

**INSTALLATION AND  
OPERATION MANUAL**

**Multiple-Radio Interface Module  
41021G-01**



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## Cautions and Warnings

**READ AND SAVE THESE INSTRUCTIONS.** Follow the instructions in this installation manual. These instructions must be followed to avoid damage to this product and associated equipment. Product operation and reliability depends on proper installation.



**DO NOT INSTALL ANY DAVID CLARK COMPANY PRODUCT THAT APPEARS DAMAGED.** Upon unpacking your David Clark product, inspect the contents for shipping damage. If damage is apparent, immediately file a claim with the carrier and notify your David Clark product supplier.



**ELECTRICAL HAZARD -** Disconnect electrical power when making any internal adjustments or repairs. All repairs should be performed by a representative or authorized agent of the David Clark Company.



**STATIC HAZARD -** Static electricity can damage components. Therefore, be sure to ground yourself before opening or installing components.

## Parts/Tools List

### Supplied by David Clark

- Multiple-Radio Interface Module (P/N 41021G-01)
- M9840FM SOLO Flush Mount Kit (P/N 40688G-70)
- C98-20PW Cable Assy, Power (P/N 40892G-02)
- System Interface Cable (P/N system dependent)
- C98-20RD\* Radio Cables (P/N 40892G-01)
- Headset Station Mounting Kit (P/N 40688G-62)

\*Other versions available. Contact factory with radio make and model.

### Customer Supplied

- Screwdriver selection
- Pen/Pencil
- Drill
- 3/16" drill bit
- 11/32" nut driver or wrench
- Wire strippers
- Wire cutters
- Wire terminals
- Wire tie assortment
- Tape Measure
- Soldering Iron/Solder
- Radio adapters (for interfacing to radios—supplied by radio manufacturer)
- Pin assignments for each radio adapter (supplied by radio manufacturer)

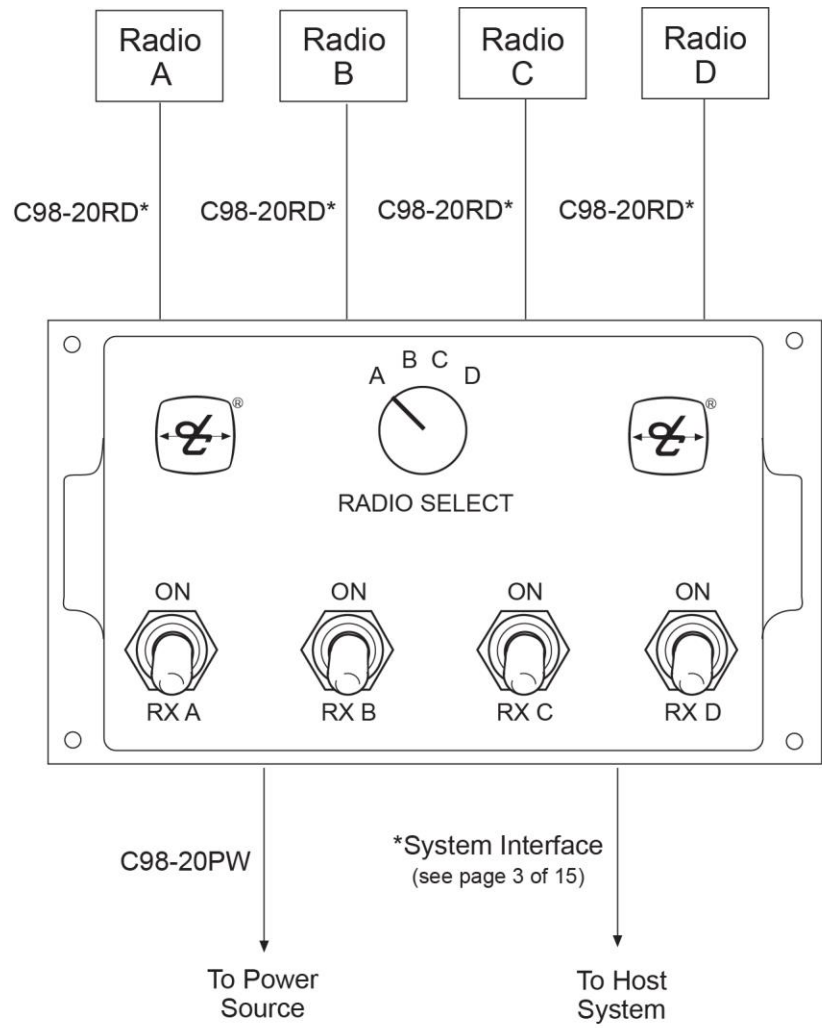
## System Overview

The Multiple-Radio Interface Module (M-RIM) is a weather-resistant radio interface designed to be a companion to other David Clark intercom systems, intended to increase the number of radios connected to the host system. The M-RIM allows up to four mobile radios to be connected to one radio port on the host system.

