



Installation Manual - EIM Kidney System Replacement

Prepared by: Kinequip, Inc.

Prepared for: Sea Ray Boats, Inc.

Contents

1. Purpose	2
2. Safety.....	2
3. Introduction	2
4. Kit Contents.....	2
5. System Overview.....	4
6. Installation Tips and Tricks.....	6
7. Installation.....	6
8. Adapter Harness Connections.....	9



1. Purpose

This document has been created to provide an Installation guide on the details of Kinequip, Inc.'s Marine Control Module (MCM) based Electronic Switching System. This guide does not provide model specific details. Care must be taken to ensure a safe and reliable installation and usage. For a troubleshooting guide, please refer to the Troubleshooting Manual.

2. Safety

This document only considers the electronic switching system to be replaced and not the proper or safe configuration of the vessel prior to or during replacement. Steps that should be taken to ensure safe configuration of the vessel include but are not limited to, disconnection at the source of all power sources including, batteries, shoreline connections, and solar charger.

Initial power up and testing should be conducted in a manner which will avoid bodily harm or property damage.

3. Introduction

The following is a draft of the installation details associated with replacing existing Electronic Switching Systems, comprised of Forward (FWD) and Aft Electronic Interface Modules (EIM) and Port and Starboard (STBD) Kidney Switch Panels, with Kinequip Marine Control Modules and Switch Panels. This system has been designed to replace the EIM Gen 2 Kidney systems. Contact Sea Ray for vessel compatibility.

4. Kit Contents

The kit should contain all items needed for normal installations. The components in the kit are listed below in Table I. An image of the Switch Panels is shown in Figure 1, MCMs in Figure 2, and MCM to EIM adapter harnesses in Figure 3. Each adapter harness includes a Junction Post (J-Post) kit for adapting the ring lug power connections to the MCM. Figure 4 shows these J-Post kits.

Table I – Kit Contents

Item	Qty	Part Number	Description
1	1	KFA-SRY-SPKP-01	Switch Panel Kidney Port
2	1	KFA-SRY-SPKS-01	Switch Panel Kidney Starboard
3	1	KFA-SRY-MCMKF-1	Marine Control Module Forward Kidney EIM
4	1	KFA-SRY-MCMKA-1	Marine Control Module Aft Kidney EIM
5	1	KFA-SRY-AHEF-01	MCM to EIM Adapter Harness Forward
6	1	KFA-SRY-AHEA-01	MCM to EIM Adapter Harness Aft
7	1	KFA-SRY-JPEA-01	Junction Post EIM Aft
8	1	KFA-SRY-JPEF-01	Junction Post EIM Forward



Figure 1 – Port and Starboard Kidney Switch Panels. FOR REFERENCE ONLY



Figure 2 – Aft and Forward Marine Control Module. FOR REFERENCE ONLY

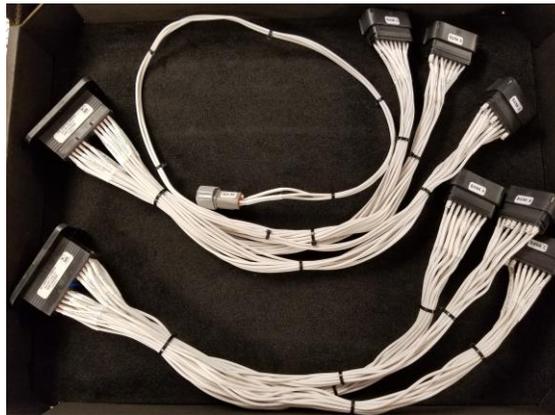


Figure 3 – MCM to EIM Adapter Harness. FOR REFERENCE ONLY



Figure 4 – Junction Post Kits. FOR REFERENCE ONLY



5. System Overview

The following diagrams show the original boat wiring vs. the new boat wiring which includes Kinequip’s MCM electronic switching system and all the equipment associated with it. This is for reference only and does not represent the exact wiring of the boat.

