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**OPERATION MANUAL**

**U9840 - SOLO SYSTEM**



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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

q	U9840	Headset Station	(P/N 40942G-01)
q	M9840FM	SOLO Flush Mount Kit	(P/N 40688G-70)
q	U9810BS	Body Switch PTT	(P/N 40895G-03)
q	U9811BS	Body Switch PTT/Cell Phone	(P/N 40895G-02)
q	C9801CL	Cell Phone Cord, STD, 2.5mm	(P/N 40972G-01)
q	C9802CL	Cell Phone Cord, 4 cond, Nextel	(P/N 40972G-02)
q	C9803CL	Cell Phone Cord, 4 cond.	(P/N 40972G-03)
q	H9832	Headset OTH	(P/N 40896G-02)
q	H9842	Headset BTH	(P/N 40897G-03)
q	H9842BK	Headset BTH (Black)	(P/N 40897G-04)
q	C98-15RS	Remote PTT Switch	(P/N 40800G-02)
q	C98-20PW	Cable Assy, Power	(P/N 40892G-02)
q	C98-15EX	Headset Extension Cable	(P/N 40939G-01)
q		Headset Station Mounting Kit	(P/N 40688G-62)

### Customer Supplied

- q Screwdriver selection
- q Pen/Pencil
- q Drill
- q 3/16" drill bit
- q 11/32" nut driver
- q Wire strippers
- q Wire cutters
- q Needle-Nose pliers
- q Grommet assortment
- q Wire tie assortment
- q Heat Shrink tubing assortment 1/8" to 3/8"
- q Tape Measure
- q X-Acto/Razor knife
- q Soldering Iron/Solder
- q Heat gun
- q Radio adapters (for interfacing to radios—supplied by radio manufacturer)
- q Pin assignments for each radio adapter (supplied by radio manufacturer)

## System Overview

The SOLO System is a weather-resistant radio interface system designed for the marine environment. It allows a single user to communicate over two mobile radios. Also available is an option to interface a third audio source such as a Stereo, CD player, or any other listen-only radio.

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

Component	Part and Model Numbers
Headset Station	<b>Headset Station</b> - Model Number U9840
Flush Mounting	<b>SOLO Flush Mount Kit</b> – Model Number M9840FM
Headsets	<b>Over-the-Head</b> Style – Model Number H9832 <b>Behind-the-Head</b> Style – Model Number H9842 <b>Behind-the-Head</b> Style – Model Number H9842BK (Black)
Cables	<b>Power Cable</b> – Model Number C98-20PW <b>Headset Extension Cable</b> – Model Number C98-15EX <b>Auxiliary Cable</b> – Model Number C98-20AX <b>Radio Cable</b> – Model Number C98-20RD (1 per Radio Input, maximum of 2)
Remote PTT Switch	<b>Remote PTT Switch</b> - Model Number C98-15RS
Body Switch	<b>Body Switch, PTT, 15' coil cord</b> - Model Number U9810BS <b>Body Switch, PTT w/cell phone connector, 15' coil cord</b> - Model Number U9811BS

