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Purpose:

The Purpose of this document is to describe the sample system that has been specifically designed for Sundancer 350DA boat of Sea Ray, Inc.

Description:

The sample system will include the following items:

Description	Quantity
PC20 with By-Pass PME1 FORE (replacing 91YY6137-2B)	1
PC20 with By-Pass PME2 AFT (replacing 91YY6138-4B)	1
DSS Keypad, Sea Ray 350DA, PORT p/n 91YY6321-1	1
DSS Keypad, Sea Ray 350DA, STBD p/n 91YY6322-1	1
Connectors Kit	1
Option available: wiring harness "Pigtail"	1
User Documentation	1

General Operation:

When a button is pressed the circuit for that button will turn on. The indicators on all keypads for that circuit will light up to show circuit is on. Any keypad can turn a circuit on or off.

If a circuit draws more than the rated current, the circuit will be turned off and the indicator LED will flash to indicate circuit was tripped. To reset the circuit, press the button down.

Customer Approval:

Signature: _____

Date: _____

**PME1 FORE 0x41: PC20 w/ By-Pass
Pin out - MOLEX and Deutsch Connector**

Circuit	Molex Pin	Deutsch Pin	Current (A)	Function	Key & LED
Windlass Up	J1 1*	31	5A	Momentary Interlock Enable by J1-8 PME2	32 C
Windlass Down	J1 2*	32	5A		32 D
Audio	J1 3 By-Pass	2	3A	Toggle	31 M
Dimmer Console	J1 4	3	5A	Light Function + Dimmer_7 State	On 31 H, Up 31 K, Down 31 L
Nav Lights	J1 5 By-Pass	38	6A	Light Function	31 H
ACC 1	J1 6*	20	15A	Toggle	32 G
Wiper STBD	J1 7*	21	5A	Toggle	31 I
Wiper PORT	J1 8*	30	5A	Toggle	31 G
Arch Light	J1 9 By-Pass	39	10A	Toggle	31 D
Unswitched Acc	J1 10*	7	10A	Always On	-
12V Receptacle	J1 11*	8	15A	Always On	-
Comp Light	J1 16 By-Pass	40	10A	Toggle	31 F
Spot Light	J2 1	9	10A	Always On	-
Horn	J2 2*	11	5A	Momentary	32 A
Not Used	J2 3	-	-	-	-
Not Used	J2 4	-	-	-	-
Not Used	J2 5	-	-	-	-
Not Used	J2 6	-	-	-	-
Not Used	J2 7	-	-	-	-
Not Used	J2 8	-	-	-	-
Not Used	J2 11	-	-	-	-
Not Used	J2 12	-	-	-	-
TxRx-	J3-1	13, 14, 24	-	-	-
TxRx+	J3-2	12, 22, 23	-	-	-
Keypad Power	J3-4**	4, 5	5A	Always On	-
Ground	J1- 12,13,14,15 J2- 9 ,10	Pin- 6,15,16,17,18, 19,25,26,27,28,29, 35,36	N/A	N/A	

*Note: Circuit protected with 300 ms trip delay

**Keypad Power: the PME1 powers both keypads

PME2 AFT 0x42: PC20 w/ By-Pass
Pin out - MOLEX and Deutsch Connector

Circuit	Molex Pin	Deutsch Pin	Current (A)	Function	Key & Led
ACC 2 (Underwater Light)	J1 1*	1	15A	Toggle	32 H
ACCY	J1 2*	21	15A	Always On	-
Nav Light	J1 3 By-Pass	34	6A	Light Function	31 H
Anchor Light	J1 5 By-Pass	33	6A	Light Function	31 H
				Toggle	31 J
Bilge Blower	J1 4*	31	10A	Toggle	32 J
	J1 6*	35	10A		
Ckpt Light	J1 7	36	15A	Toggle	31 A
Windlass Sense	J1 8	19	-	Sense (Input)	-
Bilge Pump (output diode)	J1 9 By-Pass*	11	10A	Toggle	32 I
Bilge Light	J1 10	37	15A	Toggle	31 E
-	J1 11	-	-	-	-
Comp Light	J1 16 By-Pass	38	10A	Toggle	31 F
Trim Tabs Valve Left	J2 1*	40	15A	Momentary/ Interlock	32 K, 32 L
Trim Tabs Valve Right	J2 2*	39	15A		32 M, 32 N
Trim Tabs Up	J2 3*	20	15A		32 N, 32 L
Trim Tabs Down	J2 4*	30	15A		32 K, 32 M
-	J2 5	-	-	-	-
Windlass Enable	J2 6*	32	5A	Momentary H Bridge Reverse Polarity	32 B
	J2 7*	4	5A		
-	J2 8	-	-	-	-
Hatch Lift Right Up Hatch Lift Left Up	J2 11*	2, 12	20A	Momentary Interlock – H Bridge (Default to GND)	32 E
Hatch Lift Right Down Hatch Lift Left Down	J2 12*	3, 13	20A		32 F
TxRx-	J3-1	23	-	-	-
TxRx+	J3-2	22	-	-	-
-	J3-4	-	-	-	-
Stereo Memory **	-	7	15A	Always On	-
Port Merchathode **	-	8	5A	Always On	-
Stbd Merchathode **	-	9	5A	Always On	-
Sys Monitor **	-	10	5A	Always On	-
Ground	J1- 12,13,14,15 J2- 9,10	Pin- 6,14,15,16,17,18, 24,25,26,27,28,29	N/A	-	N/A

