

ViaLite **Fibre Optic Link System**

User Manual

Lxx-HB-9

CR2934

15/02/12



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Instrument Care and Safety Information

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

Electrical Safety



The **ViaLite** Power Supply Units are Safety Class 1 products (having a metal case that is directly connected to earth via the power supply cable).

When operating the equipment note the following:

- Hazardous voltages exist within the equipment. There are no user servicable parts inside, and the covers should only be removed by suitably qualified personnel.
- The equipment does not have an isolating switch on the mains inlets. Equipment must be installed within easy reach of a clearly labelled dual pole mains isolation switch.
- Make sure that only fuses of the required rated current, and of the specified type (anti-surge, quick blow, etc.) are used for replacement.

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Optical Safety



The **ViaLite** Fibre Optic Link modules contain laser diode sources operating at 1300nm. These devices are rated at under IEC825-1 "Safety Of Laser Products", Part 1, First Edition, 1993 as CLASS 1 radiation emitting devices.

When operating the equipment note the following:

- 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 accessible – always cap the connectors.
- Do not remove equipment covers when operating.
- Details of optical connections to the units, compatible fibre types and care instructions can be found in section 3.9. Please read this section before using the link

Adjustment, maintenance and repair of the equipment should only be carried out by suitably qualified personnel.

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1 **Initial Inspection**

Unpack and inspect the equipment as soon as possible. If there is any sign of damage or any parts missing, do not install the equipment before seeking advice from PPM or your local agent.

The equipment received should correlate with the delivery documentation that is shipped with the equipment. If there are any discrepancies, contact PPM or your local agent.

2 **Introduction to the *ViaLite* Range**

The ***ViaLite*** range has been developed to provide a modular solution to the transmission of a wide range of analogue and digital data where traditional 'copper wire' systems cannot be used, for example, in electrically noisy environments.

The range is ideal for permanent and semi-permanent installation in RF communications, GPS, antenna remoting and other related applications.

The variety of links available includes GPS L1/L2, IF 70/140MHz, L-Band, wideband RF links up to 3GHz, and RS422/485.

All of these technologies are available in a range of mechanical enclosures, from 19" rear-cable-entry rack mounted to IP50 200V/m EMI hardened modules.

All operate over high quality glass fibre optic cable, which can be supplied in low-cost 3mm jacket, riser and outdoor specifications. The links can also be used with existing cable systems at customer premises.

A ***ViaLite*** system can be added to at any time, enabling the system to evolve with the needs of the user.

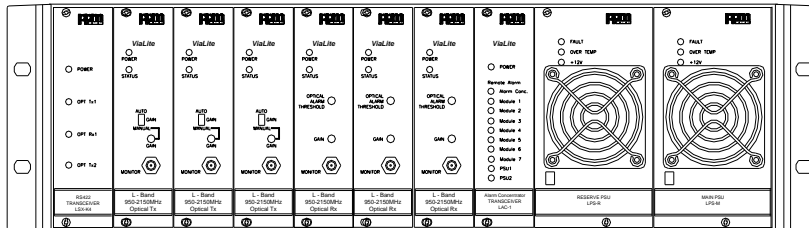
3 ViaLite System Components

3.1 ViaLite 19" Rack Case

3.2 Description

PPM offers a range of 19" subracks and cases for use with the **ViaLite** plug-in modules. These cases are suitable for desktop use and/or 19" rack mounting.

The cases accommodate up to eight plug-in RF/data modules and two plug-in power supplies. The hot-swappable, dual power supply capability provides full redundancy and maximum reliability to avoid traffic loss in the event of a power supply failure. The cases incorporate a backplane PCB for the distribution of DC power, status alarms and data.



The **ViaLite** plug-in modules simply plug into the case, allowing the user to replace modules quickly and easily or to upgrade the system with additional modules at any time.

All of the module alarm outputs are routed to a single D-sub connector on the rear panel of the case. This permits the integration of the **ViaLite** equipment into a Maintenance & Control system. In addition, a **ViaLite** Alarm Concentrator Module can be placed in module position 8. This routes all local alarms to a remote location over optical fibre. It also provides a local display of the alarm status of the remote modules, and an RS232 connection to an external device e.g. PC.

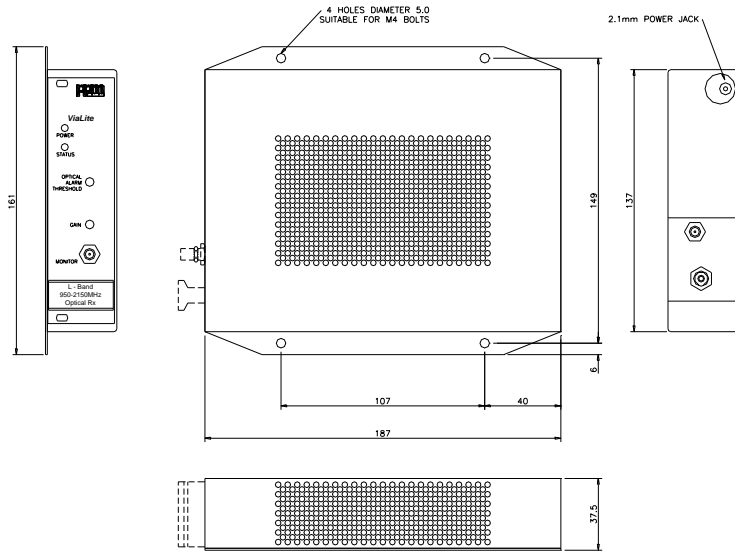
	LRK1S	LRK2S
Description	Desktop/19" Rack Mounting Case	19" Rack Mounting Case
Max. No. of Plug-In modules	8	8
19" Rack Mounting	Yes (with supplied kit)	Yes
Desktop Mounting	Yes	Not Suitable
Height	3U, 132.5mm	3U, 132.6mm
Width	84HP (448.8mm)	84HP (448.8mm)
Depth (excl. handles)	345mm	325mm
Weight (excl. modules)	7kg	5kg
Operating Temperature	-10°C to +50°C	-10°C to +50°C
Power Supply compatibility	LPS-M, LPS-R, LPS-M-48, LPS-R-48	LPS-M, LPS-R, LPS-M-48, LPS-R-48
ViaLite plug-in module compatibility	All types	All types
Data Connector	15way Female D-Sub with screwlock termination for each module position. Data input/output for data modules. Auxiliary DC output (module type dependent)	
Alarm Concentrator Connector	This concentrates the alarms from each module to a common point. CONN9 25way Female D-Sub with screwlock termination A +12V / 250mA max. supply is available at the connector.	
Summary Alarm Connector	This provides NO and NC Summary Alarm Output relay contacts. 3way Male Friction Lock Header - Cableform available P/N 73663.	

