Point2point Battery Switch and Controller

Handbook

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1 Introduction

The point2point battery load switch and controller allow the user to remotely control (via multimode fibre optic cable) the DC power applied to a remote FOL (fibre optic link) device. The battery load switch is designed for use with the complete range of point2point equipment.

This allows the user to maintain a high level of shielding and isolation while being able to disconnect the remote FOL from its power source between tests. This can be used to significant improve the endurance of remote links operating under battery power.

The battery load switch is compatible with all point2point shielded FOL and can be retro fitted to existing systems, in place of the U Link. The battery switch controller can be fitted into the full range of point2point cases and converter sleeves, including all existing systems.

This handbook covers the following point2point variants:

- 73680 Switch, Battery Load, point2point
- 73681 Module, Battery Controller, 4 channel

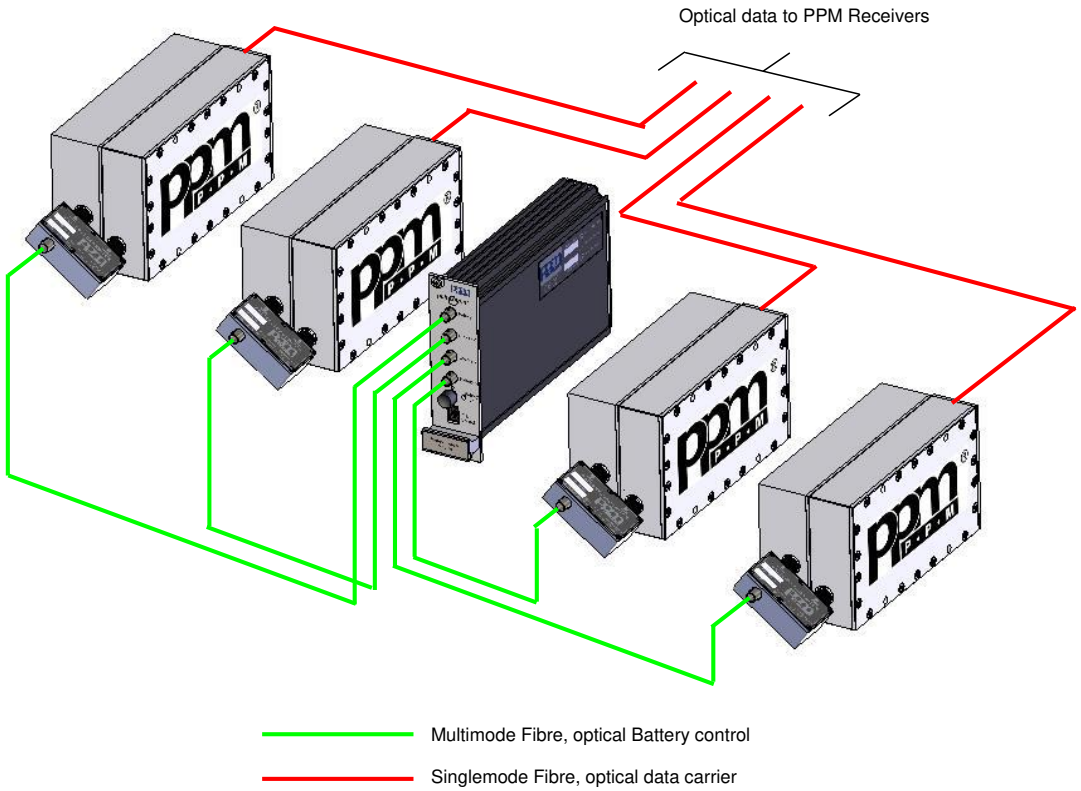
2 Using the Battery Switch and Controller

This section describes the connections to your Battery load switch and controller.

When used with the ***point2point*** shielded FOL, the battery switch should be connected with its “battery” port connected to the output of the shielded battery pack and its “module” port connected to the shielded FOL battery input. Failure to connect the battery switch correctly will result in the unit being permanently on, with approximately 1V of voltage drop between the “module” and “battery” connections.

