ViaLiteHD
Horizons HRC-3 Controller

User Guide

HRC-3-HB-1

CR3744 08/12/2017
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 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 handing 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 1270nm to 1610nm.

These devices are rated as EN60825-1:2007 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 equipment external covers when operating.
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1 Introduction

The **ViaLiteHD** SNMP and Web controller module is used to manage **ViaLiteHD** equipment, both monitoring and controlling modules. It offers multiple switched 10/100/1000 BASE-TX copper RJ45 Ethernet interfaces at 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>
<thead>
<tr>
<th>Table 1: <strong>ViaLiteHD</strong> HRC-3 Available Ethernet Configurations (see section 10 for more details)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part Number</strong></td>
</tr>
<tr>
<td>HRC-3-FD-0R-ØØ</td>
</tr>
<tr>
<td>HRC-3-FE-0R-ØØ</td>
</tr>
<tr>
<td>HRC-3-CD-nR-2m</td>
</tr>
<tr>
<td>HRC-3-FC-nR-Fm</td>
</tr>
<tr>
<td>HRC-3-CC-nR-Fm</td>
</tr>
<tr>
<td>HRC-3-EE-nR-2m</td>
</tr>
<tr>
<td>HRC-3-CD-0R-02</td>
</tr>
</tbody>
</table>

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 10km, 40km, and 75km 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-ØS-ØØ”. All other options remain the same.

1.2 Typical deployment

The SNMP and Web controller 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 an HRK3 chassis, the SNMP and Web controller 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 SNMP and Web controller 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>
<thead>
<tr>
<th>Product Family</th>
<th>Part Number</th>
<th>Interface Type</th>
<th>Interface Standard</th>
<th>ViaLite Classic</th>
<th>ViaLiteHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRC-1</td>
<td>Copper</td>
<td>10BASE-T</td>
<td>Copper</td>
<td>✓</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Optical</td>
<td>None</td>
<td>Optical</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LSX-E2</td>
<td>Copper</td>
<td>100BASE-TX</td>
<td>Copper</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Optical</td>
<td>100BASE-FX</td>
<td>Optical</td>
<td>N/A</td>
<td>✗</td>
</tr>
<tr>
<td>LSX-E4</td>
<td>Copper</td>
<td>10/100/1000BASE-TX</td>
<td>Copper</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Optical</td>
<td>1000BASE-FX</td>
<td>Optical</td>
<td>N/A</td>
<td>✗</td>
</tr>
<tr>
<td>HRC-1</td>
<td>Copper</td>
<td>10/100BASE-TX</td>
<td>Copper</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Optical</td>
<td>100BASE-F</td>
<td>Optical</td>
<td>N/A</td>
<td>✔</td>
</tr>
<tr>
<td>HRC-3</td>
<td>Copper</td>
<td>10/100/1000BASE-TX</td>
<td>Copper</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Optical</td>
<td>1000BASE-X</td>
<td>Optical</td>
<td>N/A</td>
<td>✔</td>
</tr>
<tr>
<td>HRE</td>
<td>Copper</td>
<td>1000BASE-T</td>
<td>Copper</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Optical</td>
<td>1000BASE-X</td>
<td>Optical</td>
<td>N/A</td>
<td>✔</td>
</tr>
</tbody>
</table>

Table 2: ViaLiteHD & ViaLite Classic Ethernet Compatibility Matrix
2 **ViaLiteHD Controller Key Hardware and Software Features**

2.1 **Plug and play, default set up**

The SNMP and web controller 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), or has been changed to suit the network.

**Table 3: Factory Default Configuration**

<table>
<thead>
<tr>
<th>User passwords (used for SSH/USB/web GUI)</th>
<th>Default password</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest</td>
<td>guest</td>
</tr>
<tr>
<td>Administrator</td>
<td>admin</td>
</tr>
<tr>
<td>Technician</td>
<td>tech</td>
</tr>
</tbody>
</table>

| 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.

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 SNMP 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 auto configuration**

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 correctly physically connected (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 SNMP and web controller module.

