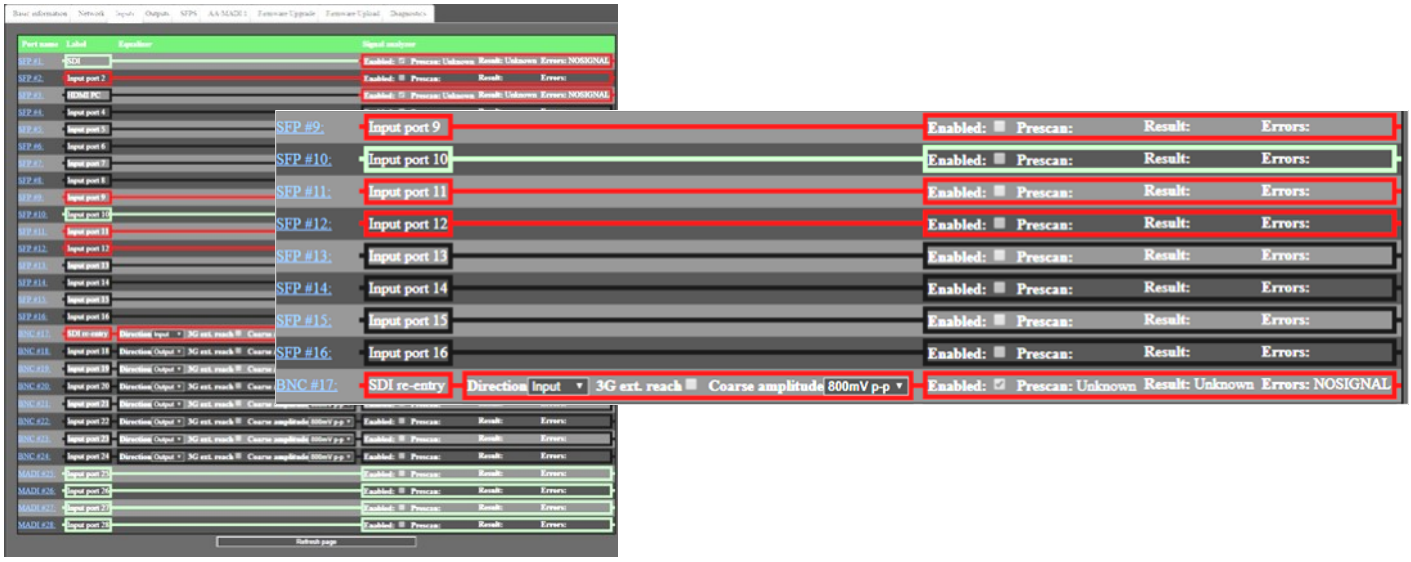
Submit Changes

There is no Take List to confirm the changes. Instead you can find 3 buttons at the bottom of each page:

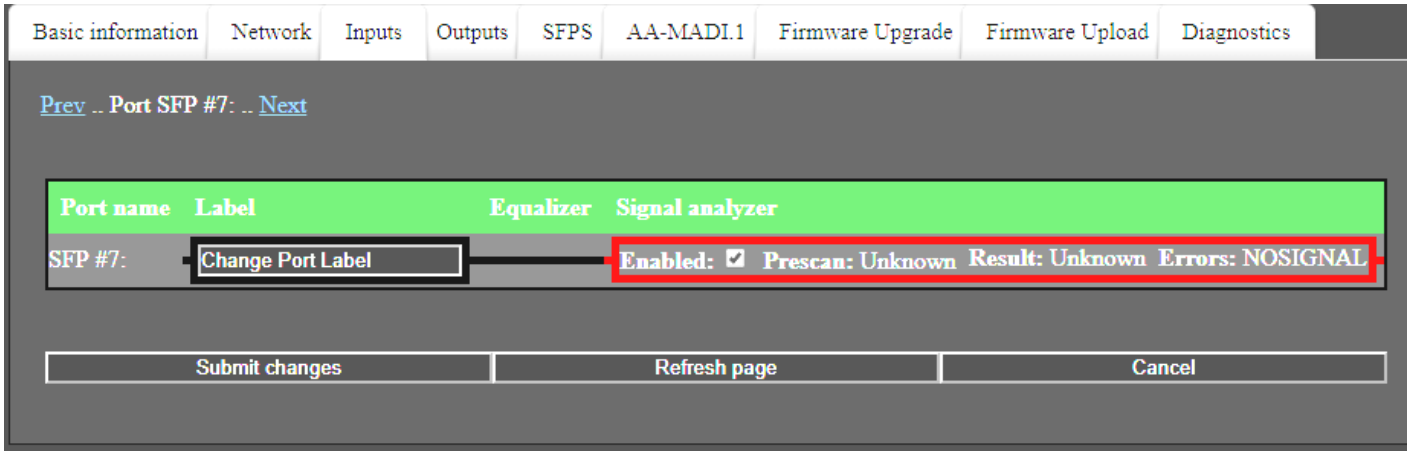
- Submit changes
- Refresh page
- Cancel

Input/Output Ports

Selecting the Input or Output tab will show an overview of the ports. You can monitor the signal analyzer etc.



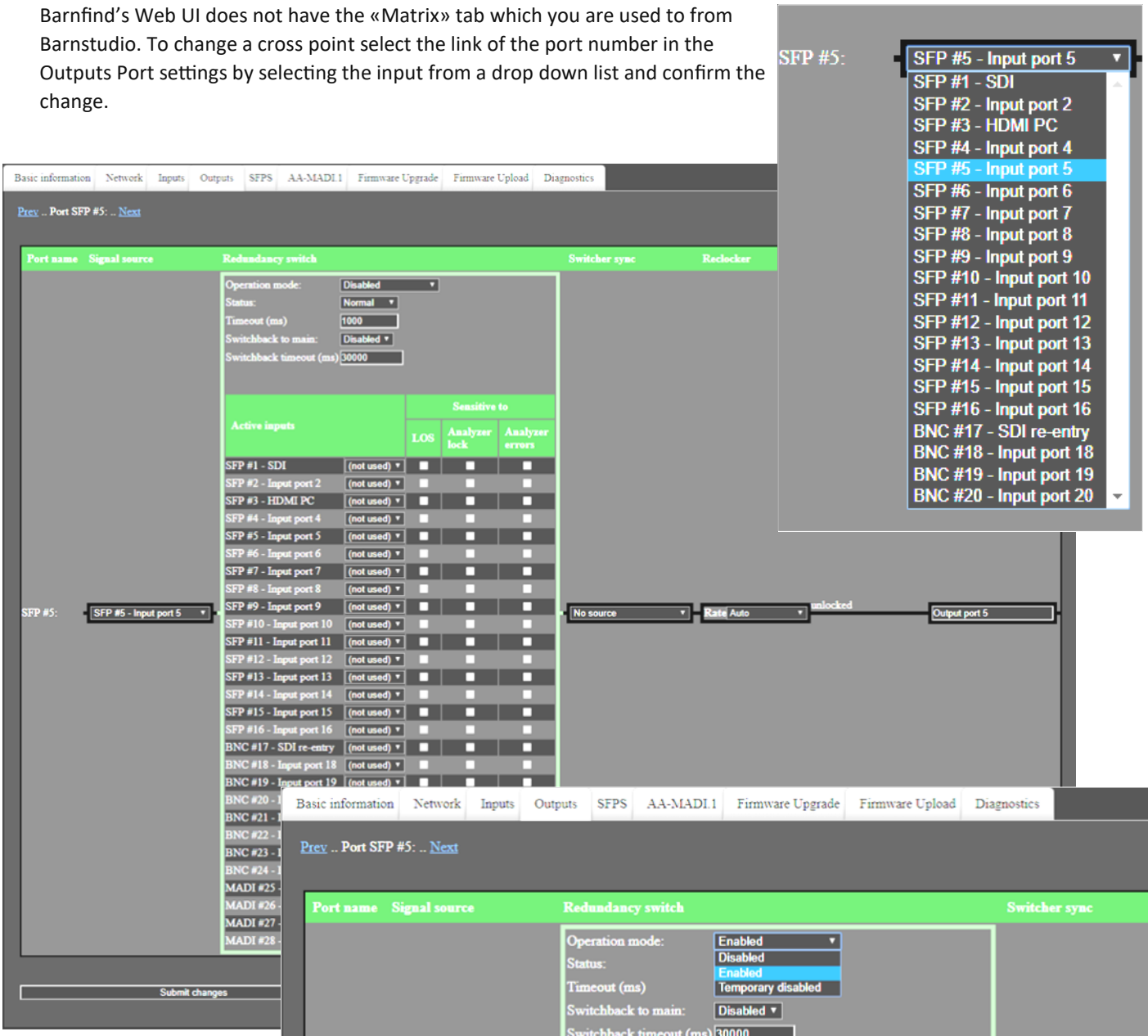
To perform changes in the settings of the port, select the link of the port number which will lead you to an extra page.



Select your changes, scroll down to the bottom of the page and confirm the changes. By selecting «Prev.» or «Next» you can navigate directly to the previous or next port without going back to the Input/Output page.

Routing

Barnfind's Web UI does not have the «Matrix» tab which you are used to from Barnstudio. To change a cross point select the link of the port number in the Outputs Port settings by selecting the input from a drop down list and confirm the change.



Redundancy Change Over

As well to be found under the Ouptut port settings is the Redundancy Change Over, which is described

3rd party control for BarnOne

Telnet

External control of BarnOne frames and BarnMini-05 can be realised by Telnet protocol. A detailed description can be found in the download section of the Barnfind website.

https://media.barnfind.no/BTF1%20Telnet%20Documentation%20revision%201.0.pdf

SNMP

BarnStudio and some few 3rd party integrators can connect to BTF1-XX frames using the SNMP protocol. This is a binary protocol that uses external meta information (MIB) to map parameters to human readable names. This meta information (MIB) can be downloaded from the download section on our website (together with documentation and command line examples if using the net-snmp software, a command line based SNMP tool). SNMP gives you full access to all parameters. For read-only access the community name “public” can be used. For read/write access the community name “private” must be used.

https://media.barnfind.no/20171201%20Barnfind%20MIB.zip

SW-P-08

SW-P-08 is an old versatile protocol that gives you access to only configure and view the status of the matrix, and also gives direct feedback about matrix changes. This protocol is very commonly used by panels and 3rd party control software due to its relative simple design and widely spread device support range. The specification must be retrieved from Snell Advanced Media. The BTF1-XX frames listen for SW-P-08 connections on TCP port 1096. The support was added in firmware version 0.1.7.