Connector pin details can be found in section 4.1 and in the individual module data sheets.

3.3 ***ViaLite* Converter Sleeve**

The Satellite Converter Sleeve 75003 converts the plug-in module into a standalone unit, for operation at a remote location where environmental and electromagnetic field levels are less demanding. Power may be provided from an external DC source or from a PPM 12V mains power supply unit via either the 2.1mm power jack (positive centre pin) or the 15way D-sub data connector on the rear panel of the case.

The module alarm output and monitor are also routed to the D-sub connector. Connector pin details can be found in section 4.1 and in the individual module data sheets.



75003 Converter Sleeve

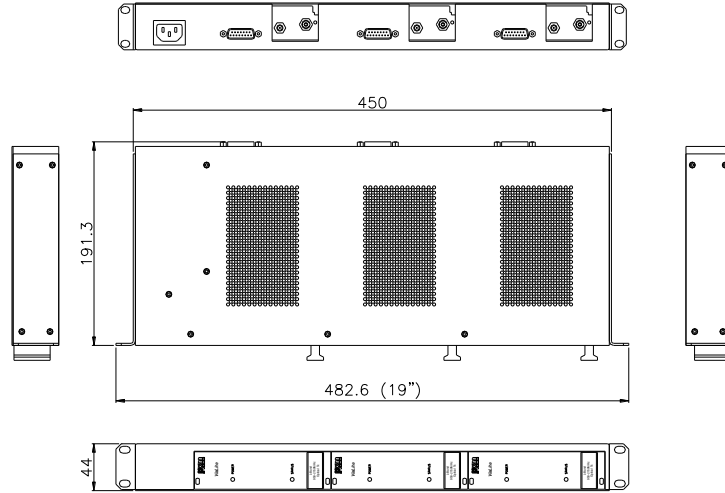
Description	3U x 7hp housing for single module	
Mounting Options	Wall & Desktop	
Width	7hp (37.5mm)	
Height	3U, (161mm including mounting brackets)	
Depth	167mm excluding handle & connectors	
Weight (excl. modules)	600g	
Operating Temperature	-10°C to +50°C	
ViaLite plug-in module compatibility	All types	
Data Connector	15way Female D-Sub with screwlock termination for each module position. Data input/output for data modules. Auxiliary DC output (module type dependent)	

75003 Converter Sleeve Power Supplies

Part Number	Description	Notes
73502 (legacy part only)	Standard power supply	Refer to section 3.5.2
LPS-CS (legacy part only)	Panel mounting power supply	Preferred Option. Refer to section 3.5.3
LPS-CS-2		

3.4 ***ViaLite*** 1U High Rack Case

A 1U high 19" Rack Case is available, accommodating up to 3 modules, and containing a single built-in power supply. This offers a highly compact solution.



75004 1U High Rack

Description	3U x 7hp housing for single module
Mounting Options	Wall & Desktop
Width	84hp (482.6mm incl. rack mounting ears)
Height	1U, (44mm)
Depth	191.3mm excluding connectors and handles
Weight (excl. modules)	600g
PSU Input	90 - 264Vac Autoswitching, IEC320 3 pin
Operating Temperature	0°C to +40°C
ViaLite plug-in module compatibility	All types
Data Connector	15way Female D-Sub with screwlock termination for each module position. Data input/output for data modules. Auxiliary DC output (module type dependent)

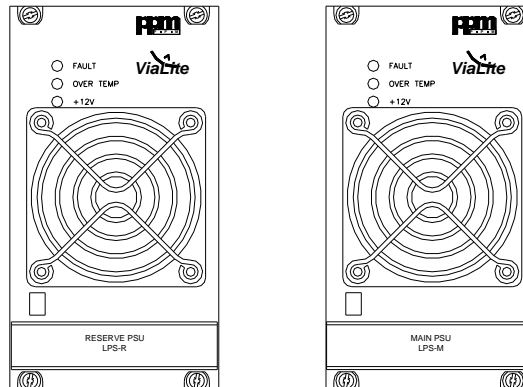
Connector pin details can be found in section 4.1 and in the individual module data sheets.

