

Disclaimer

This document is intended to be used as a reference guide for the installation and operation of the Opti-Link Control System.

Every effort has been made to ensure the reliability and accuracy of the information contained in this manual at the time of going to press. However, specifications and procedures are subject to change due to our constant endeavours to meet customer requirements, and to maintain a research and development process of continuous improvement for all Woodway products.

Woodway Engineering Ltd reserves the right to make changes in product and documentation specifications and procedures at any time and without notice. The information contained in this manual is believed to be reliable and accurate with regard to the Opti-Link Control System. The company shall not be held liable for improper installation, operation, or maintenance of the system in circumstances where procedures and specifications have not been followed correctly. It is essential therefore, that you follow the specifications, procedures, and recommendations outlined in this manual.

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Important Installation and Safety Notes



Modules and connectors are not waterproof. Install modules and cables in a dry location away from excessive heat, humidity and any components likely to damage the system.

It is the installer's responsibility to ensure that;

- the method of installation does not damage or interfere with vehicle equipment and wiring.
- if the vehicle is fitted with airbags, the installation does not interfere with the operation or effectiveness of the airbags or will cause the equipment to become a projectile that could cause death or injury.
- all connections to chassis are taken direct to the battery.
- fuse ratings are changed to suit specific applications.

The proximity of certain radio equipment may interfere with Opti-Link data transmission. To reduce this possibility, Opti-Link and radio equipment wiring should always be kept well apart and should not, under any circumstances, be harnessed or fastened together.

The installers should supply all mounting fixings.

It is the user's responsibility to ensure that;

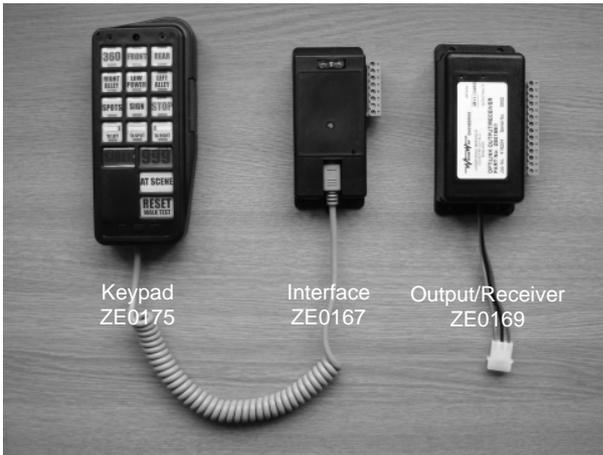
- the system is used in a safe and responsible manner to ensure the safety of both themselves, their passengers, other road users and pedestrians.
- the system and its installation are properly maintained to ensure its effective operation.

Failure to follow these notes and safety guidelines may result in damage to the product and/or vehicle and may cause injury to personnel or bystanders.

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The Opti-Link Control System – Fig 1



The Opti-Link Control System provides a flexible and intuitive control interface between the driver and the vehicle's equipment. The complete system typically comprises the **Opti-Link Keypad, Keypad Interface Module** and a data-encoding **Output/Receiver Module**.

Supply characteristics:

Supply voltage: 12Vdc

Current draw: Maximum (All switches active) 6.8A Minimum (Sleep Mode) 0.01Amps

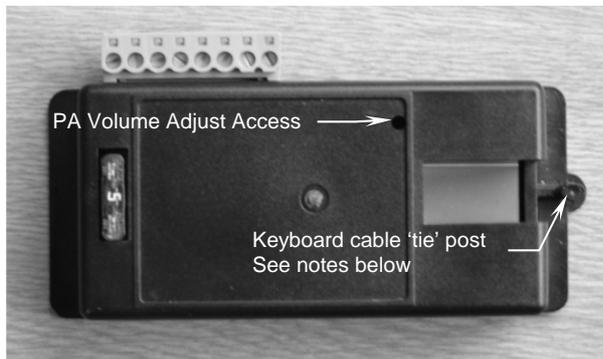
Approvals:

VCA Approved to 72/245/EEC amendment 95/54/EC

CE Marked

PITO AES Specification 5 Issue 9

The Keypad Interface Module – Fig 2



The Keypad connects to the **Keypad Interface Module (Figure 2)** via a 'keyboard' style cable which should be secured with a tyrap to the cable tie post after connection. The Keypad Interface Module encodes the **Keypad Module** status and provides power and data output which may be routed to individual **Receiver/Output Modules (Figure 3)** or the Woodway Lightbar via copper wire. **PA volume adjustment** can be made from the top of the Interface Module via a blue single-turn variable resistor. (See figure 2). To increase the volume turn clock wise and anti-clockwise to reduce the volume.