BlackMagic VideoHub

BlackMagic VideoHub is an open protocol used by BlackMagic products documented in the “BlackMagic Videohub SDK”. The protocol is text based with new lines made by using the \n character only. BTF1-XX implementation allows 3rd party to control the matrix component only, and makes it possible to control the router using “BlackMagic Smart Control” panel and “BlackMagic VideoHub” software. The BTF1-XX frames listens for connection on TCP port 9990. The support was added in firmware version 0.2.4.

Ember+

The latest implementation of 3rd party control protocols is Ember+, enabling full control functionality and seamless integration into existing environment with SFP readout, redundancy change over etc. for 3rd party control systems. Standard TCP port for Ember+ is 9000. More information about Ember+ is available here

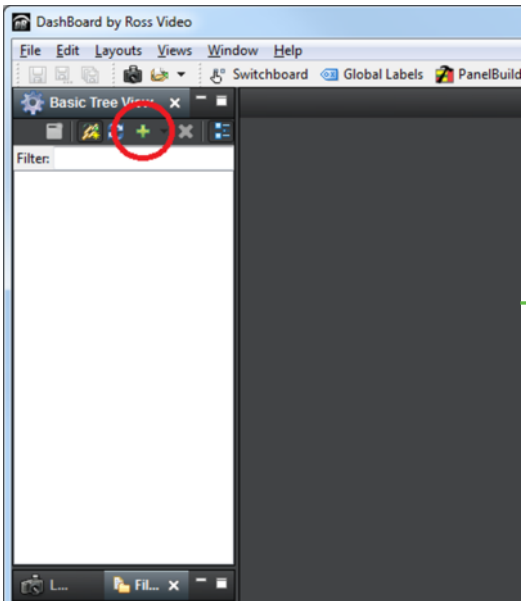
https://github.com/Lawo/ember-plus/wiki

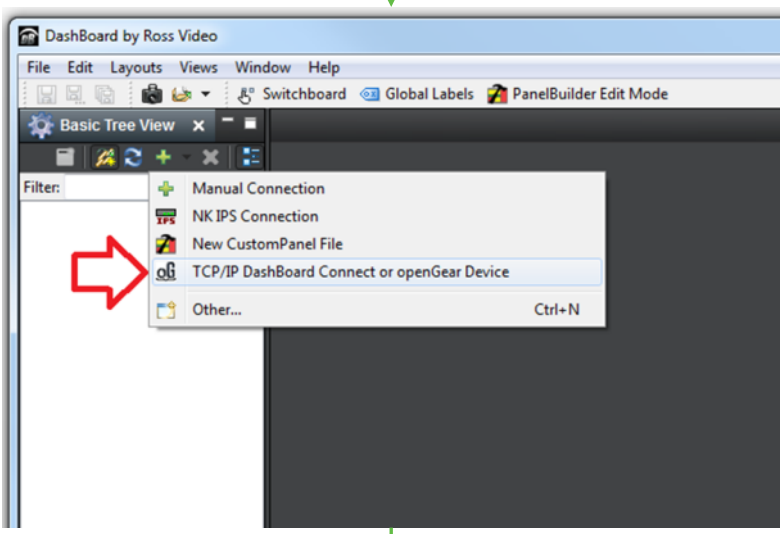
Other

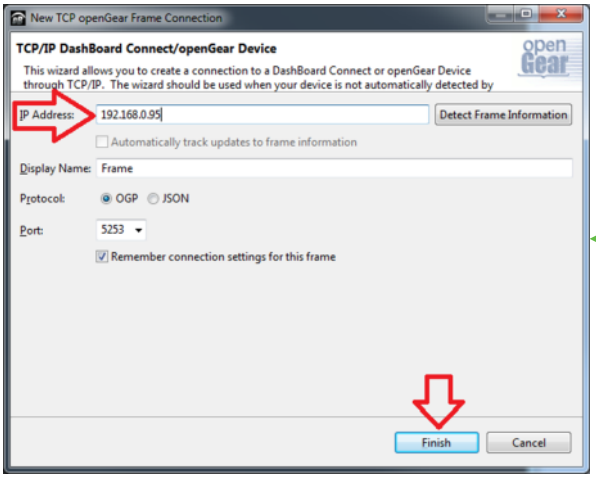
BTF1-XX can control and be controlled by many software/hardware panels. Displayed below are some few manufacturers.

openGear protocol

The openGear protocol (also known as OGP) is an open protocol developed by Ross (who must be contacted if the specifications are needed). The support for OGP was added in firmware version 0.1.7. The BTF1-XX frames does not broadcast its openGear connection details, so it has to be added manually in dashboard using the follow dialog.



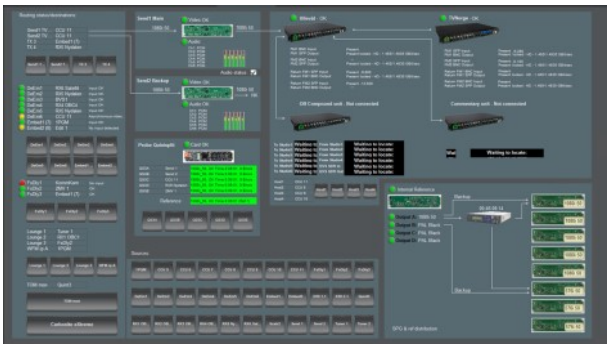




openGear gives you access to all parameters except viewing the network status and changing the network configuration. The protocol is in general more responsive than SNMP, since it feeds back changes on the already existing same TCP/IP connection.

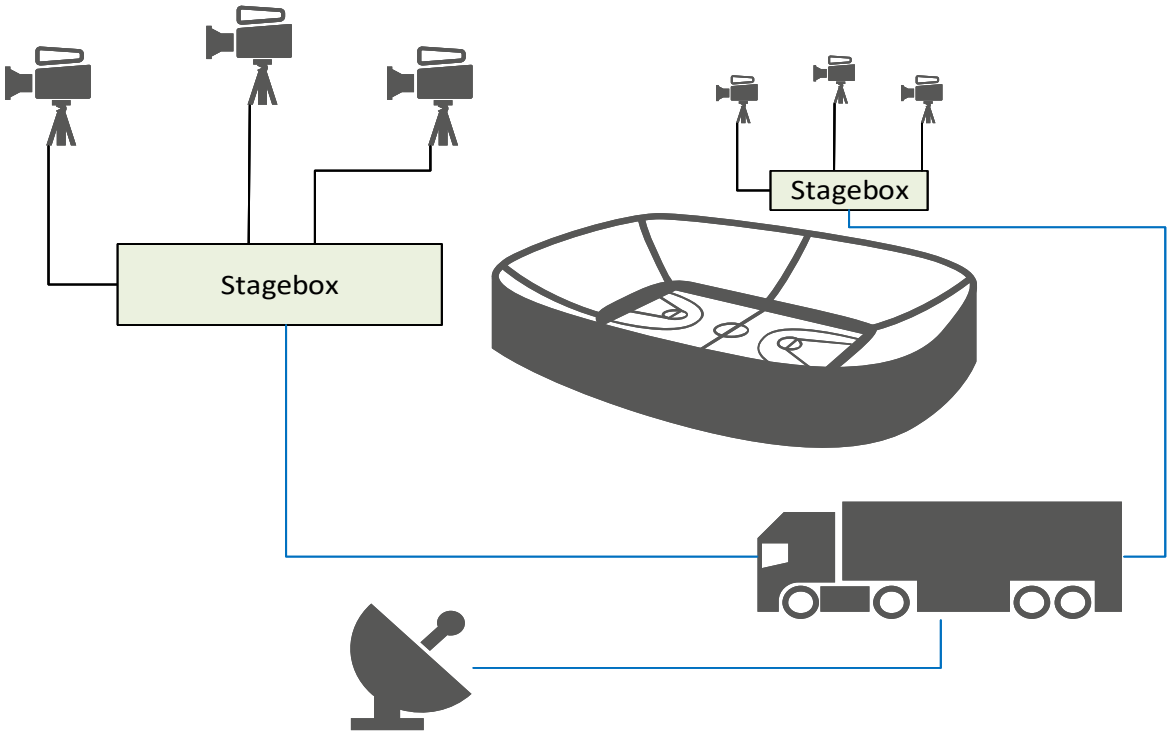
Download free version of DashBoard:

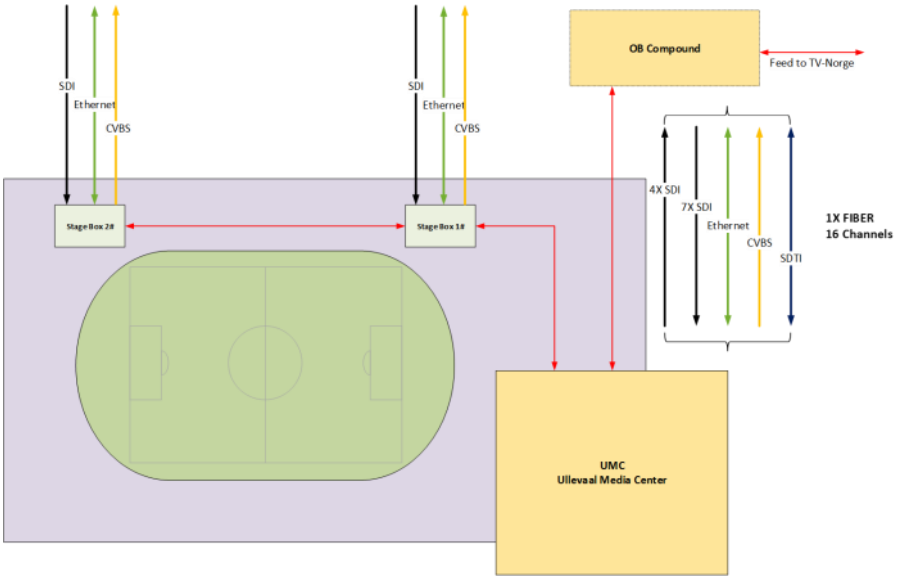
https://www.rossvideo.com/products-services/management-systems/automated-production-control/dashboard/



Example of panel using Barnfind frames.