3.5 ViaLite Power Supplies

3.5.1 19" Rack Case Power Supplies – LPS-M, LPS-R, LPS-M-48, LPS-R-48

The LPS-M and LPS-R series power supplies provide DC power to all plug-in modules in the 19" rack case. Two versions are offered, a) universal mains input (LPS-M, LPS-R) and b) –48Volt input (LPS-M-48, LPS-R-48). Together the modules provide dual redundancy operation. Separate supply inputs mean that they can be operated from different supplies for even higher levels of availability. During normal operation, the LPS-M provides most of the demand current. In the event of a failure of LPS-M, the reserve LPS-R automatically provides DC power to all modules. The front panel FAULT LED provides a visual indication of failure, and an open-collector alarm output is available for use at the alarm output connector on the **ViaLite** case.

The units are fan-cooled for maximum reliability, and each individual PSU offers an MTBF in excess of 130,000 hours at an ambient temperature of 50°C. The front panel mounted fan cartridges are available separately and, in the event of a failure, can be readily replaced. Instructions for replacement of the fan cartridge can be found below



The LPS-M and LPS-R power supply modules are auto switching, so that they can operate from 110V and 230V mains supplies. Mains power is applied at the rear of the units via an earthed IEC320 connector, and regulated DC power is supplied to the Rack Backplane PCB for distribution to the plug-in modules through a rear-mounted connector. This connector is also used for reporting PSU alarm status.

For 48V versions (LPS-M-48 and LPS-R-48), power is applied at the rear of the units via a 2-pole ModuBlock connector.

On the front panel of the module there are three LED indicators. These report the status of the module. The top (RED) LED reports a fault with the unit. If this indicator is illuminated the module should be replaced. This condition is also reported as an alarm on the Alarm Connector accessible from the rear of the 19" Rack Case. Details of this connector are given in section 4.1.

The bottom (GREEN) LED reports the output status of the unit. If the power rail is healthy, then this LED will be illuminated.

The middle (AMBER) LED reports an over-temperature condition and is an indication that the fan may have failed. The LPS power supply modules feature a replaceable fan cartridge so that, in the event of a fan stall, the unit can be swiftly replaced without removing the power supply unit.

If the fan is not turning, the fan cartridge assembly should be replaced. This can be done without disconnecting the unit from the mains supply.



The fan is removed by the following procedure.

1. **Disconnect the two pin plug, located on the front panel of the LPS module to the bottom left of the fan.**
2. **Undo the four nuts holding the finger guard and fan onto the front panel.**
3. **Remove the washers also from the studs.**

4. Withdraw the fan cartridge.

Replacing the fan cartridge is the opposite of removal

LPS Dimensions (Width x Height)	14HP(71.12mm) x 3U x 160mm excl. front panel mounted fan etc.
Versions	Main (to provide most of the load current when used with Reserve) Reserve (to provide minimal load current when used with Main, and 100% in the event of a Main failure)
Weight	1.0kg
Input Supply Power	88-121V/207-243V, 48-62Hz, 2.0A Max (LPS-M, LPS-R) 36-72V 4.0A Max (LPS-M-48, LPS-R-48)
Input Connector (Rear of Module)	IEC320 (LPS-M, LPS-R) 2-pole ModuBlock (LPS-M-48, LPS-R-48)
Fuse	Barrel fuseholder on rear of panel for 1off 5x20mm 250V, 2AT Anti-surge fuse.
Output Voltage	LPS-M: 12.4V+/-0.5V no load LPS-R: 12.2V+/-0.5V no load
Maximum Working Output Current	5A
Minimum Load Current	0A
Case Operating Temperature	0°C to +55°C
Humidity	0-95%, Non-condensing
Hot-swapping and Dual Redundant	Yes
Status Indicators	FAULT – Red LED illuminates if PSU fails OVER TEMP – Amber LED illuminates if internal temperature exceeds 55°C +12V – Green LED illuminates if PSU is OK
Backplane alarm outputs	Open collector – “Unit failed”

The following accessories are available for the LPS power supply modules:

- 73509 Replacement Fan Cartridge for LPS- units

3.5.2 Standard Power Supply 73502 for use with Converter Sleeve (legacy part, not currently available, for information only)

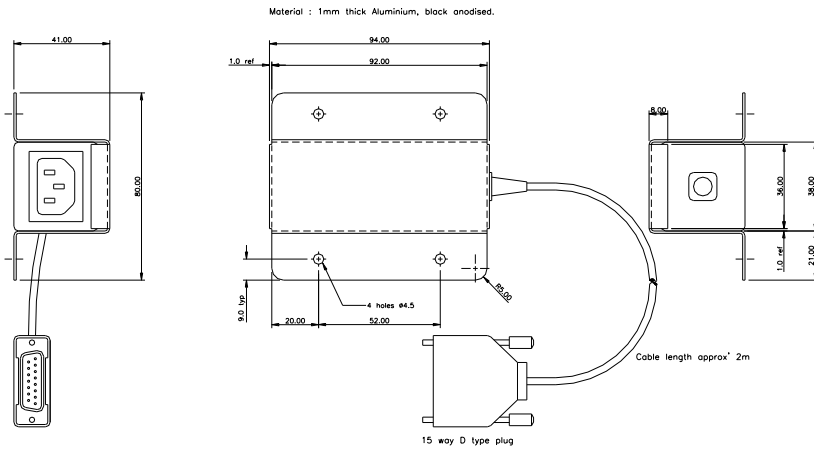
The 73502 is for connection to Converter Sleeve 75003 to power the plug-in module. It is an economical supply suitable for less critical applications. The 73502 Converter Sleeve Power Supply comes with a selection of mains plugs for different regions of the world. Select the correct plug adaptor for your location and snap it into place.