**Table 1: System Components**

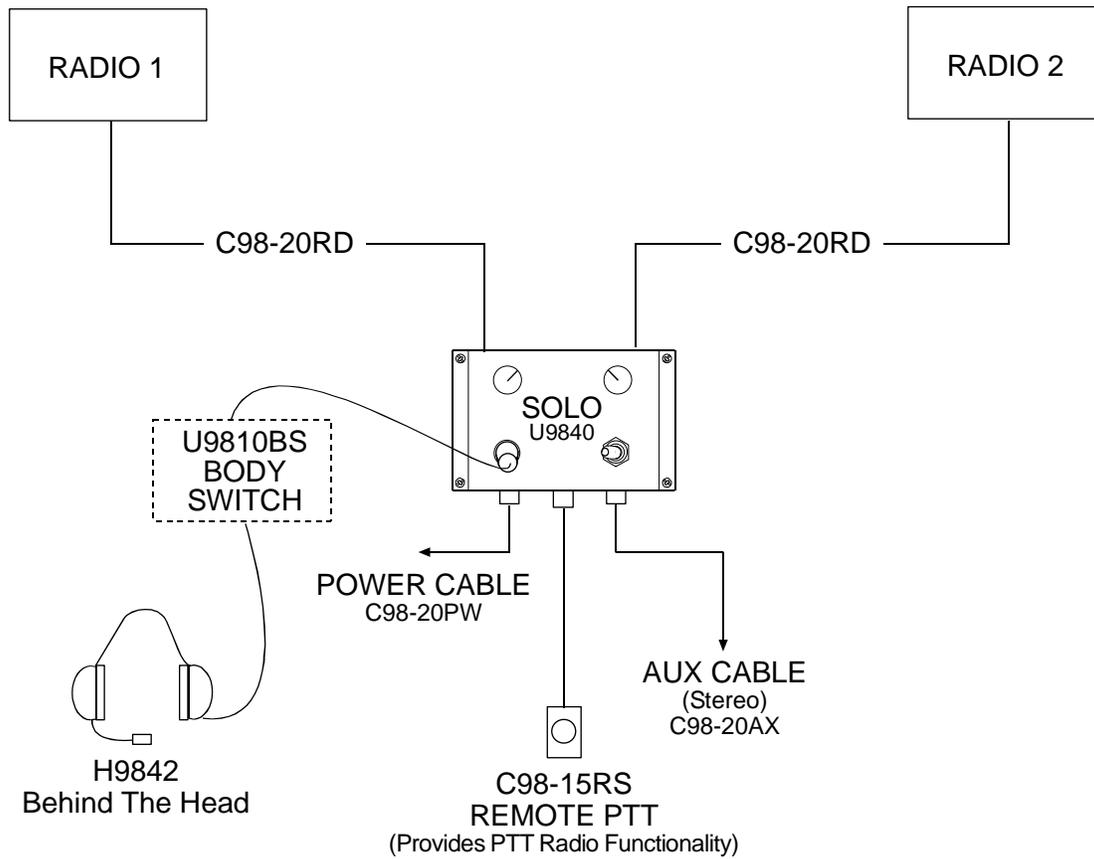


Figure 1: Typical Layout

# 1. Surface Mounting the Headset Station

## Parts/Tools Required

- q Headset Station (40942G-01)
- q Headset Station Mounting Kit (40688G-62)
- q Pencil/Pen
- q Drill
- q 3/16" Drill Bit
- q Drilling Template (**Figure 3**)
- q Phillips-head screwdriver
- q Flat-head screwdriver
- q 11/32-inch nut driver or wrench