With the optical input unconnected the default state of the switch is off. The optical input should be connected using an ST multimode cable to the battery switch controller.

Each of the four outputs of the battery switch controller can be used to control one battery load switch. The diagram below shows the connections.



Layout for optically controlled battery switches when used in conjunction with PPM shielded batteries. For illustrative purposes only; control module normally resides with receivers in a suitable PPM 19” rack case)

2.1 Battery Load Switch

The battery load switch contains a fibre optic receiver which senses the presence of a light source. With the light on it will switch the DC circuit on, allowing conduction between “battery” and “module” ports with a very low resistance. With the light off these ports are isolated, with very high impedance between them. It is housed in a fully shielded unit. The ground connections for the battery and module are common and not switched.

The module and battery ports are DIN47295 1.6/5.6 socket connectors, with spacing compatible with the battery U linking plug 55733. The fibre optic control port is ST multimode; it can accommodate a wide range of fibre types including 62.5/125um and 50/125um.

The control circuit draws its power from the input power source, but the load is relatively low and hence does not significantly impact the battery endurance. The switch is directional, the power source must be connected to the battery port and the load must be connected to the module port. It is designed for use with a centre positive power source (ie the centre pin is at a higher voltage than the outer case).

The unit is specified for operation with a 14.4V nominal battery pack when operating with PPM ***point2point*** shielded FOL. Operation is also possible as a stand-alone unit with a wide input voltages range, see specifications.

2.1.1 Signal connections

Battery port	DIN47295 1.6/5.6 Socket	DC power input, outer ground, inner $+V_{in}$
Module port	DIN47295 1.6/5.6 Socket	DC power output outer ground, inner $+V_{out}$
Optical port	Optical ST connector	Multimode optical control fibre

2.2 Battery switch controller

The Battery switch controller is design to fit in any standard ***point2point*** rack or converter sleeve, it has 4 optical outputs and can be used to control four Battery load switches.

All the optical outputs are ST multimode and can accommodate a wide range of fibre types including 62.5/125um and 50/125um.

The optical output can be manually controlled via the front panel push switch (with all control inputs open circuit). This switch toggles the output, where green signals that the output is on, and red that the output is off.

2.2.1 Control Signals

The output can also be individually electrically controlled via the front panel 8 way connector. When the status is set to on (front panel LED green) the individual outputs will be on if their control connection is high, or off if there control connection is low. When the status is off all the outputs will all be off regardless of the control signal connection status.

Low = Short circuit (<100Ω) or Voltage < 0.8V
High = Open circuit (>100kΩ) or Voltage > 2.0V

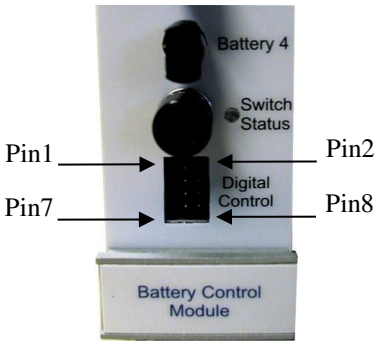
	Control X	Switch position	
		Off	On
LED	X	Red	Green
Control 1	Low	Off	Off
Control 1	High or NC	Off	On
Control 2	Low	Off	Off
Control 2	High or NC	Off	On
Control 3	Low	Off	Off
Control 3	High or NC	Off	On
Control 4	Low	Off	Off
Control 4	High or NC	Off	On

2.2.2 Signal connections

Control port: shrouded 0.1" 8way double row

Pin	Signal (wire color)	Pin	Signal (wire color)
1	Control 1 (brown)	**5**	Ground (green)
2	Control 2 (red)	**6**	V_{cc1}, $+5V_{nom}$ (NC)
3	Control 3 (orange)	**7**	Ground (NC)
4	Control 4 (yellow)	**8**	V_{cc2}, $+5V_{nom}$ (NC)

Note: A mating cable is supplied for this interface fitted with 0.25m of cable (73682)
Note: Pins 6, 7, 8 are not intended for external use and should not be connected