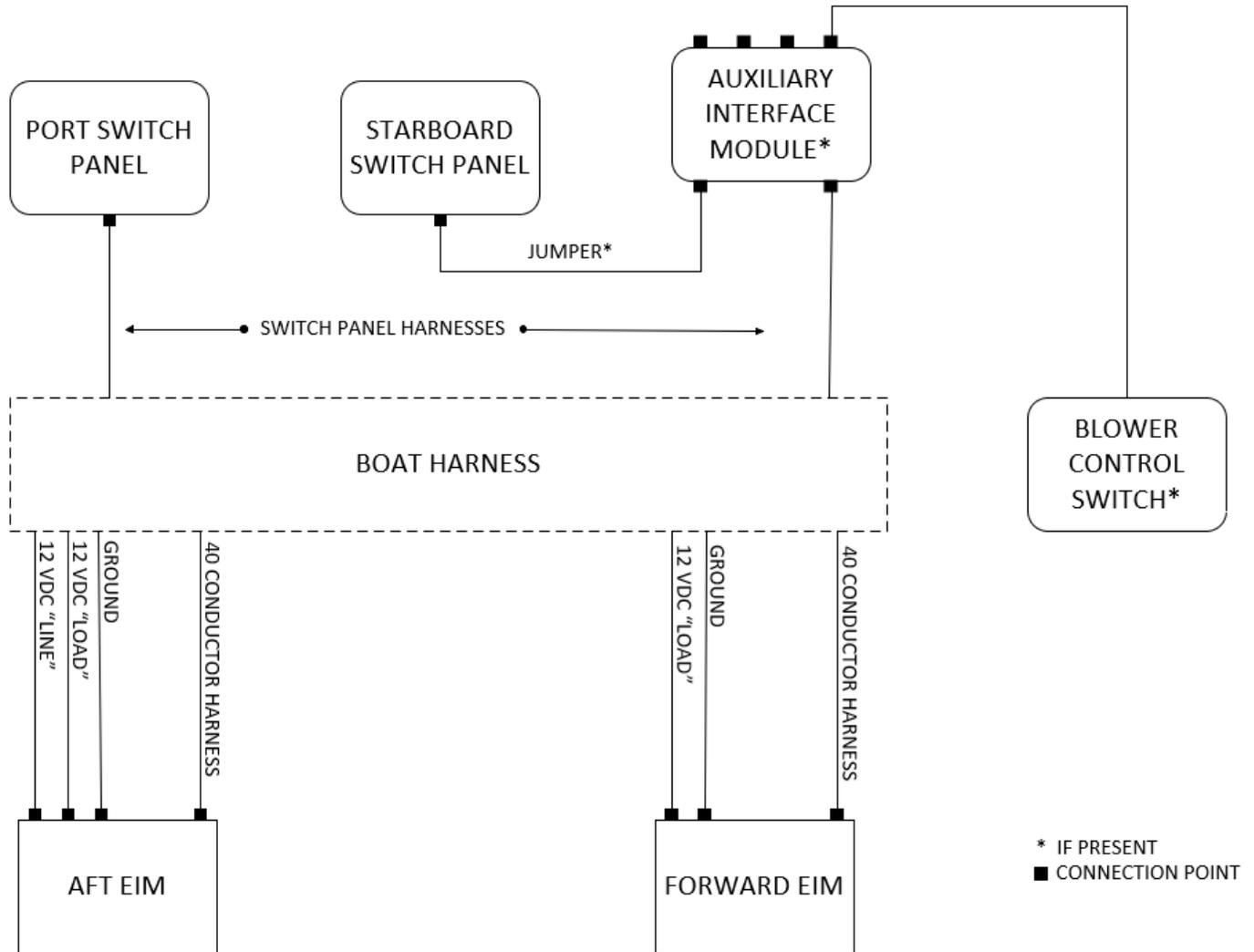


Figure 5 – Original Boat Wiring Diagram. FOR REFERENCE ONLY

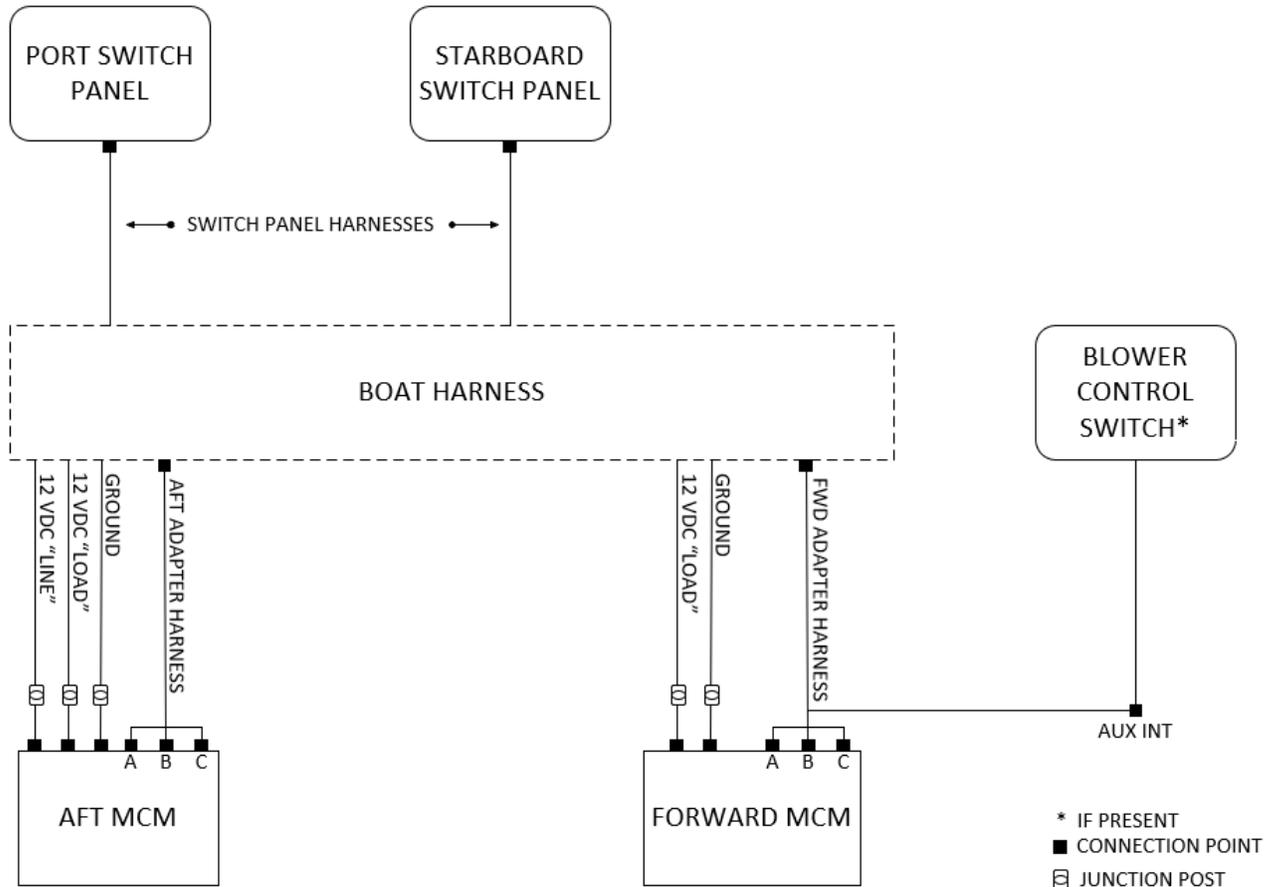


Figure 6 – New Boat Wiring Diagram. FOR REFERENCE ONLY



6. Installation Tips and Tricks

The following is a list of Tips and Tricks that can help ensure a smooth installation of Kinequip's MCM electronic switching system.

- Document all relevant connection points prior to the disconnection of the old electronic switching system. It can be difficult to correctly connect the new system if the connectors no longer have legible designators.
- Validate, as much as possible, the functionality of the boat systems prior to the replacement of the Electronic Switching System.
- Verify that the MCMs are installed in the correct location, Aft vs Forward, with the correct adapter harness.