The Output/Receiver Module – Fig 3



The **Output /Receiver Module** decodes the data and activates the required outputs via a 14-way connector (note that position 14 on this connector is not used). A green 'Data OK' led flashes to indicate that the data link is functioning. The switch outputs from the Output /Receiver Module interface directly with the low current control wiring of Woodway-supplied light bars, sirens, and strobe power supply systems. The outputs may be used to control high current auxiliary equipment via automotive relays. The output circuits incorporate back emf protection eliminating the need for diodes to be placed across the coils of any relay used.

The output channels of the **Output Receiver module** are self limiting to prevent damage should the load on any channel exceed approximately 0.5 amps. In order to prevent damage to the electronics within the receiver the overload protection operates instantaneously when this current is exceeded. Devices that contain capacitors will cause high inrush currents which may cause the unit to self limit. This will be even more evident when the engine is running due to the higher battery

voltage.

We strongly recommend that with the exception of low current switching Woodway light bars all devices to be controlled are connected via relays as shown on page 9 of the installation information.

System Operation

The Keypad has 13 control switches (1 – 13), 2 programmable switches (P1 & P2) and a Reset/Walk Test switch (14). Pressing any switch will give a corresponding output from the Output/Receiver. i.e. SW1 will switch output 1 on the Output/Receiver, SW2 output 2 etc. Switches 1-12 can be set to latching or momentary operation. Switches 13, P1 and P2 are latching only. Switch 14 has preset functions and cannot be changed. Latching switches once pressed remain active until pressed again; momentary switches are active only when pressed. A bank of switches can also be set as 'self-cancelling', which means that only one switch in the bank can be active at any one time. Switch 14 will cancel all active switches.

The keypad has a permanent backlight for low light viewing and each active latching switch is illuminated when active. Momentary switches are illuminated only when pressed. Under low light conditions a light sensor will lower the illumination intensity of all active switches to prevent driver distraction. The sensor for this is situated at the bottom of the keypad and should not be covered if the Auto Dim feature is to function.

Keypad legends can be factory fitted according to the customer's requirements or customer fitted.

Soft switching prevents large current surges on the vehicle electrical system by staggering the programmed switch activation.

Walk Test

By pressing and holding down switch 14 for 4 secs, switches 1 – 13 will be made sequentially active to allow the operator to confirm that both the system and the equipment that it is controlling are functioning. When running this facility, switch 1 will remain active for 10 seconds to allow the operator time to exit the vehicle; thereafter subsequent switches whether latching or momentary will remain active for 4 seconds. (Latching switches will illuminate when active momentary switches will illuminate briefly) Switch 14 will flash whilst the test is in progress. When the test is complete the keypad will automatically reset.

Sleep/Wake Up Function

The system will automatically shut down (sleep) after approximately 1 hour if no channels are active and the supply voltage is less than 13.5V. (i.e. the vehicle is not running) The system will 'wake up' when a switch is pressed, the voltage exceeds 13.5V or the door is opened (if connected).

The system will not go to sleep if any channel is active, the voltage is greater than or equal to 13.5V or if the 'door switch' sense is negative.

Audible and Visual Warnings

As a reminder that the panel is active, the led at the top of the panel will flash and the system will beep every 30 seconds.

The led will flash continuously when the battery voltage falls below 9.5V.

When the door and handbrake are connected to the Interface unit, if the door is opened when the handbrake is not applied the system will sound a warning beep.