2.12 Automatic, Software and Manual Gain Control

On supported ViaLiteHD modules, the controller 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.
3  **HRC-3 controller physical interfaces**

This section describes the connections between your ViaLiteHD Modules and the SNMP and Web controller module. There is no need to install any interface cables between SNMP and Web controller 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 paws of the handle should be fully engaged in the matching slots.
- 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 SNMP and Web controller module uses singlemode (9µm/125µm) 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 (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.

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.**

For more details please read the cleaning instruction which accompanies the connector cleaning kit. Details can also be found on the CD supplied with your equipment.

3.2.4 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.
3.2.4.1  **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 dustcaps 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, gently withdraw the connector.
- Replace the dustcaps 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.

3.2.4.2  **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 adapter 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.

3.2.5  **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.

Minimum Bend Radius of Fibre Optic Cable fitted to OEM modules is 50mm.

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.

<table>
<thead>
<tr>
<th>Colour</th>
<th>SNMP and Web controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED1</td>
<td></td>
</tr>
<tr>
<td>GREEN</td>
<td>Normal</td>
</tr>
<tr>
<td>RED</td>
<td>Alarm</td>
</tr>
<tr>
<td>No light</td>
<td>No power</td>
</tr>
<tr>
<td>LED2</td>
<td>Rear RJ45 port link established</td>
</tr>
<tr>
<td>GREEN</td>
<td>Rear RJ45 port unconnected</td>
</tr>
<tr>
<td>No light</td>
<td>Rear RJ45 port unconnected</td>
</tr>
<tr>
<td>LED3</td>
<td>Rear Fibre port link established*</td>
</tr>
<tr>
<td>GREEN</td>
<td>Rear Fibre port unconnected</td>
</tr>
<tr>
<td>No light</td>
<td>Rear Fibre port unconnected</td>
</tr>
</tbody>
</table>

*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.

<table>
<thead>
<tr>
<th>Colour</th>
<th>SNMP and Web controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link LED</td>
<td></td>
</tr>
<tr>
<td>AMBER or FLASHING</td>
<td>Link sending/receiving data</td>
</tr>
<tr>
<td>No light</td>
<td>No data</td>
</tr>
<tr>
<td>Activity LED</td>
<td>GREEN</td>
</tr>
<tr>
<td>Link established</td>
<td></td>
</tr>
<tr>
<td>No light</td>
<td>Unconnected</td>
</tr>
</tbody>
</table>

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

The HRC-3 controller 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. 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 SNMP and web controller 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 SNMP and web 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 Controller is properly installed within the ViaLiteHD Enclosure/Rack Unit, and is powered up.
2. Connect the computer to the ViaLiteHD Controller 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). The interface once logged in 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 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.