7. Installation

Prior to the installation of Kinequip's MCM electronic switching system, the old equipment must first be uninstalled from the vessel. A general list of equipment that is to be removed is provided below. Care must be taken regarding the Auxiliary Interface Module connections. **Do not confuse the Blower Switch connection with the Switch Panel connection at the Auxiliary Interface Module.**

The following lists the equipment to be removed:

1. Port Kidney Switch Panel
2. Starboard Kidney Switch Panel
3. Aft EIM
4. Forward EIM
5. Auxiliary Interface Module (If Present)
6. Auxiliary Interface Module Jumper Connector (If Present)

The following lists the basic uninstall procedure:

1. Disconnect the power at the source prior to replacing or servicing equipment.
2. Uninstall the Port Kidney Switch Panel from the vessel by removing the Switch Panel from the dash and disconnecting the wire harness. Note: Do not remove the old wire harness from the vessel.
3. Uninstall the Starboard Kidney Switch Panel from the vessel by removing the Switch Panel from the dash and disconnecting the wire harness. Note: Do not remove the old wire harness from the vessel. If the Starboard Switch Panel Harness comes from the Auxiliary Interface Module, remove the Auxiliary Interface Module and its associated Extension Connector and connect the Starboard Switch Panel directly.
4. Uninstall the Aft EIM from the vessel by removing the EIM from its compartment and disconnecting both the wire harness and power connections. Note: Do not remove the wire harness or power connections from the vessel. Also note which positive power cable is LINE and which is LOAD associated with the Aft EIM.
5. Uninstall the FWD EIM from the vessel by removing the EIM from its compartment and disconnecting both the wire harness and power connections. Note: Do not remove the wire harness or power connections from the vessel.
6. Remove the Auxiliary Interface Module (AIM) if present. The FWD adapter harness comes with an AUX INT connection to facilitate a Blower Control Switch, if applicable.



The following lists the basic install procedure:

With the old EIM based Electronic Switching System removed, Kinequip’s MCM based Electronic Switching System can now be installed. With a complete MCM based system unpackaged and free from damage.

1. Install the new Kinequip, Inc’s Port and Starboard Kidney Switch Panels into their respective locations on the vessel. The connection from the boat’s wiring harness to the switch panel requires no adapter harness and can be connected directly to the new switch panels.
2. **Torque the Switch Panels to 5 in/lbs. Do not use impact drivers as this can damage the units.**
3. Install the Aft MCM where the Aft EIM was located on the vessel. The connection from the boat’s wiring harness to the MCMs requires an adapter harness. Ensure that the Aft adapter harness is used on the Aft MCM.
 - 3.1. Connect power to the Aft MCM by utilizing the J-Post kit. Since the Aft MCM has two positive power cable connections (LINE and LOAD), the Aft J-Post kit has two red J-Posts. Ensure that the LINE connection on the vessel is connected to the LINE Connector on the MCM and that the LOAD connection on the vessel is connected to the LOAD Connector on the MCM. LINE is the constant hot bus while LOAD is the battery switched bus. Tables II and III below detail these connections. Utilize the black J-Post for the negative power connection. Additional information on the Junction Post installation can be found below.
4. Install the FWD MCM where the FWD EIM was located on the vessel. The connection from the boat’s wiring harness to the MCMs requires an adapter harness. Ensure that the FWD adapter Harness is used on the FWD MCM.
 - 4.1. The connection from the boat’s positive and negative power cables to the FWD MCM each require a Junction Post connection to facilitate the ring lug connectors. Additional information on the Junction Post installation can be found below.
 - 4.2. The FWD MCM to EIM adapter harness comes with an AUX INT connection to facilitate a Blower Control Switch, if applicable.

As stated above in the MCM installation procedure, the power connections associated with the MCM’s are not ring terminals. In order to utilize the ring lug connectors that are already installed on the vessel, a J-Post is required. Each MCM adapter harness comes with the required number of J-Posts for that MCM. Table IV below displays the contents of the Aft and FWD J-Post kits. Figure 7 shows a disassembled J-Post.

Table II – Forward MCM Power Connections

Connection	Forward MCM	Description
+12V LINE	+12V LOAD	Battery Switched +12 VDC
GROUND	-NEG	Ground connection

Table III – Aft MCM Power Connections

Connection	Aft MCM	Description
+12V LINE	+12V LINE	Always on +12 VDC
+12V LOAD	+12V LOAD	Battery Switched +12 VDC
GROUND	-NEG	Ground connection



Table IV – EIM Aft and FWD Junction Post Kit Contents.