Output: 12V \pm 0.25V at up to 1A via 2.1mm coaxial power plug with positive centre pin
Input: 90-264Vac, 50/60Hz, 0.75A max.

3.5.3 Panel Mounting Power Supply LPS-CS (Not available after Q4 2011) for use with Converter Sleeve

The LPS-CS is a Panel Mounting 12V mains supply with 15-way D-Sub Connector for connection to Converter Sleeve 75003 to power the plug-in module. It is suitable for more demanding high reliability applications.



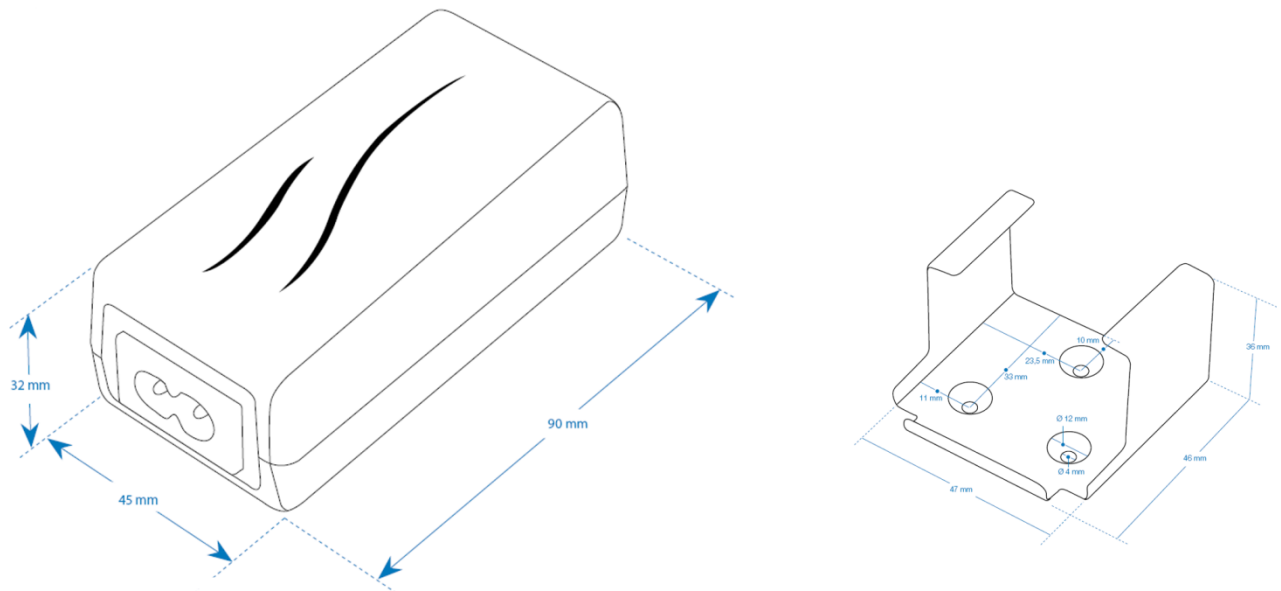
Output: 12V \pm 0.25V at up to 1.25A, connector 15 way D Plug, lead length approximately 2m

Input: 90-264Vac, 50/60Hz, 0.75A max. via IEC-60320 3 pin input socket C14.



3.5.4 Panel Mounting Power Supply LPS-CS-2 (from January 2012 onwards) for use with Converter Sleeve

The LPS-CS-2 is a Panel Mounting 12V mains supply with 15-way D-Sub Connector for connection to Converter Sleeve 75003 to power the plug-in module. It is suitable for more demanding high reliability applications.



Output: 12V \pm 0.25V at up to 1.25A, connector 15 way D Plug, lead length approximately 1.7m

Input: 90-264Vac, 50/60Hz, 0.75A max. via IEC-60320 3 pin input socket C8.

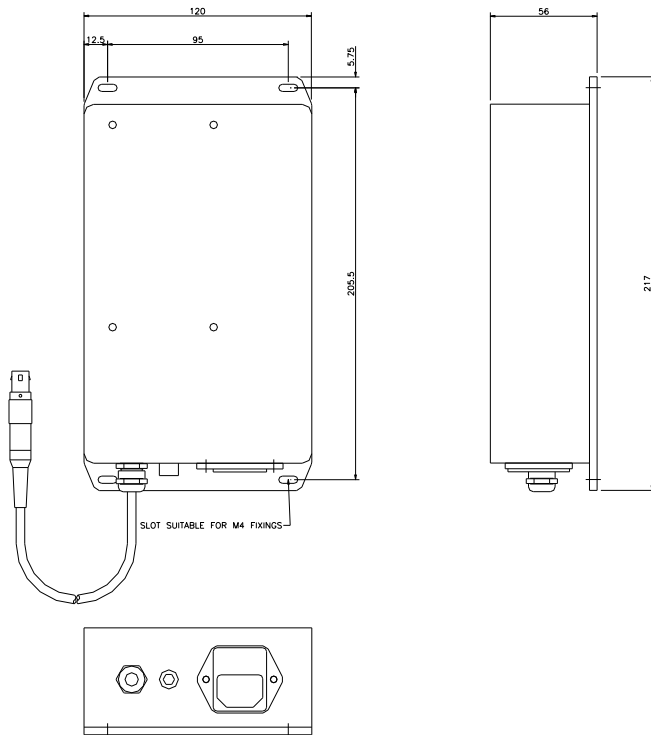
Temperature range: -20 to +40 °C, at full power

-20 to +60 °C. with derating, Derate by 0.38W/°C above 40 °C.