Applications



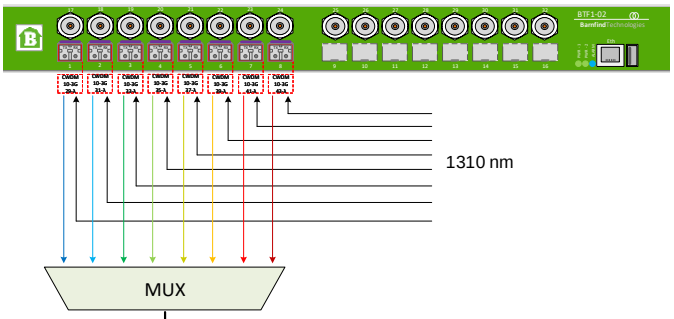


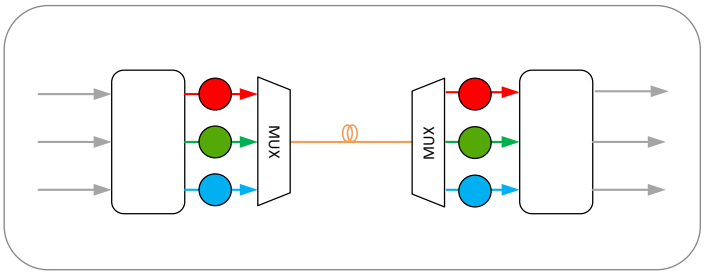
Colour conversion

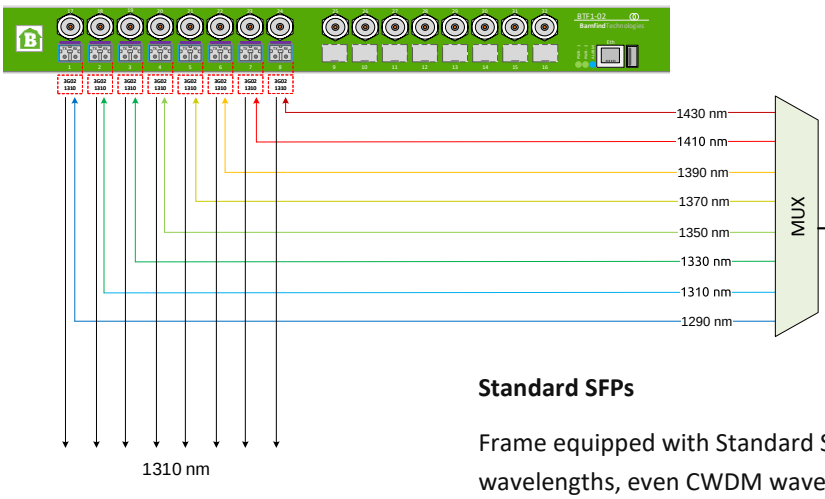
1310nm, and sometimes 1550nm are common used wavelengths on equippment with fixed (not SFP) transmitter and receiver. You will find it on RS-protocols to fiber converters, Intercom systems, HDMI extenders, optical routers and many more. The example below describe how we can convert 1310, 1550 or any other wavelengths into CWDM.

CWDM SFPs

Frame equipped with CWDM SFPs. The incoming optical signal is 1310 nm on all channels. The signals are routed to an output with colored light, CWDM





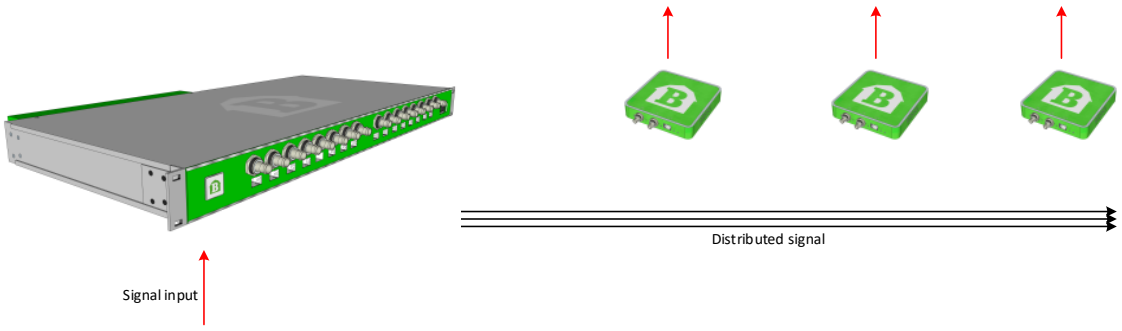


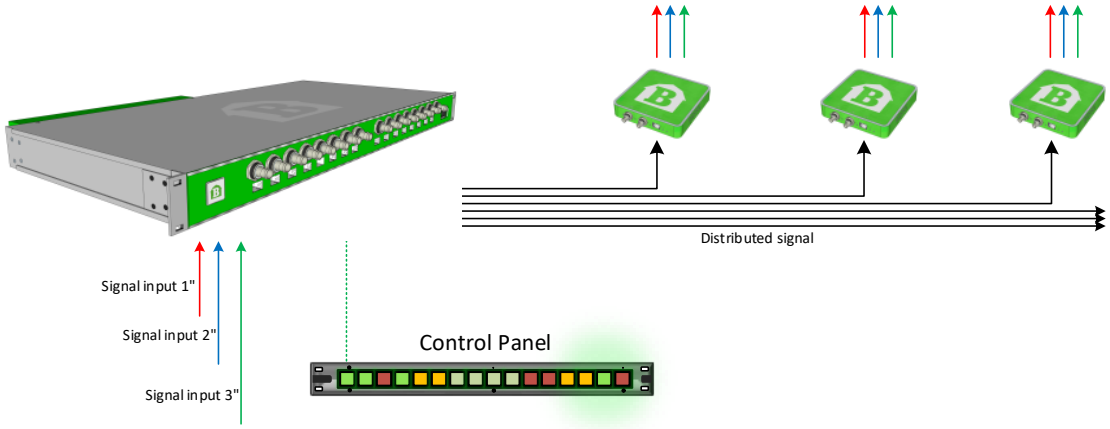
Standard SFPs

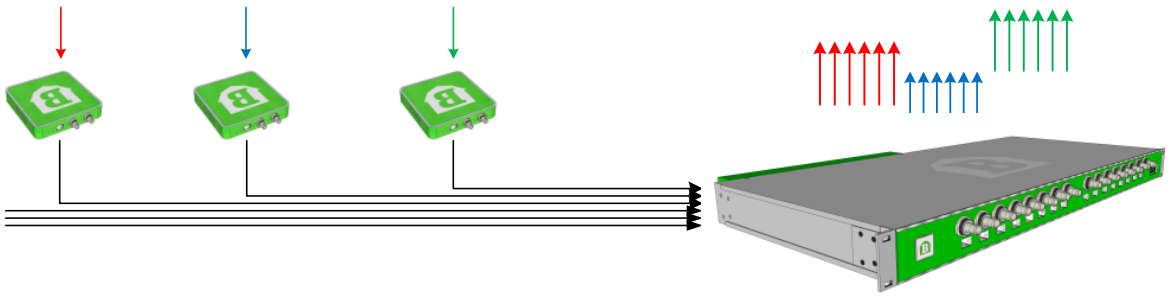
Frame equipped with Standard SFPs. Note!, the RX (receiver) can read all wavelengths, even CWDM wavelengths. The output is 1310 nm.

Signal distribution

BarnOne is used for signal ditribution of one or several feeds.