Item	Qty	Description
1	3	1/4-20 Junction Post Red with Mounting Screws
2	2	1/4-20 Junction Post Black with Mounting Screws
3	3	Wire 12" 8 AWG Red Prepared for Termination
4	2	Wire 12" 8 AWG Black Prepared for Termination

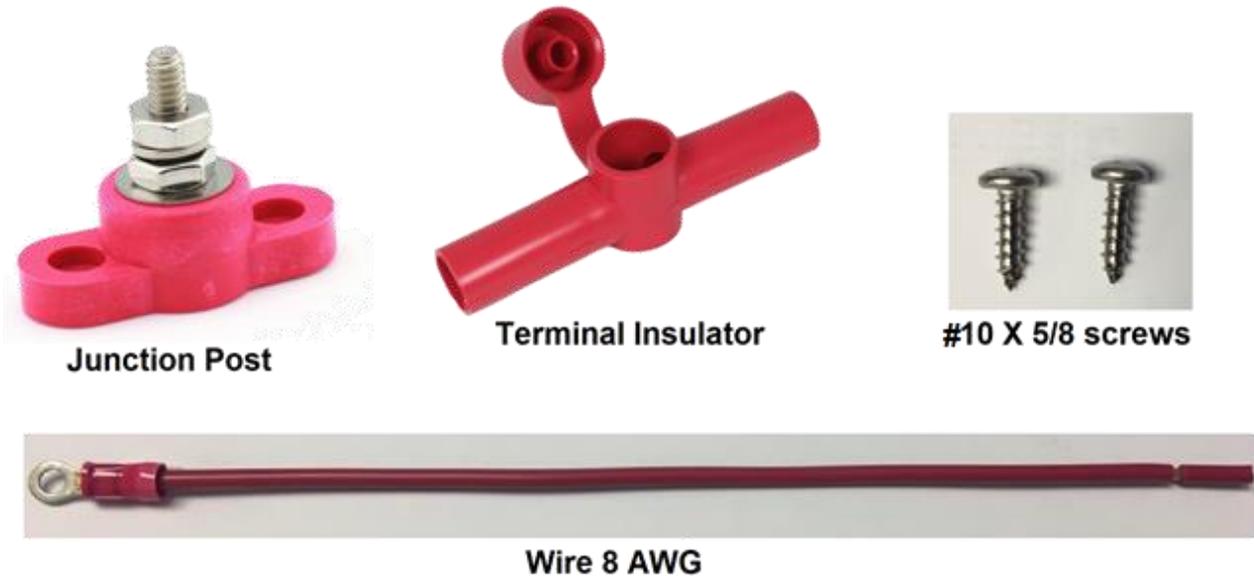


Figure 7 – J-Post Components– FOR REFERENCE ONLY

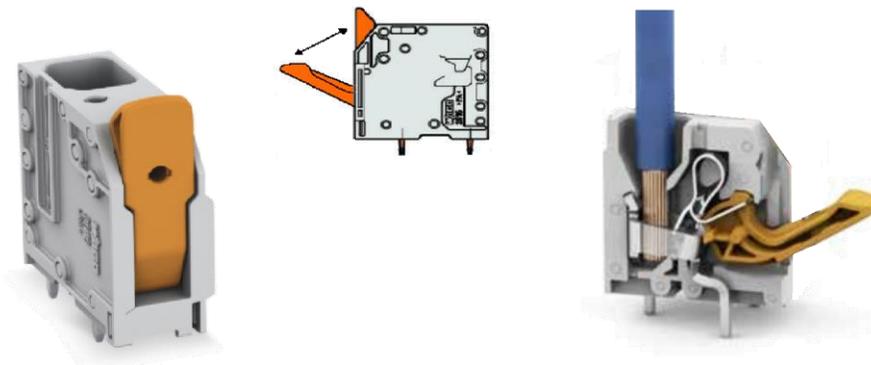
The following lists the basic installation procedure associated with the MCM power connections.

1. Remove washer and nut from the Junction Post.
2. Secure Junction Post using supplied screws (#10 X 5/8) to desired location.
VERIFY SCREW LENGTH BEFORE USING SCREWS
3. Feed crimped ring lug end of the supplied 8 AWG wire and wire from the boat harness into the terminal insulator.
4. Insert the Terminal Insulator over the Junction Post with the post going through the ring lug.
5. Secure ring lug and boat harness wire with the washer and nut as shown below in Figure 8.
6. The J-Post manufactures torque specifications are 72 in/lbs.



