

ViaLite

Electro Mechanical Redundancy Switch

User Manual

LRS-HB-7

CR2874

14/04/11



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** 19” Rack Case 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 serviceable 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.

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

For more information on the *ViaLite* range of products, please refer to the *ViaLite* system handbook Lxx-HB.

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1 Introduction

1.1 ViaLite Redundancy Switch

PPM's **ViaLite** Redundancy Switch module allows users to implement 1:1 redundancy switching with ViaLite RF modules.

The Redundancy Switch module contains a broadband RF switch that provides low insertion loss and high levels of isolation. It may be controlled automatically by other ViaLite RF modules. Alternatively, it may be controlled directly by the user's equipment.

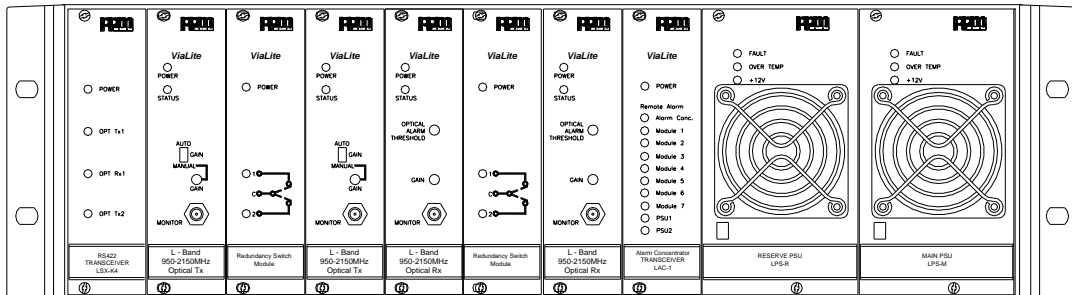
Together with the ViaLite dual redundant power supplies, the 1:1 Redundancy Switch provides the highest possible availability for the ViaLite system.

PPM's **ViaLite** 1:1 Redundancy Switch offers the following key advantages:

- Low insertion loss and high isolation
- 50Ω and 75Ω options
- DC to 3GHz operation
- Compact plug-in module

Complementary PPM **ViaLite** Products

- RF Signal modules for RF GPS, L Band, 70/140MHz, Broadband 2kHz-1500MHz and 10MHz-3GHz etc.
- ViaLite Alarm Concentrator
- 19" Rack Case
- Dual redundant PSUs



1.2 Part Numbers

This handbook covers the following modules:

Part Number	50ohm SMA	75ohm BNC	50ohm BNC	Plug-In
LRS-10	•			•
LRS-30		•		•
LRS-40			•	•

Refer to the **ViaLite** System Handbook for further details on the following **ViaLite** items:

Part Number	Description
LRK1S	Chassis for desktop or 19” rack installation. Accommodates up to 8 plug-in modules and 2 mains power supplies.
LRK2S	Chassis for 19” rack installation. Accommodates up to 8 plug-in modules and 2 mains power supplies.
LPS-M	Main Power Supply plug-in for LRK1S or LRK2S.
LPS-R	Reserve Power Supply plug-in for LRK1S or LRK2S.
LAC-1	Alarm Concentrator Module
F6R1/x	FC/APC Patchlead, 2.8mm jacket. Length defined in metres by “x” (1m, 2m, 5m, 10m)

Please read fully document Lxx-HB for information on installing your **ViaLite** equipment before commissioning your RF link system.

1.3 Installation

The Redundancy Switch module is available in plug-in module form for use in PPM’s **ViaLite** 19” Rack Case.

The Switch module may occupy any position from 1 to 8 in the **ViaLite** 19” rack shelf, except where an Alarm Concentrator module is used, which must occupy position 8. The switch can even be situated in a different rack case to the signal modules that it is switching.

Remove power from the rack.

Insert the module into an unused rack position and push home. Do not force. Forcing a misaligned module into the rack can damage both the module and the rack. Tighten the two front panel retaining screws. See section 2 for backplane connections.

2 Using the Redundancy Switch

2.1 Connecting the Module

Install as described in section 1.3. The switch has three RF ports that connect to the modules being switched. These are labelled as shown below.

RF Port	Connection
Port 1	Main Path
Port 2	Redundant Path
Port C	Common Port

Switch position control is accessed from the module specific 15way D-Sub connector on the rear of the rack case. More detailed configuration information is given in the System Integration section.