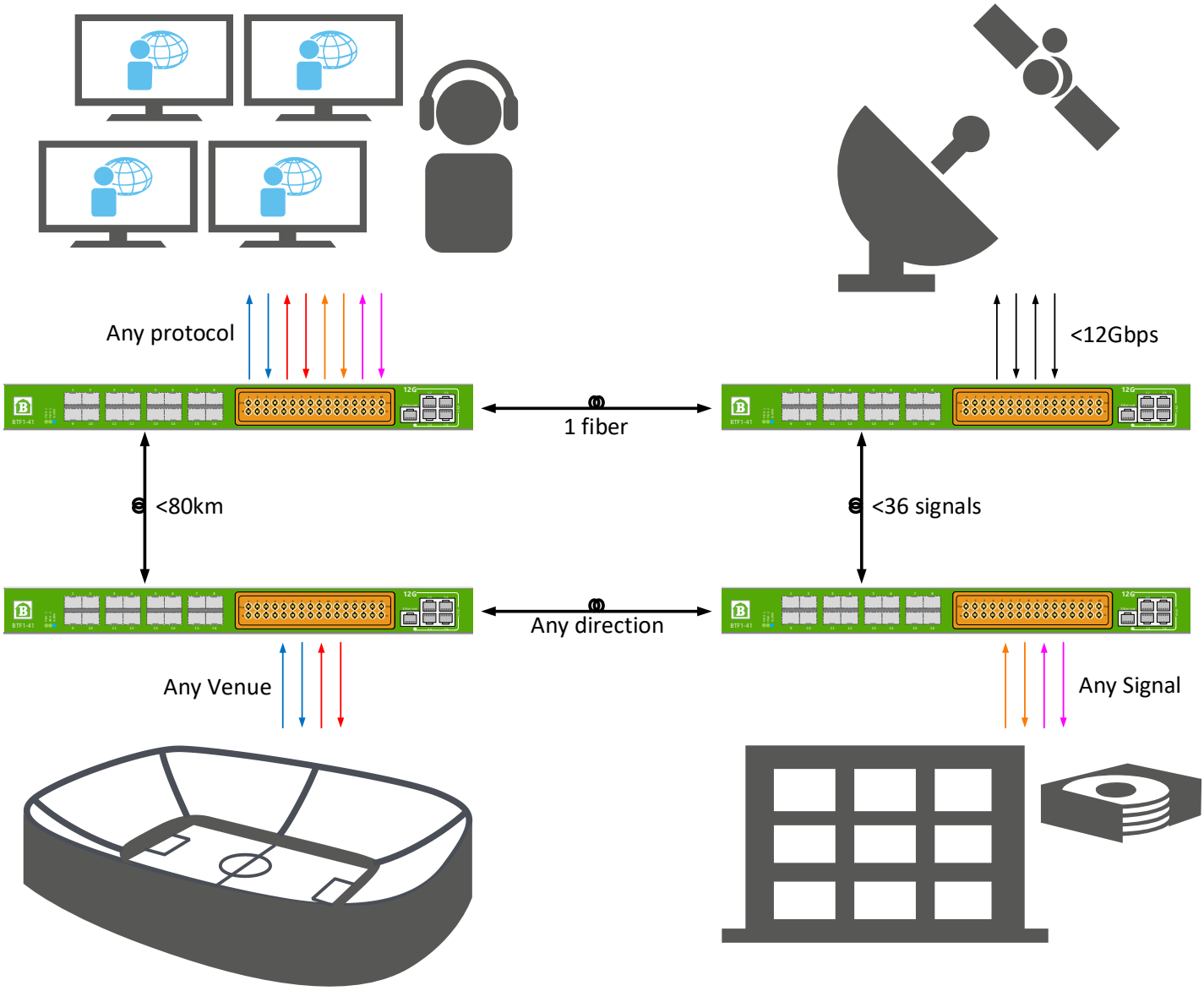




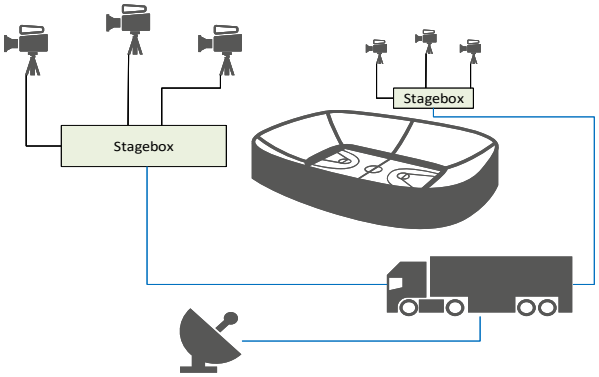


Contribution/Distribution

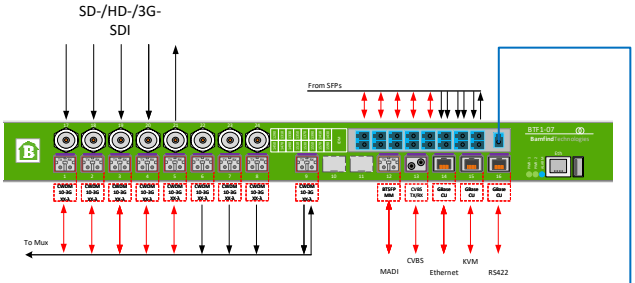
Utilizing the same fiber infrastructure a system of BarnOne units is used for signal contribution and distribution simultaniously, and the system can be rearranged on the fly.



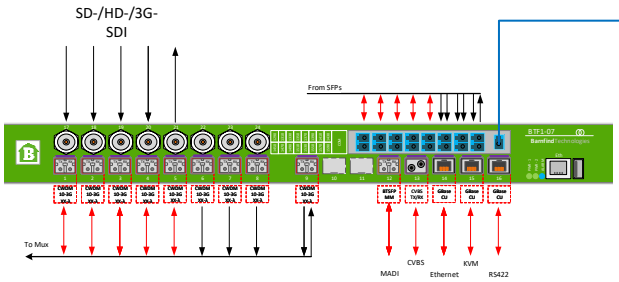
Stage box



Stagebox 1#

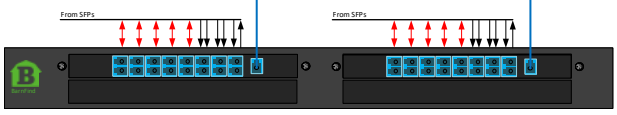


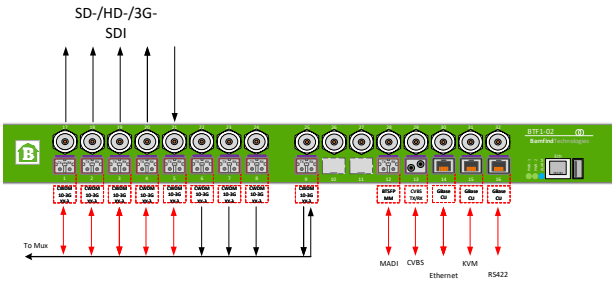
Stagebox 2#

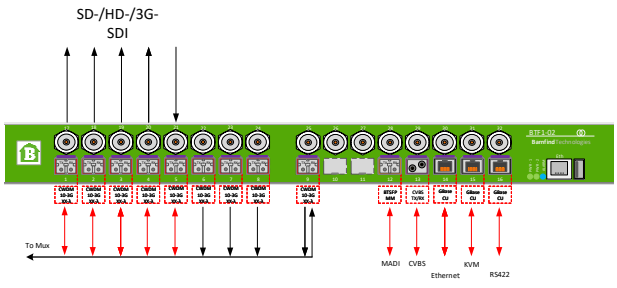


BOM list	
Product Name	**Quantity**
BT-CWDM-10-3G	36
BT-CWDM-MUX-16-LGX	2
BT-HOUS-LGX-1RU	1
BTF1-02	2
BTF1-07-16	2
BTSFP-GBaser-CU	12
BTSFP-MM-1G	4
EB30HDRT-AM	4