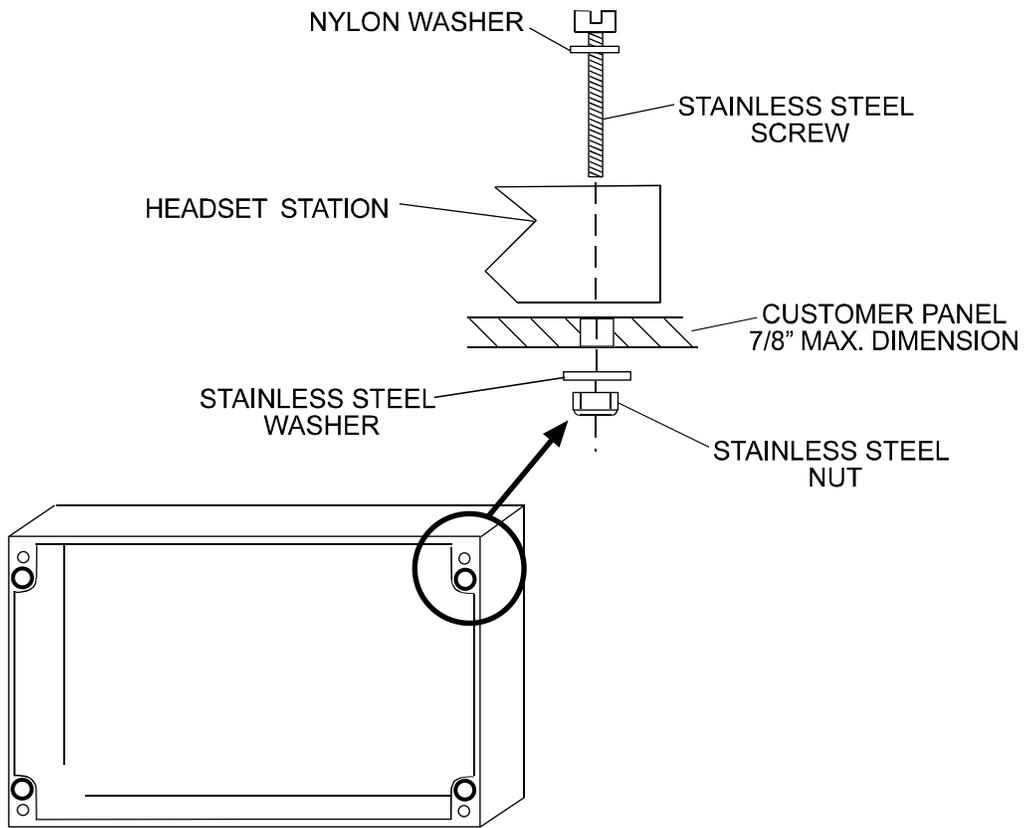
## Procedure

### *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 Headset Station is weather resistant, however the mounting location should be chosen to minimize direct exposure to the elements.