Primary components of the system are indicated in **Table 1**. In addition, a basic layout of the system is shown in **Figure 1**.

Component	Part and Model Numbers
Multiple-Radio Interface Module	<b>Multiple-Radio Interface Module</b> - Part Number 41021G-01
Flush Mounting	<b>SOLO Flush Mount Kit</b> – Model Number M9840FM (optional accessory)
Cables	<p><b>Power Cable</b> – Model Number C98-20PW (one required)</p> <p><b>System Interface Requirements:</b>  <u>Series 3800 or U9922-G38 Wireless Gateway Interface:</u></p> <ul style="list-style-type: none"> <li>- C98-20RD (1 each)</li> <li>- 18352G-05 (1 each)</li> </ul> <p>Contact factory for interface to other systems</p> <p><b>Radio Cables</b> – Model Number C98-20RD* (1 per Radio Input, maximum of 4)                      *Other versions available. Contact factory with radio make and model.</p>

**Table 1: System Components**



**Figure 1: Typical Layout**



## 1. Surface Mounting the M-RIM

### Parts/Tools Required

- Multiple-Radio Interface Module (41021G-01)
- Pencil/Pen
- Drill
- 3/16" Drill Bit
- Drilling Template (**Figure 3**)
- Phillips-head screwdriver
- Flat-head screwdriver
- 11/32-inch nut driver or wrench

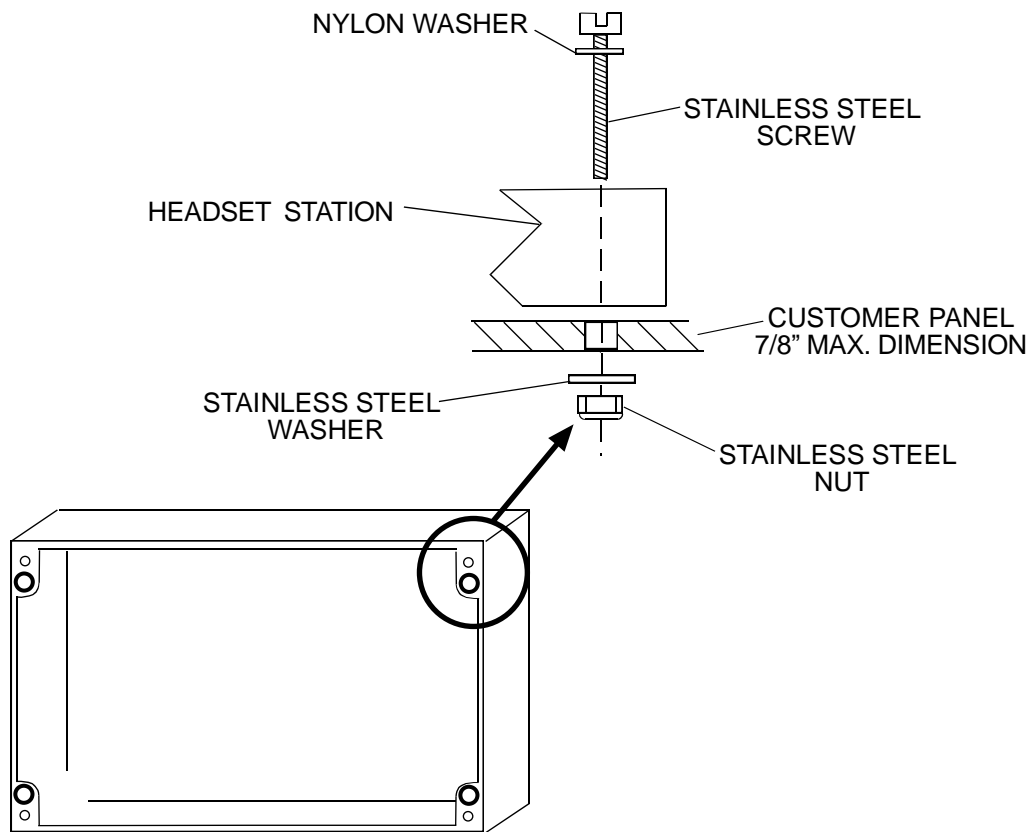
### Procedure

#### *Location Considerations*

Select a location on a flat surface that is out-of-the-way, and provides adequate room to attach all cables. Be sure to allow for internal access, as adjustments may be necessary. The M-RIM is weather resistant, however the mounting location should be chosen to minimize direct exposure to the elements.

#### *Mounting*

- Using a Philips screwdriver, remove the 4 screws on the cover of the M-RIM and lift off the cover. Observe the 4 mounting holes in each corner, as shown in **Figure 2**.
- Position the M-RIM Drilling Template and mark each hole with a pencil.
- Confirm the location and carefully drill each hole using the drill and 3/16" bit.
- Position the M-RIM and insert a 3/16" machine screw into each mounting hole.
- On the backside of the mounting wall, use the provided flat washer and lock nut to secure the M-RIM (**Figure 2**).



