

ViaLiteHD

Multizone Distribution Lossless Splitter

Handbook

HRZ -x-xx-xx-xx-xxxx-HB-1

CR5754

18/03/2024



Instrument Care and Safety Information

Please read the whole of this section before using your **ViaLiteHD** product. It contains important safety information and will enable you to get the most out of your Fiber Optic Link.

Electrical Safety



The ViaLite chassis is a Safety Class 1 product (having a metal chassis directly connected to earth via the power cable). When operating it, note the following precautions:

- Hazardous voltages exist within the rack-mounted equipment.
- There are no user serviceable parts inside; the covers **MUST NOT** be removed.
- There are no user replaceable fuses in the chassis-mounted equipment or modules.
- The chassis earth stud **SHOULD** be connected to the safety earth. When using a 2-pin power supply cable the chassis earth stud **MUST** be connected to the safety earth.

ESD Precautions



Precautions for handling electro-static sensitive devices should be observed when handling all ViaLite modules. Technicians should ensure that they use effective personal grounding (i.e. ESD wrist strap, etc.) when servicing the equipment. Any equipment or tools used should be grounded to prevent static charge build-up. Good practice should be observed at all times. For reference, see relevant standards: EN 61340-5-1, 'Protection of Electronic Devices from Electrostatic Phenomena – General Requirements'.

Optical Safety



The **ViaLiteHD** RF Fiber Optic Lossless Splitters contain optical sources operating at C-Band (DWDM) 1530 to 1565nm. These devices are rated as EN60825-1 CLASS 1M radiation emitting devices. This class is safe for exposure directly to the naked eye, but may be hazardous if exposed with the aid of optical instruments. When operating the equipment note the following precautions:

- Never look into the end of an optical fiber, directly or by reflection, either with the naked eye or through an optical instrument.
- Never leave equipment with radiating bare fibers – always cap the connectors.
- Do not remove external equipment covers when operating.

Caution



- This equipment is not suitable for use in locations where children are likely to be present.
- The HRZ product must be installed in a 19" rack or level surface.
- Do not use the HRZ in a dusty environment.

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1 Introduction

The **ViaLiteHD** RF Fiber Optic Links (FOLs) are a family of fiber optically coupled link systems designed for the transmission of RF analogue signals over long distances for the communications market. **ViaLiteHD** is a product brand manufactured by Pulse Power and Measurement Ltd (PPM). **ViaLite Communications** is a division of Pulse Power and Measurement Ltd (PPM).

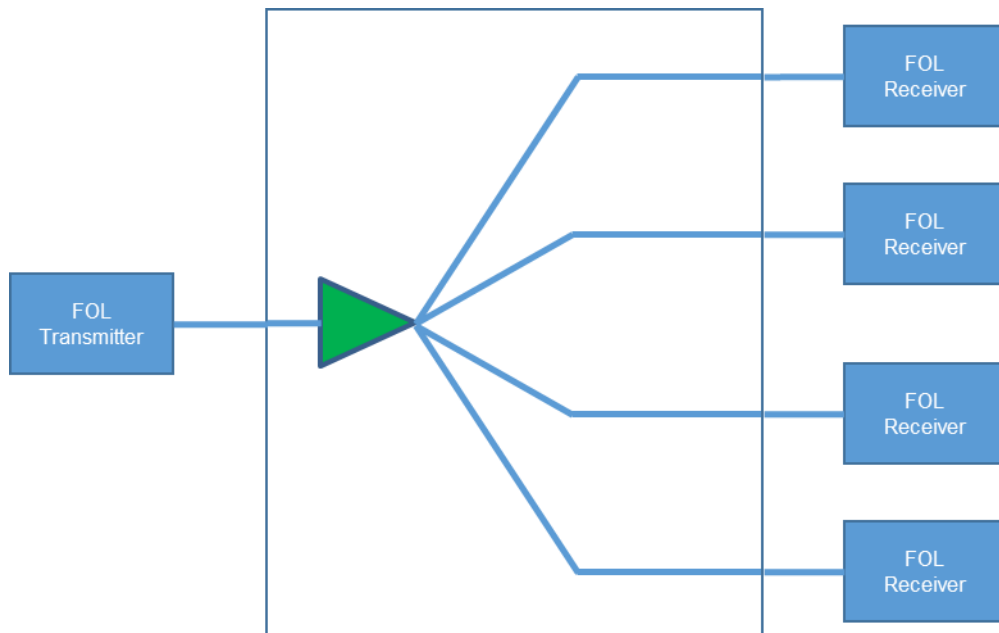
The Multizone Distribution Lossless Splitter is a fixed gain EDFA followed by a 1:N way optical splitter, the EDFA overcomes the loss of the optical splitter for an overall gain of 0dB. This ensures that the optical power present at the output ports of the splitter is the same as the optical power supplied at the input port. The lossless splitter can also amplify multiple optical signals which have been multiplexed on to a single core using a Dense Wavelength Division Multiplexer (DWDM).