*Note: Circuit protected with 300 ms trip delay

**Note: Circuits connected to the 2nd battery pole

Pin out for 4-pin PME1 FORE Bus Molex Connector J3 :

Pin	Function
1	TxRx-
2	TxRx+
3	Ground
4	Power (12V)

Pin out for 4-pin PME2 AFT Bus Molex Connector J3 :

Pin	Function
1	TxRx-
2	TxRx+
3	Ground
4	-

By pass fuse rate PME1 FORE:

Set the bypass switches to 0 in normal operating condition

By pass	Molex Pin	Circuit	Rate
1	J1-16	Comp Light	10A
2	J1-5	Nav Lights	7,5A
3	J1-3	Audio	3A
4	J1-9	Arch Light	10A

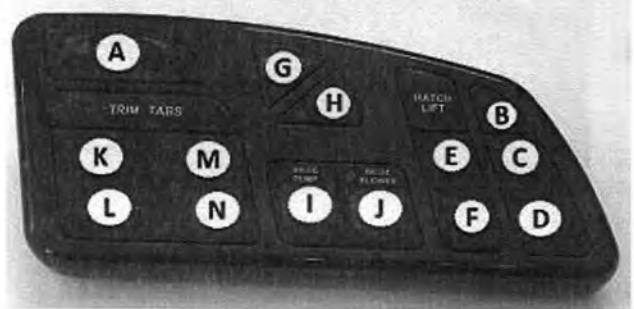
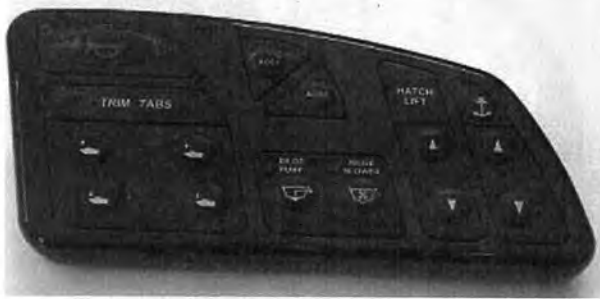
By pass fuse rate PME2 AFT:

Set the bypass switches to 0 in normal operating condition

By pass	Molex Pin	Circuit	Rate
1	J1-16	Comp Light	10A
2	J1-5	Anchor Light	7,5A
3	J1-3	Nav Light	7,5A
4	J1-9	Bilge Pump	10A

