

***ViaLiteHD***  
**Horizons HRC-3 Controller**  
**&**  
**Embedded Site Controller**

User Guide

HRC-3-HB-5

CR5044

12/04/2022



## 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 fibre optic link.*

### Electrical Safety



The **ViaLiteHD** chassis is a Safety Class 1 product (having a metal chassis directly connected to earth via the power supply cable).

When operating the equipment note the following precautions:

- Hazardous voltages exist within the equipment. There are no user serviceable parts inside; the covers should only be removed by a qualified technician.
- There are no user replaceable fuses in the chassis-mounted equipment. Replacement should only be carried out by a PPM technician.
- 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.
- The **ViaLiteHD** Power Supply modules do not have an isolating switch on the mains voltage inlet. For this reason, the **ViaLiteHD** Chassis must be installed within easy reach of a clearly labelled dual pole mains isolation switch, which supplies the equipment.

### ESD Precautions

The **ViaLiteHD** RF fibre optic link is equipped with high frequency active electronics – without the correct handling they will be susceptible to damage.



Precautions for handling electro-static sensitive devices should be observed when handling all **ViaLiteHD** 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 fibre optic transmitters, dual transmitters and transceivers contain optical sources (usually laser diodes) operating at nominal wavelengths of 1270 nm to 1610 nm.

These devices are rated as EN60825-1 as CLASS 1 radiation emitting devices. A Class 1 laser is safe under all conditions of normal use.

When operating the equipment note the following precautions:

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

## Table of contents

1	INTRODUCTION.....	5
1.1	Ethernet configurations	5
1.2	Typical deployment	5
1.3	Care of fibre optic connectors	6
1.4	<i>ViaLiteHD</i> and <i>ViaLite</i> Classic compatibility	6
1.5	Embedded Site Controller	6
2	<b>VIALITEHD</b> CONTROLLER KEY HARDWARE AND SOFTWARE FEATURES.....	7
2.1	Plug and play, default setup	7
2.2	Web-based graphical user interface	7
2.2.1	System report	7
2.2.2	Remote software update	7
2.3	Maintenance mode	7
2.4	System robustness	7
2.5	SNMP functionality	7
2.6	Slot auto-configuration	7
2.7	Real-time clock	8
2.8	Non-volatile event history log	8
2.9	Summary alarm relay	8
2.10	On-board gigabit Ethernet switch	8
2.11	On-board temperature sensor	8
2.12	Automatic, software and manual gain control	8
2.13	GPS mode operation	8
2.13.1	GPS transmitter mode operation	9
2.13.2	GPS receiver mode operation, units equipped with GPS load simulator	9
2.14	NTP support	9
2.14.1	Time zone support	9
3	HRC-3 CONTROLLER PHYSICAL INTERFACES .....	10
3.1	7 HP standard plug-in module	10
3.2	Fibre optic cable & connectors	11
3.2.1	Connector and cable types	11
3.2.2	Connecting and disconnecting	11
3.2.3	Cleaning optical connectors - cleaning before every use	11
3.2.3.1	FC/APC .....	11
3.2.3.2	SC/APC .....	12
3.2.4	Minimum bend radius	12
3.3	Front panel	13
3.3.1	Front panel indicators, plug-in modules	13
3.3.2	RJ45 indicators, plug-in modules	13
3.3.3	Front panel USB port and reset switch	13
3.4	Rear panel	14
3.4.1	Rear panel, connecting to SNMP and web controller via the fibre ports	14
4	SETUP OF THE HRC-3 CONTROLLER MODULE .....	15
4.1	Connecting the module	15
4.1.1	Connecting via USB	15
4.1.2	Connecting via SSH	15
4.1.2.1	Windows.....	15
4.1.2.2	Linux/MacOS (or other Unix-like) .....	15
4.2	Command line interface	15
4.3	Configuring chassis slot positions	17
4.4	User access levels and passwords	17
4.5	Setting user access passwords	17
5	WEB CONTROL INTERFACE .....	19
5.1	Overview	19
5.1.1	Usage conventions	20
5.1.1.1	Maintenance mode .....	20
5.2	Visual representation of the <b>ViaLiteHD</b> chassis	21
5.3	Event Log	22
5.3.1	Event severity	22
5.4	System	23
5.5	Management	24
5.5.1	Event severities	25
5.6	Report generation	25
5.6.1	Report header	25
5.6.2	System report	26
5.6.3	Event report	26
5.7	Software update	27
5.8	Power supply status	27
5.9	Module status panels	28
5.9.1	Overview	28
5.9.2	General information table	28
5.9.3	Alarm status indicators	28
5.9.4	Module-specific monitoring & control	29
5.9.4.1	Amplifier (HRA).....	29

	5.9.4.2	Ethernet Media Converter (HRE)	30
	5.9.4.3	LNB	30
	5.9.4.4	Receiver (HRR & HRV)	31
	5.9.4.5	Serial Digital (HRB)	32
	5.9.4.6	Splitter (HRD)	33
	5.9.4.7	Switch (HRS)	33
	5.9.4.8	Transmitter (HRT & HRU)	34
	5.9.4.9	Transceiver (HRX)	35
	5.9.4.10	Passive RF/Optical Card (PROC)	35
	5.9.4.11	Other modules	36
6		SOFTWARE UPDATE	38
	6.1	Web interface upload	38
	6.2	FTP	38
	6.2.1	Web interface	38
	6.2.2	Command line interface	39
7		SYSTEM INTEGRATION	40
	7.1	Initial set up equipment	40
	7.2	Site requirements	40
	7.3	Other considerations, RJ45 interconnection	40
	7.4	ViaLiteHD SNMP interface	40
8		<b>VIALITE</b> HORIZONS	41
9		MECHANICAL DIMENSIONS	42
10		PART NUMBERING	43
11		TECHNICAL SPECIFICATIONS	44
12		MAINTENANCE AND FAULT-FINDING GUIDE	45
13		GLOSSARY	46
14		PRODUCT WARRANTY	47
15		FCC APPROVAL	48
16		THIRD-PARTY SOFTWARE	49

# 1 Introduction

The **ViaLiteHD** Monitoring & Control (M&C) module is used to manage **ViaLiteHD** RF over fibre equipment. It offers multiple switched 10/100/1000 BASE-TX copper RJ45 Ethernet interfaces at the front and rear, and may optionally include rear 1000 BASE-F optical interfaces (a single 100 BASE-F optical interface is offered for compatibility with HRC-1 controllers). It sequentially polls all connected modules to monitor status and send commands.

The module also provides a single dry contact relay accessible via the chassis connector.

## 1.1 Ethernet configurations

The controller module supports up to 3 external Ethernet ports. These are all connected to an internal gigabit Ethernet switch, and can be configured (at the factory) as either copper or fibre interfaces. The following configurations are available:

**Table 1: ViaLiteHD HRC-3 Available Ethernet Configurations (see Section 10 for more details)**

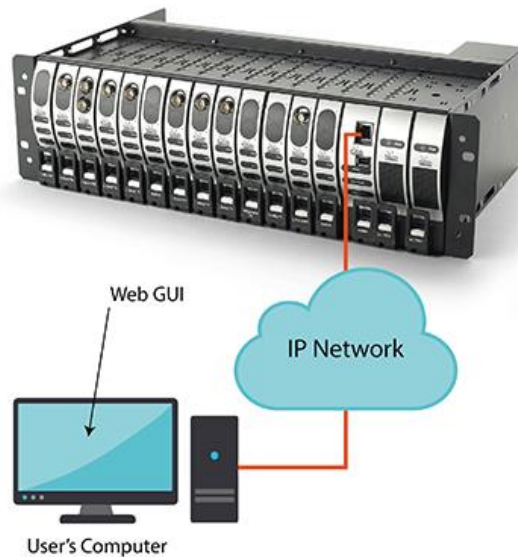
Part Number	Front Panel 10/100/1000 BASE-TX RJ45 Port	Rear Panel 10/100/1000 BASE-TX RJ45 Port	Rear Panel 1000base-X port (fibre)	Rear Panel 100base-FX Port (Fibre)
HRC-3-FD-0R-00	✓	✓		
HRC-3-FE-0R-00	✓	✓x2		
HRC-3-CD-nR-2m	✓	✓		✓
HRC-3-FC-nR-Fm	✓		✓x2	
HRC-3-CC-nR-Fm	✓		✓	✓
HRC-3-FD-nR-2m	✓	✓	✓	
HRC-3-EE-nR-2m		✓x2	✓	
HRC-3-ED-nR-Fm		✓	✓x2	

N.B.

1. 'n' in the part number denotes the fibre port connection type. Available connection types include: LC duplex, SC/APC, FC/APC & E2000.
2. 'm' in the part number denotes the optical link maximum distance (options for 10 km, 40 km, and 75 km available). For more details, see the part number diagram in Section 10.
3. When configured for use in a Satcom6, the part numbers will be of the form 'HRC-3-FD-0S-00'. All other options remain the same.

## 1.2 Typical deployment

The M&C module is typically deployed as part of a 3U chassis-based equipment solution. It can however be fitted in a range of other equipment, such as the 1U rack or Satcom6 external enclosure. When fitted in a HRK3 chassis, the M&C module must be fitted in slot 14 (7HP slot).



### 1.3 Care of fibre optic connectors

When the fibre 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 fibre ends, which are critical to the system performance. Please refer to Section 0 for fibre optic cable handling details.

### 1.4 ViaLiteHD and ViaLite Classic compatibility

The **ViaLiteHD** M&C module will not control or monitor **ViaLite** Classic equipment.

The Ethernet interface(s) (copper or fibre) may be used as an Ethernet switch in order to attach **ViaLite** Classic equipment to the network for remote monitoring and control. Please note that not all **ViaLiteHD**/Classic Ethernet ports are compatible. See Table 2 for more information.

**Table 2: ViaLiteHD & ViaLite Classic Ethernet Compatibility Matrix**

Product Family	Part Number	Interface Type	Interface Standard	ViaLite Classic						ViaLiteHD						
				LRC-1		LSX-E2		LSX-E4		HRC-1		HRC-3			HRE	
				Copper	Optical	Copper	Optical	Copper	Optical	Copper	Optical	Copper	Optical (1000BASE-X)	Optical (100BASE-X)	Copper	Optical
ViaLite Classic	LRC-1	Copper	10BASE-T	✓		✗		✓		✓		✓			✗	
		Optical	None		N/A		N/A		N/A		N/A		N/A			N/A
	LSX-E2	Copper	100BASE-TX	✗		✓		✓		✓		✓			✗	
		Optical	100BASE-FX		N/A		✓		✗		✓		✗	✓		✗
	LSX-E4	Copper	10/100/1000BASE-TX	✓		✓		✓		✓		✓			✓	
		Optical	1000BASE-FX		N/A		✗		✓		✗		✓		✗	✓
ViaLiteHD	HRC-1	Copper	10/100BASE-TX	✓		✓		✓		✓		✓			✗	
		Optical	100BASE-F		N/A		✓		✗		✓		✗	✓		✗
	HRC-3	Copper	10/100/1000BASE-TX	✓		✓		✓		✓		✓			✓	
		Optical	1000BASE-X		N/A		✗		✓		✗		✓		✗	✓
			100BASE-X		N/A		✓		✗		✓		✗	✓		✗
	HRE	Copper	1000BASE-T	✗		✗		✓		✗		✓			✓	
		Optical	1000BASE-X		N/A		✗		✓		✗		✓		✗	✓

### 1.5 Embedded Site Controller

In addition to the full-size Horizons HRC-3 M&C module used for **ViaLiteHD** chassis, **ViaLiteHD** outdoor enclosures can be fitted with an Embedded Site Controller to provide SNMP and Web GUI monitoring and control of the fitted **ViaLiteHD** modules.

The Embedded Site Controller supports the same SNMP MIB as the HRC-3 (see Section 7.4), and displays an identical Web GUI (see Section 5). The setup interface (Section 4.2) is limited to SSH access as there is no local micro USB terminal port (see Section 2.1 for factory default IP setup).

The Embedded Site Controller is fitted with a single 10/100 BASE-TX Ethernet port, but fibre connections and switching may be possible with the addition of a media converter module fitted within the same **ViaLiteHD** outdoor enclosure.

The Embedded Site Controller is not fitted with an internal RTC (Real-time clock), summary alarm relay or temperature sensor, and is not removable from the **ViaLiteHD** outdoor enclosure it is supplied within.

## 2 ViaLiteHD Controller Key Hardware and Software Features

### 2.1 Plug and play, default setup

The M&C module is supplied fully programmed and set up with a factory default configuration (see Table 3). Prior to connecting to a live network, ensure that the default IP address is valid for the network (contact the relevant network administrator if unsure) or has been changed to suit the network.