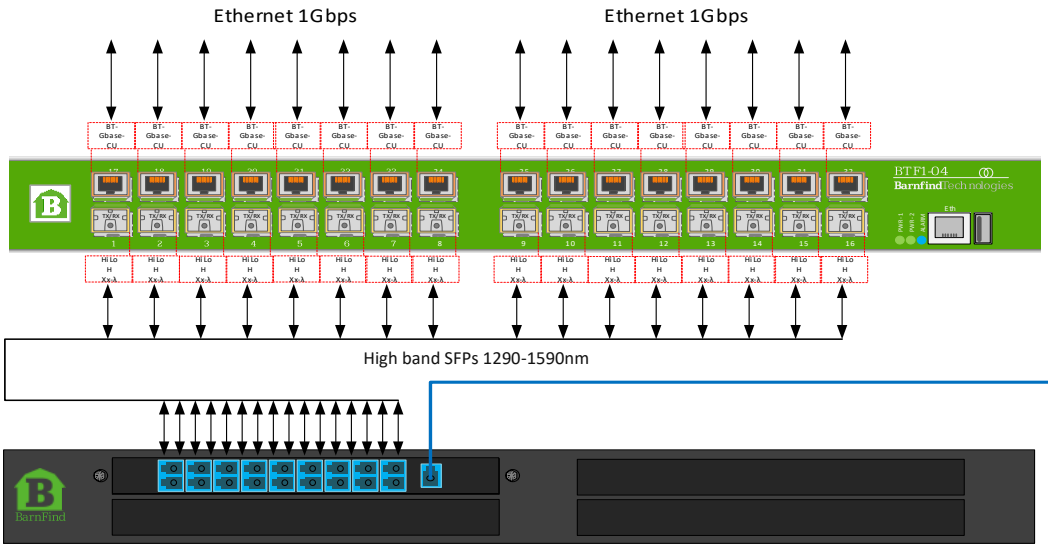
Studio / OB truck





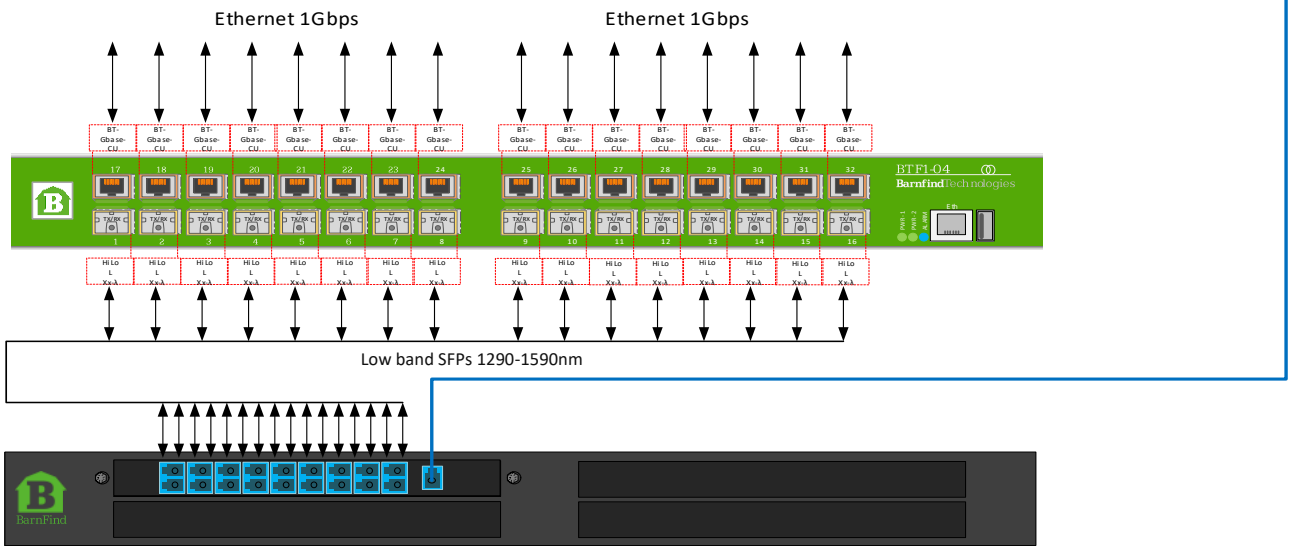


Ethernet/KVM transmission

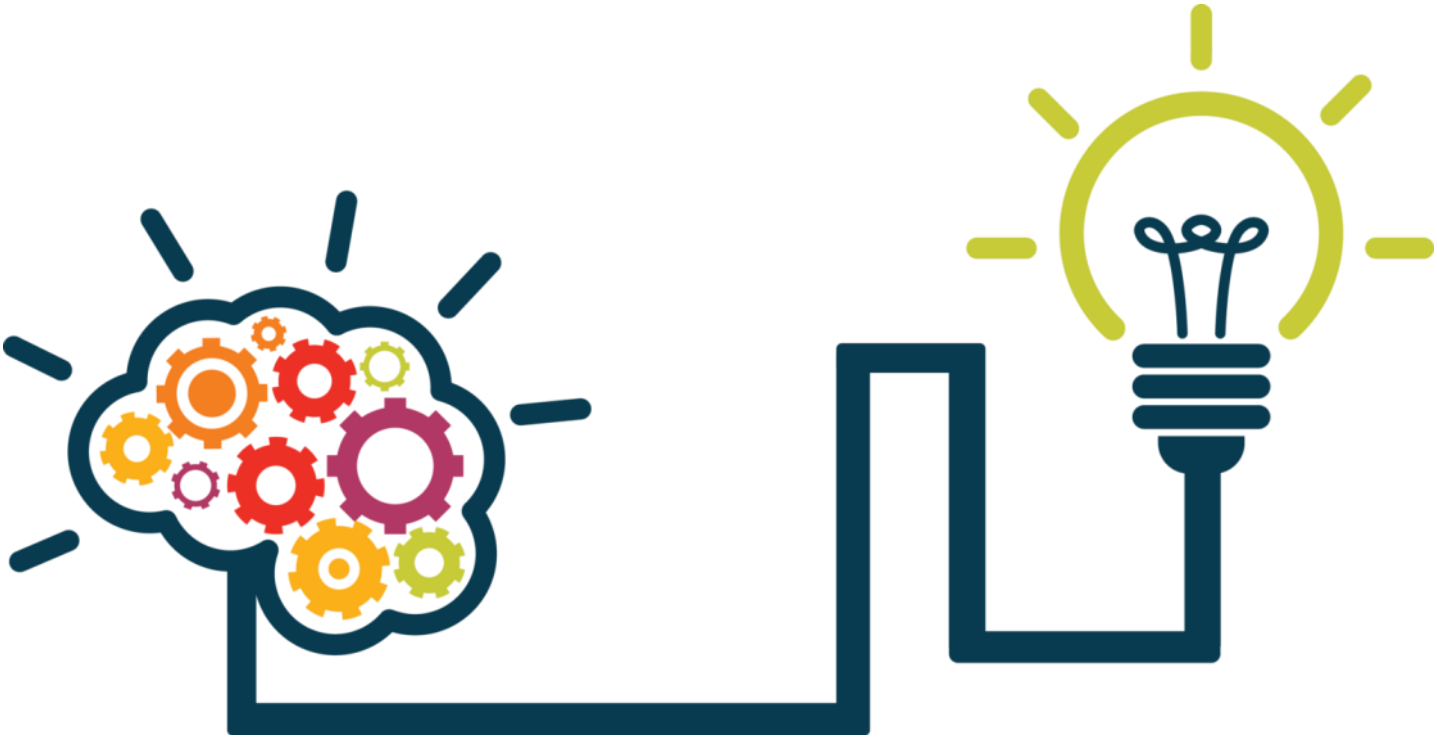


- 16X 1Gbps Ethernet or KVM
- Only 1 Single Mode fiber
  when using HiLo technology
- Only 2RU each side
- Optional redundancy line
- Up to 20km distance

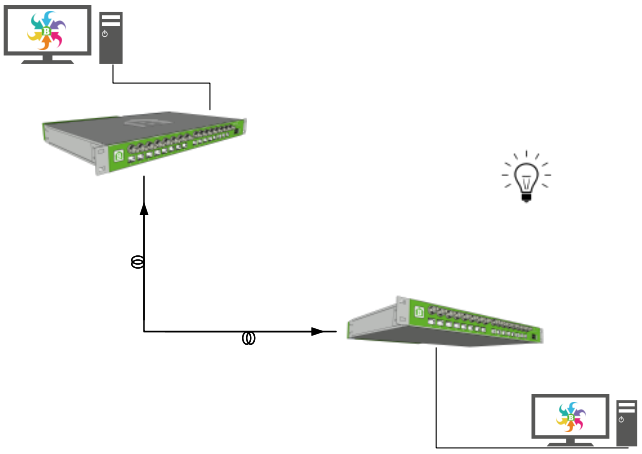
BOM list	
Product Name	**Quantity**
BT-CWDM-16	2
BT-Gbase-CU	32
BT-HOUS	2
BTF1-04	2
BT-3G-xx-H/L	32



TroubleShooting



How to establish an Ethernet connection between 2 BarnOne units



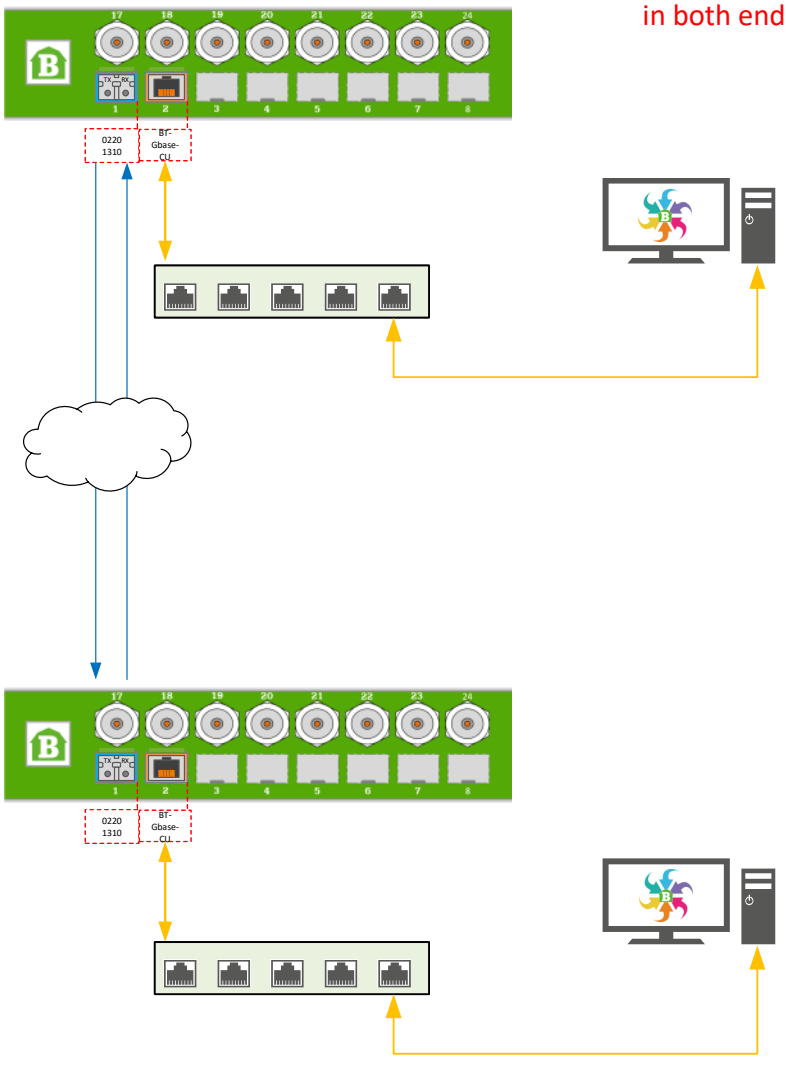
To establish an Ethernet connection over fiber by using Barnfind products, configure your setup as picture below describes.

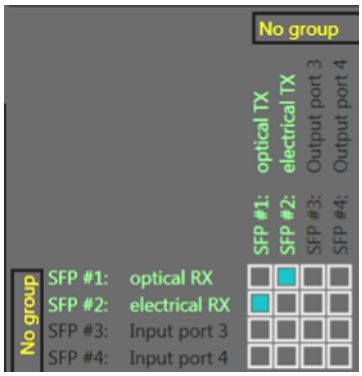
Shown examples are using a point to point connection with 2x fiber cables. Alternative setup could be WDM, CWDM or DWDM technology.

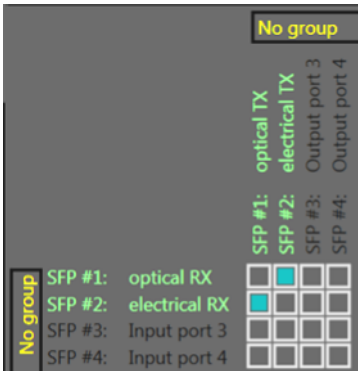
Regardless of point to point or multiplexed connection, the user must ensure the RX is connected to TX and vice versa.