**Figure 2: M-RIM Mounting Diagram**

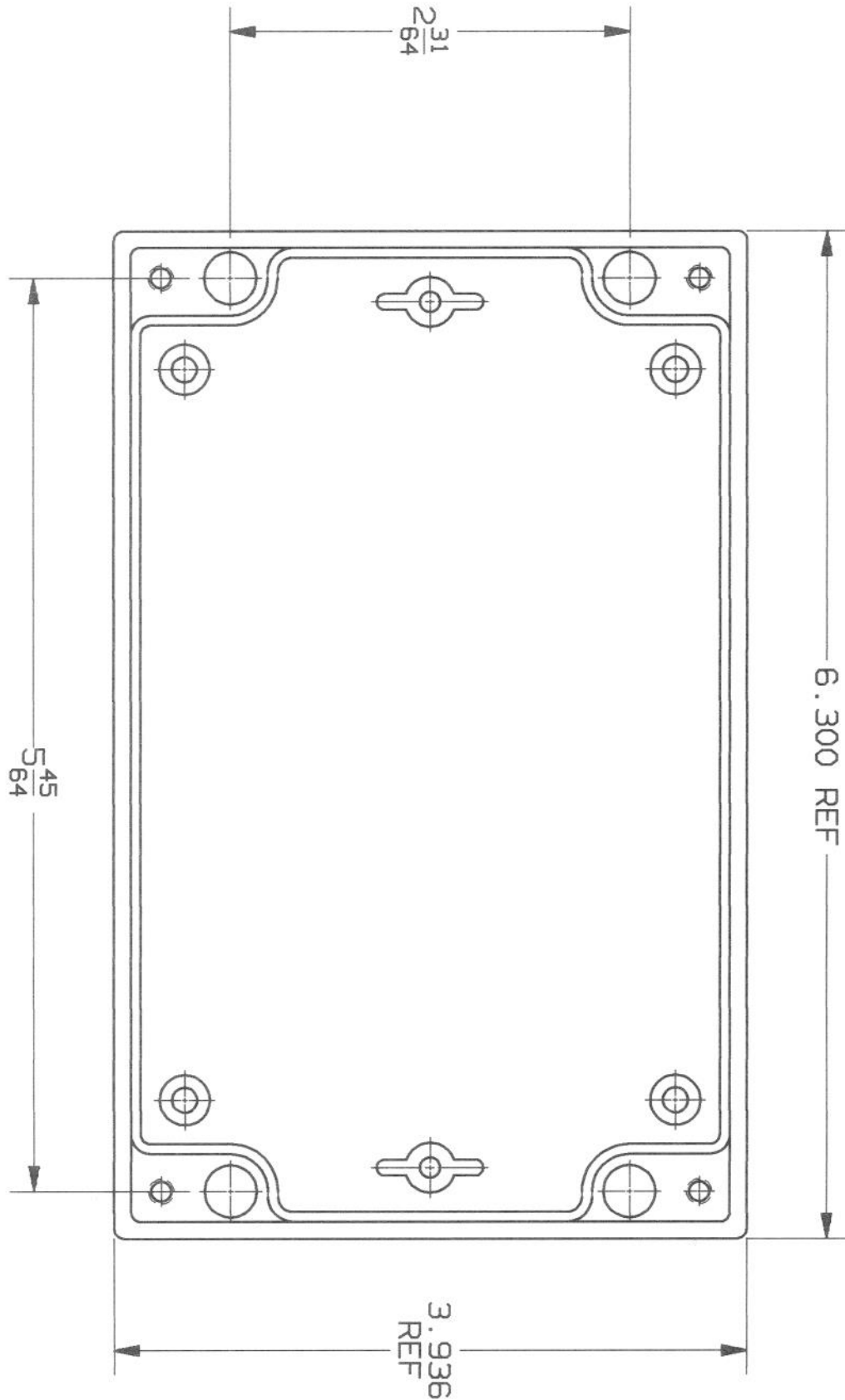
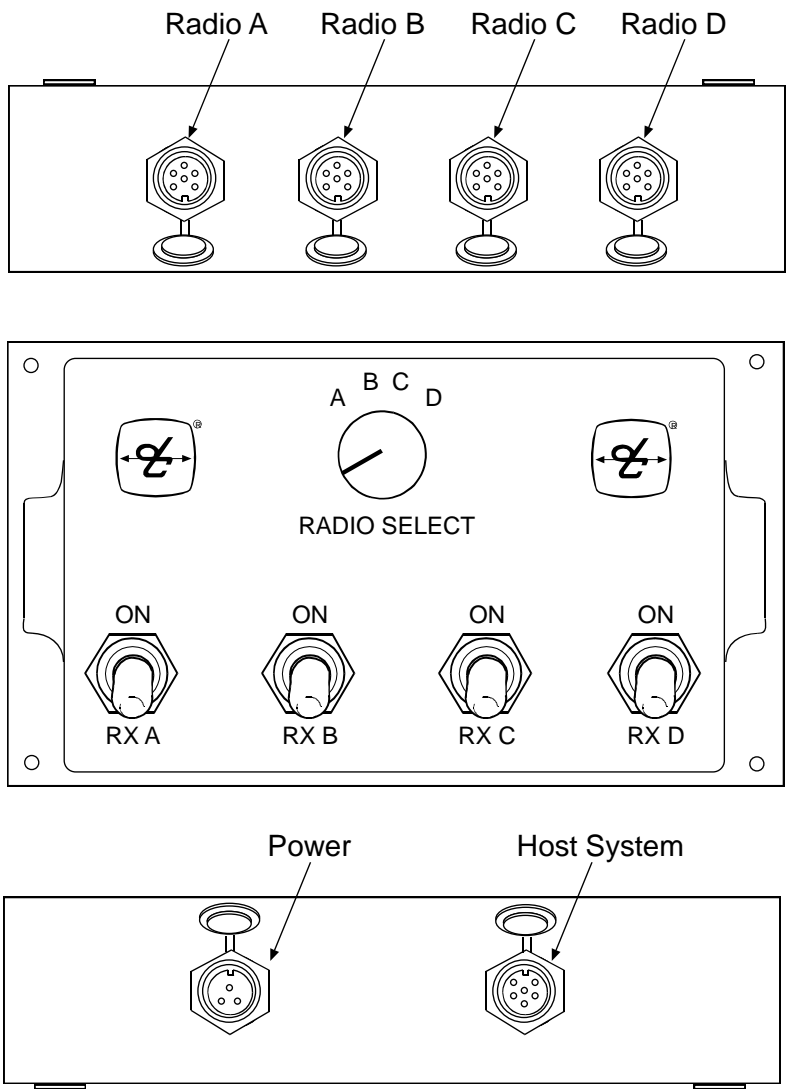