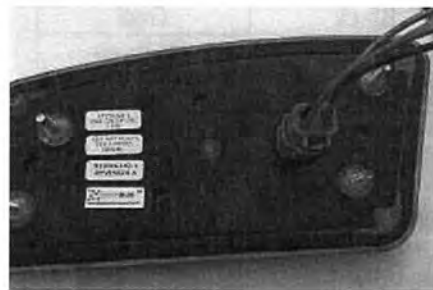
Keypads

Keypad 1: Sea Ray 350DA, STBD (0X32) p/n 91YY6322-1



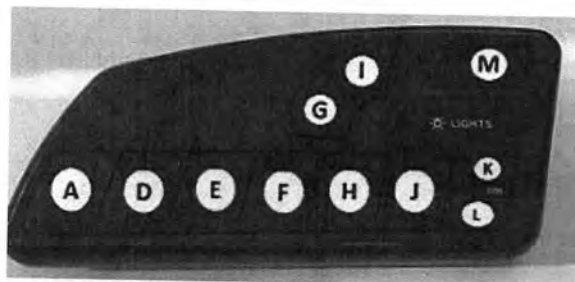
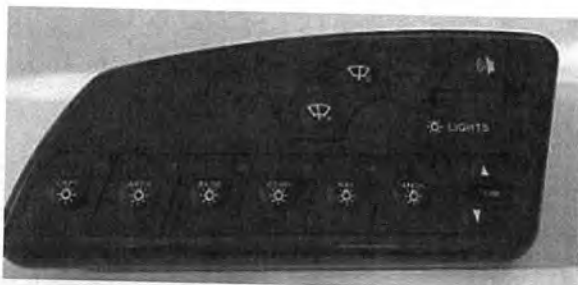
4-pin Deutsch connector Keypad

Pin	Color	Signal
1	Red	Pwr
2	Black	Gnd
3	Orange	TxRx+
4	Green	TxRx-



Firmware: 91SW6142-1 Rev. A
Sea Ray P/N: 1940065
Keypad Address: 32h
Baud rate: 9600bps
Color LED utilities: Blu
Backlight color: White

Keypad 2: Sea Ray 350DA, PORT (0X31) p/n 91YY6321-1



4-pin Deutsch connector Keypad

Pin	Color	Signal
1	Red	Pwr
2	Black	Gnd
3	Orange	TxRx+
4	Green	TxRx-



Firmware: 91SW6141-1 Rev. A

Sea Ray P/N: 1940087

Keypad Address: 31h

Baud rate: 9600bps

Color LED utilities: Blu

Backlight color: White

Summary of functions:

Toggle Function:

The first press of the button turns circuit on, and the next press turns circuit off.

Momentary Function:

The circuit is on while the button is pressed down and off when released.

Always On Function:

These circuits are always on.

Sense Function:

This is a sense input which enables Windlass Up and Windlass Down on the PME1.

Light Function (Nav Light +Anchor Light+ Backlight+ Dimmer Console)

First press of the Nav button (31H) will turn on the following circuits: FORE J1-4, FORE J1-5, AFT J1-3, and AFT J1-5. The first press of the Nav button turns on also the backlight and the LEDs on the keypad relative to the pins.

The second press of the Nav button turns the same circuits off. The Anchor button will be ignored while the Nav button is on.

First press of the Anchor button (31J) will turn on the circuit AFT J1-5 and LED. The second press of the Anchor button turns the same circuits off and LED.

The Console Dimmer output (J1-4 FORE circuit) and the backlight level can be adjusted by the buttons Dimmer Up and Dimmer Down.

The Console Dimmer (FORE J1-4) circuit will initially start at minimum level after the PME1 is powered up. The power level is changed with the Dimmer Up button (31K) or Dimmer Down button (31L). As long as the FORE PME remains powered up, the Console Dimmer will retain its previous power level when the NAV button is turned off then on again.

Momentary / Interlock Function (Trim Tabs):

When the Trim Tabs Down button is pressed the Trim Tabs Valve Right pin (PME2 J2-1) is turned on and the Trim Tabs Down pin (PME2 J2-4) is turned on. This continues until the button is released.

When the Trim Tabs Up button is pressed the Trim Tabs Valve Right pin (PME2 J2-1) is turned on and the Trim Tabs Up pin (PME2 J2-3) is activated. This continues until the button is released.

When the Trim Tabs Down button is pressed the Trim Tabs Left Valve pin (PME2 J2-2) is turned on and the Trim Tabs Down pin (PME2 J2-4) is activated. This continues until the button is released.

When the Trim Tabs Up button is pressed the Trim Tab Left Valve pin (PME2 J2-2) is turned on and the Trim Tabs Up pin (PME2 J2-3) is activated. This continues until the button is released.

If one button is pressed, the inactive pins can not activate if another button is pressed. In other words, only one button at a time will operate.

Momentary Interlock – H Bridge Function (Hatch Lift):

Two circuits are associated with the Momentary/Interlock – H Bridge Function.

Only one circuit can be on at a time. When the first circuit is on, the second circuit is at ground voltage and vice versa. If one circuit is on, the other circuit can not be turned on.

When the button is released, both circuits are at ground voltage.