**Table 3: Factory Default Configuration**

User Passwords (Used for SSH/USB/Web GUI)	Username	Default Password
	Guest	guest
	Administrator	admin
	Technician	tech
Web GUI Address	10.0.0.104	
SNMP Read-Only Community	public	
SNMP Read-Write Community	private	

These settings may be changed to suit the application of the HRC-3 controller (see Section 4 for more details).

### 2.2 Web-based graphical user interface

The module includes a web-based graphical user interface (GUI) for the management of the **ViaLiteHD** cards installed in the same rack/enclosure as the HRC-3 module. This user interface is accessible from any modern browser (IE10+, Chrome, Firefox, etc.) with JavaScript enabled, and is password protected to avoid unauthorized access. Unlike the HRC-1 controller, this GUI does not depend on Java.

For more details, see Section 5.

#### 2.2.1 System report

The Web GUI includes functionality to generate HTML-format System and Event Log reports. These reports include the status of the controller and other modules within the **ViaLiteHD** rack/enclosure. See Section 5.6 for more information.

#### 2.2.2 Remote software update

In addition to loading the software update file to the module via FTP, the HRC-3 module supports uploading the software update file directly to the Web GUI. The software update will update the operational firmware, the SNMP agent and the Web GUI simultaneously. For more details see Section 6.

### 2.3 Maintenance mode

The HRC-3 controller includes a maintenance mode for connected **ViaLiteHD** modules, which deactivates alarms and warnings whilst (for example) undergoing maintenance activities.

Modules in maintenance mode will still be polled for their applicable status and configuration data, but will not be able to generate alarms, events or SNMP traps. During maintenance mode, the modules' SNMP interface will continue to be updated as normal. Maintenance mode will not affect the operation of the **ViaLiteHD** module.

If a module is in maintenance mode, it is visually noted in the Web GUI (see Section 5.1.1.1). Additionally, an OID has been added to the MIB to allow the maintenance mode status to be queried over SNMP.

### 2.4 System robustness

The **ViaLiteHD** chassis does not require that the M&C card is either fitted or running to provide full analogue functionality. All modules fitted in the chassis can run independently once configured.

### 2.5 SNMP functionality

The HRC-3 supports monitoring and control of the connected **ViaLiteHD** modules over the SNMP interface (detailed in the supplied PPM-IGNIS MIB). SNMP versions 1 and 2c are supported. Additionally, events and alarms can be configured to be sent out as SNMP traps to network management systems.

### 2.6 Slot autoconfiguration

The controller stores the configurations of all of the connected modules in non-volatile memory to support the auto-configure functionality which, when enabled, allows replacement modules to be automatically reinitialised to the same setting of the modules they replace.

Upon replacement of a module (when auto-configure is enabled):

- The controller will compare the saved configuration with the newly inserted module.
- If the part number of the new module matches the removed module, the controller will automatically reconfigure the new module to have the same settings as the replaced module.
- If the newly inserted module does not match the removed module, no changes are made to the module configuration.

## 2.7 **Real-time clock**

The controller module has a super capacitor-backed real-time clock which will continue to keep time for 18 days after power is removed from the device. If the power is removed for a longer period, the time may need to be set via the SSH/USB interface.

## 2.8 **Non-volatile event history log**

A history of the last 128 events is stored in non-volatile memory on the controller module. Each event is indexed with an ID which will increment with each new event. This index number is only reset (to 1) when the event log is manually cleared. See Section 5.3 for more details.

## 2.9 **Summary alarm relay**

The SNMP and web controller provides a summary alarm relay. The module has a volt free 3-pin connection available on the chassis connector. The three connections are Normally Open (NO), Common (COM) and Normally Closed (NC).

Condition 1 - Power applied to chassis, no alarms (i.e. normal condition):

- Pin NO is open circuit.
- Pin NC is connected to COM.

Condition 2 - Power removed from chassis and/or one or more module alarms (i.e. alarm condition):

- Pin NO is connected to COM.
- Pin NC is open circuit.

## 2.10 **On-board gigabit Ethernet switch**

The SNMP and web controller is equipped with a managed on board 10/100/1000 Mbit/s Ethernet switch. This supports up to three copper 10/100/1000 BASE-T Ethernet ports or fibre ports.

All of the copper ports auto negotiate and are rate switchable.

The fibre port must be physically connected correctly (Rx to Tx) with a suitable transceiver to function correctly.

The optical and copper ports may be used to provide connectivity to other SNMP and web controllers and peripheral customer equipment.

## 2.11 **On-board temperature sensor**

The module is equipped with an on-board temperature sensor that reports the temperature of the M&C module.

## 2.12 **Automatic, software and manual gain control**

On supported **ViaLiteHD** modules, the M&C module allows the selection of three different gain control modes; AGC (automatic gain control), SGC (software gain control), and MGC (manual gain control). They are defined as follows:

- MGC allows the gain of each module to be set using the DIP switches on the base of the card, with the overall gain calculated by subtracting the value of the switches from the maximum gain of the module. This overrides any AGC or SGC setting applied in software.
- AGC allows the controller in the transmitter or receiver to automatically adjust to give an overall link gain, utilising a closed loop control system, with either the RF input (on transmitters), RF output or received light level (on receivers) as a reference. This setting overrides any SGC setting already applied.
- SGC allows the same level of control as the MGC, but with remote control via the SNMP interface.

NOTE: The use of AGC can mask issues such as dirty optical connectors and degraded or damaged cables. If used, ensure that proper handling procedures are observed for optical connectors.

## 2.13 **GPS mode operation**

Note: If your module is not a GPS-specific module, this setting will have no effect.

**ViaLiteHD** offers a range of modules that can support GPS band signals. It also offers software to mimic the operation of copper connected GPS units. Special GPS band units are equipped with hardware that can provide special GPS functions. They will mimic the operation of an active GPS amplifier through the fibre optic link, allowing alarm status on the remote GPS antenna and LNA to be reported.



### 2.13.1 GPS transmitter mode operation

Under normal no-fault condition, a GPS Tx FOL will operate in an identical fashion to all other *ViaLiteHD* modules. However, the transmitter is equipped with additional hardware that detects the DC current flowing from GPS transmitter RF input to the active GPS antenna.

If the current sunk by the active antenna falls below an alarm threshold (i.e. in the case of the LNA failing or not being connected), the unit will generate an internal alarm. With GPS mode enabled, the transmitter laser will turn off. This will generate an alarm in the connected receiver module, as the connected unit will have a received light level alarm (RLL). The GPS mode can only be enabled and disabled when the unit is under software control. Modules will be delivered with GPS mode ENABLE.

### 2.13.2 GPS receiver mode operation, units equipped with GPS load simulator

Under normal no-fault condition, a GPS Rx FOL operates very similarly to a normal *ViaLiteHD* FOL. With GPS mode enabled, in no-fault condition it presents a DC load at its RF output to mimic a connected GPS antenna.

When the unit is in a fault condition, either by way of an internal fault or due to low received light levels from the connected transmitter, it will disable the current sink. For most GPS receivers this will provide a basic alarm function.

Modules will be delivered with GPS mode enabled. If GPS mode is disabled, the DC load will be open circuit in both alarm and non-alarm modes. The GPS mode can only be enabled and disabled when the unit is under software control.

## 2.14 NTP support

As a part of software version 1.1.0, NTP (network time protocol) support has been added to the HRC-3. This allows Administrator and Technician users to define NTP servers which will be periodically polled to ensure the system time remains accurate.

NTP synchronisation can be set as:

- Disabled
- Automatic periodic synchronisation
  - Typical NTP deployment to ensure a running system maintains an accurate clock.
  - Will dither the system clock to recover from time mismatches of up to 1000 seconds (beyond this, no synchronisation will take place).
  - Synchronisation will happen automatically every 64-1024 seconds (depending on factors such as system load, network availability, server load, etc.).
- Manual instantaneous synchronisation
  - Manually triggered by the user.
  - Will immediately request the current time from the supplied NTP server and set the HRC-3 time to this value.
  - Can be used to correct time mismatches of any size.
  - Synchronisation will only happen when the user requests it.
  - Can be performed while automatic periodic synchronisation is enabled.

NTP timeservers defined in terms of their hostnames (e.g. "pool.ntp.org"), not as IP addresses, will require the configuration of appropriate DNS nameservers (see Section 4.2).

### 2.14.1 Time zone support

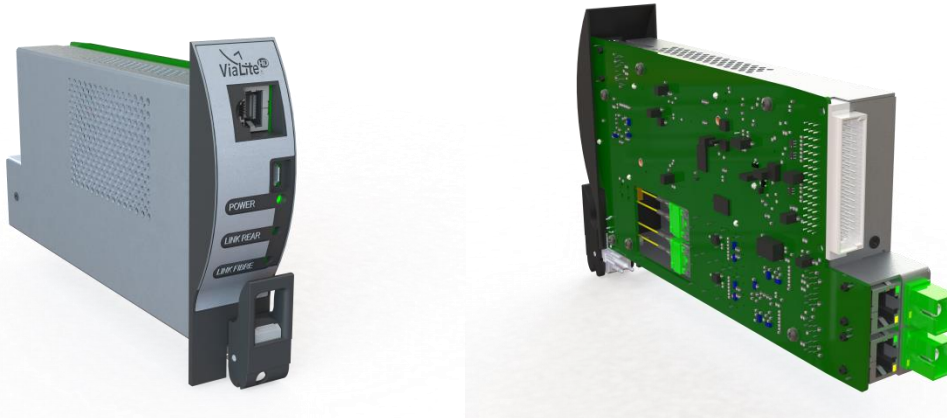
In addition to automatic time synchronisation, support has been added for specifying the system time zone. By default, the system is shipped set to UTC. The time zone can be changed using the USB/SSH setup interface (see Section 4.2).

### 3 HRC-3 Controller Physical Interfaces

This section describes the connections between your *ViaLiteHD* modules and the M&C module. There is no need to install any interface cables between the M&C module and connected modules as these are all connected via the chassis backplane. Please fully read all relevant documents for information on installing your *ViaLiteHD* equipment before commissioning your system.

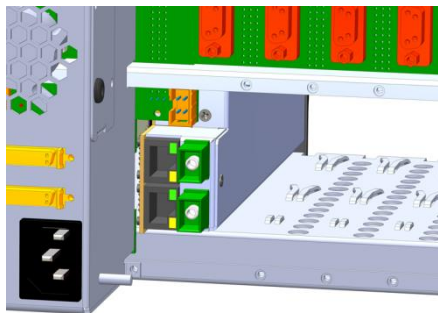
#### 3.1 7HP standard plug-in module

All *ViaLiteHD* plug-in modules are hot-swappable, so it is not necessary to power-down the chassis before inserting a module. All optical and Ethernet connectors are retained by the module. It is therefore necessary to either disconnect any cables or have a sufficiently long service loop.



To install a 7HP standard module:

- The protective covers on the connectors may be left in place.
- Push the release button of the module handle down and simultaneously pull the top of the handle forwards.
- Align the module upright and perpendicular to the front face of the chassis so that the PCB slides into the 'crow's feet' card guides top and bottom.
- Gently push the module down its guide, applying pressure via the handle – you may also apply pressure between the LED and craft port.
- As the module is fully mated, the top of the handle should snap back and lock in position.
- The pawls of the handle should be fully engaged in the matching slots.
- If power is applied to the chassis, the module power LED should light as soon as the module is fully inserted.
- Remove protective covers and connect any interface cables.



To remove a 7HP standard module:

- Disconnect any cables if necessary.
- Push the release button of the module handle down and simultaneously pull the top of the handle forwards.
- Apply pressure via the handle and gently withdraw the module from the chassis.

## 3.2 Fibre optic cable & connectors

### 3.2.1 Connector and cable types

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

**Warning!** Angle polished connectors (APC) and standard connectors (PC) 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.

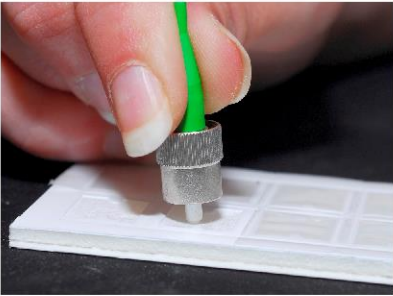
**Warning!** The specification of optical connector is critical to the performance of the complete fibre optic link. System performance can only be guaranteed with fibre optic cables and connectors supplied by PPM. When FC/APC connectors are specified they must be 'narrow key width'.