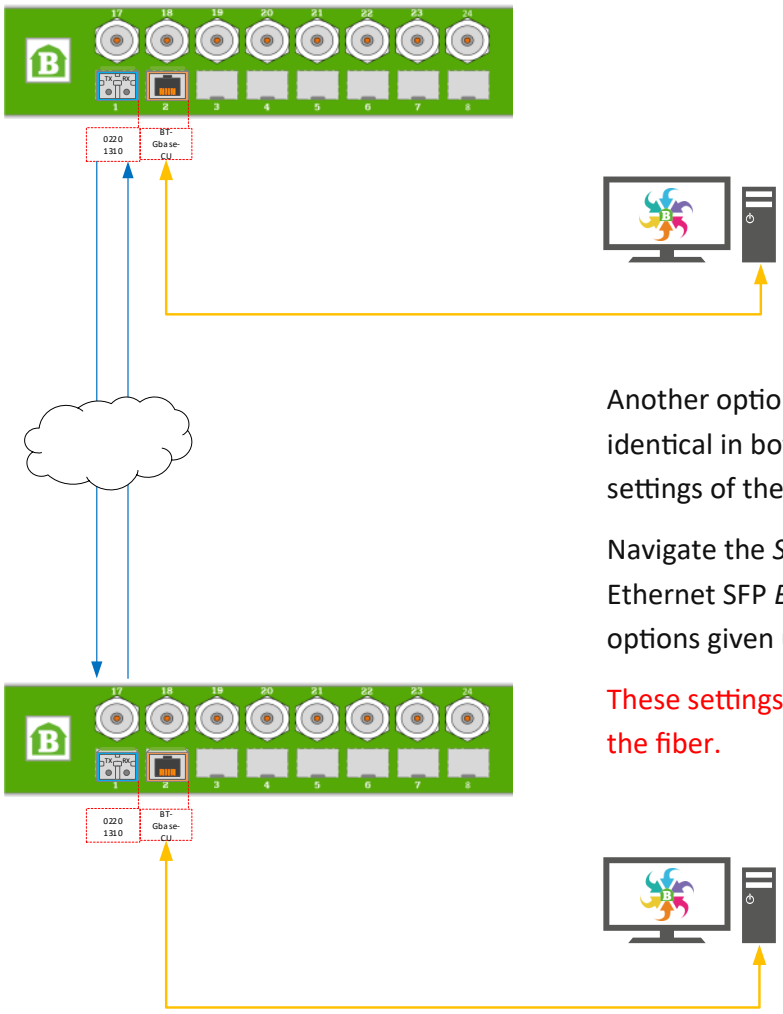
→ Ensure that Ethernet link speed is the same in both ends

→ E.g. use Ethernet switches with identical bandwidth in both ends to ensure same link speed.





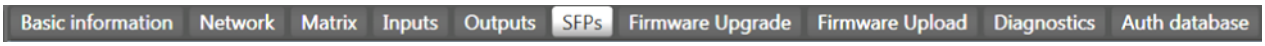


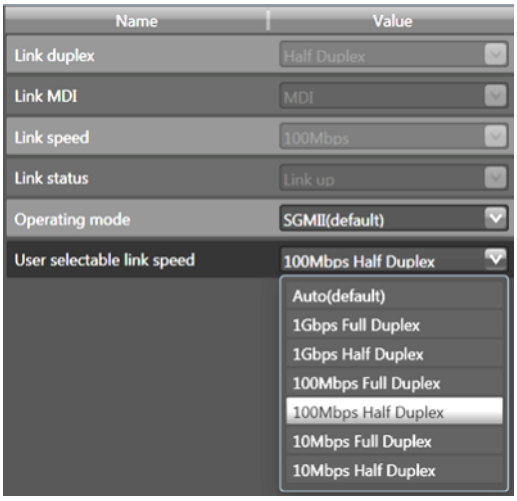


Another option to ensure that the link speed is identical in both sites is to adjust it manually in the settings of the SFP:

Navigate the *SFP tab* in BarnStudio, select the Ethernet SFP *BTSFP-GBase-CU* and select one of the options given under *User selectable link speed.*

These settings need to be identical in both ends of the fiber.

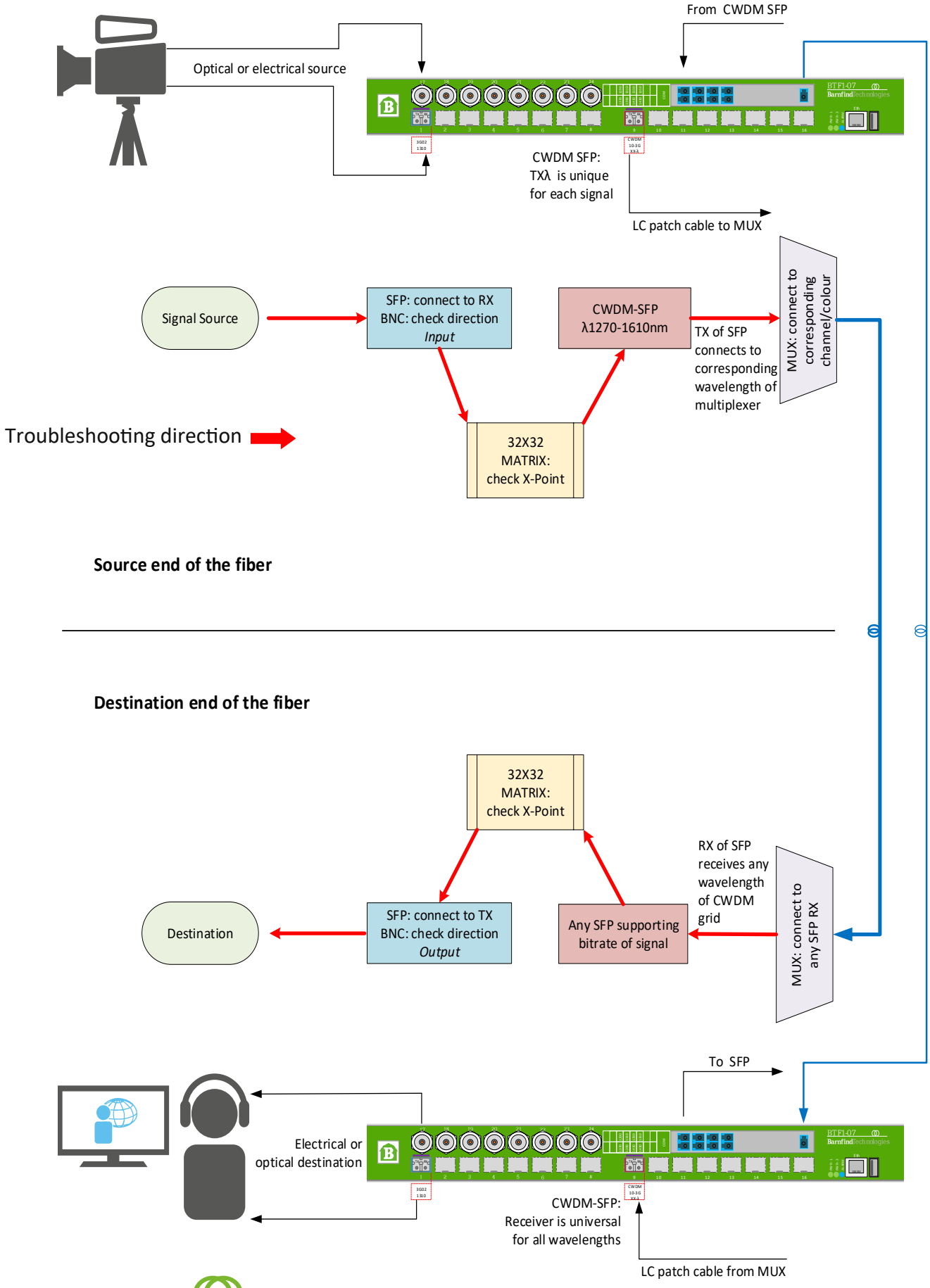




The link speed must be the same in both ends. You can enforce this using BarnStudio.

With this setup, you will not need the network switch in between.

Troubleshooting workflow



Troubleshooting - step by step

A step by step explanation to the diagram on the previous page with more detailed explanation:

Signal Source →

The source signal can be electrical or optical, verify the bitrate/bandwidth of the source and the fiber mode: single mode or multi mode.

Optical source: ensure the SFP used as receiver supports this bitrate and the fiber mode

Multi mode: check the TX wavelength 850nm or 1300/1310nm

SFP: connect to RX
BNC: check direction *Input* →

BNC: ensure that the direction is set to *Input* by BarnStudio or the web UI.

SFP: ensure it is connected to the RX side (receiver) of the SFP

Single mode: usually all single mode SFPs support wavelengths from 1260-1620nm

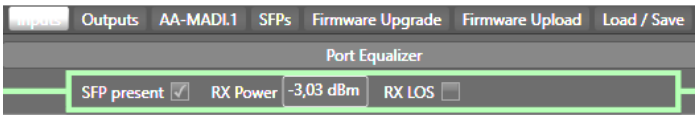
Multi mode: use a SFP corresponding to the wavelength of your source 850nm or 1300/1310nm

DO NOT TRY TO LOOK INTO THE FIBER CONNECTOR in case you do not receive a signal!
It could seriously damage your eye!

Instead, use BarnStudio to troubleshoot:

go to the tab *Inputs,* in the column *Port Equalizer* the information of the SFP about RX power is displayed. There is three different conditions:

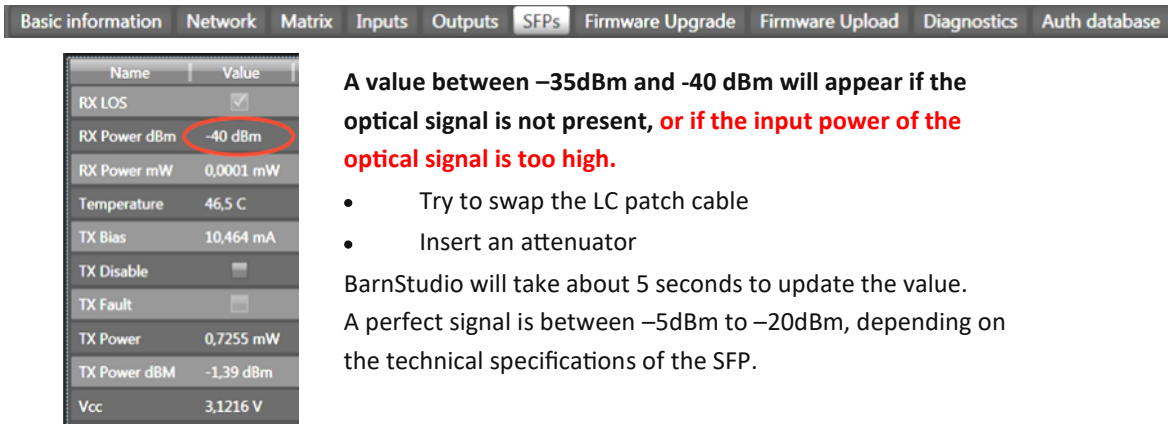
SFP present checked
RX Power ±0dBm to –30dBm
RX LOS unchecked



SFP present *unchecked*

SFP present checked
RX Power less than –35dBm
RX LOS ckecked

The same information and even more details about the condition of the SFP and the signal can be found on the *SFPs* tab.