3.5.5 Shielded Power Supply for Shielded Remote Module 73507

Panel mounting supply with Lemo 1B connector for connection to Shielded Remote Module.



Output: 12V +/-0.25V at up to 500mA

Input: 100-240Vac, 50/60Hz, 0.75A max. via fused IEC-320 input socket.

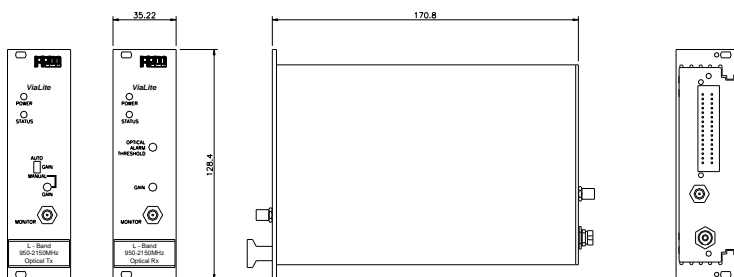
3.6 Fibre Optic Link Modules

3.6.1 Description

ViaLite modules are available in several housing options to suit different applications. Refer to individual datasheets to confirm which housings are available for each module type.

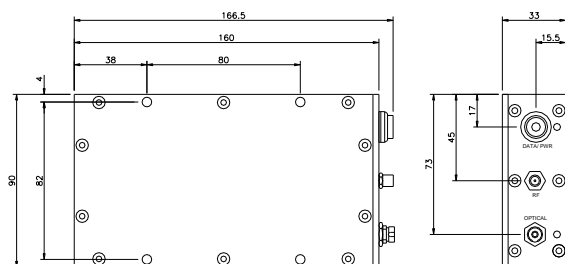
Plug-in Module

Plug-in modules are available for mounting in PPM's **ViaLite** 19" cases.



Shielded Remote Module

The compact Shielded Remote Module shields the Transmitter or Receiver unit against very high levels of electrical interference. Power is provided from shielded mains power supply 73507 or another external DC source.



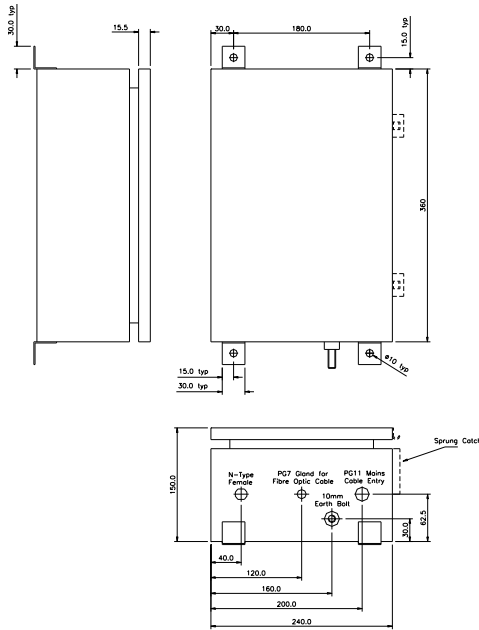
ViaLite Module Housing Specifications

	Plug-In	Converter Sleeve 75003	Shielded Remote
Dimensions	3U x 7HP x 160mm	190x60x38mm	160x90x36mm
Weight	600g	600g	750g
Power Supply	+12V from 19" Rack Case LRK1S, LRK2S	+12V e.g. from PPM Pt. No. 73502 (legacy part only) or LPS-CS (legacy part only) or LPS-CS-2	+12V
Power/Data Connector	Via 19" rack case backplane	Power only: 2.1mm socket, centre positive Power + Data: 15way Female D-Sub with screwlock termination	Lemo 1B (8-pole) Socket
Current Consumption	See individual datasheets		

Details on the installation of each type of unit can be found in section 4.

3.7 Environmental Enclosure 75001

The Environmental Enclosure provides a weatherproof housing for ViaLite RF GPS and L-Band Shielded Remote Modules, a mains power supply, lightning protection, and mains filtering etc.



A DC feed voltage may be fed to an LNA from the RF module via the lightning protection and RF input connector.

Weight	5kg excl. Shielded Remote Module and Mains Power Supply.
Construction	Stainless steel. External surfaces painted in RAL7035. Overlapping hinged lid with twin catches suitable for use with padlocks. EMC and environmental gasket to seal lid to case.
Supply Voltage/Power/Current	Determined by the shielded power supply 73507 used inside the 75001 module. Mains cable on 75001 fuse protected with 3A, 250V.
RF Connector	N-Type Female for external RF connection.
Mains Power Connection	5m flying lead for Mains supply. Lead suitable for external use, wide temperature range (-20°C to +70°C) in a conduit. 3 core, 10A. 7.6mm dia. nom. Lead passes through sidewall of box via a weatherproof gland, PG11.
RF Lightning Protection	Lightning Protection on RF Input/DC Output N Type. Feedthrough voltage must not exceed 50V. TBC Max. DC Voltage 15V, 1A Stainless steel M10 Ground bolt for use by the user. Mounted on outside lower face of box.
RF Port Insertion Loss (all RF path losses incl. lightning protection)	<0.2dB 1200-2000MHz <0.5dB 950-2500MHz
RF Port Return Loss (all RF path losses incl. lightning protection)	>20dB 950-2500MHz
Optical Connections	Unit provides secure termination of Cross-site Fibre Optic Cable via weather-proof PG7 gland suitable for 2.5-6.5mm dia. cable. Provision shall be made inside the box for the support and adequate protection of a fusion splice protection sleeve.
Humidity	95% Non-condensing
IP Rating	IP66

Details on the specific data types can be found in the handbook for that particular link or on product datasheets available from PPM or your local agent.