### 3.2.2 Connecting and disconnecting

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

### 3.2.3 Cleaning optical connectors - cleaning before every use

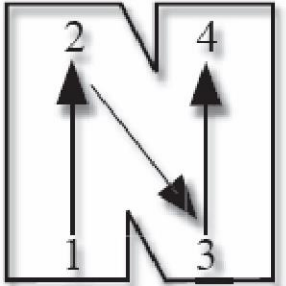
Optical connectors **MUST** be cleaned before use, even where they have been protected with dust caps. **Most performance issues are due to dirty fibres.**



- 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.

Cleaning optical connectors - high levels of contamination

If there are performance issues that are not resolved by basic cleaning in Section 3.2.3, 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 fibre 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 and then moisten 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 spilt 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.

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

#### 3.2.3.1 FC/APC

All PPM FC-connectorised modules use FC/APC (narrow key). Clean the plug before inserting (see Section 3.2.3).

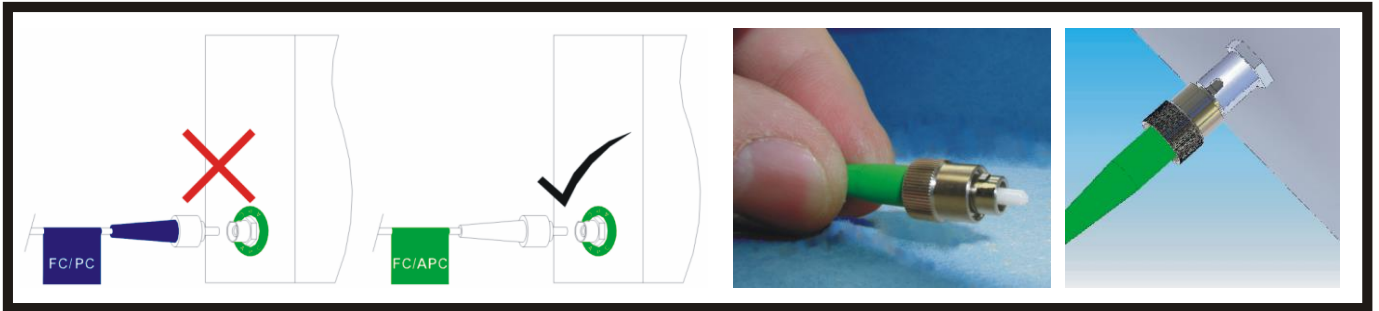
To connect FC/APC optical connectors:

- Remove the dust caps and align the white ceramic centre 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.
- Tighten the collet nut onto the threaded receptacle to finger tightness.

To disconnect:

- Using fingers, fully unscrew the knurled collet nut and 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.



Only connect FC/APC cable to FC/APC modules. During connection, locate connector key and ensure the key and keyway are aligned.

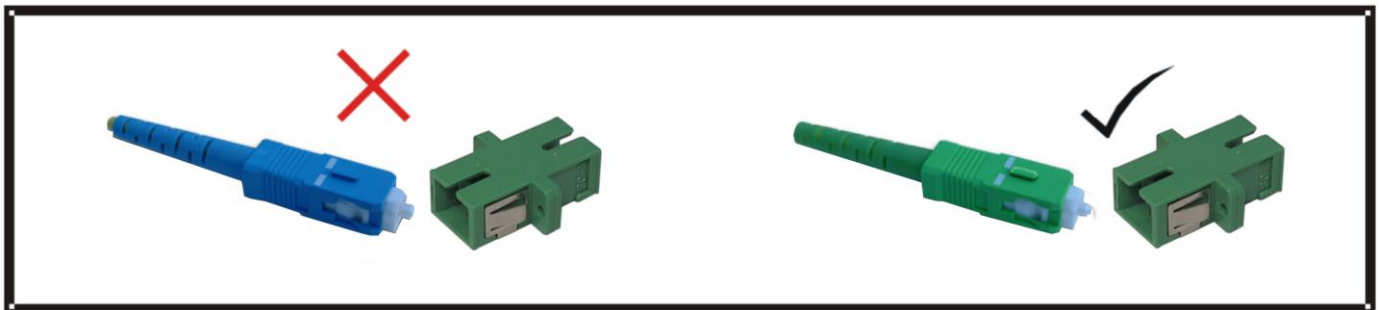
### 3.2.3.2 SC/APC

All PPM SC-connectorised modules use SC/APC. Clean the plug before inserting (see Section 3.2.3).

To connect SC/APC optical connectors:

- 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, grip the body of the plug and gently pull the plug from the adaptor, before replacing the protective cover.



Only connect SC/APC cable to SC/APC.

### 3.2.4 Minimum bend radius

Because the optical fibre 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.

The minimum bend radius of fibre optic cable fitted to OEM modules is 50 mm.

MBR specifications for PPM fibre are given in the *ViaLite* Classic and *ViaLiteHD* System Handbook Lxx-HB and Hxx-HB.

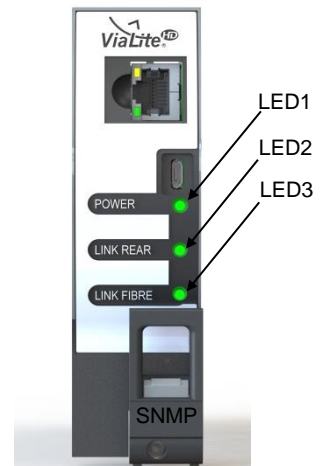
### 3.3 Front panel

#### 3.3.1 Front panel indicators, plug-in modules

Each plug-in module has three front panel LEDs for indication of the state of the module. The following table shows the operation of the front panel LEDs which are dependent on module type.

	Colour	Monitoring & Control module
LED1	GREEN	Normal
	RED	Alarm
	No light	No power
LED2	GREEN	Rear RJ45 port link established
	No light	Rear RJ45 port unconnected
LED3	GREEN	Rear fibre port link established*
	No light	Rear fibre port unconnected

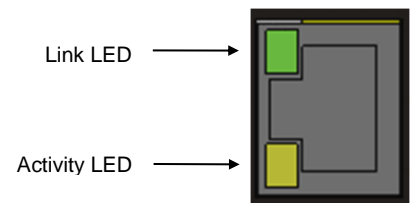
\*For HRC-3-EF-nR-2m modules, the Link Fibre LED may extinguish after an extended period of inactivity over the fibre connection (despite a valid link being established).



#### 3.3.2 RJ45 indicators, plug-in modules

Each plug-in module may have up to one front and two rear RJ45 connectors. Each has built in LED indicators to show the status of that connection. All RJ45 (and optical) Ethernet port connections are connected to an internal Ethernet switch.

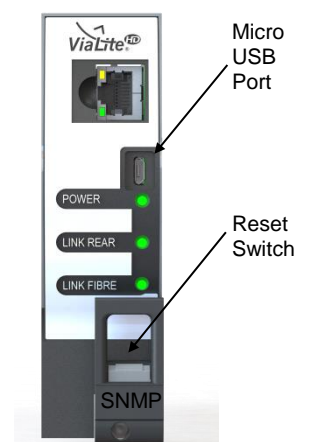
	Colour	Monitoring & Control module
Link LED	AMBER or FLASHING	Link sending/receiving data
	No light	No data
Activity LED	GREEN	Link established
	No light	Unconnected



#### 3.3.3 Front panel USB port and reset switch

The HRC-3 M&C module is fitted with a standard micro USB port. This port is used for setup and configuration of the module settings (including network settings, SNMP settings, and user passwords). This port should be used with a standard micro USB cable. See Section 4 for more details about the setup interface.

The reset switch is accessible via a small hole behind the handle and under all normal operating circumstances will not be required to be used. Short pressing the reset switch will cause the module to reboot, and long pressing the reset switch will cause the module to reset back to the factory default settings.



### 3.4 **Rear panel**

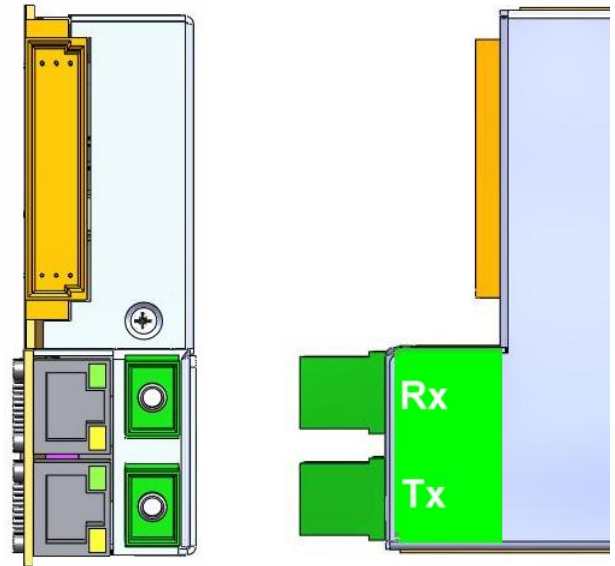
The rear panel provides interconnections for the chassis connector and the optional rear-mounted RJ45 and optional fibre connectors.

The optional fibre connectors may be:

- SC/APC (illustrated)
- FC/APC.
- E2000
- LC duplex

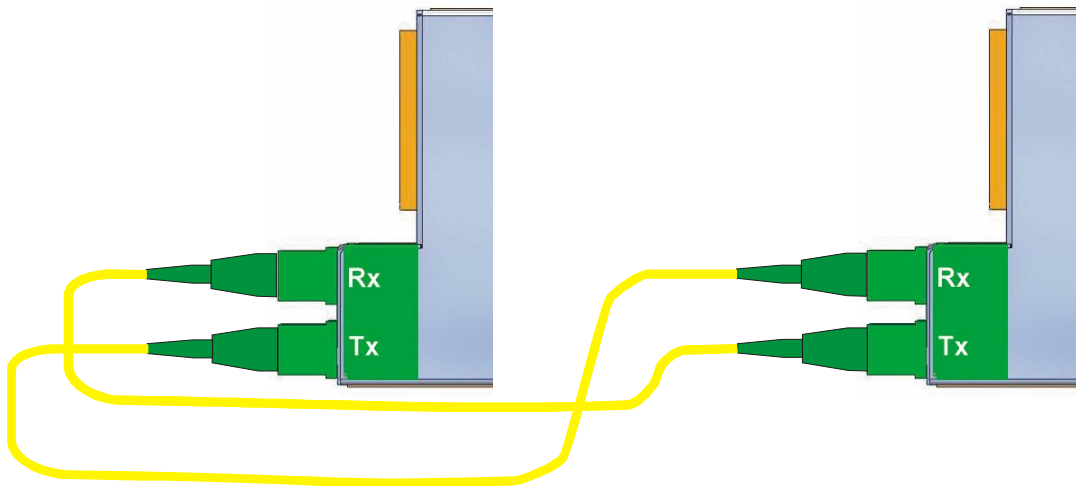
Due to size constraints, dual fibre Ethernet ports are only available in (dual) LC duplex connectors.

All Ethernet ports (fibre or RJ45) are connected to an internal Ethernet switch.



#### 3.4.1 **Rear panel, connecting two M&C modules via the fibre ports**

When connecting the fibre ports of a controller module to another fibre transceiver (such as another controller module), it is necessary to connect the ports correctly (Rx to Tx, etc.) as they will not auto negotiate.



## 4 Setup of the HRC-3 Controller Module

Your M&C module is delivered fully configured with factory default settings (see Section 2.1). The procedure for changing these settings is detailed below:

### 4.1 Connecting the module

- Connect the module to the power source and Ethernet cables.
- Optionally, you may also connect the module to fibre optic cables as described in Section 3.3.3 and connect the dry contact relay (via chassis connector).
- All signals must remain within acceptable limits; see technical specifications in Section 11.

The **ViaLiteHD** controller configuration interface is accessible via:

- USB serial (front panel micro USB-B connector).
- SSH (any network interface).

Unlike the **ViaLiteHD** HRC-1 controller, the setup interface is available at any time (not just on reboot).

#### 4.1.1 Connecting via USB

This uses the standard micro USB port on the front panel of the controller. A standard micro USB cable and a computer with a terminal emulator application (such as PuTTY) is required.

1. Ensure the **ViaLiteHD** M&C module is properly installed within the **ViaLiteHD** enclosure/rack unit and is powered up.
2. Connect the computer to the **ViaLiteHD** M&C module using a micro USB cable.
3. Ensure the device is recognised. Windows 8+ computers may recognise the device as 'Pi USB to Serial Converter'.
4. Open the terminal emulator application.
5. Select the serial connection and select the serial port the **ViaLiteHD** controller is connected to.
6. Configure the serial connection as follows:
  - 9600 bps
  - 8 data bits
  - 1 stop bit
  - No parity
  - No flow control
7. Open the connection to the **ViaLite** controller.
8. Log in with the same username/password as the Web GUI.