ViaLite offers multiple variants of the lossless splitter to suit application-specific requirements, mainly the number of ways the optical path will be split, and the fiber connector type used.

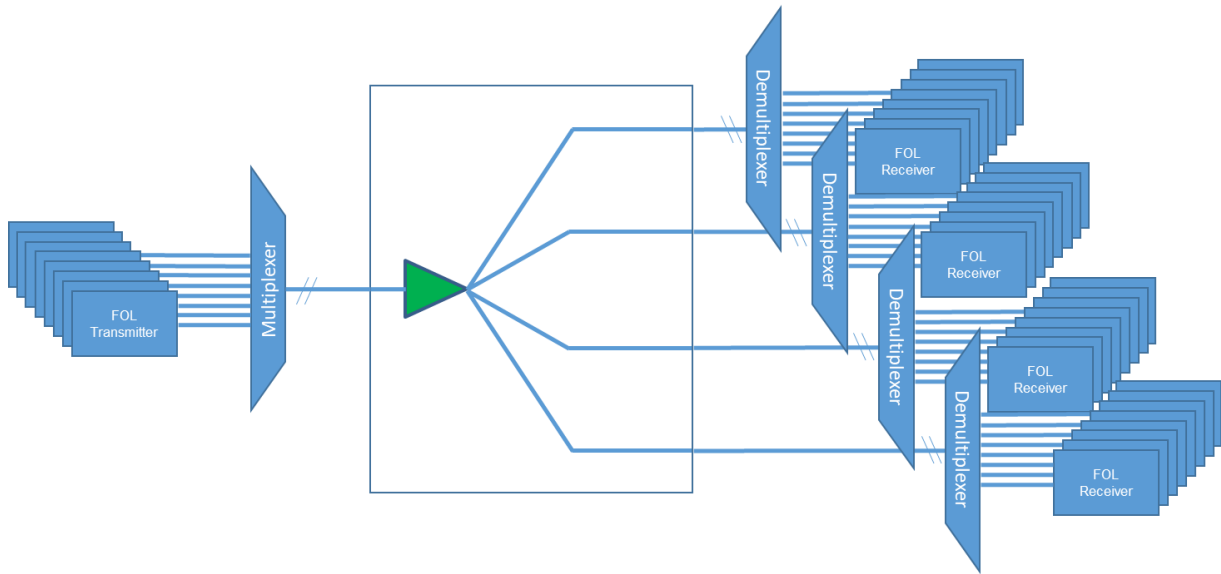


1.1 Typical Deployment

The Multizone Distribution Lossless Splitter is to be used when a single optical source is required to be split multiple ways to multiple endpoints. The splitting process results in an optical loss that is dependent on the number of ways the signal has been split, and so a fixed gain optical amplifier is included to overcome this loss. In the below example, a single wavelength Fiber Optic Link transmitter signal is split 4 ways to 4 different Fiber Optic Link receivers.



The Multizone Distribution Lossless Splitter also supports distribution of DWDM signals. If a multiple number of DWDM optical signals need to be split and distributed, there is no need to use multiple lossless splitters. Instead, a fiber optic multiplexer can be used to combine all of the separate DWDM signals onto a single fiber. A single lossless splitter can then be used to distribute all of the DWDM signals, which then if required, can be multiplexed before being passed to their Fiber Optic Link receivers. This example is shown below.



ViaLite's own RF Planning tool "System Designer" is an optimum RF planning tool to aid in the selection of link equipment and the location of these within the design. Please refer to your local **ViaLiteHD** rep for further details on the RF planning tool.

2 Care of fiber optic connectors

When the fiber optic cables are not connected, it is essential that the cable and equipment connectors are protected by the dust caps provided with the system. Failure to do so may result in damage to the fiber ends, which are critical to the system performance. Please refer to section 2.2 for fiber optic cable handling details.

