Manual

Tritec®
Etherface-1

Tx 10G Ethernet

Revision History

Version	Date	Author	Reason
0.0	09/12/22	J.Bullacher	Initial release, Yellow parts have to be reworked.
0.1	06/22/23	S.Philipp	Added Etherface-1 mounting information. Minor fixes.
0.2	08/09/23	S.Philipp	Updated Etherface-1-TX-S information. Removed power-supply. Changed case dimensions.
0.3	10/24/23	S. Philipp	Added requirements for external power supply, chap 5.1 Added accessibility warning
0.4	10/26/23	S. Philipp	Added laser safety remarks for SFP+ module chap 8.2.1 Updated packed size and weight 8.4
0.5	11/07/23	S. Philipp	Updated power and SFP+ warning signs
0.6	11/17/23	S. Philipp	Updated list of allowed cleaning substances. Added usage of Ethernet switches, chap 5.2 Added laser emission caution note.
0.7	12/05/23	S. Philipp	Added installation note.
1.0	08/12/24	S. Philipp	Removed Preliminary Watermark Updated Declaration of Conformity Added Jumbo Frames requirement, chap 5.2 Updated temperature requirement for SFP+ modules when used in wall mount environments. Updated mechanical drawings chap 9
1.1	30/07/25	S. Philipp	Corrected color of finder-LED chap 6.1 and 6.1.1

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1 Regulatory Compliance Statements

Your Tritec product is marked to indicate its compliance class: A
Of the Federal Communications Commission (FCC) — USA

1.1 FCC Class A Notice

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1.This device may not cause harmful interference.
2.This device must accept any interference received, including interference that may cause undesired operation.

Note:
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Modifications:
Any modifications made to this device that are not approved by Oracle may void the authority granted to the user by the FCC to operate this equipment.

2 EC Declaration of Conformity

EG-Konformitätserklärung
nach EN 45014

EC Declaration of Conformity
according to EN 45014

Hersteller: Manufacturer:	TRITEC Electronic GmbH Carl-Zeiss-Straße 41 D - 55129 Mainz Germany
Produktname: Product Name:	Etherface-1-TX, Etherface-1-TX-S

Das bezeichnete Produkt ist konform mit den Vorschriften der

EMV Richtlinie 2014/30/EU und der RoHS Richtlinie 2011/65/EU.

Die Konformität mit diesen Richtlinien wird dadurch nachgewiesen, dass bei dem bezeichneten Produkt folgende Normen eingehalten werden:

EN 55032:2015 + A11:2020, Klasse B
EN 55035:2017 + A11:2020, EN IEC 61000-3-2:2019, EN IEC 61000-3-3:2013 + A1:2019

The afore listed product conforms to the regulations of
EMC Directive 2014/30/EU and theRoHS Directive 2011/65/EU.

The conformity with the instructions of these directives is proved by the observation of the following standards:

EN 55032:2015 + A11:2020, Class B
EN 55035:2017 + A11:2020, EN IEC 61000-3-2:2019, EN IEC 61000-3-3:2013 + A1:2019

Jahr der CE-Kennzeichnung: CE marking date:	2024
Datum / Date:	10.01.2024
Unterschrift / Signature:	U. Schmidt
Name:	Uwe Schmidt
Funktion / Function:	Quality Manager

3 Safety Agency Compliance Statements

Read this section and the caution statements at the unit before beginning any procedure.
The following text provides safety precautions to follow when installing a Tritec Electronic GmbH product.

If the unit begins to emit smoke, smells like something is burning, or makes strange noises, disconnect all power connections immediately and contact your local representative for advice. Attempting to use a malfunctioning unit may result in fire, electric shock, or equipment damage.

Safety Precautions
For your protection, observe the following safety precautions when setting up your equipment:

Follow all cautions and instructions marked on the equipment.
Ensure that the voltage and frequency of your power source match the voltage and frequency printed on the equipment's electrical rating label.
Never push objects of any kind through openings in the equipment.
Dangerous voltages may be present.
Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Do not open the cabinet or modify the unit.
Opening the cabinet or modifying the unit may result in fire, electric shock, or burn.

Modifications to Equipment
Do not make mechanical or electrical modifications to the equipment. Tritec Electronic GmbH is not responsible for regulatory compliance of a modified Tritec product.

Keep small objects or liquids away from the unit.
Small objects accidentally falling through the ventilation slots into the cabinet or spillage into the cabinet may result in fire, electric shock, or equipment damage. If an object or liquid falls/spills into the cabinet, unplug the unit immediately. Have the unit checked by a qualified service engineer before using it again.

Installation
Etherface-1 has to be installed by trained service personnel only.

Use the unit in an appropriate location.

- Not doing so may result in fire, electric shock, or equipment damage.
- Do not place outdoors.
- Do not place in a dusty or humid environment.
- Do not place near heat generating devices or a humidifier.
- Do not place in an in flammable gas environment.
- Do not place in environments with corrosive gases (such as sulphur dioxide, hydrogen sulphide, nitrogen dioxide, chlorine, ammonia, and ozone).
- Do not place in environments with dust, components that accelerate corrosion in the atmosphere (such as sodium chloride and sulphur), conductive metals, and so on.

Use power cords compliant to your country's' standard only.
Be sure to remain within the rated voltage of the power cord. Not doing so may result in fire or electric shock. Power supply: 100-120/200-240VAC 50/60Hz

To power off the unit, unplug the mains power cord from the wall outlet.
The unit has no separate power switch.

The power adapter and power cord must be place in such way that the user can reach it anytime to disconnect the power cord.

For electrical safety, do not connect or disconnect the power cord in the presence of patients.

Caution–Not all power cords have the same current ratings.
Do not use the power cord provided with your equipment for any other products or use. Household extension cords do not have overload protection and are not meant for use with computer systems. Do not use household extension cords with your Tritec product.

The following caution applies only to devices with multiple power cords:
Caution–For products with multiple power cords, all power cords must be disconnected to completely remove power from the system.

Refer all servicing to qualified service personnel.
Do not attempt to service this product yourself as opening or removing covers may result in re, electric shock, or equipment damage.

Caution–Before connecting or removing any input or output connectors unplug the mains power cord.