#### 4.1.2 Connecting via SSH

SSH is a secure protocol to connect to remote systems across the network and replaces the TELNET interface found on the HRC-1 module. Connecting uses the same usernames and passwords as the Web GUI (and USB port). Once logged in, the interface will also be identical to connecting via the USB port.

##### 4.1.2.1 Windows

This assumes that you are attempting to connect using the PuTTY application. If you are using another application, consult the application's manual for instructions. If you are using the Windows 10 'Windows Subsystem for Linux', consult the Linux/macOS instructions.

1. Open PuTTY.
2. Ensure that the IP address and Port(22) are correct, and that the SSH connection type is selected.
3. (Optional) On the session page, save the session options.
4. Open the connection.

##### 4.1.2.2 Linux/macOS (or other Unix-like)

This assumes that the computer you are trying to connect from has an OpenSSH-compatible SSH client binary installed.

```
ssh Technician@10.0.0.210
```

In more general terms, the command is of the form:

```
ssh <ViaLiteHD Username>@<IP address of the ViaLiteHD Controller Module>
```

### 4.2 Command line interface

When connecting to the M&C module (via SSH or via the front panel USB port, the user is presented with a **ViaLiteHD** specific command line interface (see Figure 1). The commands available are as follows:

**Table 4: Setup interface command reference**

Command	Short Description
exit	Log out of the <b>ViaLiteHD</b> controller module
help	Display a list of all the available commands  help <command> displays help information specific to that command, including command-specific syntax

Command	Short Description
ip_adddns	Add a DNS nameserver IP address
ip_addr	Assign the IPv4 address
ip_gateway	Assign the IPv4 gateway address
ip_netmask	Assign the IPv4 network mask
ip_remdns	Remove a DNS nameserver
ntp_add	Add an NTP time server to the list used for periodic synchronisation
ntp_disable	Disable periodic NTP synchronisation
ntp_enable	Enable periodic NTP synchronisation
ntp_rem	Remove an NTP time server from the list used for periodic synchronisation
ntp_sync	Immediately synchronise the system time to the time supplied by the specified NTP server.
reboot	Reboot the M&C module
snmp_community	List/change/remove the community strings for the SNMP v1/v2c interface
ssh_disable	Disable the SSH interface
ssh_enable	Enable the SSH interface
sys_date	Set the system date
sys_info	Print a summary of the system configuration, including time, SNMP communities, IPv4 settings
sys_time	Set the system time
sys_timezone	Set the system time zone. Time zones are specified as their TZ database name ( <a href="https://en.wikipedia.org/wiki/List_of_tz_database_time_zones">https://en.wikipedia.org/wiki/List_of_tz_database_time_zones</a> )
update_ftp	Download a software update file from an FTP server and apply the update
user_disable	Disable a user from logging in to the Web GUI, the SSH interface and the USB interface
user_enable	Enable a user from logging in to the Web GUI, the SSH interface and the USB interface
user_passwd	Change a user's password
web_disable	Disable the Web GUI
web_enable	Enable the Web GUI



ViaLiteHD Web & SNMP Controller

ViaLite Communications  
Pulse Power & Measurement Ltd.

Type help or ? to list commands.  
(ViaLiteHD)>> ?

Available commands:  
(Type "help <command>" for more information)

```
=====
exit      ip_netmask  ntp_rem      ssh_enable   update_ftp   web_enable
help      ip_remdns   ntp_sync     sys_date     user_disable
ip_adddns ntp_add     reboot       sys_info     user_enable
ip_addr   ntp_disable snmp_community sys_time     user_passwd
ip_gateway ntp_enable  ssh_disable  sys_timezone web_disable
```

(ViaLiteHD)>>

Figure 1: ViaLiteHD Controller Command Line Interface & All Available Commands



#### 4.3 Configuring chassis slot positions

The SNMP and web controller is able to automatically recognise the type of module fitted in each slot. This allows it to use the correct type of graphic for the front panel representation and present an appropriate control interface. The only module that is not recognised by the SNMP and web controller is the redundancy load module; this will just show as a blank slot.

In the unlikely event that the modules fitted in your chassis post-date the software load on your SNMP card, it will present a default graphic and a control interface that contains the basic module information. In this case, contact your **ViaLiteHD** sales representative to acquire a software update file which adds support for this module to your controller.

#### 4.4 User access levels and passwords

There are three levels of user privileges, these are:

**Table 5: User Privileges**

Username	Description
Guest	Can read all parameters except advanced, cannot modify configuration or execute any commands
Admin	Can read all parameters except advanced, can modify configurations and execute commands
Technician	Can read and modify everything, all commands available

Each access level has a pre-set default password, these passwords are:

**Table 6: User Default Passwords**

Username	Default password
Guest	guest
Admin	admin
Technician	tech

Usernames cannot be changed, but the passwords may, see Section 4.5.

Note: The usernames and passwords for web access are case sensitive.

#### 4.5 Setting user access passwords

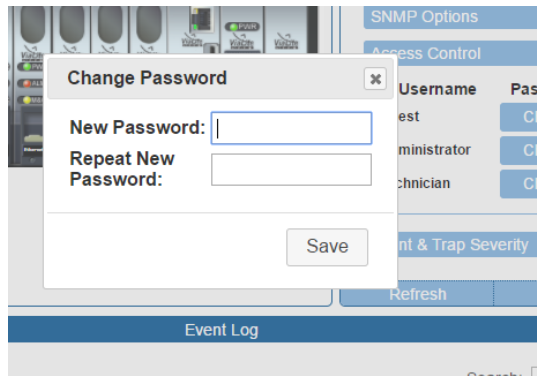
User account passwords may be changed via SSH or USB connections using the commands shown in Section 4.2.

The user account passwords may also be changed via the web interface. In all cases, the user is only allowed to change the passwords for the users at the same or lower levels of access rights (i.e. Guest can only set the Guest password, Admin can only set the Admin or Guest password, Technician can set all passwords).



**Figure 2: Setting User Passwords from the Web GUI**

Users are also able to allow and disallow the logging in of users at lower access rights than themselves.



**Figure 3: Password Change Dialogue**

## 5 Web Control Interface

### 5.1 Overview

When navigating to the web interface, the initial screen presented will be the login screen (Figure 4). This login screen includes a listing of the unit's serial number to indicate which HRC-3 module the user is attempting to access. Once logged in, the user will be presented with the front page of the web interface (Figure 5).



Figure 4: Web Interface Login Screen

This front page shows:

- The system ID information (name, location, contact) and currently logged-in user in the top header.
- The system navigation bar (in the lower half of the header).
- A visual representation of the **ViaLite** chassis (See section 5.2).
- The Event Log (see section 5.3).

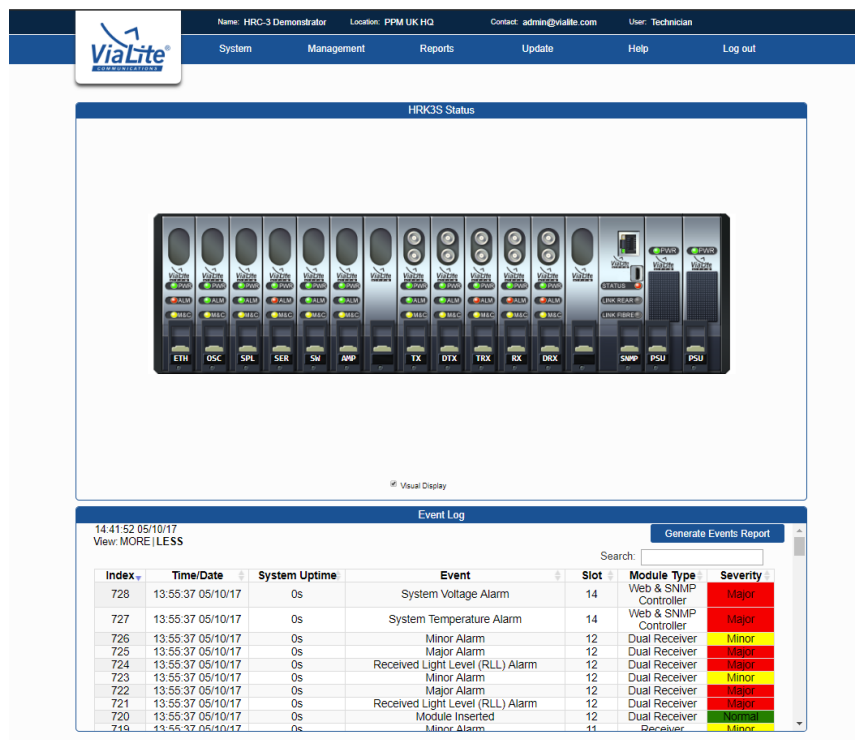


Figure 5: Typical Web Interface View

When a module, or a navigation bar entry, is selected, the status panel will be made visible to the right of the visual representation of the **ViaLiteHD** chassis (shown in Figure 6). This status panel will be populated with specific information and settings for that module. As shown in Figure 6, when opening the status panel to view a specific module's settings, the selected module is highlighted with a green border.

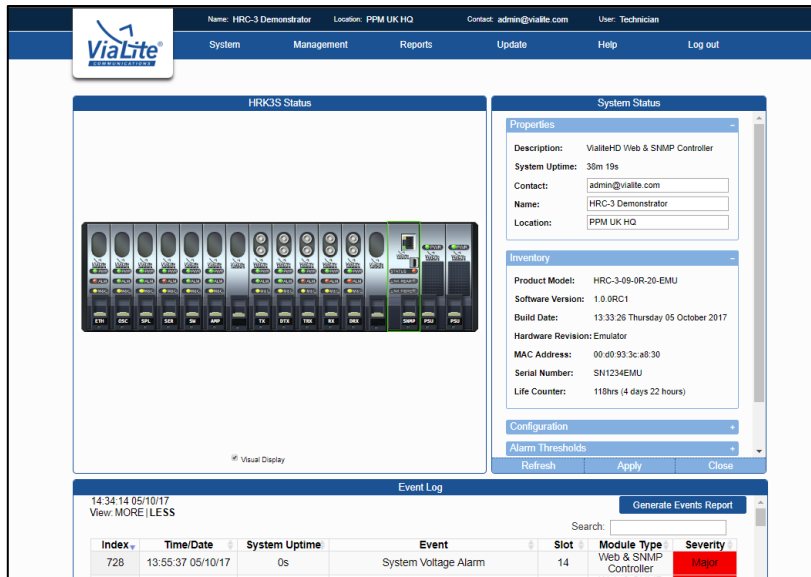


Figure 6: Typical Web Interface View with Status Panel Visible

### 5.1.1 Usage conventions

All buttons and icons can be activated by a single left click. Some boxes have arrow icons in the top left of the box, these allow the boxes to be maximised or minimised. Many elements have a hover over function, whereby hovering over the element will display key information, such as default values, allowable ranges, etc.

If information is entered as text, numbers or drop down boxes you **must** hit the panel 'Apply' button to send this information to the controller. Changes to the connected modules may take a moment to take effect, if the change is not immediately updated, press the 'Refresh' button on the panel options.

Detailed module information will be shown in the status panel, to the right of the visual representation of the **ViaLiteHD** chassis. This status panel may be dismissed by either selecting the 'Close' button in the status panel options (at the bottom of the panel) or by repeating the action used to open the panel (i.e. if the system panel is open, selecting 'System' in the system navigation bar will close the panel). Upon opening of this panel (or clicking the 'Refresh' button in the status panel options), a refresh bar will be shown at the top of the status panel (seen in Figure 7) to show that the module data is being updated with the most recent information.

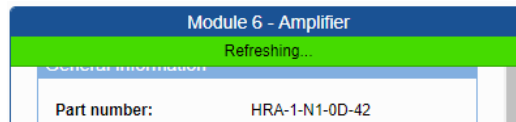


Figure 7: Module Status Panel Refreshing

#### 5.1.1.1 Maintenance mode

If a module is in maintenance mode, an indicator will be shown on the chassis view over the specific module (seen in Figure 8, Figure 11 and Figure 12). Additionally, when viewing the module status for modules in maintenance mode, an indicator bar is placed at the top of the status panel (shown in Figure 9). For more information on maintenance mode, see Section 2.3.



