

*point2point*

# BATTERY SWITCH AND CONTROLLER

## User Handbook

**7368x-HB**



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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 significantly 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

## 1.1 Battery Load switch

The Battery load switch contains a fibre optic receiver which senses the presence of a light source, with “LIGHT ON” it will switch the DC circuit on, allowing conduction between “Battery” and “Module” ports with a very low ON resistance. With “LIGHT OFF” these ports are isolated with a very high impedance between them. It is housed in a fully shielded unit. The ground connections for “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 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 voltage range, see specifications.

### 1.1.1 Signal connections

Battery Port	DIN47295 1.6/5.6 Socket	DC power input, Outer Ground, Inner +V <sub>in</sub>
Module Port	DIN47295 1.6/5.6 Socket	DC power output Outer Ground, Inner +V <sub>out</sub>
Optical Port	Optical ST connector	Multimode optical control fibre

## 1.2 Battery switch controller

The Battery switch controller is designed 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 input open circuit). The status of this switch is toggled each time it is pushed, it has two states ON (“LIGHT ON”) when the front panel LED will be GREEN, or all OFF (“LIGHT OFF”) when the front panel LED will be RED.

## 1.2.1 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 (front panel LED RED) all the outputs will all be off regardless of the control signal connection status.

LOW = Short circuit ( $< 100\Omega$ ) or Voltage  $< 0.8V$

HIGH = Open circuit ( $>100k\Omega$ ) 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

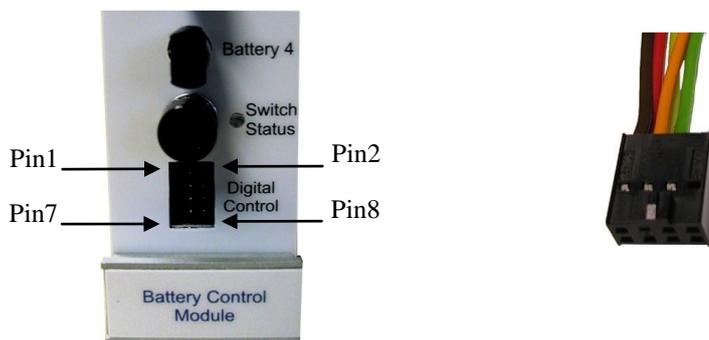
## 1.2.2 Signal connections

Control port      Shrouded 0.1" 8way double row      Optical control connector

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 1. A mating cable is supplied for this interface fitted with 0.25m of cable (73682)