Pinout for Front panel connector and supplied cable (lead length 250mm)

Optical port 1	Optical ST connector	Multimode optical control fibre for channel 1
Optical port 2	Optical ST connector	Multimode optical control fibre for channel 2
Optical port 3	Optical ST connector	Multimode optical control fibre for channel 3
Optical port 4	Optical ST connector	Multimode optical control fibre for channel 4

Backplane connector, 96 Way DIN41612

Row	Column A	Column B	Column C
1,2	Ground	Ground	Ground
3-7	NC	NC	NC
8	Module Present	Module Present	NC
9-14	NC	NC	NC
15	NC	Ground	NC
16,17	Ground	Ground	Ground
18-25	NC	NC	NC
26	NC	Ground	NC
27,28	NC	NC	NC
29,30	Ground	Ground	Ground
31,32	+12V	+12V	+12V

3 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
Controller LED not illuminated	Power is not attached to the rack unit. Mains switch is turned off. Fuse has blown in rack unit.	Connect mains power to the rack unit, and switch on power. Switch on mains switch. Replace fuse (2A anti-surge).
FOL Device under test permanently off	Dirt on the fibre optic connectors. Broken optical fibre. Battery Pack is discharged. Switch status in correct Incorrect control input status	Clean the fibre optic connector. Refer to Appendix Replace cable Recharge/replace battery Pack Check that front panel LED on controller is green Check that front panel LED on controller is green. Check all control connections are either high or not connected
FOL Device under test permanently off	Load switch incorrectly oriented Switch status in correct Incorrect control input status	Connect correctly Check that front panel LED on controller is red If LED is green, check all control connections are low

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

4 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 return merchandise authorization (RMA).

Appendix I Specifications, Battery Load Switch

System Parameters (at 25°C, V_{in} = 14.4V, I_{load}=500mA unless otherwise noted)

Operating voltage range	+5V to +30V
Operating Current	5A max
Voltage drop	50mV max (@500mA)
On resistance	48mΩ typ 100mΩ max
Time ON > OFF	200us typ
Time OFF > ON	1us typ
Control sense	Light on = Battery connected to module
	Light off = Battery disconnected from module
Standby quiescent current	4mA typ 10mA max (in light off state)
Operating quiescent current	15mA max (in light on state)
Operating range	> 1km (with 50/125um or 62.5/125um multimode cable)
Optical reception wavelength	820nm
Optical threshold ON	>-24dBm
Optical threshold OFF	<-40dBm
Operating Temperature	-10°C to +40°C
Electrical Signal Connector	DIN47295 1.6/5.6 Socket
Optical connector	ST multimode
Fibre options	Multimode 50/125um Multimode 62.5/125um Multimode 100/140um
Housing Options	Shielded remote module

Appendix II Specifications, Battery Controller

System Parameters (at 25°C unless otherwise noted)

Optical output wavelength	820nm
Optical output power	-12dBm typ (measured using 1m of 62.5/125um cable) -17dBm min AEL Class 1 LED, these devices are considered eye safe.
Input control	Low = Short circuit (< 100Ω) or Voltage < 0.8V
	High = Open circuit (>100kΩ) or Voltage > 2.0V
Operating current	400mA maximum
Operating range	> 1km (with 50/125um or 62.5/125um multimode cable)
Optical reception wavelength	820nm
Optical threshold ON	>-24dBm
Optical threshold OFF	<-40dBm
Operating Temperature	-10°C to +40°C
Front panel MMI	Switch, pushbutton, SPDT, latching
	Switch status given by front panel LED
Electrical backplane connector	96 Way DIN41612
Electrical control connector	Shrouded 0.1" 8way double row
Optical connector	Four - ST multimode
Fibre options	Multimode 50/125um Multimode 62.5/125um Multimode 100/140um
Housing Options	All standard ***point2point*** rack mounted options including SRK-3P/-3RP 19" cooled desktop cases/subracks 75002 Plug-in module converter sleeve