Accessibility of operator and patient–Make sure to not touch the relevant parts of the Etherface-1 and the patient simultaneously.

Caution– SFP+ modules and optical transmission lines output optical laser radiation. Operators should not unplug SFP+ modules and leave service work to qualified personal. Do not directly look into the openings of cable or SFP+ module when disconnected.

3.1 Product Markings

Read this manual and the caution statements at the unit before beginning any procedure.

General warning sign.

European Union—Disposal Information

The symbol above means that according to local laws and regulations your product and/or its battery shall be disposed of separately from household waste. When this product reaches its end of life, take it to a collection point designated by local authorities. The separate collection and recycling of your product and/or its battery at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

EU conformity mark in accordance with the provisions of Council Directive 93/42/EEC and 2011/65EU.

Manufacturer and date of manufacturing.

Alternating current.

Direct current.

Functional Earth.

Caution:

Mind that the unit becomes hot during use.
Do not cover or place anything on top of the unit. Do not place the unit on top of things that trap heat such as carpets, blankets, etc. Keep the unit away from direct sunlight and heat sources such as heaters. Not doing so may result in fire.
Do not touch with bare hands. Doing so may result in burns.
Before moving the unit be sure to disconnect the power plug from the power outlet, and wait until it has cooled completely.

Unplug the unit before cleaning it.
Cleaning the unit while it is plugged into a power outlet may result in electric shock.

If you plan to leave the unit unused for an extended period, disconnect the power cord from the wall socket for the safety and the power conservation.

This product is only suitable for a patient environment, but not for contact with a patient.

Cleaning:

Do not use chemicals on a frequent basis. Chemicals such as alcohol and antiseptic solution may cause gloss variation, tarnishing, and fading of the cabinet.

Never use any thinner, benzene, wax, and abrasive cleaner, which may damage the cabinet or panel.
Do not let chemicals come into direct contact with the unit.
Gently wipe off any dirt on the cabinet or panel surface with a soft cloth soaked in a small amount of water or one of the chemicals listed below.

Chemicals that may be used for cleaning

Material name	Product name
Isopropyl alcohol	Isopropyl alcohol

4 General

The Tritec® Etherface-1 Tx 10G is a converter that converts 4k video signals like HDMI, DisplayPort and SDI to IP over 10G optical Ethernet. These packets are received by the MDI-10 input board of the Multi-Display-Manager (MDM).
Tritec® Etherface-1 Tx 10G has built in repeaters for HDMI, DP and SDI input signals to be looped through to the same video standard output. No video conversion between inputs and the repeater outputs take place.
Additionally, an USB type C (USB-1.1 host) connector can output keyboard and mouse signals to an attached PC.

This document should be used to install Tritec® Etherface-1 products.

Etherface-1 is available in different options. This document describes all options of the Etherface-1 **Table 1: Order numbers and options** shows a list of available options and order numbers.

Order Number	Name	Power Supply	Video Inputs	Loop through outputs	USB C
Etherface-1-TX	Etherface-1 Tx 10G Front	External via USB C	HDMI,SDI, DP	Yes	USB 1.1 host
Etherface-1-TX-S	Etherface-1 Tx 10G Side	External via standard 5.5/2.1mm 5V DC power plug	HDMI,SDI, DP	Yes	USB 1.1 host

Table 1: Order numbers and options

Other customer dependent options available.

For technical details of the inputs refer to Table 3: Technical details of video input.

Figure 1: Etherface-1 Front

Figure 2: Etherface-1 Side

5 Usage of Tritec® Etherface-1

The following figure shows the typical use of the Etherface-1.
Refer to Table 3: Technical details of video input to find which video sources are supported.

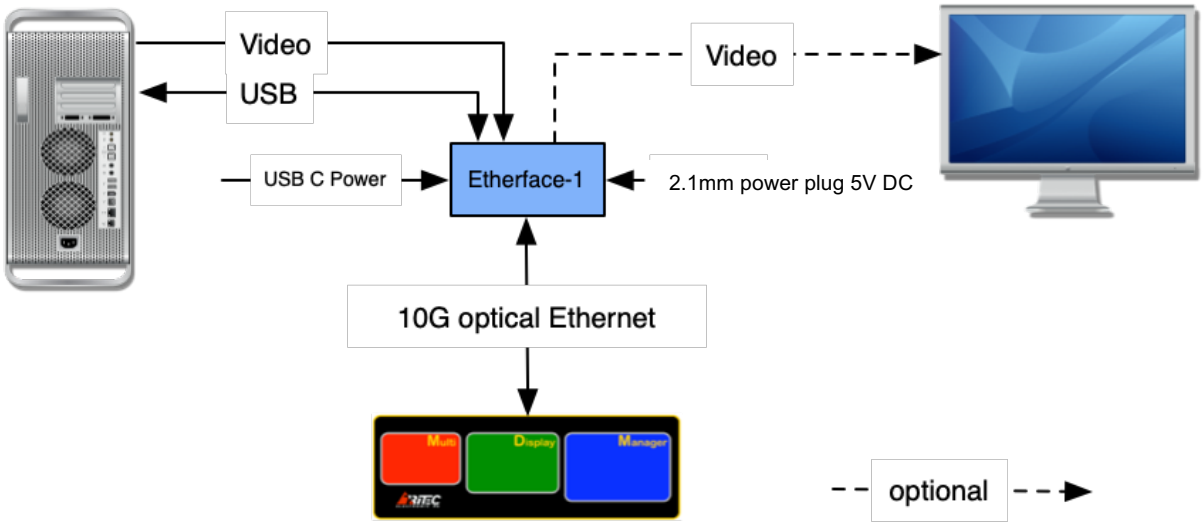

Figure 3: Etherface-1 Connection to MDM

5.1 External Power Supply

The external power supply is not part of the Etherface-1-TX-S delivery.
Any power supply that covers the following requirements can be used:

Certified	UL 62368 (ES1, PS2)
Input voltage	100V to 240V according to country
output voltage	5 V +/- 10%
output current	2.5 A min – 3A max
External power connector	standard DC jack 2.1mm power plug

Table 2: External power plug requirements

Warning:
Make sure the power supply 5V DC jack follows the following voltage polarity:

5.2 Digital Inputs

	Digital Inputs		
	HDMI	Display-Port	SDI
Supported Standards	HDMI 2.0	Display Port 1.2	12G, 6G, 3G SDI HD, SMPTE 259M, 292M, 424M
Connector Type	HDMI	DisplayPort	BNC
Input signal equalizer	yes	yes	yes
Repeater output	yes, cable driver	yes, cable driver	yes, reclocked cable driver
max . Pixel clock [MHz]	594	594	594
Max. Resolution @60Hz	4096x2160	4096x2160	4096x2160
Color Formats	RGB, YCbCr, 4:4:4, 4:2:2	RGB, 4:4:4	YCbCr, 4:2:2
Color Depth [Bits]	8,10,12	8	10
Color converter	Input resolutions of 3840x2160x50/60Hz or above are color converted to YCbCr 4:2:2		no
Color Depth visible on MDM [Bits]	8		

Table 3: Technical details of video inputs

Notes:

- Only one input can be active.
- When a repeater cable is connected to a display, EDID data are provided by the display otherwise from Etherface-1. This can be overwritten by MDM.
- Etherface-1 will use the input signal of the first connector plugged in. In order to switch to another input connector, first disconnect all video inputs.
- By default, all input resolutions above 3840x2160@30Hz (i.e. 50Hz,60Hz) (pixel clock >297Mhz) with color coding of 4:4:4 are converted to YCbCr 4:2:2 before transmitting over Ethernet. MDM is reconverting this signal to RGB 4:4:4. The conversion reduces color to BT.709 standard but not the greyscale part.

Ethernet Physical Interface	
Ethernet	802.3 compatible 10GBASE-SR
SFP+ Modul	10G optical Interface, replaceable part, not part of Etherface-1 Make sure to use SFP+ modules capable for 85°C temperature when operating the Etherface-1 in enclosed environments e.g. the wall mount box.
Max. Length of optical cable	SR Type of SFP+ module: 200m (default) LR Type of SFP+ module: 1km (not supplied)
Optical Cable Type	Multi Mode LC cable

Table 4 Ethernet Specification

Note:
Etherface-1 fully complies to the IEEE 802.3 Ethernet standard. A common 10 Gbit/s optical Ethernet switch can optionally be used to interconnect one or more Etherface-1 and MDM devices. Make sure the switch is configured to support Jumbo Frames. To optimize the network performance, no other devices should be connected to the switched network.

USB Interface	
USB	1.1 HID compatible
Connector Type	USB-C

Table 5: USB Spezification

6 Hardware Installation

This part of the installation refers to Etherface-1 10G Side or Front.

The device should only be mounted to a height less than 2m. When mounting the Etherface-1 TX Side, make sure only one side is used for mounting and the other sides have a minimum air space of d>=20mm (see Figure 4). The environment temperature shall not exceed 35 degrees C at all times. Make sure the connector front panel is not covered. In case the Etherface-1 TX Side model variant is mounted in enclosed area, an additional option to detach the AC power has to be provided (power switch etc.).