Momentary Interlock with enable (Windlass Up and Windlass Down):

The circuit is on while the button is pressed down and off when released. When the first circuit is on, the second circuit is disable. Only one circuit can be on at a time. If one circuit is on, the other circuit can not be turned on. Both circuits are enabled only when the J1-8 of the PME2 is at 12V (enable pin).

Momentary H Bridge Reverse Polarity (Windlass Enable):

Before being able to control the windlass using the 32 C (Up) and 32 D (Down) keys, the windlass must be enabled by the button 32 B.

The key 32 B is a momentary key that commands an H bridge between J2-7 and J2-6 of the PME2.

When the button is pressed, there is 12V between the outputs J2-7 and J2-6. (Pin J2-7 to 12V and J2-6 to Gnd) The second press of the button reverse the polarity of the H Bridge pin J2-7 to Gnd and J2-6 to 12V.

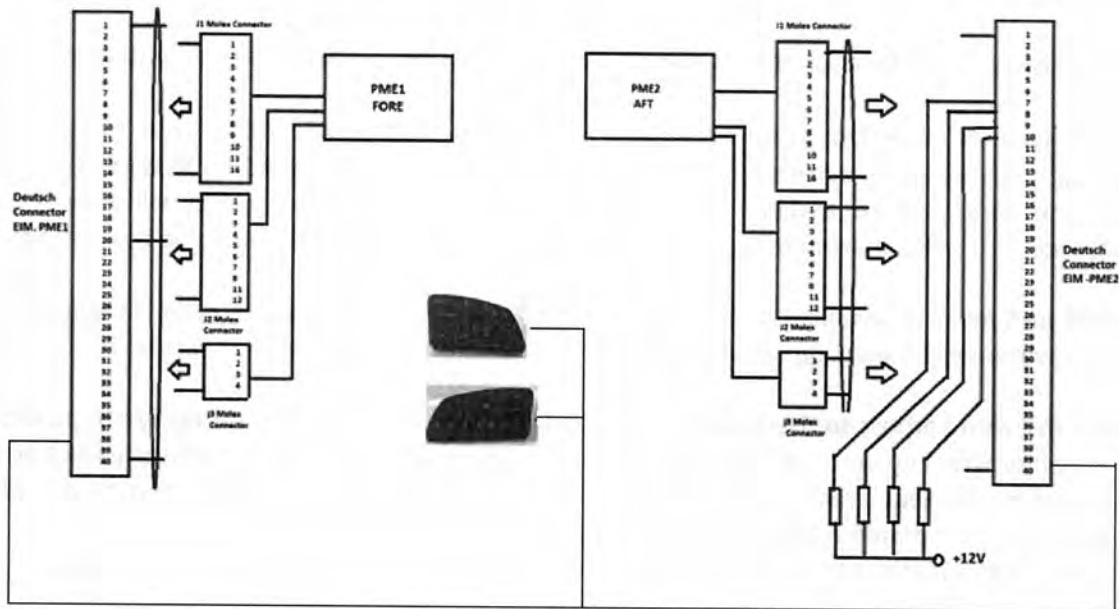
The 12V between J2-7 and J2-6 enables the relay for the windlass command, when the relay is enabled, a 12V signal is read on J1-8 of the PME2 and the PME2 switch on the LED on the windlass button on keypad1. Until the J1-8 is at 12V, the windlass up and down commands are enabled.

Dimmer_7_State Function:

This function is used for the Console Dimmer Circuit.

Pressing and holding the down button will cause the circuit voltage decrease (7 levels) until minimum power is reached. Pressing and holding the up button will cause the circuit voltage increase (7 levels) until maximum (full) power is reached. The circuit will remain on at the voltage that was present when the button is released. Pressing the button 31H a second time will turn pin off. The dimmer buttons only work when the Navigation light circuits are on. When the circuit is turned off, the next time it is turned on it will return to its previous power level (unless power is removed from the PME). The keypad LEDs will also dim from the lowest to brightest in along with the Console Dimmer.

System Block diagram



Note: The PME1 powered both keypads

Installation:

The keypad and PME unit(s) should be inspected for physical damage before installation. Any cracked, broken or bent items on either unit should be reported to your shipping firm or to Blink for proper disposition.

Ensure all power is off by disconnecting the marine batteries or de-energizing the battery switch.