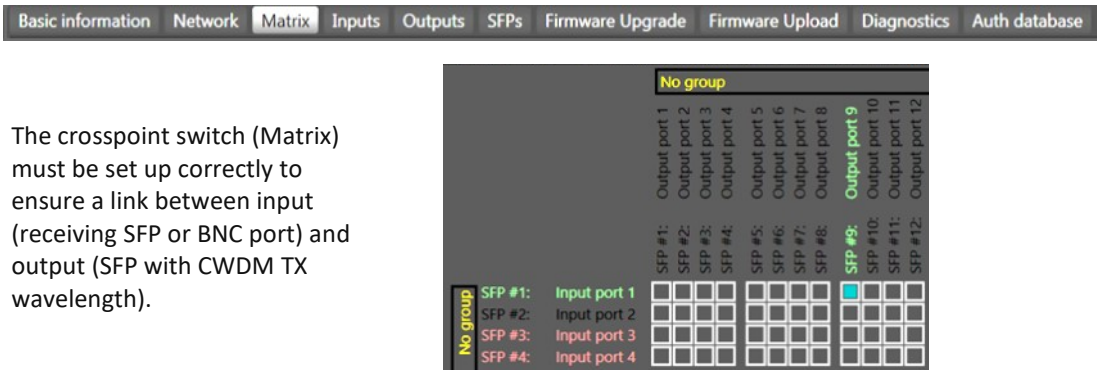


A value between –35dBm and -40 dBm will appear if the optical signal is not present, or if the input power of the optical signal is too high.

- Try to swap the LC patch cable
- Insert an attenuator

BarnStudio will take about 5 seconds to update the value.
A perfect signal is between –5dBm to –20dBm, depending on the technical specifications of the SFP.

32X32 MATRIX: check X-Point



The crosspoint switch (Matrix) must be set up correctly to ensure a link between input (receiving SFP or BNC port) and output (SFP with CWDM TX wavelength).

SFP: connect to RX
BNC: check direction *Input*

Port #1

32X32 MATRIX: check X-Point

CWDM-SFP λ1270-1610nm

Port #9

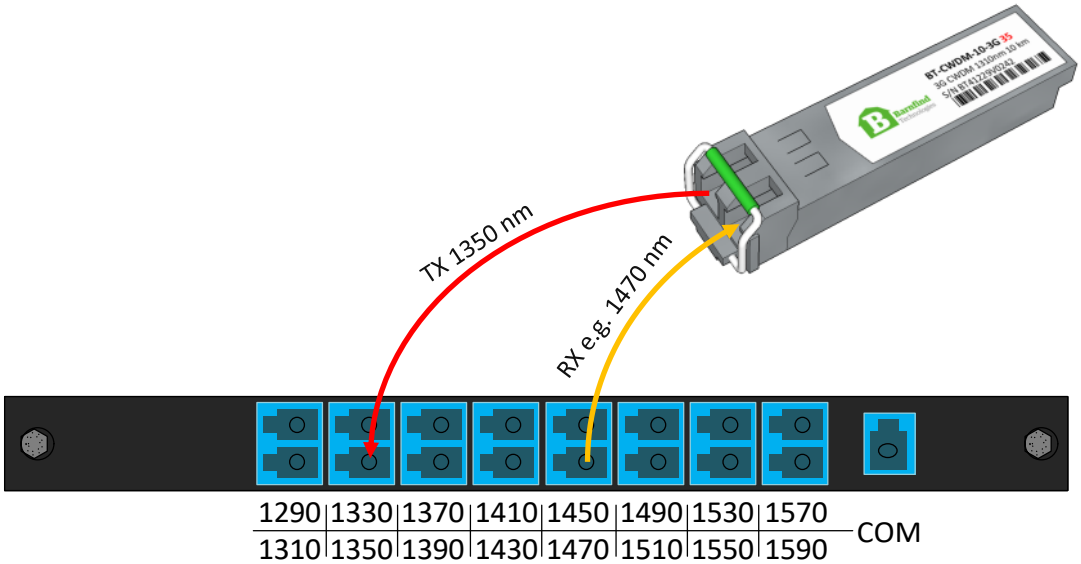
CWDM-SFP λ1270-1610nm

The purpose of this SFP is to transmit the signal which is received at an SFP or BNC port to the optical multiplexer using a specific wavelength/colour.

Note! You must use a unique wavelength for each signal. There are 18 different selections of wavelengths in the CWDM range, 1270nm to 1610nm with a channel spacing of 20nm.

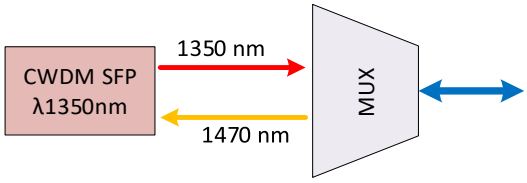
MUX: connect to corresponding channel/colour

This is the final step on the source end of the fiber (transmitter side). All wavelengths from CWDM SFPs are collected in the optical multiplexer and are transmitted as one combined signal in one fiber.



MUX: connect to any SFP RX

Most of the times the receiver of a CWDM SFP is universal, it is sensitive to any wavelength from 1260nm to 1620nm. It is possible to use instead a non-CWDM SFP as a receiver for CWDM multiplexed signals.



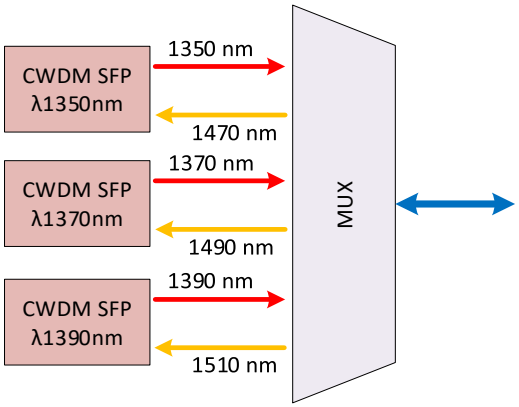
Example #1: connect 1 SFP to an optical multiplexer

The optical multiplexer is a passive unit that transports light in any of the directions at the same time:

Combine 1x TX with 17x RX or

4x TX with 14x RX or

9x TX with 9x RX

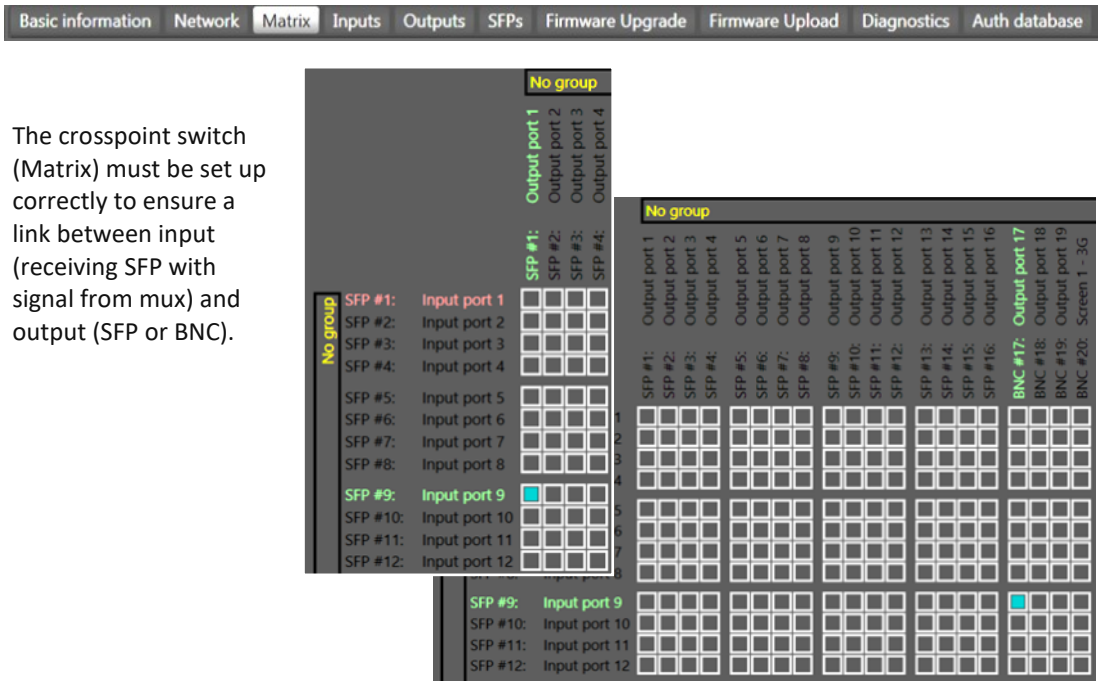


Example #2: connect multiple SFPs to an optical multiplexer

Any SFP supporting bitrate of signal

Any single mode SFP can receive signals from an optical multiplexer, no matter which wavelength the signal is traveling on. The receivers are universal usable from 1260nm to 1610nm, but you need to ensure that the SFP is supporting the bandwidth of the signal, 100Mbps, 1Gbps etc.

32X32 MATRIX: check X-Point



The crosspoint switch (Matrix) must be set up correctly to ensure a link between input (receiving SFP with signal from mux) and output (SFP or BNC).