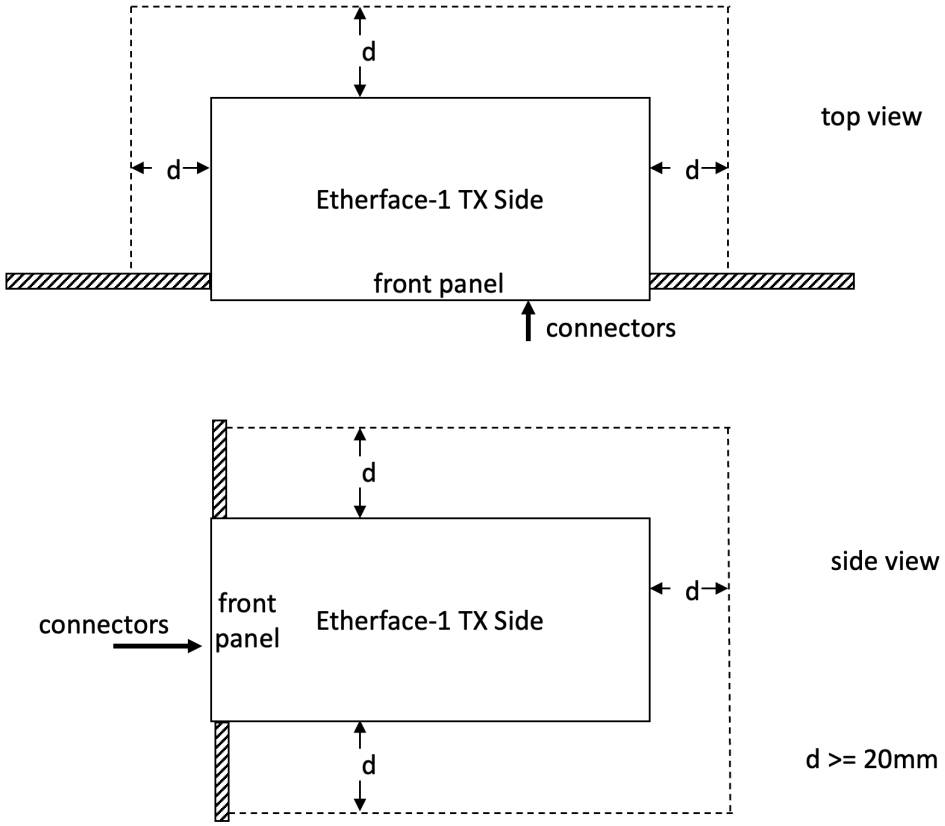

Figure 4: Etherface-1 TX Side, mounting example at front connector panel

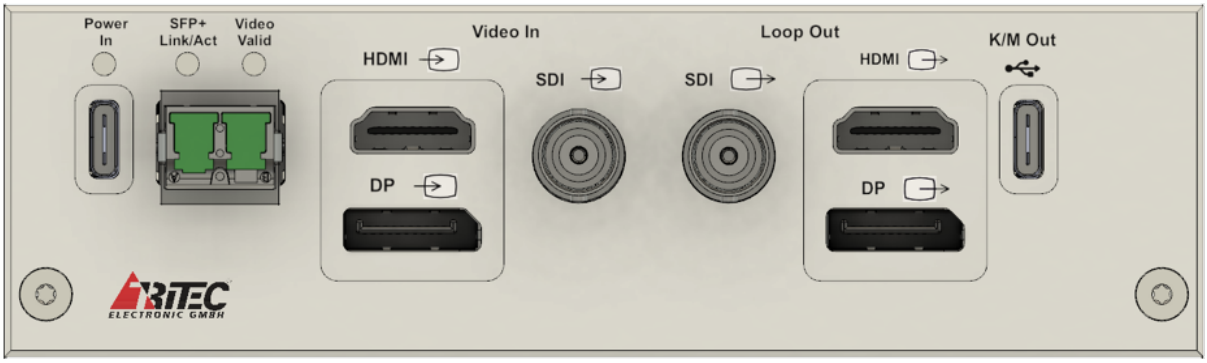

Figure 5: Front View of Etherface-1 TX Front

6.1 Minimum installation for Etherface-1 connection

The minimum connections for Etherface-1 Side:

- Connect 5V DC power to the 5.5/2.1mm standard power plug at the left side.

⇨ The 'Power' LED should light Green.

The minimum connections for Etherface-1 Front:

- Connect power to the USB-C 'power in' connector at the front.

⇨ The 'Power' LED should light Green.

For all Etherface-1 versions:

- Connect the two LC fiber cable to the SFP+ module. The cables have to be crossed. The LC connection plugged into the left side of the SFP+ module on Etherface-1 must be plugged into the right side of the MDM-10 board and vice versa.

⇨ The SFP+ Link/Act LED should light Green.
  - If not:
    - Check if Etherface-1 and MDM are powered up?
    - Try to swap the left and right LC connections.

⇨ Access the MDM-1 browser interface menu and go to the MDM-1 'Administration' Tab, select the input channel this Etherface-1 is connected to and open the 'Hardware Info' Tab.
In the 'MDI' part of the tab 'Link up' should be visible.
In the 'Etherface-1' part 'Found Etherface-1 10G Tx SFP+ Module to front/side' should be visible. For more details please refer to the MDM manual.

- Connect one video cable (HDMI, DisplayPort or SDI) from the PC to the 'Video in' of the Etherface-1.

⇨ The 'Video Valid' LED should light Green if a valid video signal is connected and detected.
⇨ The 'Video Valid' LED should light Blue when the video signal is transmitted via Ethernet to the MDM.
⇨ The 'Video Valid' LED should be blinking Blue when the input channel is open in the 'Administration' Tab where this Etherface-1 is connected to. (see next item below)
⇨ Go to the MDM-1 'Administration' Tab, select the input channel this Etherface-1 is connected to and open the 'Hardware Info' Tab. (The 'Video Valid' LED should be blinking Blue).
In the 'Info' part of the tab 'Video Connected' should be visible.
In the 'Etherface-1' part 'Video connected to HDMI or SDI or DP' should be visible.
For more details, please refer to the MDM manual.

6.1.1 LED information for Etherface-1

When power is turned on the following LED lights should be visible:

- SFP+ Link/Act LED:
  - OFF if no optical connection is made
  - Green if an optical connection is made connected
  - Green Blinking if there is traffic over the optical connection

- Valid Video LED:
  - OFF if no video input signal is present
  - Green if the video input has a valid input signal
  - Blue if the video input is transmitting the video signal via Ethernet
  - Blue Blinking if the video input is selected in Administration tab of WebUI

- Power LED:
  - Off if power is not connected
  - Green if power is connected

6.2 Additional connections for Etherface-1

6.2.1 Video loop through output

In addition to the video input connection a video output connection to a display can be made. The video input of the Etherface-1 unit is looped through to the equivalent video output. i.e. HDMI in to HDMI out etc.
EDID data of the display are looped through to the video source.

- Etherface-1 does not convert any video input signal to any other video type at the repeater output. i.e. HDMI in to DP out is not supported.
- Etherface-1 does not support any content protection (HDCP) on its output connector and the repeater output. If a source that needs HDCP is connected directly to a display that supports HDCP it will show content protected videos. If the same source is connected to an Etherface-1 input, no video is sent via ethernet connection. And no output can be seen on the repeater output.

6.2.1 USB connection

The USB-C connector marked with 'K/M out' can be connected to a PC (Host) to send keyboard and mouse data from MDM to the PC. For more details please refer to the latest MDM manual.

6.3 Important to know

For proper working please obey the following rules:

- Connect only one video source at a time. If you want to switch from one video input type to another; first disconnect all video inputs, then reconnect the desired video input.
- Check that Etherface-1 has a valid video input signal. The 'Valid Video' LED must be green.
- The source of the EDID data (available resolutions) depends on various parameters:
    - If a display is connected to the video repeater this attached display provides the EDID data.
    - If the repeater output is not connected; Etherface-1 provides the EDID data.
        - The preferred timing is provided by the MDM and can be changed in the 'Administration' tab of the connected input. For more details please refer to the MDM manual.

7 Service

Etherface-1 has no serviceable parts.
No calibration is necessary.

In case of a defect the unit has to be returned to the factory.

7.1 Features available with MDM browser interface

In the ‘Administration’ tab of the MDM browser interface several details and features of the Etherface-1 are available:

1. The serial number and the firmware / hardware revision of the Etherface-1 unit.
2. The input connector used and the resolution, color etc. of the input signal.
3. The connection status of the Etherface-1.
4. Setting of the preferred resolution (EDID data).
5. Firmware update of the Etherface-1 unit.
6. Setting a name for this Etherface-1.
7. Setting up the keyboard and mouse connection.
8. Details of the SFP+ module plugged in.
9. MAC address of the Etherface-1.

For more details, refer to the latest MDM manual.

7.2 Trouble Shooting

If one of the LEDs is not showing a green or blue light a problem may happen.

First check that the ‘DC in’ LED a shows green light. If not:

- Check the power cord for Etherface-1 side version or
- USB-C power connection for the Etherface-1 front version.

If no green light shows up the Etherface-1 unit is defect.
Remove the power cord and return the part to the manufacturer. Do not dispose it to household trash.