Figure 3: M-RIM Mounting Template

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**Figure 4: M-RIM Connections**

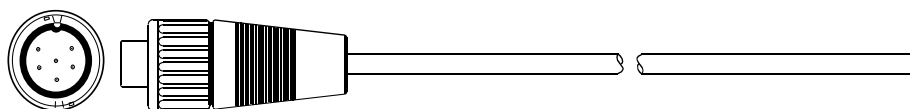
## 2. Radio Cables

The C98-20RD Radio Cable is used to interface a marine or mobile radio to the M-RIM. One end of the cable connects to the M-RIM and the other end connects to the radio. Since the interface is different for each type of radio, the C98-20RD is left un-prepared at the radio end so that the installer may choose the correct interface.

**Note:** This procedure applies only to the C98-20RD Radio Cable. Contact factory if assistance with other cables is needed.

### Parts/Tools Required

- C98-20RD Radio Cable (One for each radio to be interfaced)
- Radio adapters (for interfacing to radios—supplied by radio manufacturer)
- Pin assignments for each radio adapter (supplied by radio manufacturer)
- Wire Crimping/Cutting/Soldering/etc tools (depends on radio interface)
- Wire ties



**Figure 5: C98-20RD Radio Cable**

### Procedure

- Determine the path of the cable between each radio and the M-RIM. The radios should already be installed and tested. The cable should be routed using under-deck conduits and be as far as possible from radio antenna coax cables and anywhere water may collect.
- Measure the length of cable necessary. Add 3 feet for a service loop and trim.
- Route the cable. The connector end connects to the M-RIM. Leave enough excess cable at the radio end for preparation of radio interface.
- Determine which radio letter this radio is (i.e., Radio A, B, C, or D) and connect Radio Cable to the M-RIM. See **Figures 1&4** for connector locations.
- To connect the cable to the M-RIM, align keyways and push. Then push and turn collar clockwise until it stops. Pull back gently on the cable to ensure connector is properly locked.
- Prepare the radio interface in accordance with manufacturer's instructions. See **Table 2** for C98-20RD Radio Cable wire color functions.
- Repeat this procedure for remaining radios.

Color	Function
Red	Mic Hi (+)
White	Mic Lo (-)
Orange	PTT Hi (+)
Brown	PTT Lo (-)
Green	Ear Hi (+)
Black	Ear Lo (-)
Shield	Shield (To PTT Lo or Mic Lo)

**Table 2: Radio Cable Wire Color Functions**

### 3. System Interface Cable

A System Interface Cable is used to interface the M-RIM to the radio port of a David Clark Company host system. One end of the cable connects to the M-RIM, and the other is to be wired to the appropriate radio port mating connector, depending on the host system to be interfaced with the M-RIM.