**Figure 8 – Assembled J-Post – FOR REFERENCE ONLY**

7. Pull orange clamp on the WAGO connector on the MCM down and away from the MCM to prepare for wire installation as shown in Figure 9.
8. Remove pre-stripped insulation from the end of the 8 AWG wire and insert the appropriate position of the Marine Control Module (GND, LINE, or LOAD).
9. Close orange clamp to lock wire in place. The orange Wago clamp presents a pinch potential when closing.

**Figure 9 – WAGO Connectors – FOR REFERENCE ONLY**

8. Adapter Harness Connections

The adapter harnesses allow for the new MCM's to be plugged into the vessel's existing cable structure. The Aft adapter harness connects the Aft MCM to the connector that once plugged into the Aft EIM. Similarly, the FWD adapter harness connects the FWD MCM to the connector that once plugged into the FWD EIM, however, the FWD adapter harness also has an Auxiliary Interface Module connector. Figure 10 below displays a drawing of the Aft EIM Adapter Harness followed by the pinout in Table V. Figure 11 displays a drawing of the FWD EIM Adapter Harness followed by its associated pinouts in Table VI and Table VII.

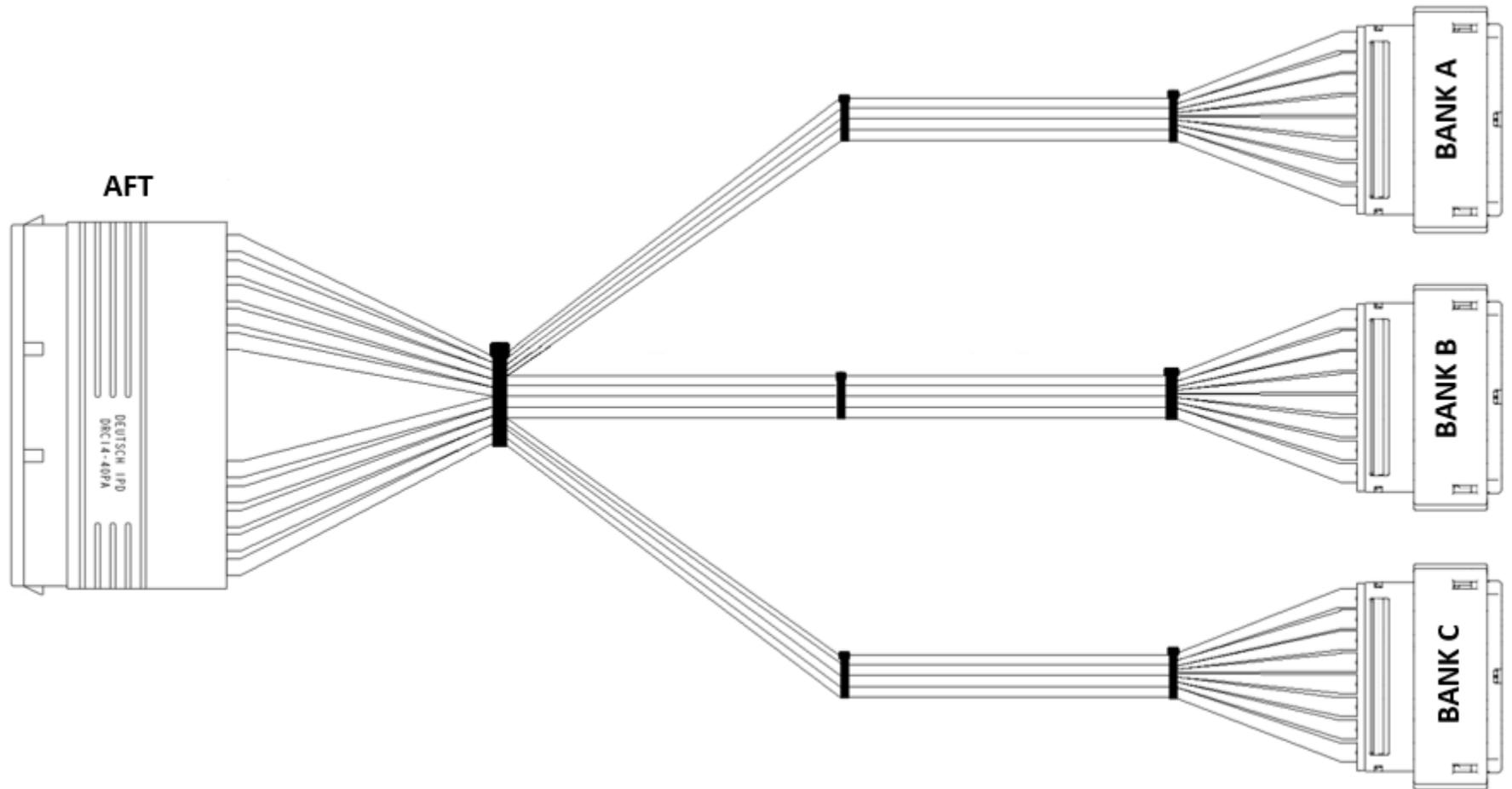


Figure 10 – AFT MCM to EIM Adapter Harness



Table V - AFT EIM ADAPTER HARNESS PINOUT

EIM PIN #	FUNCTION	BREAKER SIZE	MCM PIN#
1	AFT ACCY	15	C2
2	HATCHLIFT	20	C9
3	HATCHLIFT	20	B16
4	WINDLASS MAIN	5	A1
5	GROUND	-	C13
6	GROUND	-	A9
7	STEREO MEMORY	15	C7
8	PORT MERCATHODE	15	C8
9	STBD MERCATHODE	15	C5
10	SYSTEM MONITOR	5	C6
11	BILGE PUMP	10	C4
12	HATCHLIFT	20	C1
13	HATCHLIFT	20	B8
14	GROUND	-	A10
15	GROUND	-	A13
16	GROUND	-	A14
17	GROUND	-	C10
18	GROUND	-	C11
19	WINDLASS SENSE	-	C3
20	TRIM TABS	20	A6
21	ACCY #2	15	B3
22	TxRx+	-	B12
23	TxRx-	-	B11
24	GROUND	-	B15
25	GROUND	-	A11
26	GROUND	-	A12
27	GROUND	-	C12
28	GROUND	-	C14
29	GROUND	-	A15
30	TRIM TABS	20	A7
31	BLOWER #2	7	B4
32	WINDLASS MAIN	5	A8
33	ANCHOR	7	B5
34	RUNNING	6	B1
35	BLOWER #1	7	B6
36	COCKPIT LIGHTS	15	B2
37	BILGE LIGHTS	15	A3
38	COMPARTMENT LIGHTS	15	A5
39	TRIM TABS	20	A2
40	TRIM TABS	20	A4