If the ‘DC in’ shows a green light check the ‘Link’ LED. If it’s off, then

- Check the connection on both ends of the optical cable.
- Check that ‘receive’ is connected to ‘transmit’ and vice versa (the cables have to be crossed).
- Check if the green light at the PC side shines.

If no green or blinking green light shows up most likely the Etherface-1 unit is defect.
Remove the power cord and return the part to the manufacturer. Do not dispose it to household trash.

8 Technical Specifications

8.1 Video Input / Repeater Output Specifications

8.1.1 HDMI Input

Input	
Marking	HDMI in
Connector Type	HDMI female connector
Signal Type	According to HDMI standard 2.0 with equalization and Pre-emphasis
ESD Protection	8KV contact per IEC6100-4-2 and 2KV HBM
Pixel Clock	Max. 594MHz
Horizontal Display timing	Min. 640 Pixel; max 4096 Pixel
Vertical Display timing	Min. 480 Lines; max. 2560 Lines
Interlace	1080i 25, 30, 50, 60Hz; 576i 25, 50, 100Hz; 480i 30, 60, 120Hz
EDID Data	When no loop through plugged in provided internally. For details see separate table.

8.1.2 HDMI Repeater Output

Repeater Output	
Marking	HDMI out
Connector Type	HDMI female connector
Signal Type	According to HDMI standard 2.0 with equalization and Pre-emphasis
ESD Protection	8KV contact per IEC6100-4-2 and 2KV HBM
Pixel Clock	Max. 594MHz for Single Link.
EDID Data	When repeater plugged in provided by external display.

8.1.3 DisplayPort Input

Input	
Marking	DP in
Connector Type	DisplayPort connector, with lock
Signal Type	According to DP v1.2 standard
ESD Protection	8KV contact per IEC6100-4-2 and 2KV HBM
Pixel Clock	Max. 594MHz; HBR2 data rates
Color depth	10bit
Lanes	4 lanes / HBR2
Streams	Single stream only.
Interlace	Non-interlace only, progressive
EDID Data	When no repeater plugged in provided internally. For details see separate table.

8.1.4 DisplayPort Repeater Output

Repeater Output	
The repeater output is independent from the input link and establishes its own link.	
Marking	DP out
Connector Type	DisplayPort connector, with lock
Signal Type	According to DP v1.2 standard
ESD Protection	8KV contact per IEC6100-4-2 and 2KV HBM
Pixel Clock	Max. 594MHz; HBR2 data rates
Lanes	4 lanes / HBR2
Color depth	10bit
Streams	Single stream only.
Interlace	Non-interlace only
EDID Data	When loop through plugged in provided by external display and filtered internally for: max refresh rate of 60Hz, no audio, no HDR.

8.1.1 SDI Input

Input	
Marking	SDI in
Connector Type	BNC, 75Ohm
Signal Type	SDI: 12G; 3G Level A only
Equalization	Equalized cable lengths up to: 30m @12G; 60m@6G; 100m@3G
Clock	12Gbps
Standards	12G, 6G, 3G, HD, SD, SMPTE 292M, 424M

8.1.2 SDI Repeater Output

Repeater Output	
Marking	SDI out
Connector Type	BNC, 75Ohm
Signal Type	SDI: 12G; 3G Level A only
Clock	12Gbps
Output Signal	Re-clocked cable driver
Standards	12G, 6G, 3G, HD, SD, SMPTE 292M, 424M

8.2 10G Ethernet Connection

8.2.1 10G optical Ethernet Connection

Output	
Ethernet	802.3 compatible 10GBASE-SR
SFP+ Modul	Either on the left side or the front. More details about the module in use can be found in the 'Administration' 'Hardware Info' tab of the MDM-1 under 'Etherface SFP+ details'.
SFP+ Modul Type 	SR Type, replaceable, not part of Etherface-1 Safety Warning: Only use optical transceiver Laser Class 1 which complies with FDA performance standards for laser products except for conformance with IEC 60825-1 Ed. 3, as described in Laser Notice No. 56, dated May 8, 2019. Only use SFP+ modules with maximum power consumption of 1 W. Make sure to use SFP+ modules capable for 85°C temperature when operating the Etherface-1 in enclosed environments e.g. the wall mount box.
Connector Type	LC receive and transmit
Max. Length of Optical cable	SR Type of SFP+ module: 200m (default) LR Type of SFP+ module: 1km (not supplied)
Recommended Cable	Multi Mode LC OM3

8.3 Electrical Specifications

8.3.1 Etherface-1 electrical input

Etherface-1 Side version	
Connector Type	5.5/2.1mm standard power plug
Input Voltage	5V DC
Input current	3A

Etherface-1 Front version	
Connector Type	USB-C
Input Voltage	5VDC
Input current	3A

8.3.2 Electrical Safety & EMC specifications

Electrical Safety	IEC60601, EN60601, UL60601
EMC	According EN55032 & EN55024
Radiated Emission	FCC class A
Immunity	IEC 610004 2-11
Markings	UL, CE, WEEE

8.4 Mechanical Specifications

Etherface-1 Side version	
Unpacked Size	see chapter 9 Mechanical Details
Unpacked Weight	0.5 kg
Etherface-1 Front version	
Unpacked Size	see chapter 9 Mechanical Details
Unpacked Weight	0.5 kg

Etherface-1 Side / Front version	
Packed Size	300 x 200 x 100 mm
Packed Weight	1,0 kg

8.5 Environmental Specifications

Environmental Requirements
Unpackaged Operating: Temperature 5 °C according EN 60068-2-1 Temperature 35 °C according EN 60068-2-2.
Unpackaged Operating Humidity: Damp heat, 25°C, 10 to 80% RH (non-condensing) according EN 60068-2-38.
Unpackaged Operating Pressure: 700-1060 hPa (525 -795 mmHg) or up to 3050m (10,000ft).
Packaged Non-Operating Temperature (Storage, Transportation): Temperature -20 °C according EN 60068-2-1 Temperature +70°C according EN 60068-2-2.
Packaged Non-Operating Humidity: +25°C 10 to 95% RH (non-condensing) according 60068-2-38.
Packaged Non-Operating Pressure: 500 -1060 hPa (375 -795 mmHg) or up to 5,050m (18,000 ft).
Packaged Tests Continuous Shock: according EN 60068-2-29 and EN60721-3-2, class 2M2.
Package Drop Test: according EN 24180-2.
Sound Noise Level: No noise emitted.