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

```
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 Web & SNMP controller (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:

- exit
  - Log out of the ViaLiteHD controller module
- help
  - Display a list of all the available commands
  - help <command> displays help information specific to that command, including command specific syntax.
- ip_addr
  - Assign the IPv4 address to the Web & SNMP controller module
- ip_gateway
  - Assigns the IPv4 gateway address to the Web & SNMP controller module
- **ip_netmask**
  - Assign the IPv4 network mask to the Web & SNMP controller Module
- **reboot**
  - Reboot the Web & SNMP Controller module
- **snmp_community**
  - List/change/remove the community strings for the SNMP v1/v2c interface
- **sys_date**
  - Set the system date
- **sys_time**
  - Set the system time
- **sys_info**
  - Print a summary of the system configuration, including time, SNMP communities, IPv4 settings.
- **update_ftp**
  - Download a software update file from an ftp server, and apply the update
- **user_disable/user_enable**
  - Enable/disable 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/web_enable**
  - Enable/disable the web GUI.

![ViaLiteHD](image)

**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>
<thead>
<tr>
<th>Username</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest</td>
<td>Can read all parameters except advanced, cannot modify configuration or execute any commands</td>
</tr>
<tr>
<td>Admin</td>
<td>Can read all parameters except advanced, can modify configurations and execute commands</td>
</tr>
<tr>
<td>Technician</td>
<td>Can read and modify everything, all commands available</td>
</tr>
</tbody>
</table>

Each access level has a pre-set default password, these passwords are:
Table 5: User Default Passwords

<table>
<thead>
<tr>
<th>Username</th>
<th>Default password</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest</td>
<td>guest</td>
</tr>
<tr>
<td>Admin</td>
<td>admin</td>
</tr>
<tr>
<td>Technician</td>
<td>tech</td>
</tr>
</tbody>
</table>

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 then themselves.

Figure 3: Password Change Dialog
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).

![Web Interface Login Screen](image)

**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).

![Typical Web Interface View](image)

**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, opening the Status panel to view a specific module’s settings, the selected module is highlighted with a green border.
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.

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.
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.

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).
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.

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 7.

<table>
<thead>
<tr>
<th>Event Severity</th>
<th>Typical Event Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major</td>
<td>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 SNMP and web controller LED from green to red.</td>
</tr>
<tr>
<td>Minor</td>
<td>These are typically event 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.</td>
</tr>
<tr>
<td>Normal</td>
<td>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.</td>
</tr>
<tr>
<td>Information</td>
<td>These are the type of events that are useful to record as they represent a change in status, but do not affect service delivery.</td>
</tr>
</tbody>
</table>
### Table 7: Factory Default Event Severities

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Event Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Alarm</td>
<td>Major</td>
</tr>
<tr>
<td>Minor Alarm</td>
<td>Minor</td>
</tr>
<tr>
<td>Automatic Gain Control Alarm</td>
<td>Minor</td>
</tr>
<tr>
<td>Supply Voltage Alarm</td>
<td>Minor</td>
</tr>
<tr>
<td>Received Light Level (RLL) Alarm</td>
<td>Major</td>
</tr>
<tr>
<td>RF Level Alarm</td>
<td>Minor</td>
</tr>
<tr>
<td>RF Gain Alarm</td>
<td>Minor</td>
</tr>
<tr>
<td>Laser Alarm</td>
<td>Major</td>
</tr>
<tr>
<td>Bias Alarm</td>
<td>Major</td>
</tr>
<tr>
<td>Power Alarm</td>
<td>Minor</td>
</tr>
<tr>
<td>Current Feed Alarm</td>
<td>Minor</td>
</tr>
<tr>
<td>Voltage Feed Alarm</td>
<td>Minor</td>
</tr>
<tr>
<td>Module Temperature Alarm</td>
<td>Minor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Event Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNB Overload Alarm</td>