2.2 Front Panel Indicators

The transmitter has 3 front panel LEDs to indicate status.

	Power LED	Switch Position LED 1	Switch Position LED 2
OFF	Unit is Off	RF Port 1 Isolated	RF Port 2 Isolated
GREEN	Unit is OK	RF Port 1 Connected	RF Port 2 Connected

2.3 Switch Position Selection

The switch position selection port is compatible with the open collector alarm outputs of each individual **ViaLite** module, and those from the **ViaLite** Alarm Concentrator module. This allows a switch to be operated from either local modules or remote modules (Rx-End or Tx-End switching).

All **ViaLite** module alarm outputs provide a low impedance path to ground in their operating state, and go into a high impedance state under alarm conditions. For this reason, if a Primary Path (Port 1) signal module is withdrawn from the rack, or the switch cable disconnected, the Redundancy Switch will select the redundant path.

Backplane 15way Connector with Redundancy Switch fitted - Pin Connections

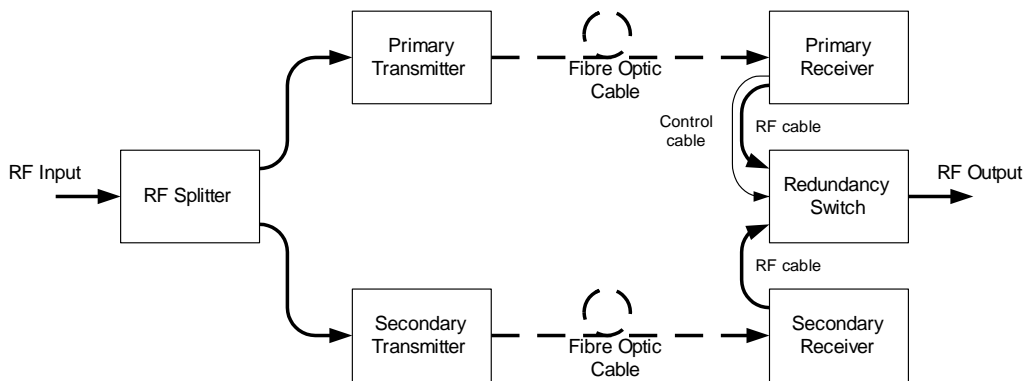
Pin Number	Function	Pin Number	Function
1	Switch Control Input	9	
2	Do Not Connect	10	
3	Do Not Connect	11	
4	Do Not Connect	12	
5	GND (Alarm Output)	13	
6	+V	14	
7		15	GND
8	GND		

The alarm output from the module is permanently grounded in the “No Alarm” state. To maximise availability the unit has the minimum of active electronics and no BITE. The switch position can be determined by the status of the primary receiver’s alarm.

3 System Integration

3.1 Rx End Switching

In a typical configuration, an RF signal is split using a passive RF splitter and fed to two ViaLite Transmit modules. These modules are connected via two separate optical fibres to two ViaLite Receiver modules. These form the Primary and Secondary paths. The RF outputs of the Primary and Secondary Receivers are connected to Ports 1 and 2 respectively of the Redundancy Switch module. The RF output on the Common port is fed to the user equipment. The control cable connected between the Redundancy Switch and the Primary Receiver ensures that the Redundancy Switch selects the Secondary path in the event of a failure in the Primary path.



Typical 1:1 redundancy configuration

In this example configuration, the following parts would be required to implement the system :

Local Setup

Quantity	Part Number	Description
1	LRKxS	ViaLite Rack Case
1	LRD-n	RF Splitter
2	LRT-xx-6R	Transmitter Module

Optical Cables

Quantity	Part Number	Description
2	F6R1/n	Patchleads

Remote Setup

Quantity	Part Number	Description
1	LRKxS	ViaLite Rack Case
1	LRS-n	Redundancy Switch
2	LRR-xx-6R	Receiver Module
2	73627 / 73630	RF Switch Cables
1	73628	Switch Control Cable*

* RED end connects to Main Path module backplane connector, BLUE end connects to Redundancy Switch module backplane connector