2.1 Fiber optic cable & connectors

All *ViaLiteHD* RF modules use single-mode (9µm/125µm) cable terminated in a range of optical connectors detailed below. Cross-site fiber optic cables are available from **ViaLite Communications** as either standard patch leads or heavy-duty multicore cables.



Warning!

Angle polished (APC) and standard (PC) connector must not be confused.

The two connector types are not interchangeable and mating one with the other will damage both the cable and the module connectors.

The specification of optical connector is critical to the performance of the complete fiber optic link. System performance can only be guaranteed with fiber optic cables and connectors supplied by **ViaLite Communications**.

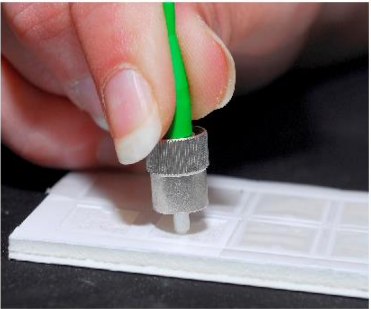
When FC/APC connectors are specified they must be “narrow key width.”

2.1.1 **Connecting and disconnecting**

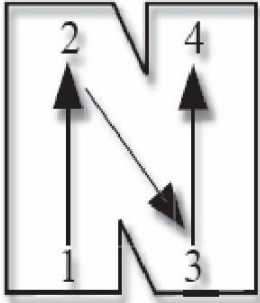
Before connecting optical fibers to the module or to each other, ensure that the mating connectors are clean (see below).

2.1.2 **Cleaning optical connectors, cleaning before every use**

Optical connectors **MUST** be cleaned before use, even where they have been protected with dust caps. A large percentage of performance issues can be attributed to dirty fibers.



- Peel the plastic cover from an unused 'N' cleaning pad.
- Hold the connector between your thumb and forefinger
- Clean the connector using firm pressure by swiping in a pendulum motion through each segment of the 'N' shape, following the diagram
- Do not swipe over the same space twice.



For more details please read the cleaning instruction which accompanies the connector cleaning kit. Further details can also be found on the **ViaLiteHD** website at www.vialite.com

2.1.3 **Cleaning optical connectors, high levels of contamination**

If there are performance issues that are not resolved by basic cleaning, then the following procedure should be used. If the level of contamination is high it will be necessary to repeat this procedure.

Cleaning items required

- Lint free fiber cleaning tissues and/or cleaning sticks (normal cosmetic tissues produce dust and are not acceptable).
- Reagent grade Isopropyl Alcohol (IPA).
- Air duster or filtered compressed air line.

Cable Connector Cleaning

- Dampen a patch of cleaning tissue with IPA and clean all surfaces of the plug ferrule.
- Using a dry cleaning tissue, dry the ferrule and clean the end face.
- Using the air duster, blow away any residue from the end of the connector.

Module Female Receptacle Cleaning (only recommended if problems are being experienced)

- Either use an optical cleaning stick or twist a cleaning tissue to form a stiff probe, moisten either with IPA. Gently push the probe into the receptacle and twist around several times to dislodge any dirt.
- Repeat the above process with a dry tissue.
- Using the air duster, blow away any residue from the receptacle.

Important Notes

- IPA is flammable. Follow appropriate precautions / local guidelines when handling and storing.
- IPA can be harmful if spilled on skin. Use appropriate protection when handling.
- It should only be necessary to clean the female receptacles on the modules if problems are being experienced.



Warning!

Never inspect an optical fiber or connector with the naked eye or an instrument unless you are convinced that there is no optical radiation being emitted by the fiber. Remove all power sources to all modules and completely disconnect the optical fibers.

2.1.4 FC/APC Connectors

To connect FC/APC optical connectors follow these steps:

- Remove the dust caps and align the white ceramic center ferrule on the cable connector with the mating receptacle.
- There is a key (lug) on the side of the ferrule, which must match the keyway (gap) in the receptacle shroud.
- When they are aligned, gently push the plug home.
- Finger tighten the knurled collet nut onto the threaded receptacle.