Figure 8: Module Maintenance Mode Indicator (Chassis View)

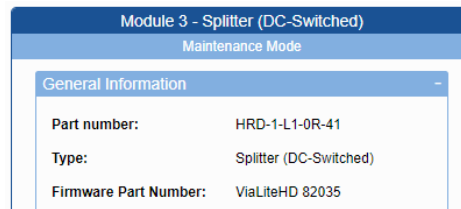


Figure 9: Module Maintenance Mode Indicator (Status Panel)

## 5.2 Visual representation of the *ViaLiteHD* chassis

The web interface includes a visual reproduction of the appearance of the *ViaLiteHD* chassis. This includes the chassis type, module front panels and status LEDs. Figure 6 through Figure 11 show the visual representation of the 3U rack, 1U rack and Satcom6 outdoor enclosure.

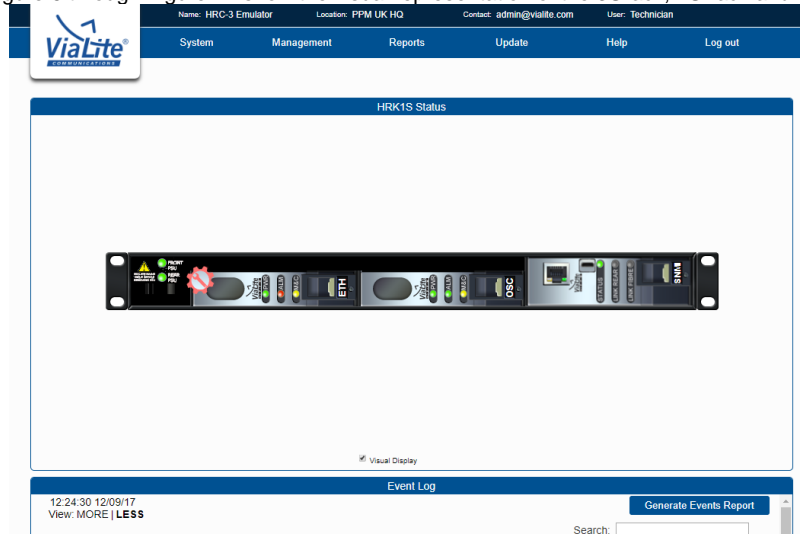
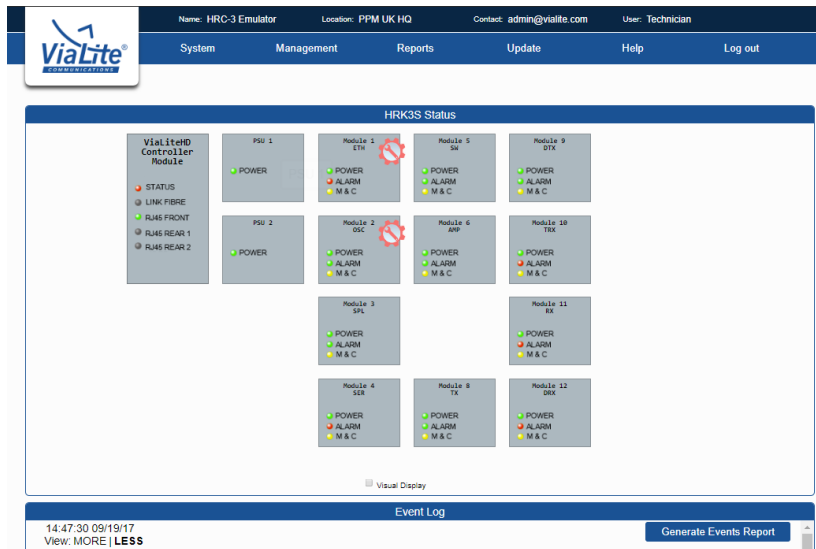
Figure 10: Visual Status View for a *ViaLiteHD* 1U Rack

Figure 11: Visual Status View for a Satcom6 (with Status Panel Open)

In addition to the reproduction of the *ViaLiteHD* chassis appearance, the Web GUI can also display a functional block diagram of the modules installed in the chassis (shown in Figure 12).



**Figure 12: Functional Status View (for a 3U Rack)**

Hovering over the individual modules (in visual or in functional view) will display the module type, slot number and module name (if applicable).

Note: The text on some module labels may be modified to improve readability.

### 5.3 Event Log

The **ViaLiteHD** SNMP and web controller stores a history of the last 128 events in non-volatile memory. Each event is indexed with an ID which will increment with each new event. This index number is only reset (to 1) when the event log is manually cleared. The Web GUI provides a formatted view of this system event log. By default, the events are sorted by descending event index so that the most recent event is at the top of the table. The events may be sorted by any of the event table columns, in both ascending and descending order, by clicking the appropriate column heading.

Figure 13 shows the Event Log as displayed in the Web GUI. Selecting 'MORE' or 'LESS' view mode will increase or decrease the size of the Event Log box, allowing more or fewer events to be seen simultaneously.

Event Log						
16:32:36 10/04/17 View: MORE   LESS						
Generate Events Report						
Search: <input type="text"/>						
Index	Time/Date	System Uptime	Event	Slot	Module Type	Severity
300	09:06:37 09/28/17	0s	Received Light Level (RLL) Alarm	4	Serial Digital	Major
301	09:06:37 09/28/17	0s	Major Alarm	4	Serial Digital	Major
302	09:06:37 09/28/17	0s	Minor Alarm	4	Serial Digital	Minor
303	09:06:38 09/28/17	0s	Module Inserted	5	Switch	Normal
304	09:06:38 09/28/17	0s	Module Inserted	6	Amplifier	Normal
305	09:06:38 09/28/17	0s	Module Inserted	8	Transmitter	Normal
306	09:06:38 09/28/17	0s	Module Inserted	9	Dual Transmitter	Normal
307	09:06:38 09/28/17	0s	Module Inserted	10	Transceiver	Normal
308	09:06:38 09/28/17	0s	Received Light Level (RLL) Alarm	10	Transceiver	Major

**Figure 13: Web GUI Event Log Display**

#### 5.3.1 Event severity

Events can be given a severity rating, shown in the Event Log display and sent out in the corresponding SNMP traps. Alarm severity ratings are able to be changed to suit the HRC-3 installation (as shown in Section 5.5.1); however, 'Alarm Cleared' events are always classified as 'Normal severity'. The factory default severities are shown in Table 8.

**Table 7: Event Severity Description**

Event Severity	Typical Event Type
Major	These are typically events that may cause major disruption to operation. Depending on specific deployment details these may or may not critically affect service. Typical events to trigger this would be low light level at optical receivers (RLL alarm), card removal or similar. Any major alarm will change the M&C module's LED from green to red.
Minor	These are typically events that may degrade performance or warn of impending major alarms, and as such they may affect the quality of service. Typical events would be system temperature alarm, Rx AGC alarm, voltage feed alarm or similar.
Normal	These are events that would be expected to happen under normal operation. Typical type of events would be system start up and alarms being cleared.
Information	These are the type of events that are useful to record as they represent a change in status but do not affect service delivery.

**Table 8: Factory Default Event Severities**

Event Type	Event Severity
Major Alarm	Major
Minor Alarm	Minor
Automatic Gain Control Alarm	Minor
Supply Voltage Alarm	Minor
Received Light Level (RLL) Alarm	Major
RF Level Alarm	Minor
RF Gain Alarm	Minor
Laser Alarm	Major
Bias Alarm	Major
Power Alarm	Minor
Current Feed Alarm	Minor
Voltage Feed Alarm	Minor
Module Temperature Alarm	Minor

Event Type	Event Severity
LNB Overload Alarm	Minor
LNB Temperature Alarm	Minor
System Voltage Alarm	Minor
System Temperature Alarm	Minor
System Start up	Normal
Event History Cleared	Normal
Module Inserted	Normal
Module Removed	Major
No Ethernet Link (HRE only)	Major
Module Entering Maintenance Mode	Normal
Module Leaving Maintenance Mode (*)	Normal
Door Open (**)	Information

\* - The 'Module Leaving Maintenance Mode' severity will always be 'Normal', only the severity of starting the maintenance mode is able to be changed.

\*\* - The door open/closed sensor is only fitted in certain supported outdoor enclosures. Therefore, the default priority is below the default recording threshold.

## 5.4 System

**Figure 14: System Status Panel**

The System Status panel (shown in Figure 14) includes system settings such as:

- System name/location/contact (accessible over SNMP as the MIB-2 sysName, sysLocation, and sysContact objects)
- System time/date
- System uptime & life counter
- Software & hardware version information
- System serial number & MAC address

In addition to the above, the system settings include the system temperature and voltage alarm thresholds, which can be changed to suit the environment the **ViaLiteHD** equipment is installed in. The current system voltage and temperature can be seen in the PSU status panel (see Section 5.8).

The 'Commands' section of the system panel includes buttons to:

- Reboot the module (this doesn't affect the operation of the other **ViaLiteHD** modules)
- Clear the event history

- Toggle the whole chassis in/out of maintenance mode
- Perform a soft reset.

The soft reset removes all saved configuration data for the **ViaLiteHD** modules (used for the auto-configure functionality) and then reboots the M&C module. This does not affect the operation of the other **ViaLiteHD** modules in the chassis.

The System Status panel can be accessed by either clicking the 'System' button in the top navigation bar or by clicking on the M&C module.

## 5.5 Management

The figure displays two views of the 'Management' settings panel. The left view shows the 'About' section with product and software version information, followed by 'SNMP MIB Files' and 'SNMP Options' sections. The right view shows the 'Access Control' section with a table of users (Guest, Administrator, Technician) and their login status, followed by 'Event & Trap Severity' settings for various events like Minimum Severity To Log, Event Log Cleared, Maintenance Mode, etc.

Figure 15: Management Settings Panel

The management settings panel (accessible from the 'Management' button in the top navigation bar) allows users to:

- Change the SNMP community settings
- Add/remove SNMP trap receivers (Figure 16)
  - Trap receivers may be set up such that only SNMP v1 or SNMPv2 format traps are sent. This is selected from the trap version on the receiver.
  - Can configure up to a maximum of 30 trap receivers.
- Change user passwords (Figure 17)
- Disable/enable users
- Modify event severities (see Section 5.5.1)

The figure shows a 'New Trap Receiver' dialog box. It has two input fields: 'Address' and 'SNMP Version'. The 'SNMP Version' field is a dropdown menu currently set to 'v1'. There is a 'Save' button at the bottom right of the dialog box.

Figure 16: New Trap Receiver Dialog Box



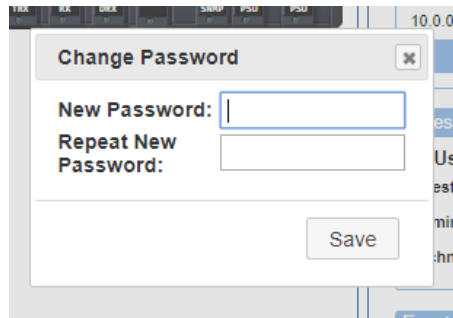


Figure 17: Password Change Dialog Box

### 5.5.1 Event Severities

The HRC-3 M&C module supports custom severities for the events reported in the *ViaLiteHD* chassis. These severities are set in the Management panel (in the 'Event and Trap Severity' box). Figure 18 shows the severity change, including a hover over showing the default options (at the bottom of the panel).

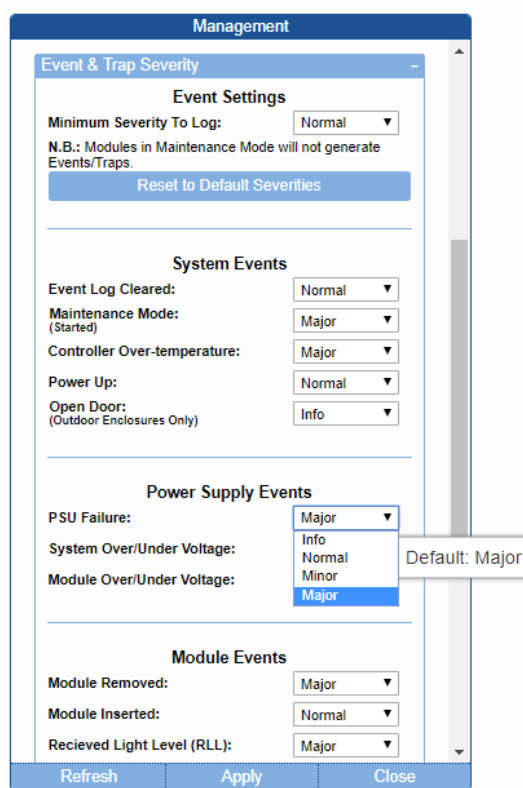


Figure 18: Event Severity Change

By default, the severities are set to match the severities configured for the HRC-1 controller. These factory default severities are shown in Table 8 (in Section 5.3.1).