### *Mounting*

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



**Figure 2: Headset Station Mounting Diagram**

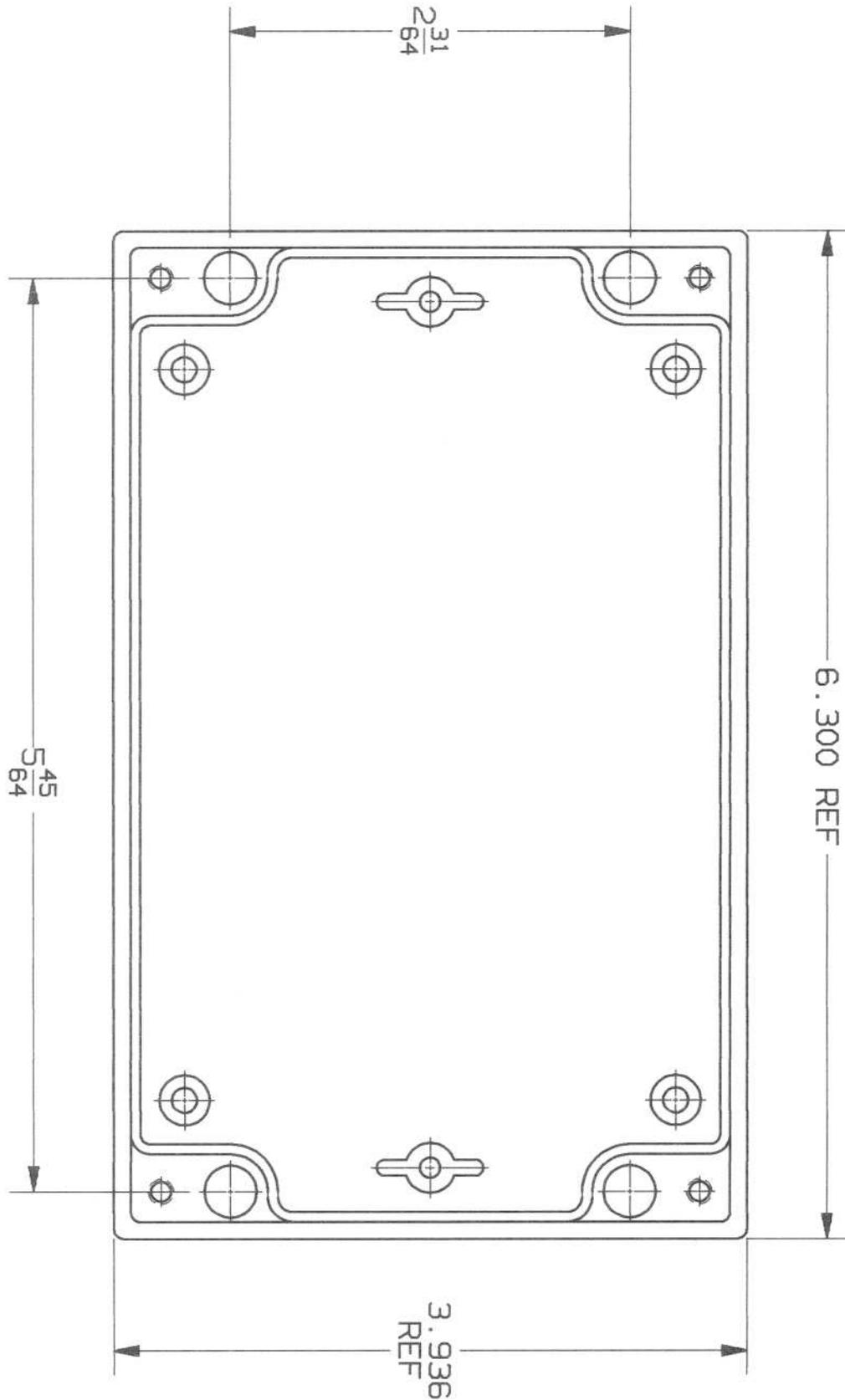
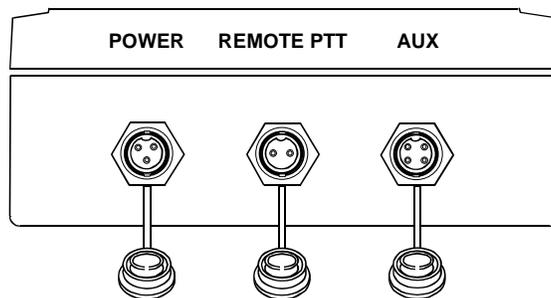
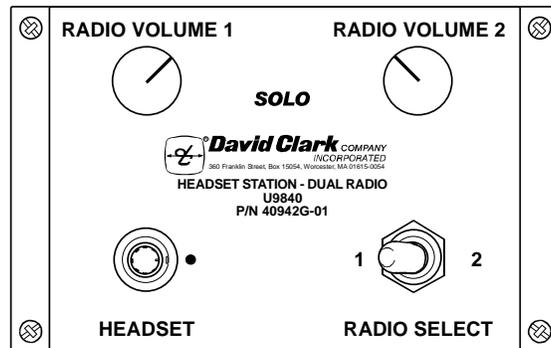
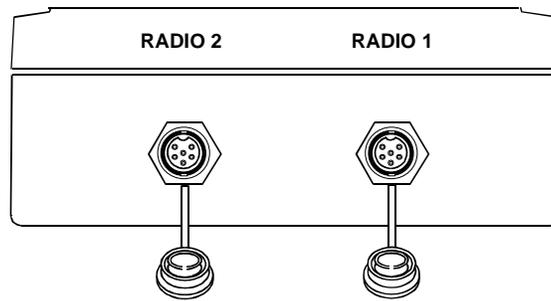


Figure 3: Headset Station Mounting Template

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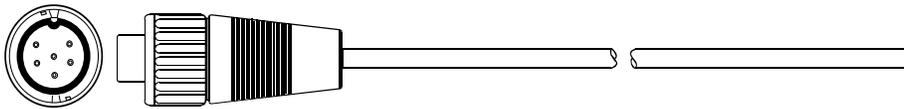
**Figure 4: Headset Station Connections**

## 2. Radio Cables

The C98-20RD Radio Cables are used to interface a marine or mobile radio to the SOLO System. One end of the cable connects to the Headset Station 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.

### Parts/Tools Required

- q C98-20RD Radio Cable (One for each radio to be interfaced)
- q Mating connector and pin information for radio interface (installer provided)
  - o Wire Crimping/Cutting/Soldering/etc tools (depends on radio interface)
- q Wire ties



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

### Procedure

- q Determine the path of the cable between each radio and the Headset Station. 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.
- q Measure the length of cable necessary. Add 3 feet for a service loop and trim.
- q Route the cable. The connector end connects to the Headset Station. Leave enough excess cable at the radio end for preparation of radio interface.
- q Determine which radio number this radio is (i.e., Radio 1/Radio 2) and connect Radio Cable to the Headset Station. See **Figures 1&4** for connector locations.
- q To connect the cable to the Headset Station, 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.
- q Prepare the radio interface in accordance with manufacturer's instructions. See **Table 2** for C98-20RD Radio Cable wire color functions.
- q Repeat this procedure for Radio 2 (if applicable).