3.2 Tx End Switching

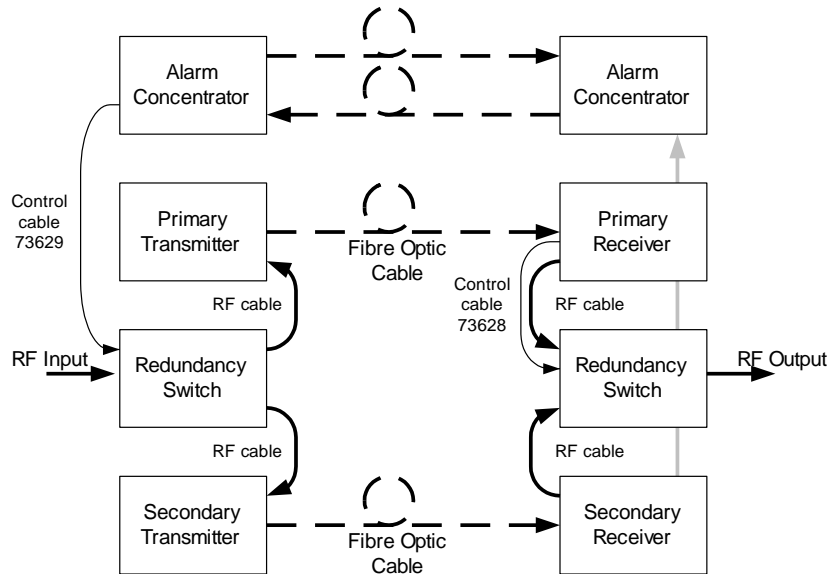
In an alternative configuration, the paths may be switched at the Transmitter end instead of being split. This method has less impact on the Carrier-to-Noise ratio.

The fully switched configuration may be implemented by use of **ViaLite** Alarm Concentrator modules. These convey alarm information from the Receiver end to the Transmitter end, where it may be used to switch the RF signal between the Primary and Secondary path Transmitters in the event of a failure anywhere between the Transmitter and Receiver modules.

The sequence of operation is as follows :

The Receiver end Redundancy Switch monitors the Primary Receiver alarm status through the Control Cable at the Receiver end. Should the Primary Receiver enter the alarm condition, the Redundancy Switch changes over to the Secondary Receiver.

The Primary Receiver alarm state is also monitored by the Receiver end Alarm Concentrator module. This conveys the alarm condition to the Transmitter end. The Transmitter end Control Cable takes the Alarm information from the Alarm Concentrator and uses it to switch the Transmitter end Redundancy Switch to the Secondary Transmitter. Hence the RF circuit is restored through the Secondary Path.



Typical fully switched 1:1 redundancy configuration

In this example configuration, the following parts would be required to implement the system :

Local Setup

Quantity	Part Number	Description
1	LRKxS	ViaLite Rack Case
1	LRS-n	Redundancy Switch
2	LRT-xx-xR	Transmitter Module
2	73627 / 73630	RF Switch Cables
1	73629	Switch Control Cable*
1	LAC-1	Alarm Concentrator Module

Optical Cables

Quantity	Part Number	Description
4	F6R1/n	Cross Site Cables

Remote Setup

Quantity	Part Number	Description
1	LRKxS	ViaLite Rack Case
1	LRS-n	Redundancy Switch
2	LRR-xx-xR	Receiver Module
2	73627 / 73630	RF Switch Cables
1	73628	Switch Control Cable*
1	LAC-1	Alarm Concentrator Module

* See section on accessory cables for correct usage.

3.3 Manual Switching

If the ViaLite Redundancy Switch is to be incorporated into an overall Operations and Maintenance System, it might be necessary to operate the Redundancy Switch on stimulus from a source external to the ViaLite system. In this case, manual wired control can be used to change over the Redundancy Switch.

4 Accessory Cable Data

4.1 Split Signal Setup Control Cable

This cable assembly is for use when using the configuration shown in section 3.1. The cable assembly is terminated with one D-Sub connector at each end.

The BLUE shrouded connector should be attached to the mating connector on backplane rear panel at the Redundancy Switch position.