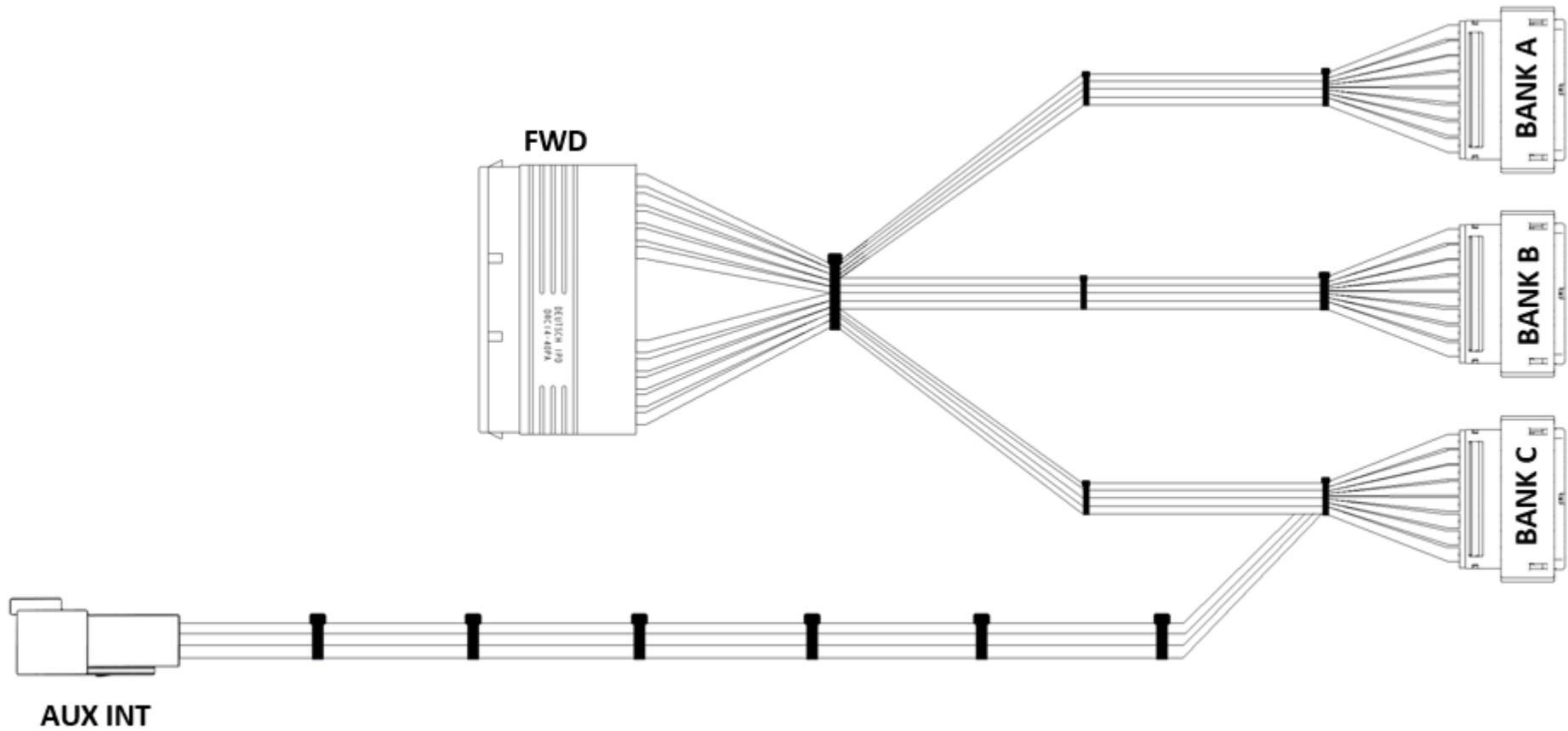


Figure 11 – FWD MCM to EIM Adapter Harness



Table VI – FWD EIM ADAPTER HARNESS PINOUT

EIM PIN #	FUNCTION	BREAKER SIZE	MCM PIN#
1	ACCY #3	10	C1
2	STEREO	3	A5
3	CONSOLE DIMMER	5	C3
4	KEYPAD	5	C4
5	KEYPAD	5	C5
6	GROUND	-	A10
7	UNSWITCHED ACCY	10	A2
8	12V RECEPTACLE	15	A3
9	SPOTLIGHT	10	A4
10	ACCY #1	3	B7
11	HORN	5	A6
12	TxRx+	-	B14
13	TxRx-	-	B9
14	TxRX-	-	B10
15	GROUND	-	C10
16	GROUND	-	A15
17	GROUND	-	A11
18	GROUND	-	A12
19	GROUND	-	A13
20	FWD ACCY	15	B1
21	STBD WIPER	5	B2
22	TxRx+	-	B13
23	TxRx+	-	B12
24	TxRx-	-	B11
25	GROUND	-	C14
26	GROUND	-	C15
27	GROUND	-	A14
28	GROUND	-	B15
29	GROUND	-	A9
30	PORT WIPER	5	B3
31	WINDLASS UP	5	B4
32	WINDLASS DOWN	5	B5
33	WINDSHIELD VENT	5	A1
34	WINDSHIELD VENT	5	A8
35	GROUND	-	C12
36	GROUND	-	A16
37	NAV LIGHTS ANCHOR	6	C6
38	NAV LIGHTS RUNNING	6	B6
39	SPOILER LIGHTS	10	B8
40	COMPARTMENT LIGHTS	10	C7

Table VII – FWD AUXILLARY INTERFACE PINOUT

PIN #	FUNCTION	MCM PIN#
1	LIGHT (INDICATOR)	C8
2	SWITCH	C2
3	(-) RETURN	C11
4	N/C	N/C