<td>Minor</td>
</tr>
<tr>
<td>LNB Temperature Alarm</td>
<td>Minor</td>
</tr>
<tr>
<td>System Voltage Alarm</td>
<td>Minor</td>
</tr>
<tr>
<td>System Temperature Alarm</td>
<td>Minor</td>
</tr>
<tr>
<td>System Start up</td>
<td>Normal</td>
</tr>
<tr>
<td>Event History Cleared</td>
<td>Normal</td>
</tr>
<tr>
<td>Module Inserted</td>
<td>Normal</td>
</tr>
<tr>
<td>Module Removed</td>
<td>Major</td>
</tr>
<tr>
<td>No Ethernet Link (HRE only)</td>
<td>Major</td>
</tr>
<tr>
<td>Module Entering Maintenance Mode</td>
<td>Normal</td>
</tr>
<tr>
<td>Module Leaving Maintenance Mode (*)</td>
<td>Normal</td>
</tr>
<tr>
<td>Door Open (**)</td>
<td>Information</td>
</tr>
</tbody>
</table>

* - 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

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 (doesn’t affect the operation of the other *ViaLiteHD* modules)
- Clear the Event History

![Figure 14: System Status Panel](image-url)
- 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 Controller 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 SNMP controller module.

5.5 Management

![Management Settings Panel](image)

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)

![New Trap Receiver Dialog Box](image)
5.5.1 Event Severities

The HRC-3 Controller 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 severity. Event severity changes do not take effect until the change has been sent to the controller, by using the “Apply” button in the panel options (at the bottom of the panel).

By default, the severities are set to match the severities configured for the HRC-1 controller. These factory default severities are shown in Table 7 (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.
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.

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).
5.7 **Software Update**

The software update functionality is accessible by selecting the “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.

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**

![Module Status Panels](image)

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 (show 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 Module Information Table (DTxLN0)](image)

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.
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” sub section
- Writeable information displayed in a “Control” sub section.

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 module specific 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.

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 15dB and maximum of 30dB), and the RF Power thresholds are shown in the “Control” sub section (and can be changed by the user). The minor alarm (warning) thresholds are given in the “Thresholds” sub section. These warning thresholds are not absolute values of gain or power, but are offsets from the Major alarm thresholds.

Figure 25: Alarm Status Indicators (TRx)

Figure 26: Amplifier Module Status Panel
For example, if the RF Gain warning threshold is set at 3dBm:

- Major alarms will occur at 15dB (or lower) gain, and 30dB (or higher) gain.
- Minor alarms (warnings) will occur at 18dB (or lower) gain, and 27dB (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 ±20dBm, and the warning threshold set at 3dBm:

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

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](image)

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) sub section, as shown in Figure 28.
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).

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 28: LNB Status as a part of a DTxLNB Status Panel

Figure 29: Standalone LNB Module Status Panel
Dual receiver modules present the same module information and data items, for both receiver sub-modules (as shown in Figure 31).

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.
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](image)

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](image)
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.

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

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 Other Modules

Certain modules do not implement or require functionality to show module specific monitoring or control information (such as the Oscillator, diplexer, etc., modules). These modules will only display the "General Information", plus a Major/Minor alarm status (as shown in Figure 38)