8.6 Reliability

Etherface-1 Tx Front	87,600h MTBF Calculation per MIL-HDBK-217F Parts Count Reliability Prediction Method, @25°C
Etherface-1 Tx Side	70,000h MTBF Calculation per MIL-HDBK-217F Parts Count Reliability Prediction Method, @25°C

8.7 EDID Timings

8.7.1 Standard EDID Timings

	Digital EDID for HDMI, DP
(EDID V1.4)	
Vendor ID / Product ID	TRT / 8225 (x2021)
Analog / Digital	Digital
Preferred timing mode	**x**
Established Timings:	
720x400x70	**x**
720x400x88	.
640x480x60	**x**
640x480x67	**x**
640x480x72	**x**
640x480x75	**x**
800x600x56	**x**
800x600x60	**x**
800x600x72	**x**
800x600x75	**x**
832x624x75	**x**
1024x768x87	.
1024x768x60	**x**
1024x768x70	**x**
1024x768x75	**x**
1280x1024x75	**x**
1152x870x75	**x**
Standard Timings:	
Timing ID #1	1152x864x60
Timing ID #2	1280x720x60
Timing ID #3	1280x800x60
Timing ID #4	1280x960x60
Timing ID #5	1280x1024x60
Timing ID #6	1400x1050x60
Timing ID #7	1440x900x60
Timing ID #8	1600x900x60
Timing ID #9	1600x1200x60
Timing ID #10	1680x1050x60
Timing ID #11	1920x1080x60

8.7.2 Additional Progressive Video Timings for HDMI inputs

„progressive video“	
Common features:	Underscan, Audio, YCbCr 444, YCbCr 422
Video formats:	3840x2160p @ 59,94/60, 50, 29,97/30, 25, 23,98/24 Hz
	1920x1080p @ 59,94/60, 50, 29,97/30, 25, 23,98/24 Hz
	1280x720p @ 59,94/60, 50, 29,97/30, 25, 23,98/24 Hz
	720x480p @ 59,94/60 Hz
	720x576p @ 50 Hz
	640x480p @ 59,94/60 Hz
Audio:	L-PCM, 48kHz, 44,1kHz, 32kHz, 16bits
Deep Color:	36bit, 30bit, Y444
Max TMDS Clock:	600MHz
Content:	HDMI Video Present

8.7.1 Additional Progressive Video Timings for DP inputs

„progressive video“	
Common features:	Max. 10bit, YCbCr 444, YCbCr 422; RGB
Video formats:	Max. 3840x2160p @ 60

8.7.2 Preferred Timing

These are the preferred timings; which can be selected in the MDM ‘Administration’ tab.

	Resolution name:	Note:
Standard timings:	640x480,60Hz	DMT
	800x600,60Hz	DMT
	1024x768,60Hz	DMT
	1152x864,60Hz	CVT
	1280x720,60Hz	CEA
	1280x800,60Hz	CVT
	1280x960,60Hz	DMT
	1280x1024,60Hz	DMT
	1400x1050,60Hz	CVT
	1440x900,60Hz	CVT
	1600x900,60Hz	CVT
	1600x1200,60Hz	DMT
	1680x1050,60Hz	CVT
	1920x1080,60Hz	CEA
	1920x1200,60Hz	CVT RB
	1536x2048,30Hz	special
	2048x2048,30Hz	special
	2048x2560,25Hz	special
	2560x1440,30Hz	CVT RB
	2560x1600,30Hz	CVT RB
	2560x1440,60Hz	CVT RB
	2560x1600,60Hz	CVT RB
	3840x2160,30Hz	CVT RB
	3840x2160,60Hz	CVT RB

8.8 SDI supported Timings

The following table shows all supported SDI timings.

Table 6 Supported SDI Timings

Video timings according to CEA-861-F				
progressive	H Display	V Display	Pixel Clock	SDI rate
HD				
1280 x 720p25	1280	720	74250000	HD
1280 x 720p29,97	1280	720	74175824	HD
1280 x 720p30	1280	720	74250000	HD
1280 x 720p50	1280	720	74250000	HD
1280 x 720p59,94	1280	720	74175824	HD
1280 x 720p60	1280	720	74250000	HD
FHD				
1920 x 1080p23.9	1920	1080	74175824	HD
1920 x 1080p24	1920	1080	74250000	HD
1920 x 1080p25	1920	1080	74250000	HD
1920 x 1080p29,97	1920	1080	74175824	HD
1920 x 1080p30	1920	1080	74250000	HD
1920 x 1080p50	1920	1080	148500000	3G
1920 x 1080p59,94	1920	1080	148351648	3G
1920 x 1080p60	1920	1080	148500000	3G
UHD				
3840 x 2160p23.9	3840	2160	296703297	6G
3840 x 2160p24	3840	2160	297000000	6G
3840 x 2160p25	3840	2160	297000000	6G
3840 x 2160p29,97	3840	2160	296703297	6G
3840 x 2160p30	3840	2160	297000000	6G
3840 x 2160p50	3840	2160	594000000	12G
3840 x 2160p59,94	3840	2160	593406594	12G
3840 x 2160p60	3840	2160	594000000	12G
4K				
4096 x 2160p23.9	4096	2160	296703297	6G
4096 x 2160p24	4096	2160	297000000	6G
4096 x 2160p25	4096	2160	297000000	6G
4096 x 2160p29.97	4096	2160	296703297	6G
4096 x 2160p30	4096	2160	297000000	6G
4096 x 2160p50	4096	2160	594000000	12G
4096 x 2160p59,94	4096	2160	593406594	12G
4096 x 2160p60	4096	2160	594000000	12G

Video timings according to CEA-861-F				
Video timings according to CEA-861-F				
interlaced	H Display	V Display	Pixel Clock	SDI rate
1920 x 1080i50	1920	1080	74250000	HD
1920 x 1080i59,94	1920	1080	74175824	HD
1920 x 1080i60	1920	1080	74250000	HD

9 Mechanical Details

Figure 6: Etherface-1 Front version. Dimension and Connectors.