Automatic Arrival Switching

When the door and handbrake are connected to the Interface unit, and P1 (pursuit) is active, if the handbrake is applied and the door is opened, the system will switch to P2 (arrival).

If this function is required the 'External 999 Switching' cannot be used.

External 999 Switching (This is not available on systems with ZE0169i1 keypads)

When required the door switch signal can be used to switch the system to the programmed switch P1.

If this function is required the 'Automatic Arrival Switching' cannot be used.

PA Microphone

The Keypad incorporates a public address **microphone** for use with a Woodway siren with PA capability and is made active via a **PTT** (Press-To-Talk) switch located on the side of the keypad. When the switch is operated it will mute any active siren tones. The volume is factory set but may be adjusted to suit operator preferences. See **Figure 2**.

Mounting

A number of installation options are made possible through the availability of various fascia mounting brackets. The Keypad can be positioned either vertically or horizontally allowing the best use of limited mounting space.

Default Programme

The keypad may be supplied with a default programme which does not give the desired control. To disable the programme disable the lockout and press and hold SW11 and SW14 until a confirmation beep is heard. Enable the lockout



Keypad Programming

WARNING! Keypad programming should only be carried out with either the data wire to the receiver disconnected or the receiver output connector removed to prevent un-intentional operation of the vehicle equipment. Changes to the keypad settings should not be carried out with the vehicle engine running.

Keypad Lockout

In normal use the keypad is locked to prevent changes to the keypad function. Keypad functions cannot be changed until the lock is disabled. To disable the lock press and hold switches 1, 4, 7, 12 and 14 until a beep is heard. The led at the top of the panel will be permanently on. To enable the lock press and hold SW13 and SW14 until a beep is heard. The keypad will de-activate. To re-activate press any key.

To program P1:

- 1 Press and hold down P1 until the confirmation beep is heard (5 seconds approx). P1 will flash and the current program setting, if any, will be activated. All programmed switches will be illuminated.
- 2 Select the new combination of buttons to activate with P1 by activating/de-activating buttons 1 to 13, leaving only those buttons required illuminated.
- 3 When the selection is complete, do not press any other button until the beep is heard to confirm the programme. (Approximately 10 seconds from the last selection). P1 will stop flashing when programmed.
- 4 Reset the keypad by pressing the Reset button.
- 5 To program P2, repeat as for P1.

Switch self-cancelling mode:

In some situations it may be preferable to have buttons self-cancelling, i.e. if one button in the row is active pressing another one in the same row will cancel it. This is possible for individual rows of buttons, i.e. **1 - 3, 4 - 6, 7 - 9, 10 -12** and a self cancelling bank **7 - 12**

To program the buttons for self-cancelling mode:

Press and hold down the first button on the row, i.e. 1, 4, 7 or 10 and, at the same time, press and hold down SW14 until a beep is heard. Repeat this procedure for further row settings.

Buttons **7 to 12** may be a self-cancelling bank. To set this option, press the **Reset Button** and button **12**.

To cancel the self-cancelling mode, repeat the above procedures.

To program the buttons for momentary or latching operation:

The default setting for switches 1-12 is latching. To change any switch from latching to momentary operation or vice-versa;

- 1 Press and hold down SW13 and the switch to be changed for 5 secs until a confirmation beep is heard
- 2 Release both switches and press SW14.

Special Strobe Setting:

The special strobe setting is only applicable to switches 1 to 3 and is usually set when the system is used to control '360' light selection on a Woodway lightbar. When this option is set pressing SW1 will also activate SW2 and SW3.

- 1 Press and hold down SW14 and switch 2 until a confirmation beep is heard.
- 2 Release both switches.
- 3 To cancel the setting, repeat the procedure.

External 999 Input

To enable this function.

- 1 Press and hold SW6 and SW14 until a beep is heard.

To cancel the setting, press SW3 and SW14 until a beep is heard

Changing and Fitting the Switch Legends

The keypad switch legends are factory fitted when customers have specified the legend layout required. A comprehensive list of standard legends is available on request. Users may change the legends at any time by following the procedure below.