5.9.4.10.1 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).

5.9.4.10.2 Passive Modules
Modules such as the Redundancy load module do not include any active components or microprocessors, and such will not be shown in the GUI, and will not 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).

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.

![Web Upload Software Update](image)

**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” dialog (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 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).
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 set up equipment

For initial set up and configuration you will require:

- A computer with an:
  - USB port which supports USB-serial adaptors. The computer should have PuTTY (or similar software) in serial mode, or
  - 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
- Suitable chassis to mount the target SNMP and web controller module, while performing this task.

Full set up 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 controllers features:

- A computer with a modern web browser to use the web interface.
  OR
- Computer running an SNMP network management package.
- Suitable mounting environment for chassis.
- Power source for 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 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.

For more information visit www.vialite.com or contact PPM or your local agent.
9 Mechanical Dimensions

Weight: 255g Typical
10 Part Numbering

Module type
- A - Amplifier
- B - Serial Digital
- C - Multizone Distribution
- D - Single Channel Optical Amplifier (OCA)
- E - Gigabit Ethernet
- F - Diplexer
- G - Passive splitter
- H - External load
- I - Optical Switch
- J - Optical Filter
- K - Laser Type
- L - Frequency Type
- M - Module Package
- N - Nominal Gain (dB)
- O - Extra data field
- P - Connections
- Q - Options
- R - Laser Type/Channel/Interleaved
- S - Laser Channel/Wavelength
- T - Wavelength Range
- U - Additional Options
- V - Module Type
- W - Module Type
- X - Module Type
- Y - Module Type
- Z - Module Type

Connections
- 0 - No connection
- 1 - Fiber pigtail connector
- 2 - SMA connector
- 3 - Telpo connector
- 4 - MPO connector
- 5 - FC/ST connector
- 6 - LC/PC connector
- 7 - SC/PC connector
- 8 - SM connector
- 9 - MM connector
- A - Single fiber connector
- B - Dual fiber connector
- C - Triplex fiber connector
- D - Quad fiber connector
- E - Five fiber connectors
- F - Six or more connectors

Options
- 0 - No options
- 1 - Single optical connection
- 2 - Two optical connections
- 3 - Three optical connections
- 4 - OC pass-through
- 5 - Two optical connections
- 6 - External TC feed to OC connector from chassis
- 7 - Input Range 270nm to 3000nm
- 8 - Input Range 100nm to 1500nm
- 9 - Input Range 200nm to 1600nm
- A - Four optical connections
- B - Five optical connections
- C - Six optical connections
- D - Seven or more connections

Laser Type/Channel/Interleaved
- 0 - No laser
- 1 - Single channel
- 2 - Dual channel
- 3 - Triplex channel
- 4 - Quad channel
- 5 - Interleaved

Laser Channel/Wavelength
- 0 - No laser
- 1 - Single channel
- 2 - Dual channel
- 3 - Triplex channel
- 4 - Quad channel
- 5 - Interleaved

Note: Options relevant to the SNMP module are shown in dark. Grey options are not available for this module. Not all combinations of options are available. Contact PPM for more details.
## 11 Technical Specifications

<table>
<thead>
<tr>
<th>Module function</th>
<th>Controller card with Ethernet switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Format</td>
<td>Plug in module compatible with <strong>ViaLiteHD</strong> chassis, 7HP slot</td>
</tr>
<tr>
<td>Indicators</td>
<td>Front Panel LED “Power (RED/GREEN)”</td>
</tr>
<tr>
<td></td>
<td>Front Panel LED “Rear RJ45 LINK (GREEN)”</td>
</tr>
<tr>
<td></td>
<td>Front Panel LED “Rear Fibre LINK (GREEN)”</td>
</tr>
<tr>
<td></td>
<td>RJ45 LED each with ACTIVITY (AMBER) and LINK (GREEN)</td>
</tr>
<tr>
<td>Electrical signal/power connector</td>
<td>Plug-in module, user accessible via 19” Chassis backplane</td>
</tr>
</tbody>
</table>

### Operating Conditions

<table>
<thead>
<tr>
<th>Module operating voltage</th>
<th>+12V ± 0.5V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module operating power</td>