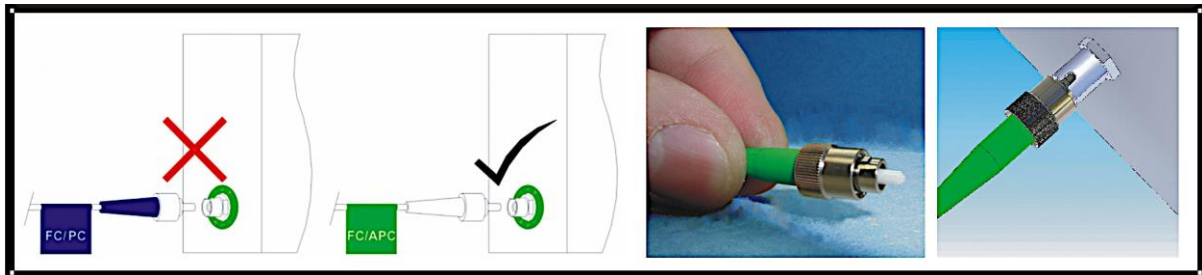
To disconnect follow these steps:

- Using fingers fully unscrew the knurled collet nut, gently withdraw the connector.
- Replace the dust caps on both the receptacle and the cable plug.



Warning!

It is possible to tighten the knurled collet without aligning the lug and gap. This will result in poor light transmission. Check that the lug and gap are aligned before tightening the knurled collet.



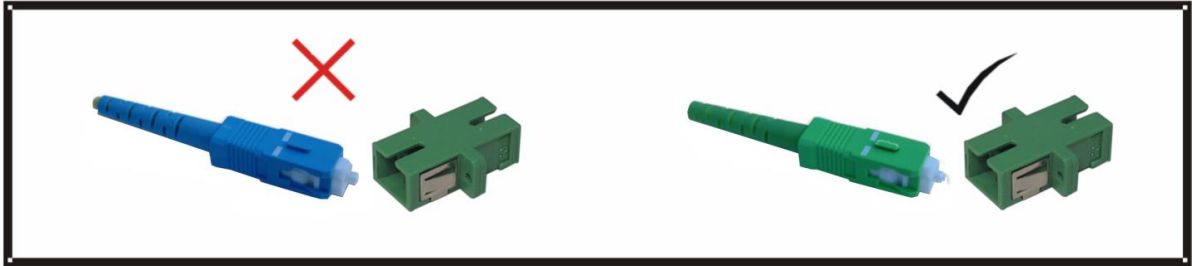
2.1.5 SC/APC Connectors

To connect SC/APC optical connectors follow these steps:

- Remove the plug protective cover.
- Align the connector keyway slot in the adaptor to the key of the plug.
- Gently push the plug-into the adaptor until a click is heard and the connector locks.

To disconnect follow these steps:

- Grip the body of the plug and gently pull the plug from the adaptor, replace the protective cover.



Only connect SC/APC cable to SC/APC receptacles.

2.1.6 Minimum bend radius

Because optical fiber is made of glass, it is important not to subject it to excessive stress. For this reason, each type of cable has a minimum bend radius (MBR) specification, beyond which the cable cannot be bent without permanent damage occurring. Systems using longer wavelength (i.e. 1550nm) are less tolerant to small bend radii.

The minimum bend radius of standard SMF28 fiber optic cable fitted to **ViaLiteHD** modules is 50mm. MBR specifications for **ViaLite Communications** supplied fiber optic cables are given in the **ViaLite Classic** and **ViaLiteHD** System Handbooks Lxx-HB and Hxx-HB respectively.

3 Lossless Splitter Features

This section describes the features of your Multizone Distribution Lossless Splitter.

Please read fully all relevant documents for information on installing your **ViaLiteHD** equipment before commissioning your system.

3.1.1 Optical Connectors

The **ViaLiteHD** Multizone Distribution Lossless Splitter is supplied with SC/APC input and output optical connectors as standard. An FC/APC option is also available.

3.1.2 Dual Redundant Power Supply

The Multizone Distribution Lossless Splitter comes fitted with dual redundant power supplies. The power lead(s) are fed to the rear of the equipment. Each power supply is activated by a dedicated power switch also on the rear.

3.1.3 Front Display Screen

The display screen on the front of the module allows the user to scroll through all menu items in turn. This allows the user to view any device readings such as optical power and temperature.

3.1.4 Key lock laser enable.

The front panel of the module includes an activation key, which can be used to disable the laser pump. This is a safety feature to prevent the pump from operating when not in use.

4 Using the Lossless Splitter. Control, Indicators and Alarms

4.1 Connecting the module

All instructions refer to the representation of the front panel shown in the diagram below. The user can scroll through the menus by using the push buttons located to the right of the LCD screen and scrolling to select all the menus of the lossless splitter.