Note 2. 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

## Back plane connector, 96 Way DIN41612

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

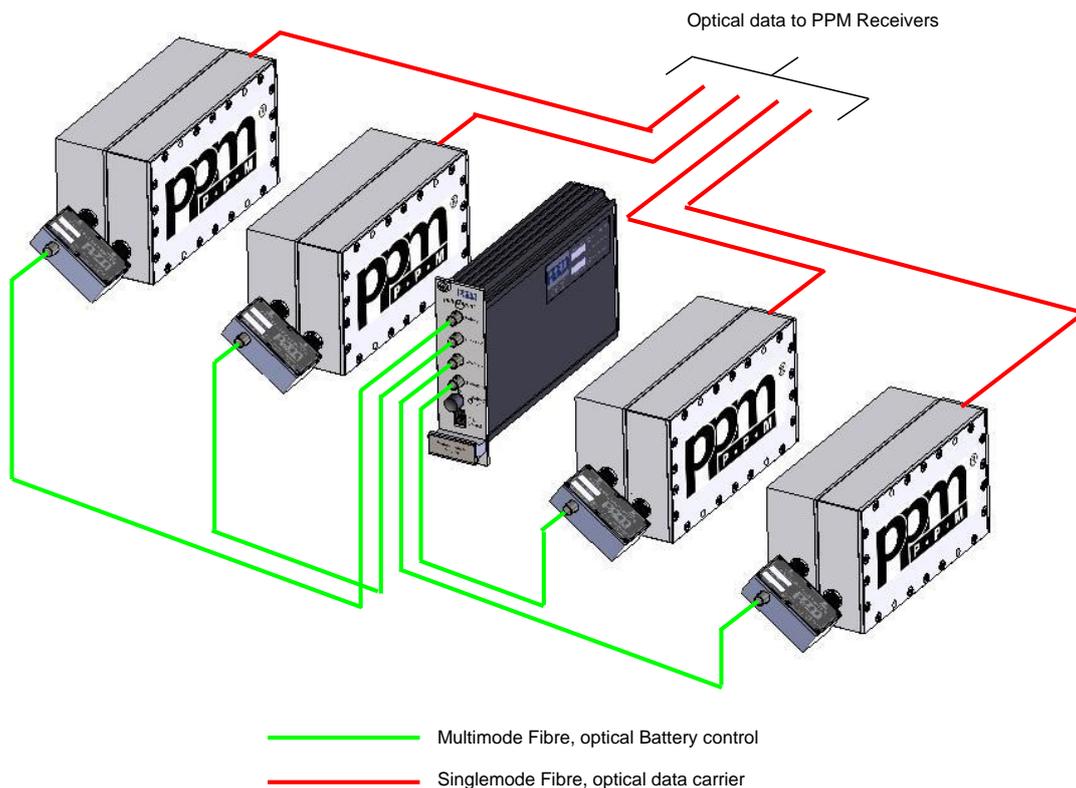
## 2 Using the Battery switch and controller

This section describes the connections to your Battery Load Switch and Controller.

When used with **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 1 volt drop between “Module” and “Battery”

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 to normally reside with Receivers in a suitable PPM 19" rack system)

Please read fully document Sxx-HB for information on installing your **point2point** equipment before attempting to make any measurements.

Maximum ratings for inputs are given in the technical specifications.

### **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 ON	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 Goods Return Number (GRN).**

## Appendix I      Fibre Optic Connector Cleaning Procedure

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

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 any 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 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.

## Appendix II 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	48 mΩ typ 100mΩ max
Time ON > OFF	200 us Typ
Time OFF > ON	1 us 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 III Specifications, Battery Controller

System Parameters (at 25°C unless otherwise noted)

Optical output wavelength	820nm
Optical output power	-12 dBm typ (measured using 1m of 62.5/125um cable) -17 dBm min AEL Class 1 LED, these devices are considered eye safe.
Input control	LOW = Short circuit ( $< 100\Omega$ ) or Voltage $< 0.8V$
	HIGH = Open circuit ( $>100k\Omega$ ) 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	$-10^{\circ}C$ to $+40^{\circ}C$
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 <b>point2point</b> rack mounted options including SRK-3P/-3RP 19" Cooled Desktop Cases / Subracks 75002 Plug-In Module Converter Sleeve

## Appendix IV Accessories

F1R1/1	1m Multimode Fibre Optic Cable 50/125, ST Connectors /10 (=10m), /50. For 25 to 2000m contact PPM
F6R1/1	1m Singlemode Fibre Optic Cable, FC/APC Connectors /10 (=10m), /50. For 25 to 2000m contact PPM
F8R1/1	1m Multimode Fibre Optic Cable 62.5/125, ST Connectors /10 (=10m), /50. For 25 to 2000m contact PPM
73481	Cable Management Reel
73511	Standard Capacity Battery Pack + Battery Linking Plug
73512	High Capacity Battery Pack + Battery Linking Plug
56292	Battery Charger + 4 Charging Leads
75002	Plug-In Module Converter Sleeve (for stand-alone use)
73502	Mains Power Supply for Converter Sleeve
SRK-3P/-3RP	19" Cooled Desktop Cases / Subracks
73401	Battery Switch lead, DIN47295 to 2.1mm power plug
73402	Battery Switch lead, DIN47295 to bare end
73682	8 way battery switch control cable, with 0.25m of cable

### **7368x-HB-4 p2p battery switch + controller handbook**

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