#### Parts/Tools Required

- System Interface Requirements:
  - Series 3800 and U9922-G38 Wireless Gateway
    - o C98-20RD: Radio Cable (1 each)
    - o 18352G-05: Connector Kit, 6-pin MS (1 each)
- Wire ties
  - Contact factory for interface to other systems

#### Procedure

- Determine the path of the cable between the host system and the M-RIM. The host system should already be installed and tested. The cable should be routed using under-deck conduits and be as far as possible from radio antenna coax cables and anywhere water may collect.
- Route the cable and connect to the M-RIM. See **Figures 1&4** for connector location.
- To connect the cable to the M-RIM, align keyways and push. Then push and turn collar clockwise until it stops. Pull back gently on the cable to ensure connector is properly locked.
- Connect the other end of the interface cable to the host system. Refer to the host system installation/operation manual for further instructions.

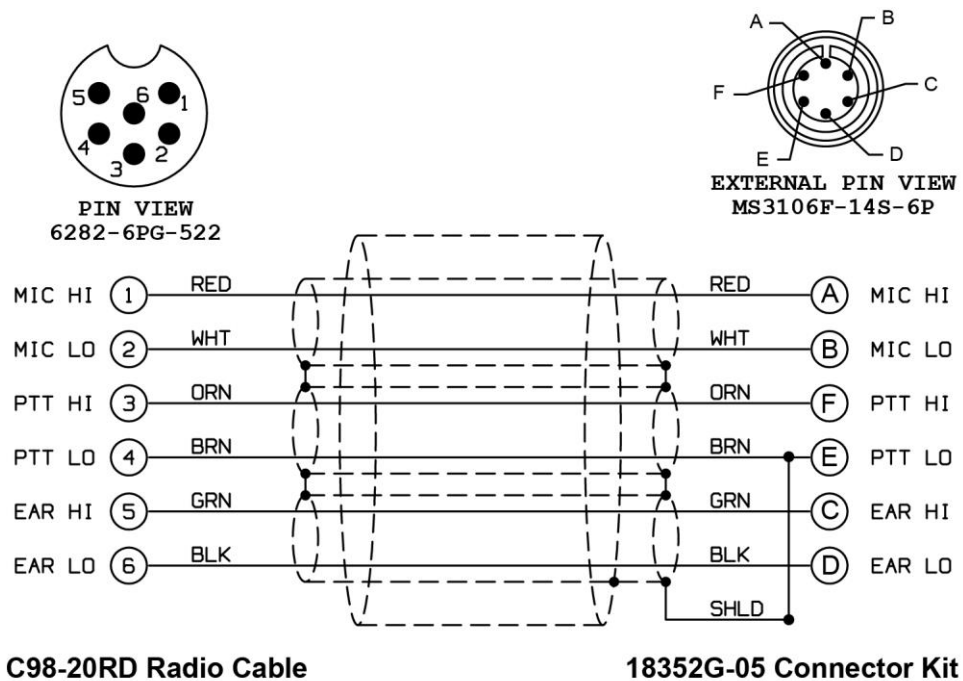


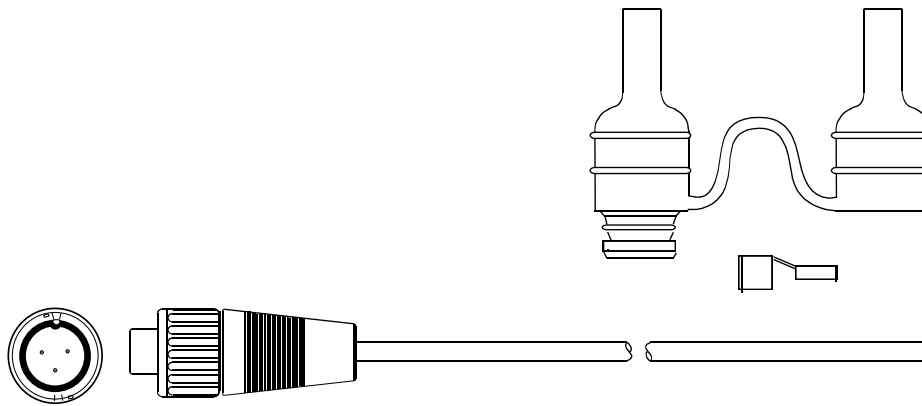
Figure 6: Schematic

## 4. Power Cable

The C98-20PW is a 20-foot cable used to provide power to the M-RIM. It has a connector on one end and is unterminated on the other end. It is important to choose a power “pick-off” point that can provide at least two amperes of current at a voltage between 11-30VDC. Direct connection to a 2-Amp fuse/circuit-breaker is preferred.