To fit the switch legends:

- 1 Disconnect power from the switch panel.
- 2 Before removing the bezel note the current legend layout and orientation.
- 3 Remove the two screws at the top of the panel and one in the centre of the panel
- 4 Place a small screwdriver blade into the hole at the top left edge of the bezel and gently lift the bezel. Slide the blade around the edge to prise the bezel completely away from the keypad.
- 5 Each switch button is made up of three parts, the button pad, the legend and the lens. Remove the button to be changed and slide the button lens left or right to remove it from the button assembly.
- 6 Fit the new legend in the correct orientation and slide the lens back onto the button.
- 7 Replace all the button assemblies onto the keypad.
- 8 Holding the keypad firmly to prevent the button assemblies from being dislodged, locate the bezel tabs into the slots at the bottom edge of the keypad and press the bezel firmly in place.
- 9 Before re-fitting the screws check the action of the buttons. If necessary remove the bezel and refit.
- 10 Re-fit all the screws. Do not over tighten the screws as this may distort the plastics and prevent the correct action of the switches
- 11 Check that all the buttons are free and operate reliably before reconnecting the switch panel.

Troubleshooting

The following table is a guide to the most common problems and assumes that the equipment under control is fully functioning.

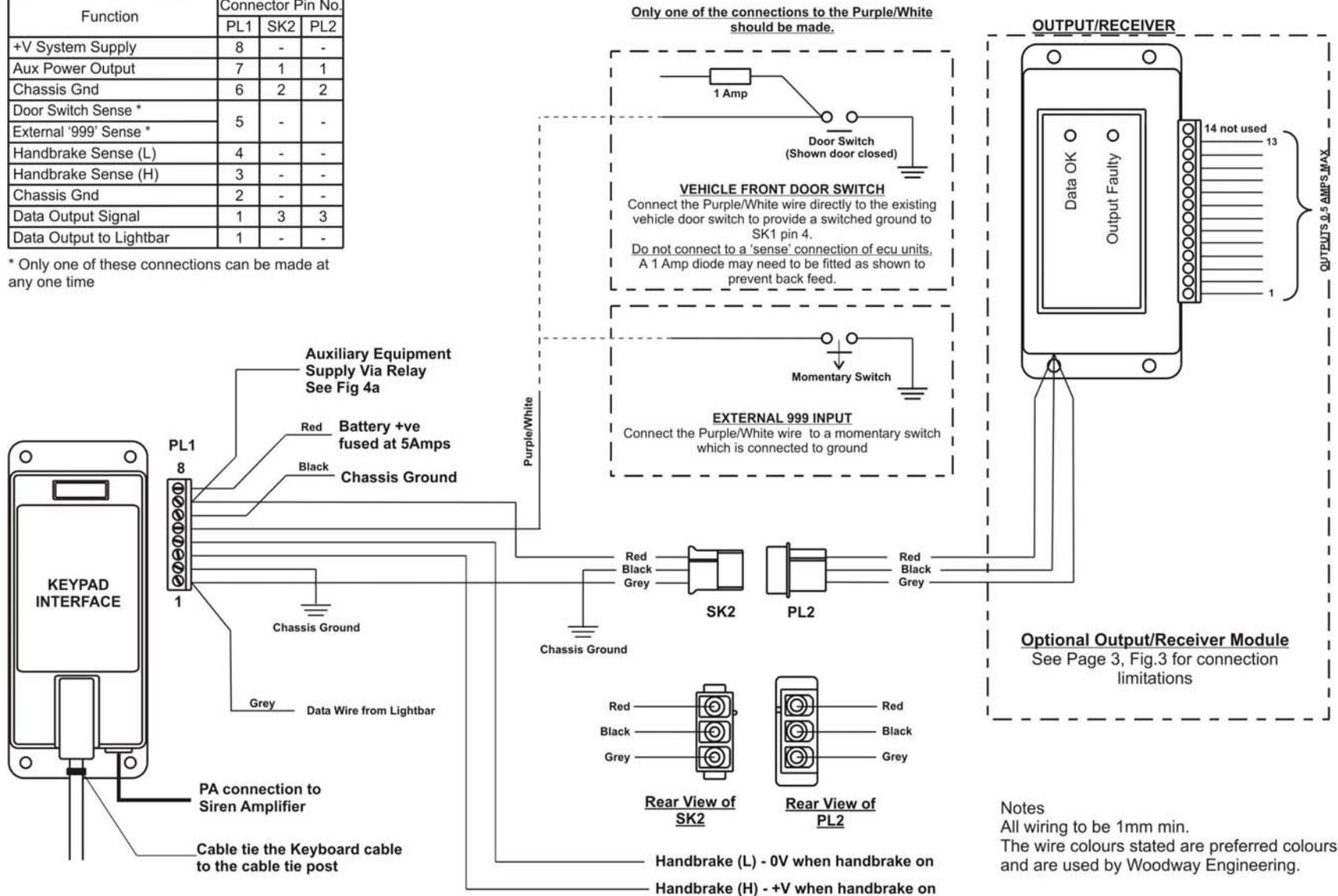
Problem	Possible Cause(s)	Solution(s)
Total system failure	Blown fuse.	Check power supply and connections to modules.
<ul style="list-style-type: none"> Single switch operation on handset is ok but multiple switch operation fails or causes system shutdown. Lightbar control failure 	Communications fault. Low voltage.	<ul style="list-style-type: none"> Check Data link connections are secure. Check inputs and cable ends are clean. Check battery voltage has not dropped below 12V.