## 5.6 Report generation

The controller module is able to produce HTML format reports detailing the chassis status and the event log. This report generation functionality is accessible by selecting the 'Reports' in the main navigation bar.

### 5.6.1 Report header

Both the event log report and the system report include the same report header. This header (Figure 19) includes the current status of the controller module, plus a listing of all the modules connected to the *ViaLiteHD* chassis.



ViaLiteHD® Web & SNMP Controller Chassis Report - 11/05/17 14:57:19

System Info

IP Address	10.0.0.209	Contact	sales@ppm.co.uk
Name	Repatiate Eval Board	Location	PPM Engineering
Date/Time	11/05/17 14:57:19	System Uptime	6h 20m 31s
Username	Technician	Serial Number	SN1756843
Software Version	0.5.0 ALPHA	Build Date	11:06:21 Tuesday 09 May 2017
Hardware Revision	Emulated HW - VERSION 0.0.1	MAC Address	00:00:93:3c:a8:30
Chassis Part Number	HR3KS	Slot Auto-Configuration	Disabled
Temperature	59°C	Supply Voltage	12.43V
PSU 1 Status	Normal	PSU 2 Status	Not Present

Module Summary

Slot	Card Type	Part Number	Serial Number	Firmware	Name	Life Counter (hr)	Customer ID
1	Transmitter	HRX-00-000-0000	SN1966413	ViaLiteHD 80211 100 27 Mar 2012		884	None
2	Receiver	HRX-00-000-0000	SN1966413	ViaLiteHD 80211 100 27 Mar 2012		884	None
3	Transceiver	HRX-00-000-0000	SN1966413	ViaLiteHD 80211 100 27 Mar 2012		884	None
4	Amplifier	HRX-00-000-0000	SN1966413	ViaLiteHD 80211 100 27 Mar 2012		884	None
5	Serial Digital	HRX-00-000-0000	SN1966413	ViaLiteHD 80211 100 27 Mar 2012		884	None
6	-	-	-	-	-	-	-
7	Splitter	HRX-00-000-0000	SN1966413	ViaLiteHD 80211 100 27 Mar 2012		884	None
8	Switch	HRX-00-000-0000	SN1966413	ViaLiteHD 80211 100 27 Mar 2012		884	None

Figure 19: Report Header

### 5.6.2 System report

In addition to the standard report header, the system report includes a detailed readout of the module status and settings for all the connected modules in the *ViaLiteHD* chassis. An example section is given in Figure 20.

Module 2 - Dual Transmitter with LNB

General Info					
Part Number	HRU-L1-8D-53-S1310-S1310	Type	Dual Transmitter with LNB	Serial Number	SN1220234
Firmware Part Number	ViaLiteHD 82011, ViaLiteHD 82011, ViaLiteHD 82002	Firmware Version	121, 121, 120	Firmware Date	17Dec14, 17Dec14, 25Jun14
OEM Number	T1	Customer ID	None	Life Counter	168hrs
Name		Major Alarm		Minor Alarm	

Transmitter A					
Temperature Alarm:	OK	Vcc Alarm:	OK	AGC Alarm:	OK
Optical Power Alarm:	Fault	RF Power Alarm:	Fault	RF Gain Alarm:	OK
External Voltage Alarm:	OK	External Current Alarm:	Fault	Laser Alarm:	Fault
Bias Alarm:	OK	Vcc (V):	11.89		
Gain Mode:	Factory Default	AGC Target (dBm):	0.00	SGC Level (dB):	1.71
Laser:	Disabled	Laser Bias (mA):	9.15	Laser Power (dBm):	-18.52
RF Power (dBm):	-28.38	RF Gain (dB):	-11.00	RF Input (dBm):	-46.93
FSK (Digital Channel):	Disabled	GPS Mode:	Disabled	External Current (mA):	1.90
External Voltage (V):	1.43	RF Power Alarm High Threshold (dBm):	0.00	RF Power Alarm Low Threshold (dBm):	0.00

Transmitter B					
Temperature Alarm:	OK	Vcc Alarm:	OK	AGC Alarm:	OK
Optical Power Alarm:	Fault	RF Power Alarm:	Fault	RF Gain Alarm:	OK
External Voltage Alarm:	OK	External Current Alarm:	Fault	Laser Alarm:	Fault
Bias Alarm:	OK	Vcc (V):	11.89		
Gain Mode:	Factory Default	AGC Target (dBm):	0.00	SGC Level (dB):	-11.00
Laser:	Disabled	Laser Bias (mA):	0.17	Laser Power (dBm):	-20.49
RF Power (dBm):	-28.38	RF Gain (dB):	-11.00	RF Input (dBm):	-46.21
FSK (Digital Channel):	Disabled	GPS Mode:	Disabled	External Current (mA):	0.90
External Voltage (V):	1.43	RF Power Alarm High Threshold (dBm):	0.00	RF Power Alarm Low Threshold (dBm):	0.00

LNB					
Vcc Alarm:	OK	Current Alarm:	OK	Tone Alarm:	OK
Overload Alarm:	OK	Over Temperature Alarm:	OK		
Power Block:	Disabled	Auxiliary Mode:	Enabled (+22V Nominal)	Output Boost:	Disabled
Output Voltage:	High (+18V Nominal)	Tone Output:	Disabled (DSQIN)		
Tone Generation:	Active (22kHz Tone)	Current Threshold:	High (12mA)		
Current Limit Mode:	Static (Clamp)				

Figure 20: Module Report Summary (for a DTXLNB Module)

### 5.6.3 Event report

The event report, in addition to the standard report header, consists of a table displaying the whole event log for the controller module (shown in Figure 21).

Event Log						
Index	System Time/Date	System Uptime	Event	Slot	Module Type	Severity
71	11:12:41 03/11/17	1s	Minor Alarm	7	Transceiver with LNB	Minor
72	11:12:41 03/11/17	1s	Feed Current Alarm	7	Transceiver with LNB	Minor
73	11:12:41 03/11/17	1s	Module Inserted	8	Transceiver	Normal
74	11:12:41 03/11/17	1s	Received Light Level (RLL) Alarm	8	Transceiver	Major
75	11:12:41 03/11/17	1s	Major Alarm	8	Transceiver	Major
76	11:12:41 03/11/17	1s	Minor Alarm	8	Transceiver	Minor
77	11:12:41 03/11/17	1s	RF Level Alarm	8	Transceiver	Minor
78	11:12:41 03/11/17	1s	Minor Alarm	8	Transceiver	Minor
79	11:12:41 03/11/17	1s	Feed Current Alarm	8	Transceiver	Minor
80	11:12:41 03/11/17	1s	Module Inserted	9	Dual Receiver	Normal
81	11:12:41 03/11/17	1s	Received Light Level (RLL) Alarm	9	Dual Receiver	Major
82	11:12:41 03/11/17	1s	Major Alarm	9	Dual Receiver	Major
83	11:12:41 03/11/17	1s	Automatic Gain Control (AGC) Alarm	9	Dual Receiver	Minor
84	11:12:41 03/11/17	1s	Minor Alarm	9	Dual Receiver	Minor
85	11:12:41 03/11/17	1s	Received Light Level (RLL) Alarm	9	Dual Receiver	Major

Figure 21: Event Log Report

## 5.7 Software update

The software update functionality is accessible by selecting 'Update' in the main navigation bar. The HRC-3 controller is able to be updated over FTP (similar to the HRC-1) and over the Web GUI. For more details on how to perform a software update, see Section 6.

## 5.8 Power supply status

The 'Power Supply Status' panel can be accessed by clicking on the PSU image in the chassis view.

PSU Status	
Environment	
PSU 1 Status:	Not Present
PSU 2 Status:	Normal
Controller Temperature:	50.37°C
Controller Voltage:	11.92 V
Slot 1 Voltage: No Card Present	
Slot 2 Voltage: No Card Present	
Slot 3 Voltage: Not Supported by this Module.	
Slot 4 Voltage: Not Supported by this Module.	
Slot 5 Voltage: Not Supported by this Module.	
Slot 6 Voltage: Not Supported by this Module.	
Slot 7 Voltage: No Card Present	
Slot 8 Voltage: Not Supported by this Module.	
Slot 9 Voltage: Not Supported by this Module.	
Slot 10 Voltage: 11.98 V	
Slot 11 Voltage: 11.98 V	
Slot 12 Voltage: 12.02 V	
Slot 13 Voltage: No Card Present	
Refresh Close	

Figure 22: Power Supply Status Panel

The Power Supply Status panel (shown in Figure 22) includes the power supply status information (including measured module voltages at supported **ViaLiteHD** modules). Also included is the measured module temperature.

## 5.9 Module status panels

### 5.9.1 Overview

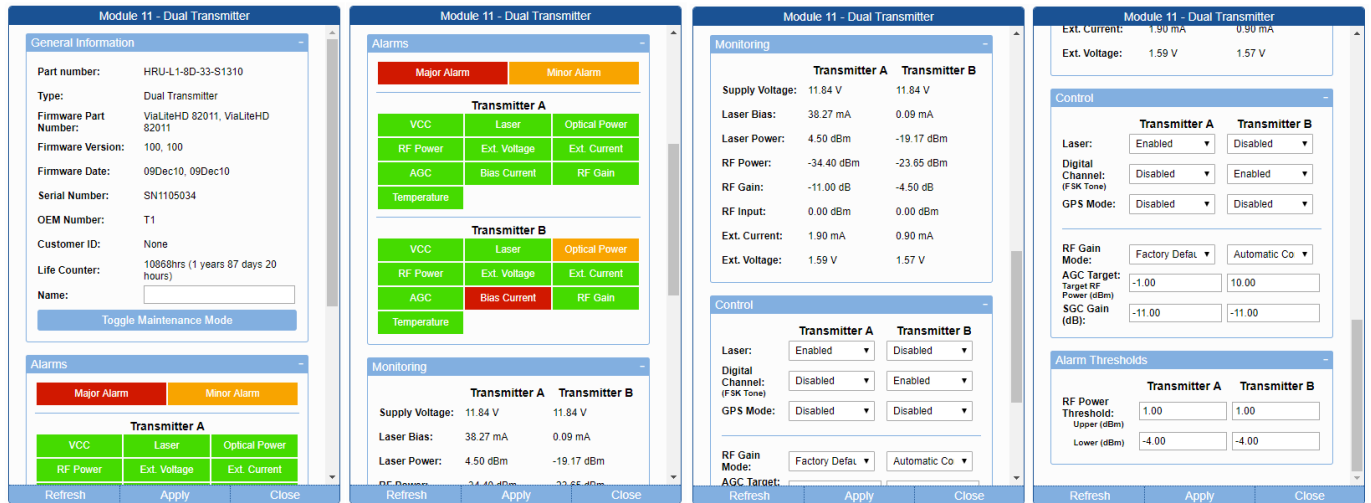


Figure 23: Module Status Panel for a Dual Transmitter Module

The module status panel is made up of several sub-sections, each contained in a collapsible container box (to expand or collapse, click the box title). All module status panels follow the same general format and consist of:

- A general information table
- Alarm status indicators
- Module-specific monitoring & control

### 5.9.2 General information table

The general information table in the module page is consistent for all module types. This table (shown in Figure 24) will show the module identification information, including the part number, serial number and firmware information. Also included is a name field which users can use to assign a descriptive name to the module. The 'Toggle Maintenance Mode' button allows users to put the module into maintenance mode (see Section 2.3).

General Information	
Part number:	HRU-L1-8D-53-S1310-S1310
Type:	Dual Transmitter with LNB
Firmware Part Number:	ViaLiteHD 82011, ViaLiteHD 82002
Firmware Version:	121, 121, 120
Firmware Date:	17Dec14, 17Dec14, 25Jun14
Serial Number:	SN1220236
OEM Number:	T1
Customer ID:	None
Life Counter:	2976hrs (124 days 0 hours)
Name:	<input type="text"/>
<button>Toggle Maintenance Mode</button>	

Figure 24: General Module Information Table (DTxLNB)

### 5.9.3 Alarm status indicators

In the alarm status indicators (Figure 25), each alarm is represented by a colour block annotated with the alarm title.

- If the alarm block is coloured green, the alarm is not active (status is OK).
- If the alarm block is coloured red, the alarm is active (not OK) and the module deems it a 'Major Alarm'.
- If the alarm block is coloured orange, the alarm is active (not OK) and the module deems it a 'Minor Alarm'.

These alarm priorities are not affected by the event severities set in the HRC-3 module (see Section 5.3.1), they are set in the **ViaLiteHD** module firmware at time of manufacture.