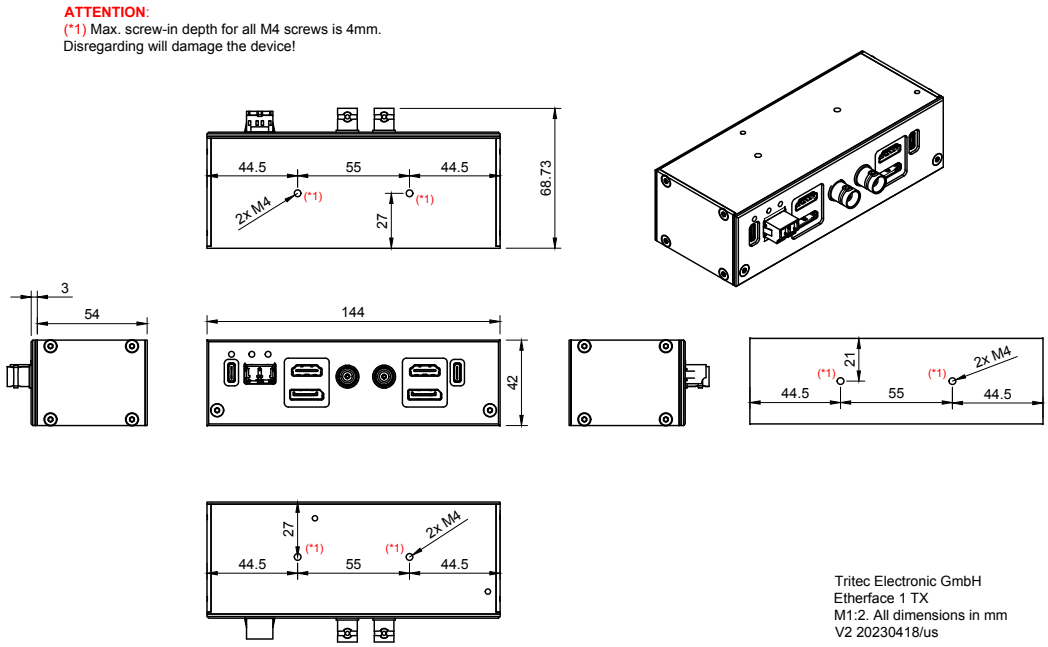

Figure 7: Etherface-1 TX Side version

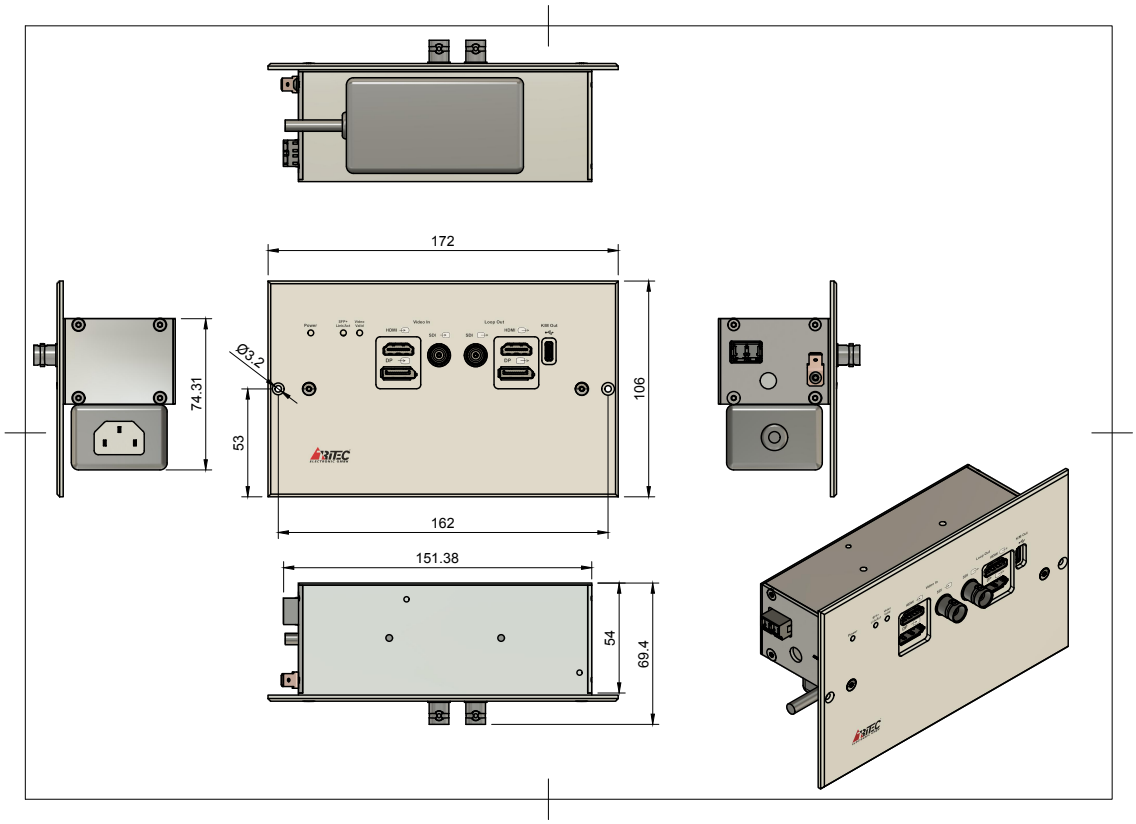

Figure 8: Etherface-1 Side Mounting example