<ul style="list-style-type: none"> Red LED illuminated on Output/Receiver module When selecting more than one switch function some lights are on others are not. Light operation appears to be 'haywire' 	Excessive current draw on one or more channels. (Maximum working current is 0.5 amps (500mA) per channel).	To locate the faulty channel, Operate each switch individually until the Red LED illuminates. <ul style="list-style-type: none"> Check for short circuit in wiring. Check for faulty equipment. If problem still persists replace Output/Receiver Unit
No output from Output/Receiver. 'Data OK' led is not flashing	Communication fault.	Check Data link connections are secure.
High pitch 'whistle' from the speaker on PA operation	Volume set too high.	Turn the pot anti-clockwise to reduce the volume. (See Fig. 2)
	Keypad and speaker too close together	Increase the physical separation between the keypad and the speaker
The Keypad led is flashing.	Low Voltage	Check that the voltage is healthy. For 12V systems >9.5V
The keypad led is permanently on and the system is not functioning	Internal eeprom fault	Replace keypad
One or more switches will not remain on.	Switches are set for momentary operation.	Reset the switches to latching operation (See Keypad Programming on Page 6)
Pressing one switch 'On' turns the previous one 'Off'.	Switches are set to 'self-cancelling'.	Reset the switches. (See Keypad Programming on Page 6)
When selecting '360' the lightbar is not functioning	Switches are incorrectly set.	For the '360' to function correctly when connected to a Woodway lightbar only SW1 can be used as 360 and the 'Special Strobe Function' must be set. (See Keypad Programming on Page 5)
Switch panel cannot be programmed.	Keypad has lockout still enabled.	Disable lockout (see page 5)
Switches 3, 13 and 14 have no output.	A 'special' programme setting has been enabled.	To disable the programme setting put the keypad into programming mode and press and hold SW11 and SW14 until a beep is heard.
When the door is opened a beeper is heard.	Door switch has been connected but the handbrake has not been connected or the handbrake has not been applied.	If the door switch is connected into the system, the handbrake must also be connected. The beeper acts as a 'handbrake off' warning.