3.8 Options & Accessories

The following accessories are available for the Signal Modules:

- 72301 Mounting Plate for Shielded Remote Module, M5 fixings

3.9 Fibre Optic Cable



All **ViaLite** modules use singlemode (9µm/125µm) cable terminated with either FC/APC or E2000/APC optical connectors. Cross-site fibre optic cables are available from PPM in standard (3mm diameter) and heavy-duty (8mm diameter) variants.

FC/APC and E2000/APC are standards for angle-polished connectors and must not be confused with standard FC/PC and E2000 connectors respectively. The two connector types are not interchangeable and mating one with the other will damage both the cable and the module connectors.

The specification of the FC/APC and E2000/APC optical connectors are 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.

Instructions on how to care for your connectors can be found in section 4.5.

4 Installation Guide

4.1 19" Rack Case Installation

The **ViaLite** Power Supply Modules LPS-M and LPS-R do not have an isolating switch on the mains voltage inlet. For this reason, the **ViaLite** Rack Case must be installed within easy reach of a clearly labelled dual pole mains isolation switch, which supplies the equipment.

The **ViaLite** 19" Rack Case is designed to fit 19" cabinets and occupies a height of 3U. The Rack is provided with flanges for mounting to the rack.

The Rack Case must be used with at least one LPS type Power Supply Module (see section 4.2).

The rack backplane contains 15-way D-type data connectors for each module position. This provides user access to data and voltage feed outputs from relevant modules (depends on module type). The pinouts of these connectors depend on the type of module in use in that rack position. Details for specific module types are available in the relevant signal module handbooks.

There is also a common alarm concentrator connector providing access to alarm and monitoring information from all modules.

4.1.1 Pin Outs for Alarm Concentrator Connector:

Summary Alarm ALM_S	1	14	PSU 1 Secondary Alarm – ALM_P1C
PSU 2 Secondary Alarm – ALM_P2C	2	15	PSU 1 Primary Alarm – ALM_P1A
PSU 2 Primary Alarm – ALM_P1A	3	16	Module Position 1 Secondary Alarm - ALM1C
Module Position 2 Secondary Alarm - ALM2C	4	17	Module Position 3 Secondary Alarm - ALM3C
Module Position 4 Secondary Alarm - ALM4C	5	18	Module Position 5 Secondary Alarm - ALM5C
Module Position 6 Secondary Alarm - ALM6C	6	19	Module Position 7 Secondary Alarm - ALM7C
Module Position 8 Secondary Alarm - ALM8C	7	20	Module Position 1 Primary Alarm - ALM1A
Module Position 2 Primary Alarm – ALM2A	8	21	Module Position 3 Primary Alarm – ALM3A
Module Position 4 Primary Alarm – ALM4A	9	22	Module Position 5 Primary Alarm – ALM5A
Module Position 6 Primary Alarm – ALM6A	10	23	Module Position 7 Primary Alarm – ALM7A
Module Position 8 Primary Alarm – ALM8A	11	24	+12V from rack case power supply
+12V from rack case power supply	12	25	Ground
Ground	13		

4.1.2 Pin Outs for Module Backplane connections (CONN1 – CONN8):

Connector Type : 15 way D-sub

D-Sub Pin Number	Module Pin No.	Function
1	A2	D1 (Tx1_B+)
2	A3	D2 (Tx1_A-)
3	A4	D3 (Tx2_B+)
4	A5	D4 (Tx2_A-)
5 *	A1 *	ALMnA
6 *	A13, A14, C13, C14 *	+V
7	A12, B12, C12	Line_1
8	A15, A16, B15, B16, C15, C16	Ground
9	C2	D5 (Rx1_B+)
10	C3	D6 (Rx1_A-)
11	C4	D7 (Rx2_B+)
12	C5	D8 (Rx2_A-)
13 *	C1 *	ALMnC
14	A12, B12, C12	Line_1
15	A15, A16, B15, B16, C15, C16	Ground

** Lines added to Issue B and later versions of backplane PCB 19232. New lines added to get individual module alarms and +V to module 15 D-Subs. This also ensures that all remote alarms are fed to CONN8 when alarm concentrator is fitted. The alarm concentrator should only be used with racks manufactured after 1st February 2003 to make use of this functionality.*

4.2 **19" Rack Case Power Supply Module Installation**

The **ViaLite** Power Supply Module powers the plug-in modules via the rack backplane PCB. It occupies a width of 14HP.

Modules are installed by simply sliding into one of the two right hand positions, identified by a vertical line on the Rack Backplane PCB. Once the module is pushed fully home, tighten the corner screws, which hold the unit onto the front rails of the rack case.

The rack case will work satisfactorily with a full compliment of signal modules, using only one LPS-M Power Supply Module. The power supply may occupy either position 9 or 10 (those closest to the right hand side of the rack). A 14HP blank panel is available for single supply applications.

If the equipment is to be operated in dual redundancy mode, one Main Power Supply (LPS-M or LPS-M-48) and one Reserve Power Supply (LPS-R or LPS-M-48) will be required. The location of each is not critical. The main power supply will take approximately 80% of the current load and the reserve, 20%. In the event of a power supply module failure, the FAULT indicator on the failed unit will illuminate and 100% load will be transferred to the reserve unit. The faulty power supply should be replaced as soon as possible. The **ViaLite** product supports full hot-swappability and so the faulty power supply can be removed without removing power to the backplane.