SFP: connect to TX
BNC: check direction *Output*

32X32 MATRIX: check X-Point

Any SFP supporting bitrate of signal

Port #1

Port #9

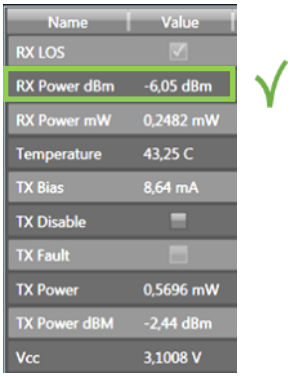
Destination

The destination/receiver can be electrical or optical, choose the correct output port BNC or SFP

Optical destination: ensure the SFP used as receiver supports this bitrate and the fiber mode

Multi mode: check the TX wavelength 850nm or 1300/1310nm of your multi mode SFP

Usage of attenuators



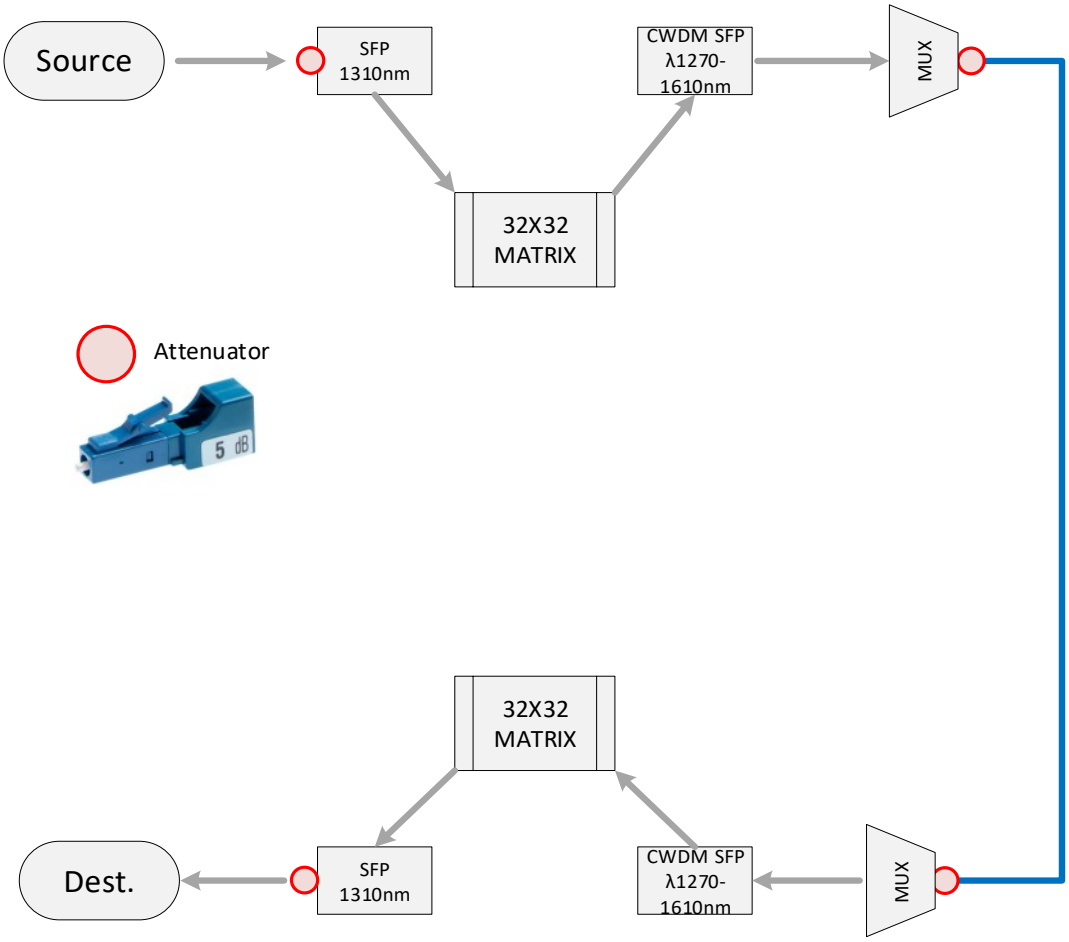
An optical receiver e.g. in a SFP will automatically shut down when the optical power is too high. In BarnStudio, this will be indicated as –40dBm, the same value as for *No Signal.*

In case you do not receive a signal with a SFP the reason can be

- No/too little optical power
- Too high optical power

To ensure a correct optical level, you can use attenuators. They can be inserted at several points in the optical signal chain, depending if you want to attenuate a single signal or the combined signals between two multiplexers.

Typically the optical level should be within the range: -5dBm to –20dBm



Troubleshooting

BTF1-XX frames and connection

Problem	Possible Cause	Suggested Correction
Frame does not appear in BarnStudio Device list	Network cable(s)	Change cable(s)
	Network switch broken/unplugged	Change Network switch (connect directly from computer to frame to verify)
	Wrong/no settings in [Multicast Search Scope]	Change settings according to BarnGuide Chapter Software & Control
	Wrong/no matching IP network	Change settings according to BarnGuide Chapter Software & Control
	Frame is not powered up	Power up frame. At least one green LED in front should be illuminated.
Blue LED at front panel is flashing (Alarm)	A critical component, fan speed, temperature or PSU has reached a level outside 'normal' range	Use BarnStudio [Diagnostics] to read information about the error. Uncheck to turn off the LED indication.
Frame or SFP is overheating (Alarm)	Minor cooling airflow, hot or dusty environment	If fans are not running, open cassette to check connector
		make sure fan speed is running at +7000rpm
		Add filter if dusty environment/Clean filter
Missing functionalities	Frame has old firmware	Upgrade frame to latest firmware.
	BarnStudio is outdated	Download latest BarnStudio http://www.barnfind.no/downloads

Input and output ports

Problem	Possible Cause	Suggested Correction
Can not receive signal (Optical)	Verify if the input is connected to the correct output(s)	Check and correct crosspoint in BarnStudio [Matrix]
	Optical signal in is too strong	BarnStudio will indicate -40dBm. Add attenuator.
	Optical signal in is too weak/missing	Verify incoming signal with an optical power meter.
	Signal format is outside SFP range e.g 3G-SDI->1.25Gbps SFP	Replace SFP
	Wrong connection to SFP. Note, RX is rightside connector seen from front	Swap connectors (fiber connectors)
Can not transmit signal (Optical)	Verify if the output is connected to the correct input	Check and correct crosspoint in BarnStudio [Matrix]
	Signal format is outside SFP range e.g 3G-SDI->1.25Gbps SFP	Replace SFP
	TX turned off	Enable TX in BarnStudio [Output]. Default ON
	Reclocker Bypassed	Change reclocker status to AUTO (default)
Can not receive signal (BNC)	Verify if the input is connected to the correct output(s)	Check and correct crosspoint in BarnStudio [Matrix]
	The port (BNC) is configured as output	Change the direction in BarnStudio [Input or Output]
	Signal format is outside range	Maximum datarate is 3.2Gbps
Can not transmit signal (BNC)	Verify if the output is connected to the correct input	Check and correct crosspoint in BarnStudio [Matrix]
	The port (BNC) is configured as input	Change the direction in BarnStudio [Input or Output]
	Reclocker Bypassed	Change reclocker status to AUTO (default)

Questionaire

Questionnaire for fiber optical transmission

Please use this questionaire to prepare a system design

1 **System Name** (please give a name we can use for communication)

_____

2 **How many locations?**

_____

3 **Is the fiber cable in place/installed already?**

_____

3.1 If YES, how many fiber strands are available between the locations?

_____

3.2 If YES, what kind of fiber is installed, single mode or multimode?

_____

3.3 If NO, how many fiber strands shall be installed?

_____

4 **What is the distance between the single locations?**

_____

5 **Is multiplexing an option to reduce the fiber count?**

_____

6 **Do you wish optical redundancy?**

_____

7 **Comments (please feel free to give as much information as you would like to)**

_____

8 **Signal list for each location, please list how many signals of each type**

8.1 Loc A:

		Please insert quantity
8.1.1	SD-, HD-, 3G-SDI In:	
8.1.2	SD-, HD-, 3G-SDI Out:	
8.1.3	6G/12G SDI In:	
8.1.4	6G/12G SDI Out:	
8.1.5	HDMI In:	
8.1.6	HDMI Out:	
8.1.7	1Gbps Ethernet (specify electr./ opt., SM/MM):	
8.1.8	10Gbps Ethernet (specify electr./ opt., SM/MM):	
8.1.9	GPI:	
8.1.10	GPO:	
8.1.11	RS422/485 (specify)	
8.1.12	ASI/MADI/AES In electr.:	
8.1.13	ASI/MADI/AES In opt.:	
8.1.14	Analog Audio In:	
8.1.15	Analog Audio Out:	
8.1.16	Other opt. In (e.g. CAM-CCU/proprietary):	
8.1.17	Other opt. Out (e.g. CAM-CCU/proprietary):	
8.1.18	Comments:	

8.2 Loc B:

		Please insert quantity
8.2.1	SD-, HD-, 3G-SDI In:	
8.2.2	SD-, HD-, 3G-SDI Out:	
8.2.3	6G/12G SDI In:	
8.2.4	6G/12G SDI Out:	
8.2.5	HDMI In:	
8.2.6	HDMI Out:	
8.2.7	1Gbps Ethernet (specify electr./ opt., SM/MM):	
8.2.8	10Gbps Ethernet (specify electr./ opt., SM/MM):	
8.2.9	GPI:	
8.2.10	GPO:	
8.2.11	RS422/485 (specify)	
8.2.12	ASI/MADI/AES In electr.:	
8.2.13	ASI/MADI/AES In opt.:	
8.2.14	Analog Audio In:	
8.2.15	Analog Audio Out:	
8.2.16	Other opt. In (e.g. CAM-CCU/proprietary):	
8.2.17	Other opt. Out (e.g. CAM-CCU/proprietary):	
8.2.18	Comments:	

8.3 Loc C:

		Please insert quantity
8.3.1	SD-, HD-, 3G-SDI In:	
8.3.2	SD-, HD-, 3G-SDI Out:	
8.3.3	6G/12G SDI In:	
8.3.4	6G/12G SDI Out:	
8.3.5	HDMI In:	
8.3.6	HDMI Out:	
8.3.7	1Gbps Ethernet (specify electr./ opt., SM/MM):	
8.3.8	10Gbps Ethernet (specify electr./ opt., SM/MM):	
8.3.9	GPI:	
8.3.10	GPO:	
8.3.11	RS422/485 (specify)	
8.3.12	ASI/MADI/AES In electr.:	
8.3.13	ASI/MADI/AES In opt.:	
8.3.14	Analog Audio In:	
8.3.15	Analog Audio Out:	
8.3.16	Other opt. In (e.g. CAM-CCU/proprietary):	
8.3.17	Other opt. Out (e.g. CAM-CCU/proprietary):	
8.3.18	Comments:	

One fiber
All signals

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