System Wiring

Opti-Link System Installation Wiring Diagrams

Function	Connector Pin No.		
	PL1	SK2	PL2
+V System Supply	8	-	-
Aux Power Output	7	1	1
Chassis Gnd	6	2	2
Door Switch Sense *	5	-	-
External '999' Sense *		-	-
Handbrake Sense (L)	4	-	-
Handbrake Sense (H)	3	-	-
Chassis Gnd	2	-	-
Data Output Signal	1	3	3
Data Output to Lightbar	1	-	-

* Only one of these connections can be made at any one time



Sleep Timer Override
 Although not recommended to override this function link PL1 terminals 2, 4 and 5

Sleep Timer Function Handbrake Connections
 Only one of the above connections is required

OPTI-LINK SYSTEM GENERAL WIRING LAYOUT

Auxiliary Relays

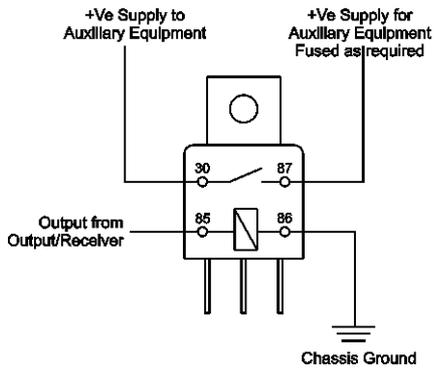


Figure 4: Output/Receiver Relay Connections

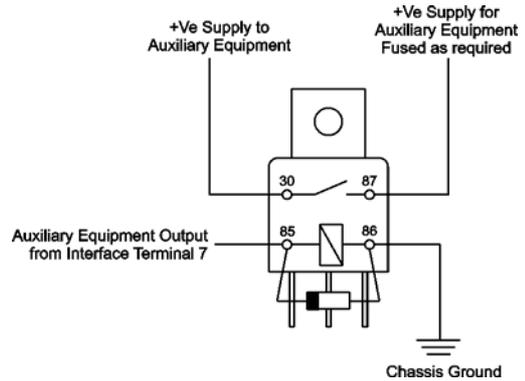


Figure 4a: Auxiliary Equipment Relay Connections
 Note: A diode must be fitted across the coil to prevent back emf.

Beta Siren Installation – Hands Free Control

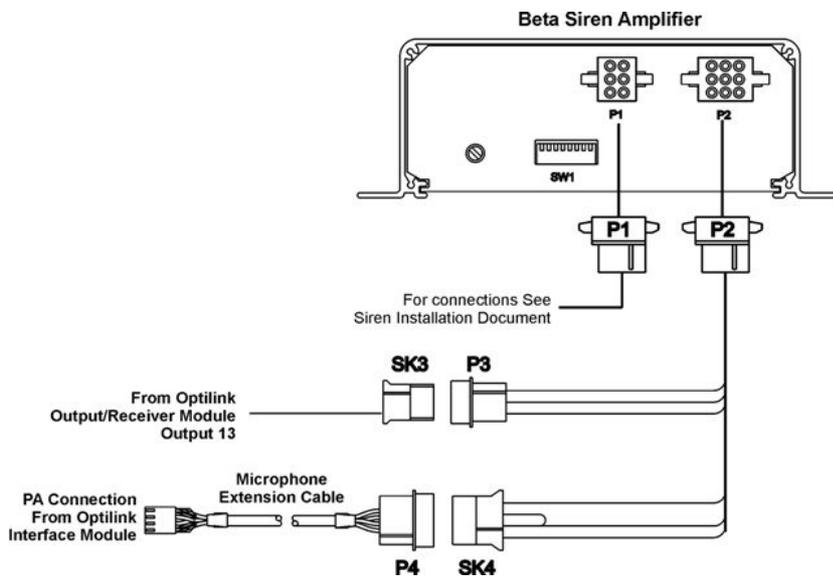


Figure 5

Socket SK3		
Pin	Wire Colour	Function
1		
2		
3	White/Orange	Hands Free
Plug P3		
Pin	Wire Colour	Function
1		
2		
3	White/Orange	Hands Free
Socket SK4		
Pin	Wire Colour	Function
1	White/Blue	Mic +
2	White/Black	Mic -
3		
4	White/Violet	PTT
Plug P2		
Pin	Wire Colour	Function
1	Red/White	Not Used
2	White/Green	Horn Ring
3	White/Brown	Wail
4	White/Red	Yelp
5	White/Orange	Hands Free
6	White/Yellow	Not Used
7	White/Violet	PTT
8	White/Black	Mic -
9	White/Blue	Mic +