<td>4W Typical</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-10°C to +50°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40°C to +70°C</td>
</tr>
<tr>
<td>Ambient relative humidity</td>
<td>10% to 95% (Non Condensing)</td>
</tr>
<tr>
<td>Maximum weight</td>
<td>300g</td>
</tr>
</tbody>
</table>

### Ethernet ports, Copper

<table>
<thead>
<tr>
<th>Data rate, RJ45 ports</th>
<th>10/100/1000 MB/s (auto negotiating)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network standards</td>
<td>10/100/1000 BASE-TX</td>
</tr>
</tbody>
</table>

### Ethernet port, Optical

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

### Setup port

<table>
<thead>
<tr>
<th>Connector type</th>
<th>Micro-USB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface cable</td>
<td>Standard micro-USB cable</td>
</tr>
<tr>
<td>Serial data type</td>
<td>USB to RS232 Converter, 9600 bps, 8 data bits, 1 stop bit, no parity, no flow control</td>
</tr>
</tbody>
</table>

### Relay

<table>
<thead>
<tr>
<th>Relay Type</th>
<th>Form C break before make, dry contact, volt free</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay ports</td>
<td>RELAY [1= normally closed, 2=common, 3=normally open]</td>
</tr>
<tr>
<td></td>
<td>COM (common) Available on chassis connector</td>
</tr>
<tr>
<td></td>
<td>NO (normally open) Available on chassis connector</td>
</tr>
<tr>
<td></td>
<td>NC (normally closed) Available on chassis connector</td>
</tr>
<tr>
<td>Maximum voltage &amp; current</td>
<td>50V @1A, all voltages are relative to ground</td>
</tr>
<tr>
<td>Initial contact resistance</td>
<td>75 mΩ</td>
</tr>
</tbody>
</table>

### Software interfaces

<table>
<thead>
<tr>
<th>SNMP agent</th>
<th>Supports SNMP version 1 and version 2C</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIB</td>
<td>ViaLite proprietary MIB, RFC1213 compliant, supports MIB-II &quot;system&quot; group</td>
</tr>
</tbody>
</table>

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## 12 Maintenance and Fault-Finding Guide

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

<table>
<thead>
<tr>
<th>Fault</th>
<th>Possible Causes</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR LED does not light</td>
<td>Power source not connected.</td>
<td>Connect power source.</td>
</tr>
<tr>
<td>PWR LED is RED</td>
<td>A connected modules has a major alarm</td>
<td>If this is normal behaviour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fix alarming module</td>
</tr>
<tr>
<td>PWR LED is flashing Red and Green</td>
<td>I2C error</td>
<td>Remove and reinset the controller module from the chassis. If that fails, reboot the chassis.</td>
</tr>
<tr>
<td>LINK FIBRE LED does not light</td>
<td>Module and remote fibre, not correctly</td>
<td>Check that Fibres are correctly connected and not swapped</td>
</tr>
<tr>
<td></td>
<td>connected</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dirty Fibre</td>
<td>Clean Fibres then reconnect</td>
</tr>
<tr>
<td>PWR, LINK REAR, LINK FIBRE LED are RED</td>
<td>Module is performing start up checks and/or</td>
<td>This is normal behaviour</td>
</tr>
<tr>
<td></td>
<td>software update</td>
<td></td>
</tr>
<tr>
<td>Module not accessible via Ethernet</td>
<td>Ethernet cable not connected</td>
<td>Connect the Ethernet cable</td>
</tr>
<tr>
<td></td>
<td>Wrong IP settings</td>
<td>Set right IP values in consultation with your network administrator</td>
</tr>
<tr>
<td>GUI not displayed</td>
<td>IP setting not correct</td>
<td>Use configured module IP address</td>
</tr>
<tr>
<td></td>
<td>PC configuration IP set up incorrect</td>
<td>Correct PC set up</td>
</tr>
<tr>
<td></td>
<td>Internal fault</td>
<td>Consult local PPM office.</td>
</tr>
</tbody>
</table>

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 PPM or your local agent.
### 13 Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Ampere</td>
</tr>
<tr>
<td>AGC</td>
<td>Automatic gain control</td>
</tr>
<tr>
<td>BUC</td>
<td>Block up converter</td>
</tr>
<tr>
<td>CNR</td>
<td>Carrier to noise ratio</td>
</tr>
<tr>
<td>COM</td>
<td>Common</td>
</tr>
<tr>
<td>dB</td>
<td>Decibel</td>
</tr>
<tr>
<td>dBc</td>
<td>Decibel relative to carrier</td>
</tr>
<tr>
<td>dBm</td>
<td>Decibel milliampere</td>
</tr>
<tr>
<td>DC</td>
<td>Direct current</td>
</tr>
<tr>
<td>DHCP</td>
<td>Dynamic host configuration Protocol</td>
</tr>
<tr>
<td>DIP</td>
<td>Dual in line (package)</td>
</tr>
<tr>
<td>DVB</td>
<td>Digital video broadcast</td>
</tr>
<tr>
<td>DVB-T</td>