4.2 Menu and Operation

These modules are fitted with a single LED for indication of the state of the module.



4.2.1 Boot Sequence

- Plug in the power supply to both ports
- Turn on the power switch on the rear panel
- Front Panel shows part number and “Key off”
- PUMP status lamp red
- INPUT status lamp red
- ALARM status lamp red
- POWER1 status lamp green
- POWER2 status lamp green (for dual PSU)
- Turn the laser start-up key switch to on
- Front panel shows "KEY ON...", Pump status lamp turns green from red

4.2.2 Startup main menu

Press ◀/▶ button and the following menus will be displayed in sequence.

Menu #1 – Descriptor

Read only menu – provides a description of the Equipment Part Number

Menu #2 – S/N

Read only menu – Displays the serial number of the device

Menu #3 – Input

Read only menu – Displays the Input optical power in dBm or shows “No Input”

Menu #4 – Output

Read only menu – Displays the output optical power in dBm or “Low” if no input

Menu #5 – Bias1

Read only menu – Displays the drive current of pump 1 in mA

Menu #6 – Tec1

Read only menu – Displays the pump current during heating/cooling status in mA

Menu #7 – Temp1

Read only menu – Displays the temperature of pump laser 1

Menu #8 – +5V Reads

Read only menu – Displays the voltage of power supply 1, should be +5.0V

Menu #9 – Unit Temp

Read only menu – Displays the unit temperature in °C

Menu #10 – LCD Contrast Level

Read/Write menu – Displays and allows change of the LCD contrast value, from 1 to 9

5 Installation of the Lossless Splitter

The location for the installation of the Multizone Distribution Lossless Splitter will have been selected at the design stage of the program. The selection of the splitter will be based upon the number of ways the optical signal is required to be split, and the connector type required.

When installing the lossless splitter, ensure the pump key is in the off position and fibers are cleaned before connection. After installation, all unused optical ports should be recapped before the pump key is turned to the on position.

The maximum operating altitude of the Lossless Splitter is 2000m. Contact ViaLite for operation above maximum operating altitude.

6 **Part numbering**

For part numbering please refer to the relevant datasheet which can be found on our website or contact your local **ViaLiteHD** distributor.

7 Maintenance and fault finding guide

Refer to the following table that gives a list of commonly encountered problems and suggested solutions.

| Fault | Possible Causes | Solution |
|---|---|--|
| Power LED does not illuminate | Power is not connected to the PSU Power switch is not enabled | Connect mains power to the rear of the PSU. Check fuses of power leads. Check the power switch is set to "1" |
| Pump status lamp stays red | Pump not enabled | Check the safety key is set to on |
| Lossless Splitter shows "NO INPUT" when fiber connected | Input level out of range Poor fiber connection Low optical output level Unknown Cause | Check that the input level is within specified input range Clean the fiber connectors and ports Check optical link for breaks/kinks Check all optical connectors are clean Contact your local ViaLite Communications office for Customer Support. |
| Low signal level | Gain adjustment set too low Input level too low Optical loss too high Incorrect optical connectors Incorrect manual or software gain settings Input power too high | Increase gain setting Check optical input levels Clean and check optical connections Ensure that optical cable matches the type of connectors on your ViaLiteHD module, singlemode fiber and APC connectors. Check all front panel settings Check that the input level is within specified input range |

The **ViaLiteHD** range of optical conditioning modules are precision-engineered and calibrated for optimum performance and accuracy before dispatch.

In the event of any problems or queries arising with the equipment, please contact **ViaLite Communications** or your local agent.

8 **Product warranty**

The guarantee / warranty period, unless otherwise agreed in writing, shall be as stated in document F292 - PPM Manufactured Product – Warranty, which is available at: <https://ppm.co.uk/warranty-periods/>. Extended warranty options are available at the time of purchase.

Prior to returning any goods for warranty or non-warranty repairs please contact PPM / **ViaLite Communications** for a returns reference.

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PULSE POWER & MEASUREMENT LTD, 65 SHRIVENHAM HUNDRED BUSINESS PARK, SWINDON, SN6 8TY, UK.

TEL: +44 1793 784389

FAX: +44 1793 784391

EMAIL : SALES@VIALITE.COM

WEBSITE : WWW.VIALITE.COM