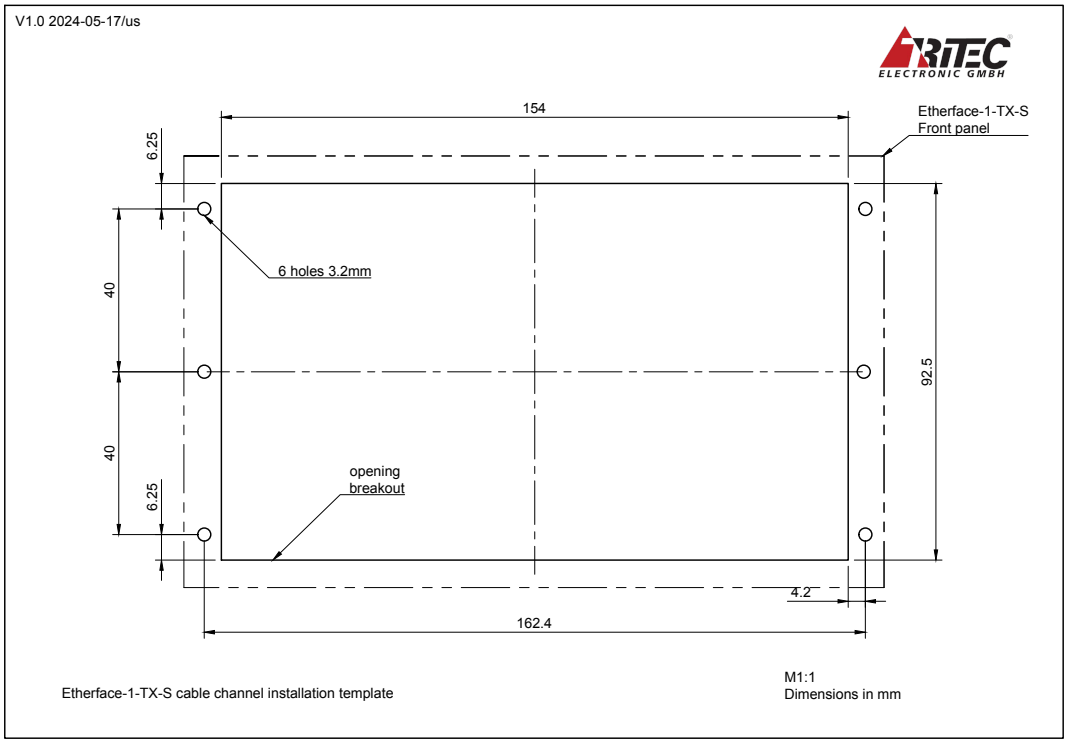

Figure 9: Etherface-1 Side Installation Template

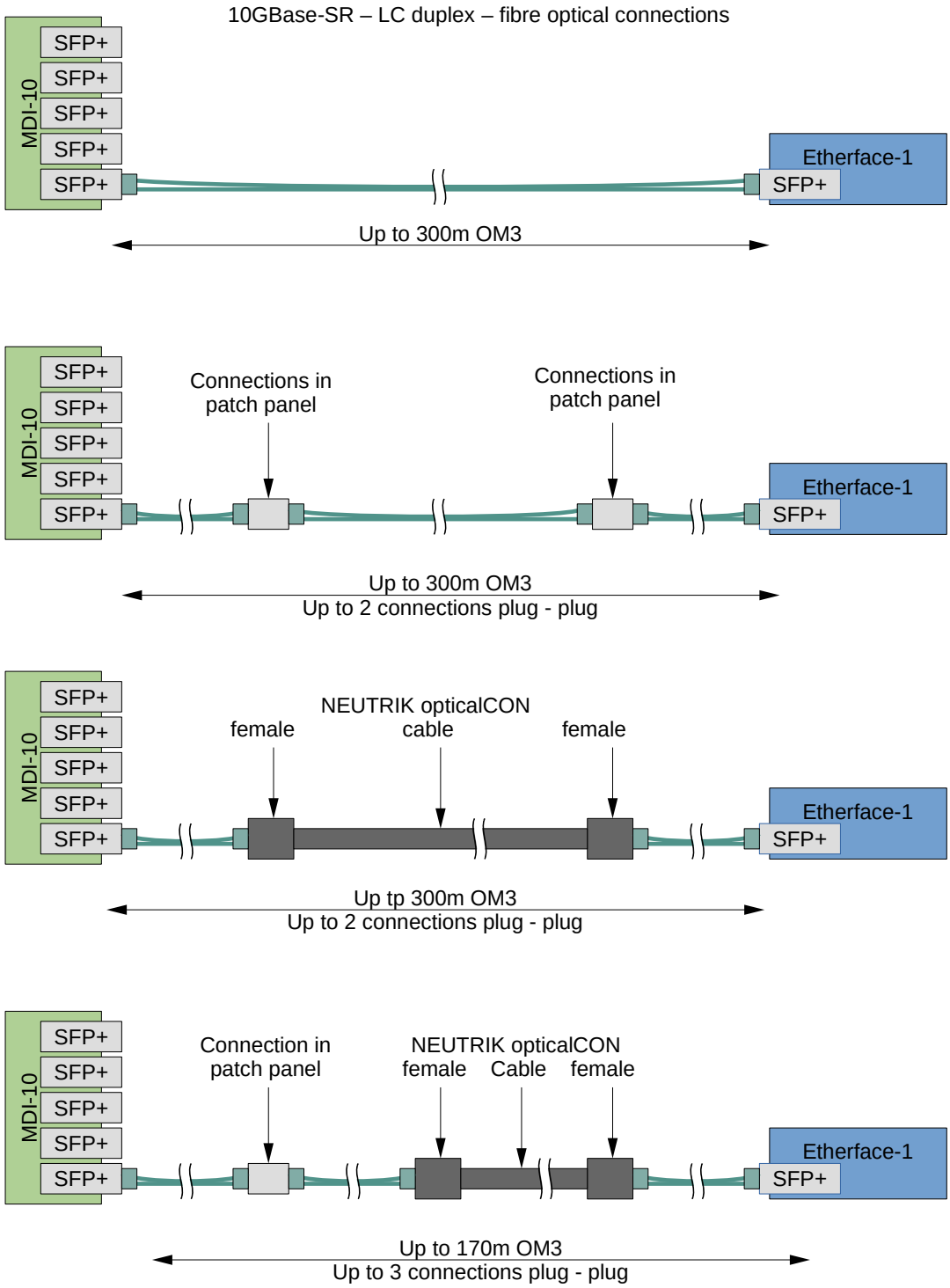

Figure 10: Optical Cable length versa Connectors