Keypads must be mounted to a flat surface using a properly positioned cut out for the keypad mounting studs and connector pigtail. The keypad mounting studs should be secured through the panel using 10-32 UNF nut and lock-washer. Do not exceed torque ratings as this will crack or deform the keypad. The maximum torque applicable on the keypads studs should be below 0,8Nm.

The PME unit must be installed in a non-submerged and ventilated space in order to guarantee the correct environmental working conditions. The ambient temperature shall not exceed 70°C.

Connect the wire harness to the devices of the system. Wire harnesses are normally not provided by Blink together with keypads and PME units. It is the customer's responsibility to ensure the harnesses are designed, manufactured, and installed to meet the design specifications and to comply the relevant standards related to the end user application.

To connect the PME, refer to the table Pin-out - MOLEX connector.

Secure the negative power side terminal to the negative panel connector and the positive power side terminal to the positive panel connector. Take care to never reverse the power supply polarity. Crimp the wires in the Molex pins and insert the pins in the harness connector. Once all the pins are inserted, plug the Molex harness connector into the panel header connector. Never connect the Molex pin connectors to the PME without connecting the power terminals first.

If the PMEs shall be installed in an existing boat for the replacement of the EIM unit, the wiring harness adapter "Pigtail" is available.

Secure the PME with four M5 bolts, nuts and washers or equivalent wood screws (not provided).

To connect the Keypad, refer to the table Pin out for 4-pin Keypad Deutsch Connector.

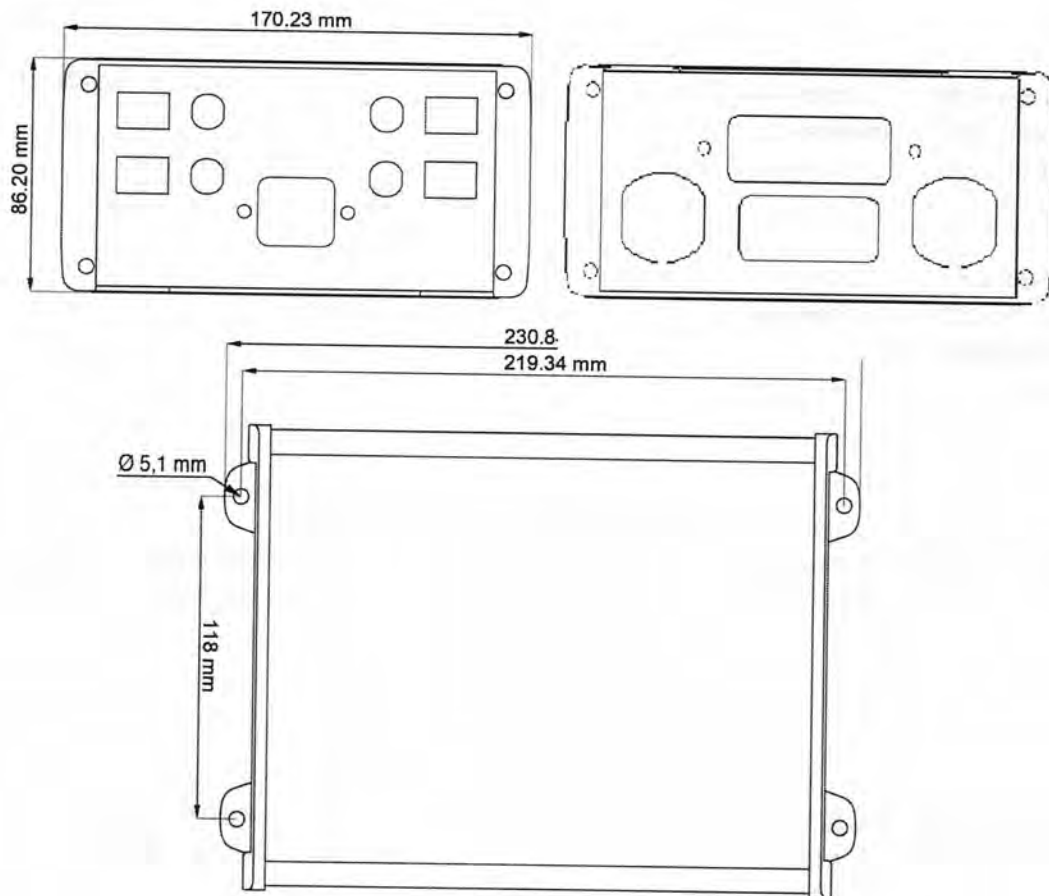
When the wire harness is finished, the system is ready for power and operation. Re-connect the main batteries to the circuit and follow the operational instructions.