Status		
Major Alarm		Minor Alarm
Transmitter		
VCC	Laser	Optical Power
RF Power	Ext. Voltage	Ext. Current
AGC	Bias Current	RF Gain
Temperature		
Receiver		
Vcc	Temperature	RLL
AGC	RF Level	RF Gain
BUC		

Figure 25: Alarm Status Indicators (TRx)

## 5.9.4 Module-specific monitoring & control

As each module type has different capabilities, each module type will have different monitoring and control capabilities. The module-specific information in the status panel will typically follow the same layout:

- Read-only information displayed in a 'Monitoring' subsection
- Writeable information displayed in a 'Control' subsection.

It is important to note that upon refreshing, all fields (including the editable fields in the 'Control' section) are updated with the current data.

For more information on any modulespecific option or parameter, please consult the relevant module handbook for more details.

### 5.9.4.1 Amplifier (HRA)

The Amplifier module status panel (shown in Figure 26) includes the current RF gain and RF power status. Users are also able to change the gain mode (including AGC target and SGC levels).

The Amplifier may be configured for manual gain control by selecting the MGC switch on the module DIP switches.

Figure 26: Amplifier Module Status Panel

#### 5.9.4.1.1 Alarm thresholds

The Amplifier module includes major and minor (warning) alarm support for the RF gain and RF power.

The major alarm thresholds for the RF gain are set by the maximum and minimum gain of the module (typically minimum of 15 dB and maximum of 30 dB), and the RF power thresholds are shown in the 'Control' subsection (and can be changed by the user). The minor alarm (warning) thresholds are given in the 'Thresholds' subsection. These warning thresholds are not absolute values of gain or power but are offsets from the major alarm thresholds.

For example, if the RF gain warning threshold is set at 3 dBm:

- Major alarms will occur at 15 dB (or lower) gain and 30 dB (or higher) gain.
- Minor alarms (warnings) will occur at 18 dB (or lower) gain and 27 dB (or higher) gain.

The RF power thresholds operate in the same manner, but have user-configurable major alarm thresholds. Therefore, if the major alarm thresholds are set at  $\pm 20$  dBm and the warning threshold is set at 3 dBm:

- Major alarms will occur at -20 dBm (or lower) power and 20 dBm (or higher) power.
- Minor alarms (warnings) will occur at -17 dBm (or lower) power and 17 dBm (or higher) power.

#### 5.9.4.2 Ethernet Media Converter (HRE)

As the media converter only allows for the monitoring of the temperature and voltage alarms plus the Ethernet link status, the module panel does not include any monitoring or control subsections.

The link status is represented similarly to the alarm status:

- If the link boxes are green, then a valid link has been established through that interface.
- If the link boxes are grey, then no link has been established. The media converter interprets no link as a major alarm (as shown in Figure 27).

Figure 27: Ethernet Media Converter Module Status Panel

#### 5.9.4.3 LNB

A **ViaLiteHD** LNB module can take two forms:

- A standalone LNB module (for use in a Satcom6 Outdoor Enclosure) (see Section 5.9.4.3.2).
- As an option on a plug-in module (for example, a TxLNB module) (see Section 5.9.4.3.1).

In both cases, users will have the capability to modify the configuration of the LNB supply (see the available options in Figure 28 or Figure 29).

##### 5.9.4.3.1 Additional module option

If a **ViaLiteHD** module includes an LNB, the LNB options will be included in the module status panel. This will add additional alarm indicators and an additional (LNB-specific) subsection, as shown in Figure 28.

Figure 28: LNB Status as a Part of a DTxLNB Status Panel

#### 5.9.4.3.2 Standalone LNB (HRP)

If the **ViaLiteHD** LNB module is fitted in a Satcom6 outdoor enclosure as a standalone module, the module status panel will include only the LNB-specific information (Figure 29).

Figure 29: Standalone LNB Module Status Panel

#### 5.9.4.4 Receiver (HRR & HRV)

The receiver module status panel (shown in Figure 30) allows for monitoring of the receiver status and settings, including the RF gain settings, the FSK (digital channel) and GPS mode settings.

The GPS mode or FSK mode settings will not affect the operation of modules without this capability. To operate correctly in FSK mode, the connected transmitter must be FSK-capable and have FSK enabled.

The automatic gain control mode in the receiver has two modes: RF Level and Received Light Level (RLL).

In RLL mode:

- The receiver will attempt to compensate for the optical loss by adjusting the module's RF gain.
- This mode attempts to mimic a zero loss optical link.
- AGC Target is not used.
- The SGC gain setting may be set to change the module gain target.

In RF Level mode:

- The AGC control loop will adjust the RF gain to maintain a constant RF power output.

Figure 30: Receiver Module Status Panel

Dual receiver modules present the same module information and data items for both receiver sub-modules (as shown in Figure 31).

Figure 31: Dual Receiver Module Status Panel (Excerpt)

Single or dual receiver modules may include an integral LNB module, which adds the LNB settings to the module status panel (see Section 5.9.4.3.1).

#### 5.9.4.5 Serial Digital (HRB)

Figure 32 shows the module status panel for the Serial Digital module. The Serial Digital model allows for the monitoring of the status of the FOL, as well as configuration of the serial data link.

If the module is set (via the DIP switches) to be in manual mode, the changes made through the controller module will be overridden by the DIP switch settings.



Figure 32: Serial Digital Module Status Panel

#### 5.9.4.6 Splitter (HRD)

##### 5.9.4.6.1 DC-Switched Splitter (HRD-2)

The DC-Switched Splitter module status panel (shown in Figure 33) includes controls to monitor the switch direction and select the switch direction priority.

Figure 33: DC-Switched Splitter Module Status Panel

##### 5.9.4.6.2 DC-Unswitched Splitter (HRD-1)

As this version of the splitter has not active monitoring or control ability, the module status pane will only show the general information and major/minor alarm status indicators. This will result in a module view as shown in Figure 38, Section 5.9.4.10.

#### 5.9.4.7 Switch (HRS)

The RF Switch module status panel (shown in Figure 34) includes controls to monitor the switch direction and select the switch direction priority.

Figure 34: RF Switch Module Status Panel

#### 5.9.4.8 Transmitter (HRT & HRU)

The transmitter module status panel (shown in Figure 35) displays the transmitter status and settings, including the RF gain settings, the FSK (digital channel) and GPS mode settings.

To operate correctly in FSK mode, the connected receiver must be FSK capable and have FSK enabled.

##### 5.9.4.8.1 GPS mode

If a transmitter supports GPS mode, the transmitter is equipped with extra hardware which detects the DC current flowing from the GPS transmitter RF input to the active GPS antenna. If the GPS mode is enabled, the transmitter will deactivate if the antenna current falls to near zero.

If the transmitter does not support GPS mode, the GPS mode setting has no effect.

Full details are given in the RF module handbook.

Figure 35: Transmitter Module Status Panel

Dual transmitter modules present the same module information and data items for both transmitter sub-modules (as shown in Figure 31).

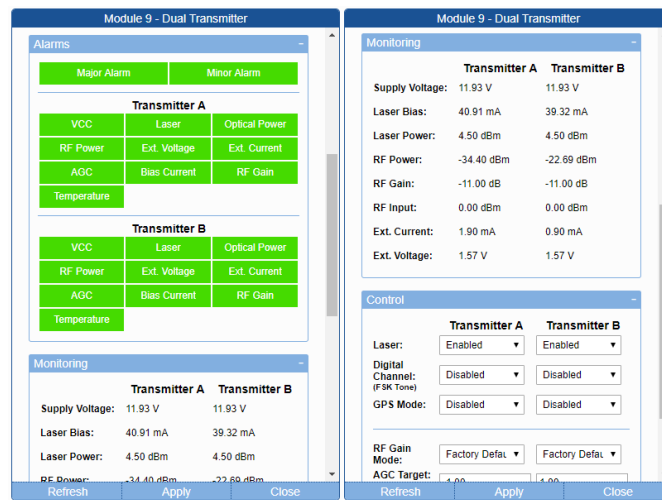


Figure 36: Dual Transmitter Module Status Panel (Excerpt)

Single or dual transmitter modules may include an integral LNB module, which adds the LNB settings to the module status panel (see Section 5.9.4.3.1).

#### 5.9.4.9 Transceiver (HRX)



Figure 37: Transceiver Module Status Panel

Transceiver modules incorporate a single transmitter sub-module and a single receiver sub-module within one *ViaLiteHD* module. Therefore, the transceiver module status panel (shown in Figure 37) includes all the data items and control information as the individual transmitter and receiver module status panels (see Sections 5.9.4.4 & 5.9.4.8).

Transceiver modules may include an integral LNB module, which adds the LNB settings to the module status panel (see Section 5.9.4.3.1).

#### 5.9.4.10 Passive RF/Optical Card (PROC)

PROC modules only report their 'General Information' and factory configuration description, there are no user controls or active monitors.

**Module 7 - Passive RF/Optical Card**

**General Information**

Part number: HRG-7-AA  
 Type: Passive RF/Optical Card  
 Firmware Part Number: ViaLiteHD 82098  
 Firmware Version: 100  
 Firmware Date: 08Apr22  
 Serial Number: SN1274553  
 OEM Number: OP  
 Customer ID: NONE  
 Life Counter: 0hrs (0 hours)  
 Name:

**Alarms**

Major Alarm Minor Alarm

**Monitoring**

Description: CWDM Module

*No control functions available for this module.*

Refresh Apply Close

#### 5.9.4.11 Other modules

Certain modules do not implement or require functionality to show module-specific monitoring or control information (such as the sscillator, diplexer, etc., modules). These modules will only display the 'General Information', plus a major/minor alarm status (as shown in Figure 38).

**Module 2 - Oscillator**

**General Information**

Part number: HRO-1-11-OR-01  
 Type: Oscillator  
 Firmware Part Number: ViaLite HD 820S  
 Firmware Version: 100  
 Firmware Date: 20Jan11  
 Serial Number: SN1217701  
 OEM Number:  
 Customer ID:  
 Life Counter: 130668hrs (14 years 334 days 12 hours)  
 Name:

**Alarms**

Major Alarm Minor Alarm

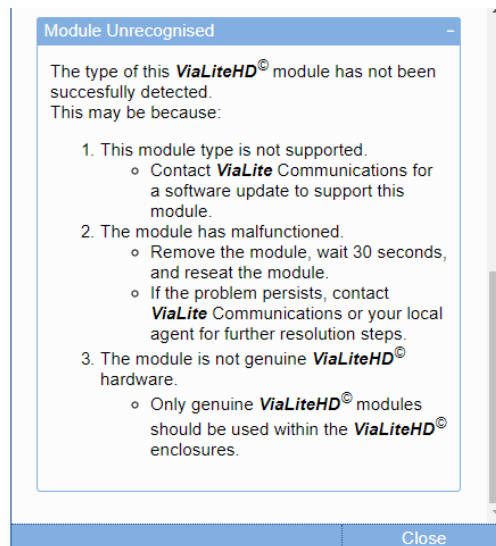
*No other monitor or control functions available for this module type.*

Refresh Apply Close

**Figure 38: Module Panel with No Monitor or Control Capability**

#### 5.9.4.11.1 Unknown modules

If the controller encounters an unknown module type, an attempt will be made to parse the general information. In addition, an explanation will be shown to warn the user that the module has not been recognised. This will also include suggestions on how to resolve the issue with the unknown card (as shown in Figure 39).



**Figure 39: Unknown Module Warning**

#### 5.9.4.11.2 Passive modules

Modules such as the Redundancy Load module do not include any active components or microprocessors, and as such will not be shown in the GUI or give a module control panel.

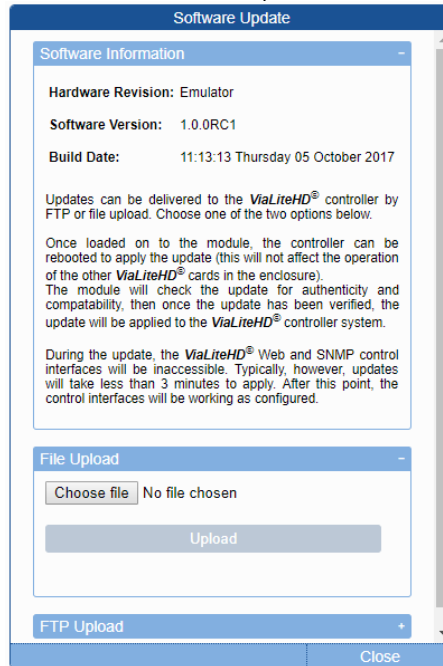
## 6 Software Update

Updates to the controller can be delivered via FTP (as in prior versions of the controller) or via an upload from the web interface.