### Parts/Tools Required

- C98-20PW Power Cable (40892G-02)
  - Includes David Clark 2-Amp Fuse kit (40688G-47)
- Power pick-off point (circuit breaker/Fuse box, 11-30VDC)
- Soldering iron/Solder
- Wire terminals
- Wire cutters/ Wire strippers
- Tape Measure
- Wire ties



**Figure 7: C98-20PW Cable with 40688G-47 2-Amp Fuse kit**

### Procedure

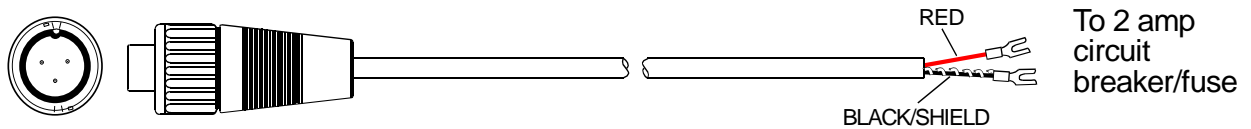
- Determine the location of a 2-Amp circuit breaker to be used and how to connect to it (solder, screw terminals, lugs, etc).
- If only a higher-amperage circuit breaker is available, it may be used, but the David Clark 2-Amp Fuse Kit must also be used.
- Determine the location of the 11-30VDC and Ground pick-off points.
- Determine the path of the cable between the power source and the M-RIM. The cable should be routed using under-deck conduits and be as far as possible from radio antenna coax cables and anywhere water may collect.
- Measure the length of cable necessary, adding 3 ft as a service loop.
- If necessary, trim the length of the cable to the length you just determined in the previous step. Be sure to trim the UN-PREPARED end of the cable.
- Route the cable. Use wire ties where necessary.



- ❑ Connect the cable to the jack on the M-RIM labeled “Power”, see **Figures 1&4**. To connect the cable to the M-RIM, align keyways and push. Then push and turn collar clockwise until it locks into place. Pull back gently on the cable to ensure connector is properly locked.

**Before continuing, ensure that power is shut off to the point where you are going to connect the power cable!**

- ❑ Using the wire cutters and wire strippers, prepare the end of the cable as necessary for your installation (**Figure 7**).
- ❑ If using the David Clark 2-Amp Fuse Kit, please see **Appendix A** for assembly instructions.
- ❑ Connect the cable to the power source
  - Connect the RED to the positive (+) terminal.
  - Connect the BLACK and SHIELD to the negative (-) terminal.
- ❑ Do not turn on power at this time, wait until Section 6. **Testing & Troubleshooting**.

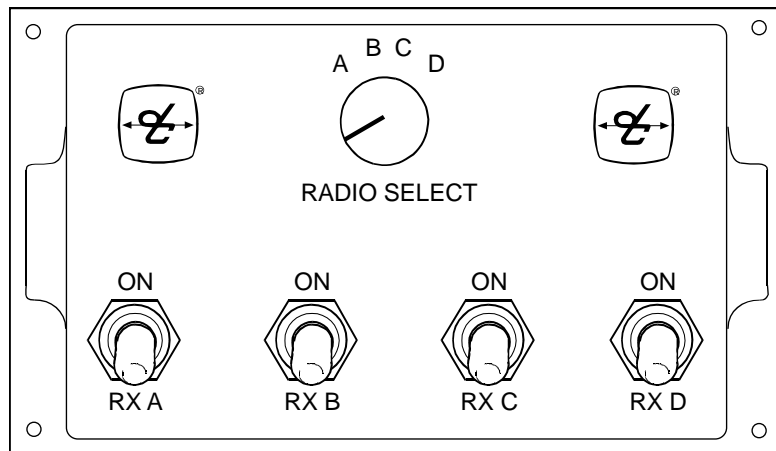


**Figure 8: C98-20PW Power Cable**

## 5. Operation

Use the M-RIM to control radio access to the host system.

1. The toggle switches control whether the RX audio from the radios can be heard. Each radio has its own RX Audio On/Off switch.
2. The *Radio Select* switch determines which radio is active for transmitting. When the user presses PTT (see instructions for host system), they will be transmitting over the radio that is selected.



**Figure 9: M-RIM Controls**

## 6. Testing & Troubleshooting

### Parts/Tools Required

- Completion of the previous installation sections (1-4) in their entirety
- Read section 5, **Operation**
- An assistant (optional)

### Test Procedure

- Double-Check all connections and wiring from the previous sections.
- Complete connections of power cables to power source.
- Turn on power at the pick-off point/source.
- Verify that receive audio from all radios is heard (see host system instructions).
- Verify transmit access to all radios.
  - Using a scanner or an assistant at another radio, verify that you can hear, key, and speak over the selected radio (see host system instructions).
  - Verify TX audio level. If adjustment is necessary, refer to **Appendix B** for TX modulation adjustment.
  - Repeat this procedure for the remaining radios.