<b>Color</b>	<b>Function</b>
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)

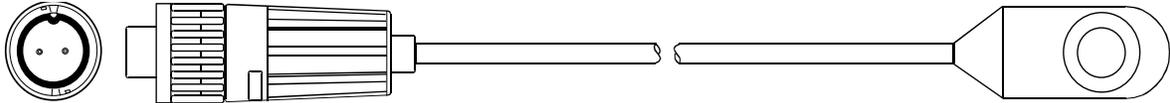
**Table 2: Radio Cable Wire Color Functions**

### 3. Remote PTT (Optional)

The SOLO System provides the option for a Remote PTT switch, which can be mounted in a convenient location. The cable is finished with a connector on one end and a molded, waterproof switch on the other end.

#### Parts/Tools Required

- q C98-15RS Remote PTT Cable (40800G-02)
- q Wire ties



**Figure 6: C98-15RS Remote PTT Cable**

#### Procedure

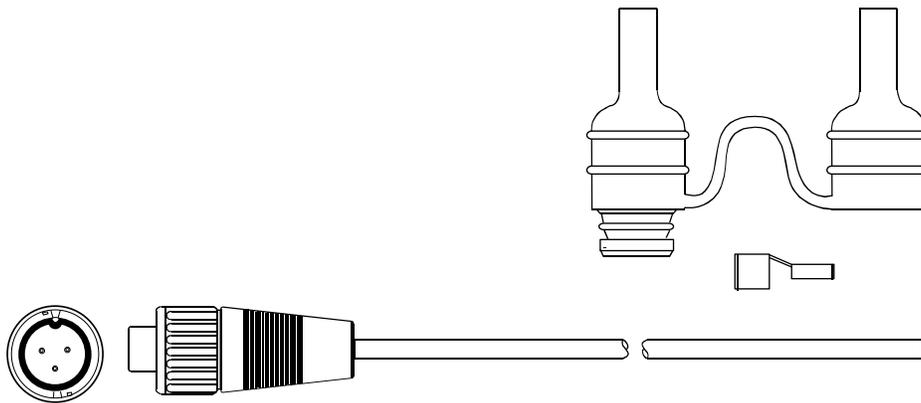
- q Determine the locations of the PTT switch. Choose location based on customer requirement and accessibility. A common location for the Remote PTT is wire-tied to the throttle.
- q Determine the path of the cable between the PTT switch location and the Headset Station. The cable should be routed using under-deck conduits and be as far as possible from radio antenna coax cables and anywhere water may collect.
- q Route the cable. Use wire ties where necessary.
- q To connect the cable to the Headset Station, 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. See **Figures 1&4** for connector locations.

## 4. Power Cable

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

### Parts/Tools Required

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



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

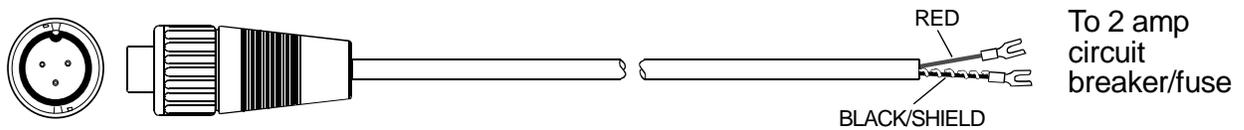
### Procedure

- q Determine the location of a 2-Amp circuit breaker to be used and how to connect to it (solder, screw terminals, lugs, etc).
- q 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.
- q Determine the location of the 11-30VDC and Ground pick-off points.
- q Determine the path of the cable between the power source and the Headset Station. 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.
- q Measure the length of cable necessary, adding 3 ft as a service loop.
- q 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.
- q Route the cable. Use wire ties where necessary.