If the power supply fuse blows, it should be replaced with a similar 20mm, 250V, 2AT anti-surge fuse. If fuses continue to blow, do not use the power supply module, and return it to PPM or your local agent.

REMOVE THE MAINS POWER CONNECTOR BEFORE REPLACING THE FUSE.



The Power Supply Module is an Electrical Safety Class 1 product (having a metal case bonded to earth). There are no user-serviceable parts inside the power supply module. The module should only be opened by qualified personnel. In the event of a fault, return the module to PPM or your local agent.

4.3 Installation of Plug-in Modules

All **ViaLite** plug-in modules are hot-swappable, so it is not necessary to power-down the rack before inserting a module. Simply slide the module along the guides ensuring that it does not foul the adjacent units. When the module is pushed fully home, tighten the upper and lower screws on the module front panel.

Connections can be made to the rear of the unit through the void at the rear of the rack case.

The module is now installed and the POWER LED should illuminate GREEN to indicate correct operation.

Please refer to module handbook for detailed instructions on installation and operation.

4.4 Installation of Shielded Remote Modules

The rugged Shielded Remote Module is rated to IP50 and capable of withstanding up to 200V/m. The module has four fixing holes for M4 studs, which enable it to be mounted onto any flat panel or surface. Ensure that adequate strain relief is provided for the cables and that the minimum bend radius of the cables is not compromised.

Power is applied to the modules through an 8-pin shielded connector on the front panel. On data modules, this connector is also used as the data interface. Once power is applied to the unit, the POWER LED should illuminate GREEN to indicate correct operation.

Please refer to module handbook for detailed instructions on installation and operation.

4.5 **Fibre Optic Cable & Connectors**

4.5.1 **Care of fibre optic connectors**

Modern optical connectors offer very high levels of performance, reliability and repeatability. However, they are more sensitive to damage and contamination than electrical connectors. In order to maintain full performance from your fibre optic link system, it is necessary to take care to protect the connectors from damage and to keep them clean.

The light carrying core of a single-mode optical fibre is 8µm in diameter and, in a mating connector pair, the two cores must be aligned to better than 1µm in order to minimise insertion loss. The optical connectors used in PPM's systems maintain their performance even after hundreds of matings, as long as they are kept clean. Dirt contamination may result in the core being obscured or the misaligned, and this in turn results in high insertion loss and poor link performance.

The following precautions should be taken to maintain the performance of your link.

- The cable connectors should always be cleaned before they are used, even if they have been protected by dust caps.
- When the fibre optic cables are not connected, it is essential that the cable and module connectors are protected by the dust caps provided with the system.

4.5.2 **Connector and Cable Types**

All **ViaLite** RF modules use singlemode (9µm/125µm) cable terminated with either FC/APC or E2000/APC optical connectors. Cross-site fibre optic cables are available from PPM in standard (3mm diameter) and heavy-duty (8mm diameter) variants.

FC/APC and E2000/APC are standards for angle-polished connectors and must not be confused with standard FC/PC and E2000 connectors. The two connector types are not interchangeable and mating one with the other will damage both the cable and the module connectors.

The specification of the FC/APC and E2000/APC optical connectors are 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.

4.5.3 **Connecting and Disconnecting**

The cable connectors should be cleaned before each and every connection (see 4.5.4).

4.5.3.1 **FC/APC**

To connect FC/APC optical connectors align the centre ferrule on the cable connector with the female receptacle in the module. There is a lug on the side of the ferrule, which must align to the gap in the receptacle. When they are in alignment, push the plug gently home and finger tighten the knurled collet onto the receptacle.

To disconnect FC/APC connectors, unscrew the knurled collet on the plug and gently withdraw the plug. Replace the dustcaps on both the receptacle and the cable connector.

4.5.3.2 **E2000/APC**

To connect E2000/APC optical connectors, simply push the connector positively into the Receptacle until a click is heard. The protective shutter will automatically lift as the connector is mating.

To disconnect E2000/APC connectors, depress the lever on the connector to disengage, then withdraw the connector from the receptacle. The shutter is sprung-loaded and should spring back to protect the ferrule.

4.5.4 Care and Cleaning

The cable optical connectors should be cleaned **before each and every use**, even where they have been protected with dust caps.

It should only be necessary to clean the female receptacles on the modules if problems are being experienced.

Cleaning items required

- Lint free fibre cleaning tissues (normal cosmetic tissues produce dust and are not acceptable);
- Reagent grade Iso Propyl Alcohol;
- 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 polish the end face.
- Using the air duster, blow away all residue from the end of the connector.

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

- Twist a cleaning tissue to form a stiff probe, and 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 all residue from the receptacle.

Important Notes

- IPA is flammable. Follow appropriate precautions and local guide-lines when handling and storing IPA.
- 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.**

4.5.5 Cable Specification

Because the optical fibre is made of glass, it is important not to subject it to a tight bend radius. For this reason, the fibre has a minimum bend radius specification, beyond which the cable cannot be bent without excessive loss or damage occurring.