### Troubleshooting

Symptom	Possible Cause(s)
No (or low) radio receive audio	<ol style="list-style-type: none"><li>1. Power applied to M-RIM?</li><li>2. Radio turned on?</li><li>3. Radio's volume setting up to an audible level (on radio)?</li><li>4. Check radio settings/wiring.</li><li>5. Check host system troubleshooting guide.</li></ol>
No radio transmit	<ol style="list-style-type: none"><li>1. Power applied to M-RIM?</li><li>2. Radio turned on?</li><li>3. Check radio settings/wiring.</li><li>4. Check host system troubleshooting guide.</li></ol>
Too low or too high radio transmit audio	<ol style="list-style-type: none"><li>1. See <b>Appendix B</b> for adjustment information.</li></ol>

**Table 3: Troubleshooting**

## Appendix A

### P/N 40688G-47 Waterproof Fuse Kit Installation Instructions

#### Parts/Tools Required

- 1/8-inch diameter heat shrink tubing
- Wire strippers
- Crimp tool (Radio Shack P/N 64-409 or equivalent)
- Crimp terminals
- 2-Amp fuse kit

#### Procedure

1. Using a heat gun, install 1/8" diameter heat shrink tubing\* over one end of the 4" red wire (supplied). Install the second piece of 1/8" diameter heat shrink tubing over the red wire on the C98-20PW Power Cable.
2. Thread red wire of power cord with heat shrink tubing\* into one end of fuse holder.
3. Thread the heat shrink end of the 4-inch red wire into other end of fuse holder.
4. Strip insulation on both wires 1/4 inch.
5. Crimp fuse clips to both wires. (Recommended crimp tool Radio Shack No. 64-409 or equivalent).
6. Insert 2-amp fuse.
7. Snap two halves of housing together.

\* Note: The heat shrink tubing is necessary in order to provide weather tightness.

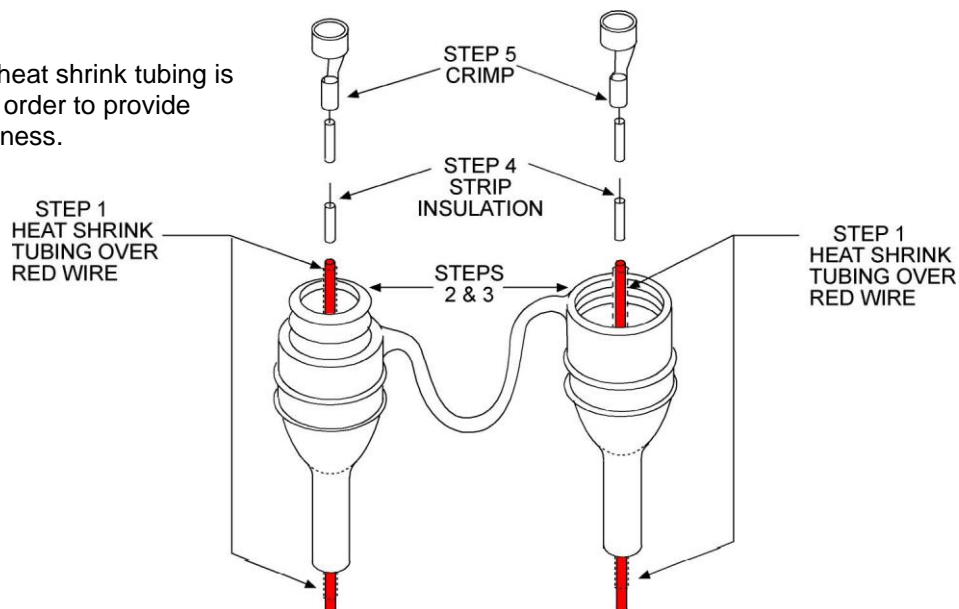


Figure A1: Proper assembly of Fuse Holder Kit (40688G-47)

## Appendix B

### M-RIM Adjustments

#### *Transmit Audio Level Adjustments*

Under most circumstances these adjustments have been pre-set to optimum levels and should never need to be performed in the field. However, they are included in this section should their adjustment be necessary.

To increase or decrease the transmit mic audio level for each radio, remove the top cover and locate and adjust the appropriate potentiometer (**See Figure B1 for the locations of these components**):

- For Radio A, locate and adjust R8
- For Radio B, locate and adjust R7
- For Radio C, locate and adjust R6
- For Radio D, locate and adjust R5

Turning the potentiometers clockwise will increase the levels and counter-clockwise will decrease the levels. Use a jeweler's screwdriver to make these adjustments.

Also it is important to not increase the levels so much as to over-modulate the radios. This is in violation of FCC regulations and will seriously degrade the quality of the transmissions. If you have the equipment to measure the modulation, 4-4.5 KHZ is an optimum level.