<td>Digital video broadcast terrestrial</td>
</tr>
<tr>
<td>FC/APC</td>
<td>Fibre connector angled polished contact</td>
</tr>
<tr>
<td>FC/PC</td>
<td>Fibre connector physical contact</td>
</tr>
<tr>
<td>FOL</td>
<td>Fibre optic link</td>
</tr>
<tr>
<td>FSK</td>
<td>Frequency shift keying</td>
</tr>
<tr>
<td>FTP</td>
<td>File transfer protocol</td>
</tr>
<tr>
<td>g</td>
<td>Gram</td>
</tr>
<tr>
<td>GHz</td>
<td>Giga hertz</td>
</tr>
<tr>
<td>GPS</td>
<td>Global positioning system</td>
</tr>
<tr>
<td>GRN</td>
<td>Goods Return Number</td>
</tr>
<tr>
<td>GUI</td>
<td>Graphical user interface</td>
</tr>
<tr>
<td>HRK3</td>
<td>ViaLiteHD 3U chassis</td>
</tr>
<tr>
<td>HTML</td>
<td>Hypertext mark-up language</td>
</tr>
<tr>
<td>HP</td>
<td>Chassis hole pitch measurement of width 5.08mm</td>
</tr>
<tr>
<td>Hz</td>
<td>Hertz</td>
</tr>
<tr>
<td>I2C</td>
<td>Inter-Integrated circuit bus</td>
</tr>
<tr>
<td>IMD</td>
<td>Intermodulation distortion ratio</td>
</tr>
<tr>
<td>IP</td>
<td>Internet protocol</td>
</tr>
<tr>
<td>IP3</td>
<td>Third order intercept point</td>
</tr>
<tr>
<td>kg</td>
<td>Kilo gram</td>
</tr>
<tr>
<td>kHz</td>
<td>Kilo hertz</td>
</tr>
<tr>
<td>LAN</td>
<td>Local area network</td>
</tr>
<tr>
<td>LASER</td>
<td>Light amplification by stimulated emission of radiation</td>
</tr>
<tr>
<td>LC/PC</td>
<td>Lucent connector physical contact</td>
</tr>
<tr>
<td>LED</td>
<td>Light emitting diode</td>
</tr>
<tr>
<td>LNA</td>
<td>Low noise amplifier</td>
</tr>
<tr>
<td>LNB</td>
<td>Low noise block</td>
</tr>
<tr>
<td>m</td>
<td>Metre</td>
</tr>
<tr>
<td>mA</td>
<td>Milli ampere</td>
</tr>
<tr>
<td>Max</td>
<td>Maximum</td>
</tr>
<tr>
<td>MHz</td>
<td>Mega hertz</td>
</tr>
<tr>
<td>Min</td>
<td>Minimum</td>
</tr>
<tr>
<td>mm</td>
<td>Milli metre</td>
</tr>
<tr>
<td>mV</td>
<td>Milli volt</td>
</tr>
<tr>
<td>NC</td>
<td>Normally closed</td>
</tr>
<tr>
<td>NF</td>
<td>Noise figure</td>
</tr>
<tr>
<td>nm</td>
<td>Nano meter</td>
</tr>
<tr>
<td>NO</td>
<td>Normally open</td>
</tr>
<tr>
<td>P1dB</td>
<td>Power at one decibel gain compression</td>
</tr>
<tr>
<td>PC</td>
<td>Personal computer</td>
</tr>
<tr>
<td>PPM</td>
<td>Pulse power and measurement Ltd</td>
</tr>
<tr>
<td>PWR</td>
<td>Power</td>
</tr>
<tr>
<td>RF</td>
<td>Radio frequency</td>
</tr>
<tr>
<td>RLL</td>
<td>Received light level</td>
</tr>
<tr>
<td>RST</td>
<td>Reset</td>
</tr>
<tr>
<td>RX</td>
<td>Receiver</td>
</tr>
<tr>
<td>SC/APC</td>
<td>Subscriber connector angled polished contact</td>
</tr>
<tr>
<td>SC/PC</td>
<td>Subscriber connector physical contact</td>
</tr>
<tr>
<td>SFDR</td>
<td>Spurious free dynamic range</td>
</tr>
<tr>
<td>SINAD</td>
<td>Signal to noise and distortion ratio</td>
</tr>
<tr>
<td>SNMP</td>
<td>Simple network management protocol</td>
</tr>
<tr>
<td>TCP/IP</td>
<td>Transmission Control Protocol</td>
</tr>
<tr>
<td>TRX</td>
<td>Transceiver</td>
</tr>
<tr>
<td>TX</td>
<td>Transmitter</td>
</tr>
<tr>
<td>Typ</td>
<td>Typical</td>
</tr>
<tr>
<td>U</td>
<td>Rack units measurement of height 44.45mm</td>
</tr>
<tr>
<td>V</td>
<td>Voltage select</td>
</tr>
<tr>
<td>VSEL</td>
<td>Voltage select</td>
</tr>
<tr>
<td>VSWR</td>
<td>Voltage standing wave ratio</td>
</tr>
<tr>
<td>W</td>
<td>Watt</td>
</tr>
</tbody>
</table>
14 **Product Warranty**

PPM guarantees its products, and will maintain them for a period of three years from the date of shipment and at no cost to the customer. Extended warranty options are available at the time of purchase.

Please note that the customer is responsible for shipping costs to return the module to PPM.

PPM or its agents will maintain its products in full working order and make all necessary adjustments and parts replacements during the Company’s normal working hours provided that the Customer will pay at the rates currently charged by the Company for any replacements made necessary by accident, misuse, neglect, wilful act or default or any cause other than normal use.

Claims must be made promptly, and during the guarantee period.

**IMPORTANT:**

Please contact both your selling agent and PPM prior to returning any goods for Warranty or Non-Warranty repairs. Goods will not be accepted without a valid Goods Return Number (GRN)
15 **FCC Approval**

Information to 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 own licenses. These licenses and copyright statements may be found in the Sources folder on the ViaLiteHD Controller CD, or on the ViaLite website.