**N.B.** Software updates from previous versions of the controller module (HRC-1) must not be used to update the controller module. Similarly, updates for this controller module must not be applied to previous versions (HRC-1). The HRC-3 module uses a different update file to the Embedded Site Controller. Care should be taken to ensure you're applying the correct update file. If a HRC-3 update file is used on the Embedded Site Controller (or vice-versa) the update will not be completed but the module will still reboot.

### 6.1 Web interface upload

Update files can now be sent to the controller via the web interface. The update menu in the web interface includes an upload function.



**Figure 40: Web Upload Software Update**

- 1) Once logged into the web interface (as Administrator or higher), navigate to the Software Update menu.
- 2) Use the 'Choose File' dialogue (in the 'Upload File' section) to select the appropriate update image.
- 3) Click the 'Upload' button. The file will be uploaded to the controller module. It is important that the browser window or software update menu is not closed whilst uploading, as this may cause an incomplete upload.
- 4) Once the file has been downloaded to the controller module, the web interface will show a 'Reboot to apply update' button. This can be used to reboot the device to apply the update.

The update will be applied on the next reboot of the controller.

**N.B.** The 'Upload' button will remain disabled until a valid file is selected (using the 'Choose File' button).

### 6.2 FTP

To maintain feature parity with previous versions of the controller module, the software update can be downloaded from an FTP server. This can be performed from the web interface or from the command line interface (SSH or USB).

Both methods require the FTP server to be correctly configured, with the **ViaLiteHD** update file accessible.

#### 6.2.1 Web interface

- 5) Once logged into the web interface (as Administrator or higher), navigate to the Software Update menu.
- 6) Under the 'FTP Update' heading, fill out the FTP server details (shown in Figure 41).

Contact: sales@ppm.co.uk User: Technician

Update Help Log out

### Software Update

ViaLiteHD cards in the enclosure.

The module will check the update for authenticity and compatability, then once the update has been verified, the update will be applied to the ViaLiteHD® Controller system.

During the update, the ViaLiteHD® Web and SNMP control interfaces will be inaccessible. Typically, however, updates will take less than 3 minutes to apply. After this point, the control interfaces will be working as configured.

Web Upload +

FTP Upload -

FTP Server Hostname

Username

Password

File Path

Update

Close

Figure 41: Web Interface FTP Update

- 7) Click the 'Update' button.
- 8) Once the file has been downloaded from the FTP server, the web interface will show a 'Reboot to apply update' button. This can be used to reboot the device to apply the update.

The update will be applied on the next reboot of the controller.

### 6.2.2 Command line interface

- 1) Log in to the controller module over SSH or using the USB connection.
- 2) Use the 'update\_ftp' command to download the update file over FTP.
  - a. The command expects information in the following format:
 

```
"update_ftp <FTP username> <FTP Password> <FTP address> <Path on FTP server>"
```

 i.e. "update\_ftp user password 10.0.0.50 img.bin"
- 3) Reboot the controller to apply the update.

## 7 System Integration

### 7.1 Initial setup equipment

For initial set up and configuration you will require:

- A computer with :
  - A USB port which supports USB-serial adaptors. The computer should have PuTTY (or similar software) in serial mode, or
  - An Ethernet port (10/100/100BASE-T, for example). The computer should have PuTTY (or similar software) which can open a SSH connection to the module.
- A micro USB to USB cable
- A suitable chassis to mount the target SNMP and web controller module while performing this task.

Full setup details are given in Section 4.

### 7.2 Site requirements

The site will require the following services to make full use of the SNMP and web controller's features:

- A computer with a modern web browser to use the web interface.
- OR
- A computer running an SNMP network management package.
- A suitable mounting environment for the chassis.
- A power source for the chassis.
- Copper and optical cabling as required, with appropriate interfaces to terminate these to.
- LAN, unless the module is only to be locally controlled.
- Network identification values that should be allocated by the network administrator are:
  - IP address for the SNMP and web controller module.
  - IP address for the NMS station and/or trap receiver.
  - Netmask.
  - Gateway address.

### 7.3 Other considerations, RJ45 interconnection

The HRC-3 controller module is fitted with multiple Ethernet connections and an internal switch. This may therefore be used:

- To connect to other customer peripheral equipment with Ethernet interfaces.
- To daisy chain multiple controller modules, reducing the requirement for LAN connections.

### 7.4 ViaLiteHD SNMP interface

The **ViaLiteHD** chassis can be located in the MIB tree at OID 1.3.6.1.4.1.31225.1.1. The full path is: iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).ppm(31225).ppmProducts(1).ignis(1)

Refer to the MIB file(s) in order to find more details. The file(s) contains detailed comments explaining the meaning of all parameters along with typical values. The latest MIB files are available from the [www.vialite.com](http://www.vialite.com) website.

The data objects for the **ViaLiteHD** modules are arranged in a table of OIDs. Each row of the table represents a card slot in the **ViaLiteHD** chassis. Each row contains all the possible OIDs for all the possible card types, but only the applicable OIDs are updated from the default values.

- Single transmitter – use parameters starting with modTx1 to access the unit.
- Single receiver – use parameters starting with modRx1.
- Dual receiver – use modRx1 to access the upper receiver and modRx2 to access the lower transmitter.
- Dual transmitter – use modTx1 to access the upper transmitter and modTx2 to access the lower transmitter.
- Transceiver – use modTx2 to access the transmitter and modRx1 to access the receiver.
- Single amplifier - use modAmp1 to access the amplifier.
- Dual amplifier - use modAmp1 to access the upper amplifier and modAmp2 to access the lower amplifier.
- Splitters, Switches, and LNB power supplies are always single modules.



## 8 **ViaLite Horizons**

In addition to accessing the **ViaLiteHD** monitor and control functions from both the SNMP and Web interfaces, **ViaLite** have produced **ViaLite Horizons**, a standalone configuration application which is compatible with both HRC-1 and HRC-3 controller modules. **ViaLite Horizons** can be used to perform all the normal monitoring and configuration functions for the **ViaLiteHD** controller module.

**ViaLite Horizons** brings the same brand-new look and feel from the HRC-3 to the HRC-1 controller modules, including the redesigned event and system reports. **ViaLite Horizons** uses SNMP to communicate with and control the controller module and does not require a browser (or Java) to run.

**ViaLite Horizons** does not support the Embedded Site Controller.

For more information visit [www.vialite.com](http://www.vialite.com) or contact PPM or your local agent.

## 9 Mechanical Dimensions



Weight: 255 g typical

## **10 Part Numbering**

For part numbering please refer to the relevant datasheet which can be found on our website or contact us.

## 11 Technical Specifications

Module function	Controller card with Ethernet switch
Format	Plug-in module compatible with <b>ViaLiteHD</b> chassis, 7HP slot
Indicators	Front panel LED 'Power (RED/GREEN)' Front panel LED 'Rear RJ45 LINK (GREEN)' Front panel LED 'Rear Fibre LINK (GREEN)' RJ45 LED each with ACTIVITY (AMBER) and LINK (GREEN)
Electrical signal/power connector	Plug-in module, user accessible via 19" chassis backplane

### Operating Conditions

Module operating voltage	+12 V $\pm$ 0.5 V
Module operating power	4 W typical
Operating temperature	-10 °C to +50 °C
Storage temperature	-40 °C to +70 °C
Ambient relative humidity	10% to 95% (non-condensing)
Maximum weight	300 g

### Ethernet ports, Copper

Data rate, RJ45 ports	10/100/1000 MB/s (auto-negotiating)
Network standards	10/100/1000 BASE-TX

### Ethernet port, Optical

Data rate, fibre port	1000 MB/s or 100 MB/s
Fibre	Single-mode 9/125, Corning SMF28 or equivalent
Optical connector	LC/PC or FC/APC or E2000/APC or SC/APC or LC/APC
Optical path length	0 - 10 km for 1310 nm with single mode fibre 0 - 40 km for 1550 nm with single mode fibre 0 - 75 km for 1550 nm with single mode fibre (minimum path loss 5 dB required)
Optical power budget	>10 dB (Typical fibre losses: fibre: 0.4 dB/km; connectors: 0.5 dB max.)

### Setup port

Connector type	Micro USB
Interface cable	Standard micro USB cable
Serial data type	USB to RS232 converter, 9600 bps, 8 data bits, 1 stop bit, no parity, no flow control

### Relay

Relay Type	Form C break before make, dry contact, volt free
Relay ports	RELAY_ [1= normally closed, 2=common, 3=normally open] COM (common) Available on chassis connector NO (normally open) Available on chassis connector NC (normally closed) Available on chassis connector
Maximum voltage & current	50 V @ 1 A, all voltages are relative to ground
Initial contact resistance	75 mΩ

### Software interfaces

SNMP agent	Supports SNMP version 1 and version 2C
MIB	<b>ViaLite</b> proprietary MIB, RFC1213 compliant, supports MIB-II 'system' group

## 12 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
PWR LED does not light	Power source not connected.	Connect power source.
PWR LED is red	A connected module has a major alarm.	If this is normal behaviour,ix alarming module
PWR LED is flashing red and green	I2C error.	Remove and reinsert the controller module from the chassis. If that fails, reboot the chassis.
LINK FIBRE LED does not light	Module and remote fibre not correctly connected.	Check that fibres are correctly connected and not swapped.
	Dirty fibres	Clean fibres then reconnect.
PWR, LINK REAR, LINK FIBRE LED are red	Module is performing start up checks and/or software update.	This is normal behaviour.
Module not accessible via Ethernet	Ethernet cable not connected.	Connect the Ethernet cable.
	Wrong IP settings.	Set right IP values in consultation with your network administrator.
GUI not displayed	IP setting not correct.	Use configured module IP address.
	PC configuration IP set up is incorrect.	Correct PC set up.
	Internal fault.	Consult local PPM office

The **ViaLiteHD** range is 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** or your local agent.

## 13 Glossary

A	Ampere
AGC	Automatic gain control
BUC	Block up converter
CNR	Carrier to noise ratio
COM	Common
dB	Decibel
dBc	Decibel relative to carrier
dBm	Decibel milliwatt
DC	Direct current
DHCP	Dynamic host configuration protocol
DIP	Dual in line (package)
FC/APC	Fibre connector angled polished contact
FC/PC	Fibre connector physical contact
FOL	Fibre optic link
FSK	frequency shift keying
FTP	File transfer protocol
g	Gram
GHz	Gigahertz
GPS	Global positioning system
GRN	Goods return number
GUI	Graphical user interface
HRK3	<b>ViaLiteHD</b> 3U chassis
HTML	Hypertext mark-up language
HP	Chassis hole pitch measurement of width 5.08 mm
Hz	Hertz
I2C	Inter-integrated circuit bus
IMD	Intermodulation distortion ratio
IP	Internet protocol
IP3	Third order intercept point
kg	Kilogram
kHz	Kilohertz
LAN	Local area network
LASER	Light amplification by stimulated emission of radiation
LC/PC	Lucent connector physical contact
LED	Light emitting diode
LNA	Low noise amplifier
LNB	Low noise block
m	Metre
mA	Milliampere
Max	Maximum
MHz	Mega hertz
Min	Minimum
mm	Millimetre
mV	Millivolt
NC	Normally closed
NF	Noise figure
NTP	Network time protocol
nm	Nanometer
NO	Normally open
P1dB	Power at one decibel gain compression
PC	Personal computer
PPM	Pulse Power and Measurement Ltd
PWR	Power
RF	Radio frequency
RLL	Received light level
RST	Reset
RX	Receiver
SC/APC	Subscriber connector angled polished contact
SC/PC	Subscriber connector physical contact
SFDR	Spurious free dynamic range
SINAD	Signal to noise and distortion ratio
SNMP	Simple network management protocol
SSH	Secure socket shell
TCP/IP	Transmission control protocol
TRX	Transceiver
TX	Transmitter
Typ	Typical
U	Rack unit measurement of height 44.45 mm
V	Voltage select
VSEL	Voltage select
VSWR	Voltage standing wave ratio
W	Watt

## 14 **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.

## 15 **FCC Approval**

Information for the user of **ViaLiteHD** products

For a Class A digital device or peripheral, the following instructions are furnished to the user. 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 not installed and used in accordance with the instruction manual, 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.



## 16 Third-Party Software

This product incorporates third-party software packages, each of which are distributed under their own copyrights and licenses. These licenses and copyright statements may be found under 'Third Party Sources files' on the Software page of the **ViaLite** website.

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