#### *Receive Audio Level Adjustments*

The factory has pre-set the receive audio adjustment potentiometers to levels which should be acceptable in most applications. Should the need arise to change these settings, the installer may do so by the following procedure:

To increase or decrease the receive audio level for each radio, remove the top cover and locate and adjust the appropriate potentiometer (**See Figure B1 for the locations of these components**):

- For Radio A, locate and adjust R83
- For Radio B, locate and adjust R20
- For Radio C, locate and adjust R18
- For Radio D, locate and adjust R16

Turning the potentiometers clockwise will increase the levels and counter-clockwise will decrease the levels. Use a jeweler's screwdriver to make these adjustments.

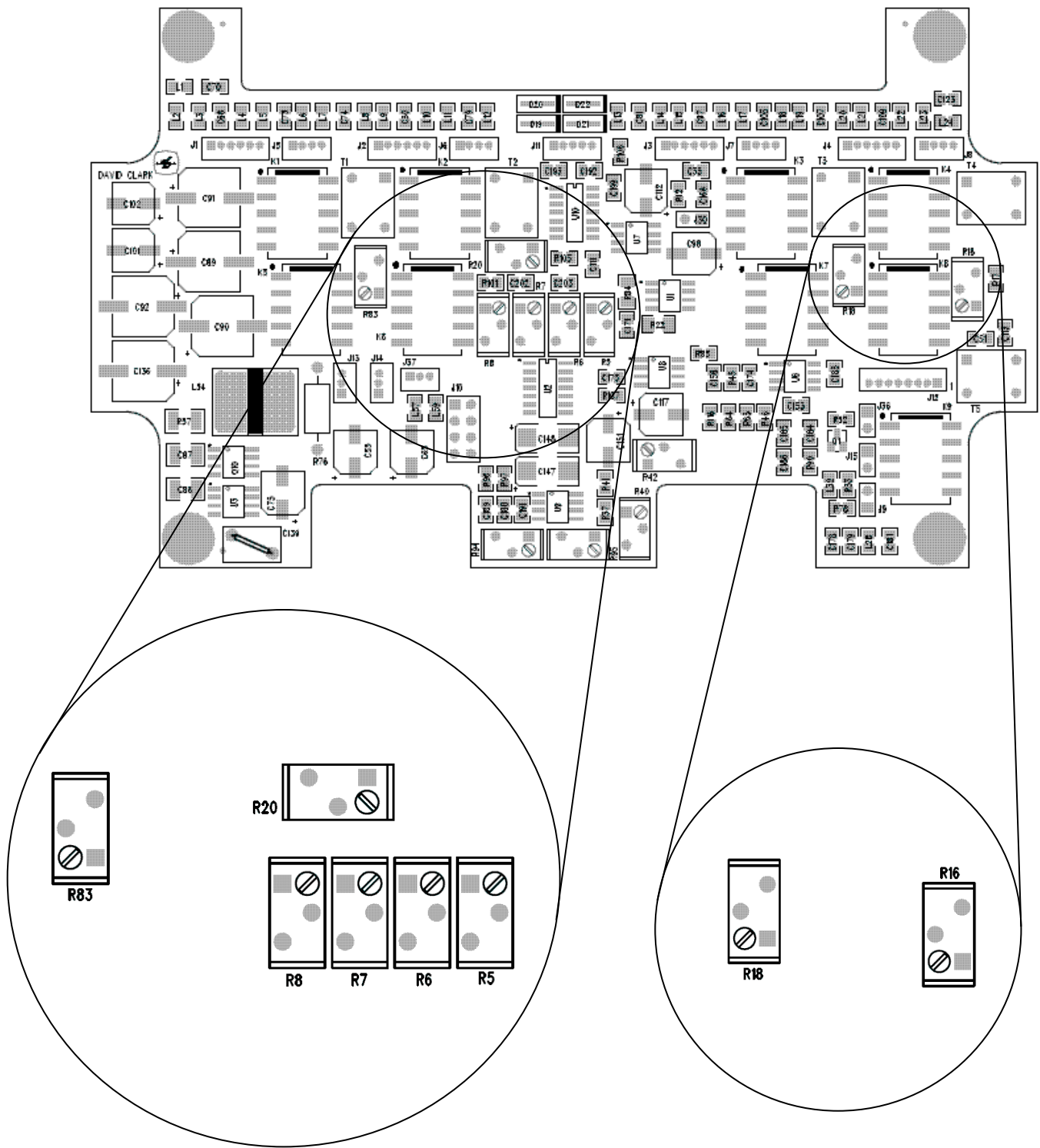


Figure B1: Adjustment Locations

## Appendix C

### Specifications

1. Supply voltage:	11 VDC Minimum 30 VDC Maximum
2. Input current:	2 A Maximum (@ 12VDC) 1 A Typical (@ 12VDC)
3. RX audio input:	8.5 V RMS Maximum 4.25 V RMS Typical
4. TX audio output:	700 mV RMS Maximum 400 mV RMS Typical

**Table C1: Specifications**