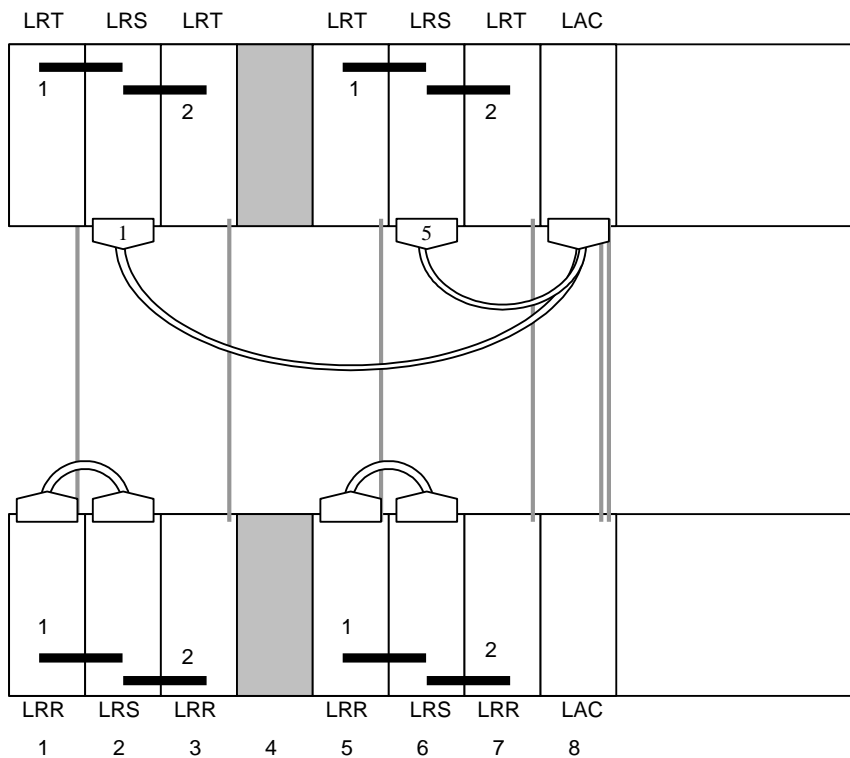
The RED shrouded connector must be mated to the D-Sub socket on the backplane rear panel at the primary channel module position.

4.2 Fully Switched Setup Control Cable

This cable assembly is for use where the signal is switched at both Transmitter and Receiver ends of the link. It should be used at the Transmitter end rack, as it takes its switching information from the Remote Modules via the Alarm Concentrator link, and NOT from the module alarm outputs in the Local rack case.

The cable assembly comprises one connector with a RED shroud, which must be connected to the Alarm Concentrator module backplane connector, and seven connectors with BLUE shrouds for connection to Local Redundancy Switches.

The seven BLUE connectors each provide a "FAIL Output" signal from module positions 1 to 7 at the REMOTE (receiver) rack case. The number on the BLUE connector should be matched with the module location number on the rear of the rack backplane.



The example configuration drawn shows the Transmitter End Switches being controlled by the alarm outputs from the Receiver End Switches.

4.3 Multiple Rack Case Setup

The flexibility of the **ViaLite** Redundancy Switch Module enables 1:1 Redundant configurations across multiple racks. Because the switching signal to the Redundancy Switch Module is not carried on the backplane, but on connectorised flying leads, the operation of the Redundancy Switching is independent of the Rack cases. This means that, if required, Primary, Secondary and Switch modules can be mounted in separate Rack cases.

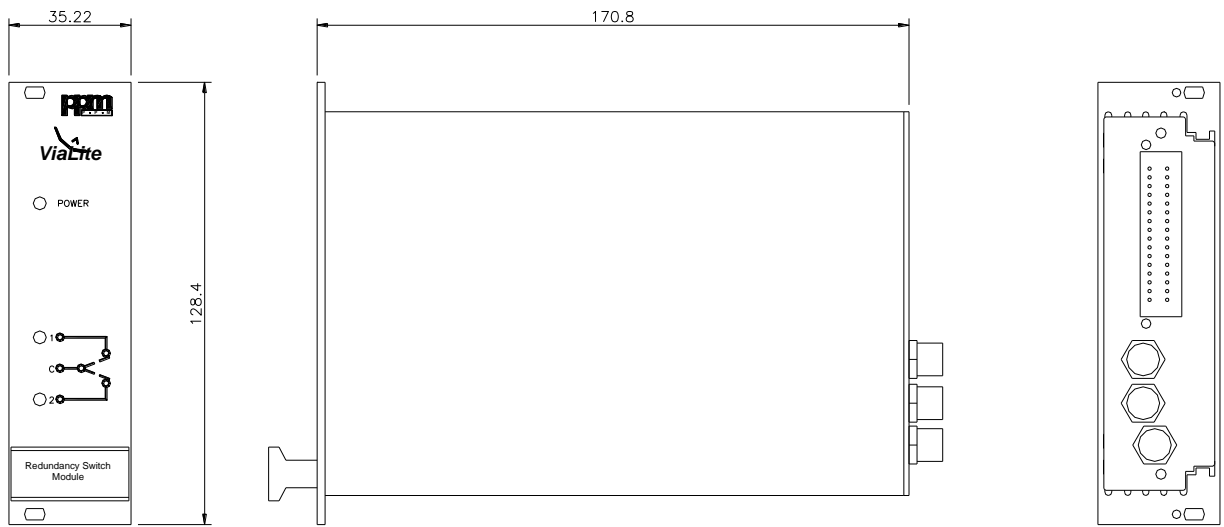
PPM are able to provide recommended 1:1 redundant configurations on request. For more complex redundancy switching configurations, please consult factory.