Fibre Optic Cable F6R1

Description	Tight buffered Fibre Optic Cable containing one single-mode 9/125 optical fibre in a 900um secondary coating. The fibre packed in kevlar to form a rugged construction inside a low smoke and fume jacket.
Optical Fibre	Single-mode, 9/125 900um tight buffer
Optical Connectors	FC/APC narrow key
Diameter	2.8mm nominal
Weight	8kg/km
Temperature Rating	Operating: -10°C to +50°C Installation: 0°C to +50°C
Maximum Loading	100N
Min. Bend Radius	30mm
Crush Resistance	75N/cm

Fibre Optic Cable F7R1

Description	Tight buffered Fibre Optic Cable containing one single-mode 9/125 optical fibre in a 900um secondary coating. The fibre packed in kevlar to form a rugged construction inside a low smoke and fume jacket.
Optical Fibre	Single-mode, 9/125 900um tight buffer
Optical Connectors	E2000/APC narrow key
Diameter	2.8mm nominal
Weight	8kg/km
Temperature Rating	Operating: -10°C to +50°C Installation: 0°C to +50°C
Maximum Loading	100N
Min. Bend Radius	30mm
Crush Resistance	75N/cm

5 Alarm Management

The alarm strategy on the ViaLite system caters for all levels of Alarm and Monitoring System complexity from simple module failure LED indication, to local and remote end alarm notification and redundancy switching.

All modules provide an alarm output to the Rack Case backplane to indicate that the module is present and working correctly. The alarm is fail-safe in that when a working module is withdrawn from the Rack Case an alarm is registered for that module position.

5.1 Module Alarm Output 15way Connectors

The alarm output from the module is connected to the 15way D connector adjacent to the module position on the rear of the Rack Case backplane. This output is designed for use in conjunction with PPM's ViaLite Redundancy Switch modules.

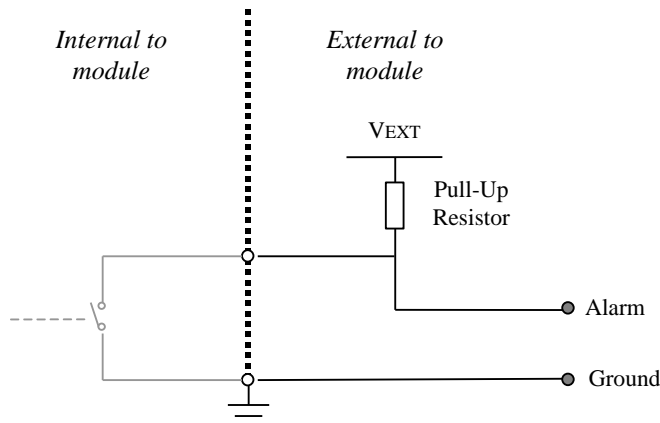
The Alarm Concentrator Module, LAC-1 is a fibre optic module that uses these alarm signals to send alarm data to a counterpart module in a remotely located Rack Case.

5.2 Alarm Concentrator 25way Connector

All module alarms are provided for the user on the 25way alarm concentrator D connector on the Rack Case rear panel. These outputs are diode protected "open collector" outputs.

5.2.1 Connecting to an "open collector" output.

The alarm output pin should be connected to a suitable current source (a positive voltage via a 10kohm pull-up resistor is adequate). When the module is in a working (non-alarm) state, the alarm output pin is short circuited to ground by the module. If the module enters an alarm state, the alarm pin is released to a high impedance state and current is no longer drawn from the constant current source. In the case of a positive voltage and pull-up resistor, the voltage on the alarm output pin will rise to indicate the alarm state. It follows that, if a module is removed from the subrack, the alarm will be raised for that module position.



Open Collector/Drain: 50mA/15V max. capability

Note: The output shall sink current in the normal state, and be high impedance in an alarm state. This means that modules not being present will be registered as an alarm to equipment connected to the alarm concentration connector or to the alarm concentration module.

Summary Alarm Output Connector

There is a volt free 3-pin connector for the Summary Alarm Output - each pin being labelled NO, COM, NC.

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

Pin labelled "NO" is open circuit

Pin labelled "NC" is connected to the Pin labelled "COM" i.e. it is closed.

Condition 2 - Power removed from Rack Case and/or one or more module alarms

Pin labelled "NC" is open circuit

Pin labelled "NO" is connected to the Pin labelled "COM" i.e. it is closed.

5.3 Module Alarm Defeat

In some installations, the Rack Case might not be fully populated with modules. In this case, the module alarm output for the vacant positions would register a continuous alarm state and the Summary Alarm Output would also register an alarm condition.

In order to defeat alarms for these module positions, 10 DIP switches are provided on the rear panel of the Rack Case. By selecting the appropriate switches as indicated by the label on the rear panel, the unused position alarms can be defeated.

It is very important to ensure that the DIP switches for Rack Case positions where modules are present are set correctly. If a defeat switch is set for a present module, then if this module were to fail, NEITHER THE MODULE ALARM NOR THE SUMMARY ALARM WOULD DETECT THE FAILURE. The front panel LEDs will always register an alarm condition correctly regardless of the state of the rear panel defeat switch.

6 **Maintenance and Fault-Finding Guide**

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

Fault	Possible Causes	Solution
Power LED does not illuminate on the plug-in PSUs.	Power is not attached to the PSU. Fuse has blown in PSU.	Connect mains power to the rear of the PSU. Replace fuse (2AT, 250V, 20mm anti-surge). If a fuse continues to blow, return the unit to PPM or your local agent.
Power LED does not light on Satellite or Shielded Remote Module.	Power supply is not attached.	Attach power source.
RF links exhibiting low gain and Link Status LED is red.	Dirt on the fibre optic connectors.	Clean the fibre optic connector.
RF links not transmitting signal and Link Status LED is red.	Broken Fibre Optic Cable.	Contact PPM.

In the event of any problems or queries about the equipment, contact PPM or your local agent.

7 Product Warranty

The Company 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 unit to PPM.

The Company 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).

ViaLite HANDBOOK (LXX-HB) ISSUE 8 CR2915

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