- q Connect the cable to the jack on the Headset Station labeled “Power Cable”, see **Figures 1&4**. To connect the cable to the Headset Station, 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!**

- q Using the wire cutters and wire strippers, prepare the end of the cable as necessary for your installation (**Figure 8**).
- q If using the David Clark 2-Amp Fuse Kit, please see **Appendix A** for assembly instructions.
- q Connect the cable to the power source
  - o Connect the RED to the positive (+) terminal.
  - o Connect the BLACK **and** SHIELD to the negative (-) terminal.
- q Do not turn on power at this time, wait until Section **8. Testing & Troubleshooting**.



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

## 5. Auxiliary Audio Connection (Optional)

The Auxiliary Audio connection is intended for use with line-level devices only. Typical connections include a portable CD/MP3 player's headphone jack or the "Preamp Output" RCA jacks on a car/marine stereo.



**IMPORTANT: To connect to the External Speaker terminals of a communications or weather radio that has balanced audio output, an external transformer MUST be used to prevent possible damage to the radio and/or the SOLO System.**

### Parts/Tools Required

- q C98-20AX Auxiliary Audio Cable (40892G-04)
  - o Includes 3.5mm Female to Left/Right RCA Plugs Adapter
- q Wire cutters/Wire strippers
- q Soldering iron/Solder
- q Heat-shrink tubing
- q Wire ties

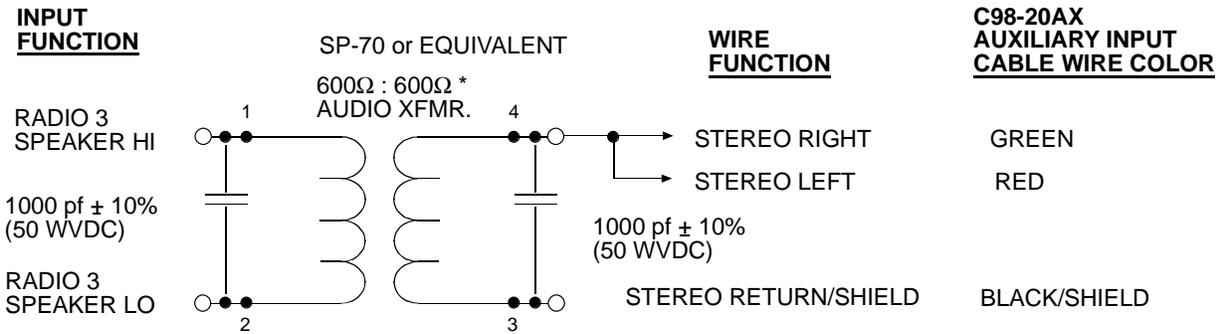
### Procedure

- q Route the C98-20AX Cable between the source and the Headset Station. 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. Use wire ties where necessary.
- q Connect the cable to the Headset Station's jack labeled "Auxiliary Input", see **Figures 1&4**. To connect the cable to the Headset Station, 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.
- **For Portable CD/MP3/Etc. installation:**
  - q Plug 3.5mm male into the device's 3.5mm jack labeled "Line Out" or "Headphones"
  - q Adjust device's volume to 50%.
- **For Car/Marine Stereo installation:**
  - q Locate the "Preamp Output" RCA jacks on the stereo. Some models require an additional adapter from the manufacturer to access these jacks.
  - q Connect the supplied 3.5mm to RCA adapter cable to the stereo's output RCA jacks.
  - q Connect the C98-20AX cable to the adapter cable's 3.5mm jack.
  - q Use a waterproof, outdoor cable/coax sealant to ensure that no moisture can enter the contacts of the RCA plugs and the 3.5mm connections.