Important: always switch off the system power supply (disconnect the batteries) in case the PME needs to be removed for maintenance or replacement.

Mechanical and Environmental Specifications

Keypad Environmental	
<i>Operating Temperature:</i>	-20°C to +85°C
<i>Storage Temperature:</i>	-40°C to +85°C
<i>Humidity:</i>	0 to 98% (No condensation)
<i>Salt Spray:</i>	Per ASTM B117
<i>UV Protection:</i>	UV-B 400 Hrs
Keypad Connectors	Deutsch DT04-4P or equivalent

Enclosure dimensions



System Troubleshooting Guide

Problem	Possible Causes	Troubleshooting Steps
No Power to Keypads (No functions work and no lights turn on)	<ol style="list-style-type: none"> 1. Keypad power breaker tripped 2. PME not wired or connected properly 3. Low battery power 4. Improper wiring from PME to Keypad 5. Faulty Keypad 6. Faulty PME box 	<ol style="list-style-type: none"> 1. Check PME to see if the keypad power circuit limit is tripped. 2. Verify PME is wired to the battery properly (refer to wiring diagram) 3. Verify battery is fully charged 4. Verify switch pad power, ground, TX/RX+ and TX/RX- lines are connected to the correct PME pins. 5. Replace Switch pad 6. Replace PME box
Single Function doesn't work but Indicator LED lights up when button is pressed	<ol style="list-style-type: none"> 1. Improper wiring to device 2. Faulty boat device 3. Faulty PME box 	<ol style="list-style-type: none"> 1. Check for 12V at device. Check for 12V at PME pin 2. Check boat device for operation 3. Replace PME box
Single function doesn't work and indicator LED doesn't light up when button is pressed	<ol style="list-style-type: none"> 1. Faulty Keypad 2. Faulty PME box 	<ol style="list-style-type: none"> 1. Replace Keypad. 2. Replace PME box.
Function Switch works but indicator LED doesn't light up	<ol style="list-style-type: none"> 1. Low battery power 2. Faulty Keypad 3. Faulty PME 	<ol style="list-style-type: none"> 1. Verify system is at recommended voltage (2. Cycle power to the Switch pad and watch for LED to light up. Replace Switch pad if LED still doesn't light up. 3. Replace PME box.
Keypad powers up but no functions work	<ol style="list-style-type: none"> 1. Tripped circuit limits 2. Improper wiring 3. Faulty Keypad 4. Faulty PME 	<ol style="list-style-type: none"> 1. Check Device for over-current. 2. Verify communication lines (TX/RX+ and TX/RX-) are wired to appropriate PME pin #'s. 3. Cycle power to the Keypad and watch for LED to light up. Replace Keypad if LED still doesn't light up. 4. Replace PME box.

Circuit is always tripped when button is pressed	<ul style="list-style-type: none"> 1. Faulty boat device 2. Short circuit in wiring harness 3. Circuit trip limit value too low for device 	<ul style="list-style-type: none"> 1. Verify boat device is working properly. 2. Check for short circuit in wiring harness. 3. Verify circuit breaker value is sufficient for system.
LED Blinks and output circuit does no work	<ul style="list-style-type: none"> 1. Faulty boat device 2. Short circuit in wiring harness 3. Circuit trip limit value too low for device 	<ul style="list-style-type: none"> 1. Repair problem and then press the button to clear trip reset.
Wrong output is activated when button is pressed	<ul style="list-style-type: none"> 1. Improper wiring 	<ul style="list-style-type: none"> 1. Verify device is connected to appropriate pin # on PME box.
Indicator LED's flicker on and off	<ul style="list-style-type: none"> 1. Function has no load 2. Stray Voltage from harness 	<ul style="list-style-type: none"> 1. Apply a load to the function. 2. Check shielding on communication lines.
System Locks Up	<ul style="list-style-type: none"> 1. Low battery power 	<ul style="list-style-type: none"> 1. Cycle power to the Keypad and PME. 2. Verify system is at recommended voltage.

Date	Revision	Comment	SW Version
24/09/19	1.0	Initial Release	00
24/10/19	1.1	Moved the circuit Windlass Sense from J2-8 to J1-8. Moved the circuit Bilge Light from J1-8 to J1-10.	01