5 Redundancy Switch Technical Data

5.1 Specifications

Parameter	LRS-10	LRS-30	LRS-40
Bandwidth	DC-3GHz	DC-200MHz	DC-200MHz
Impedance	50Ω	75Ω	50Ω
Insertion Loss	10 - 200MHz : <0.5dB 950 - 1750MHz : <1.5dB 1750 - 3000MHz : <2.0dB	<0.6dB	<0.6dB
Isolation	DC - 500MHz: >60dB 500MHz - 3GHz: >50dB	>60dB	>60dB
VSWR	DC - 500MHz: <1.3:1 500MHz - 3GHz: <1.8:1	DC - 500MHz: <1.3:1	DC - 500MHz: <1.3:1
Power and voltage consumption	1.5W Typ (switched to Main Path) or 3.6W Typ (switched to Redundant Path) at +12VDC ± 0.5VDC		
Operating Conditions			
Operating Temperature	-10°C to +50°C		
Storage Temperature	-40°C to +70°C		
User Interface			
Front panel indicator LEDs	Power - Indicates DC power is applied to the module 1 - Indicates Primary RF path is selected 2 - Indicates Secondary RF path is selected		
Switch control	Via Pin 1 on 15-way D-Type female on 19" Rack Chassis or Converter Sleeve. Leave Pin 1 open to switch RF from Common Port to Port 2. Connect Pin 1 to ground (Pin 8) to switch RF from Common Port to Port 1.		
RF Input/Output	1 - Primary port 2 - Secondary port C - Common port		
RF Connector	SMA 50Ω	BNC 75Ω	BNC 50Ω
Physical Format			
Housing Options	Rack Plug-in Module - suitable for Rack Chassis or Plug-in Converter Sleeve		
Supply Voltage	+12VDC from LRK power supply		
Rack Plug-in Module	+12VDC from external supply		
Plug-in Converter Sleeve			
Weight	600g		
Rack plug-in module	600g		
Plug-in Converter Sleeve	600g + module		
Rack Mount Case Suitability	LRK1S, LRK2S		

5.2 Module Dimensions



Plug-in Module

5.3 Module 15-way D-Connector

Connection is made to the module by the 15-way D-Sub connector on the rear of the rack backplane.

Pin Number	Function
1	Switch Control Input - connect to ground to switch
2	Do Not Connect
3	Do Not Connect
4	Do Not Connect
5	Ground (Alarm Output)
6	+12V from rack supply
7	Do Not Connect
8	Ground
9	Do Not Connect
10	Do Not Connect
11	Do Not Connect
12	Do Not Connect
13	Do Not Connect
14	Do Not Connect
15	Ground

The alarm output from the module is permanently grounded in the “No Alarm” state. To maximise availability the unit has the minimum of active electronics and no BITE. The switch position can be determined by the status of the primary receiver’s alarm.

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 light.	Power source not connected.	Connect power source.
Power LED lights up RED.	Internal fault.	Consult local PPM office.
Switch is stuck in position 2 with Primary module working.	Switch cable disconnected.	Connect switch cable from Redundancy Switch to Primary module.
Switch changes over but RF signal is lost.	RF cable not attached to secondary module.	Attach RF cables.
Local switch stuck in position 2 in Fully Switched setup.	Alarm concentrator not connected. Switch cable not connected.	Install Alarm Concentrators in position 8 and connect via clean optical patchcords. Connect switch cable.
Local switch will not change state as expected in Fully Switched setup.	Local switch cable incorrectly connected.	Connect switch cable.

The **ViaLite** range of equipment is precision engineered and calibrated for optimum performance and accuracy before dispatch.

However, in the event of any problems or queries arising about the equipment, please 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 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).

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