- **For Weather/2-Way Radio Connection (Listen Only):**



- ☐ **It is very important to follow these instructions carefully. Failure to do so may result in serious damage to your radio equipment or the Solo System.**
- ☐ Locate the Speaker/Audio outputs on the radio. Determine the method of connection (terminals, connector, etc.).
- ☐ See **Figure 9 & Table 3** which show how to connect an isolation transformer between the radio and the C98-20AX cable. Stereo installations require two transformers.
- ☐ The installer will fabricate the circuit in **Figure 9**, mount it in an appropriate enclosure, and interface it with the radio and the C98-20AX cable.
- ☐ The David Clark Company recommends using a SP-70 transformer (P/N: 09363P-34).
- ☐ Note that two 1000pF, 50WVDC capacitors are also required.



**Figure 9: Audio isolation transformer circuit used to interface to Ext. Speaker of 2-Way/Wx radio**

<b>Wire Color</b>	<b>Function</b>
Green	Right
Red	Left
Black/Shield	Return

**Table 3: C98-20AX Wire Color Chart**

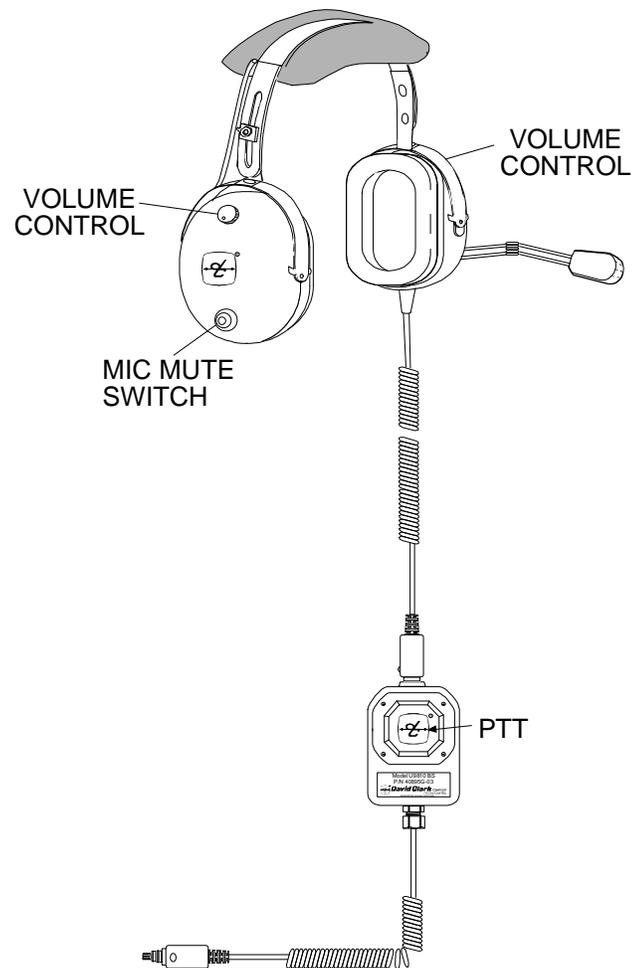
## 6. Connecting Headset & PTT Switch

### Parts/Tools Required

- q H9800-Series Headset
- q U9810BS/U9811BS Body PTT Switch
- q Completion of SOLO System installation steps 1-6.

### Procedure

- q To connect the Headset to the Body PTT Switch, align the keyways on each connector and push together. To remove, just pull apart. See **Figure 10**.
- q The Body PTT Switch is optional. Otherwise the Headset connects directly to the System Cable and the Remote PTT switch can be used to key the radios.



**Figure 10: Headset with Body PTT Switch**

## 7. Operation

### Headset Station Controls

#### *Radio 1 / Radio 2 Volume Controls*

The Radio 1 & Radio 2 volume controls adjust the receive audio level of each radio heard in the headset. The Radio 2 volume control features an off position when turned fully counter-clockwise (when not in use).

#### *Radio 1 / Radio 2 Toggle Switch*

The Radio 1 / Radio 2 toggle switch is used to select which radio is active for transmitting. Both radios can always be heard regardless of which position the toggle switch is in, unless the Radio 2 volume control is switched “off”, then only Radio 1 will be heard.

### Headsets & PTT Switches

#### *Wearing the Headset Properly*

Each headset should be worn so that the black earseals fit snugly against the head. The microphone boom can be rotated to may be worn on either side of the head. The microphone should be positioned no more than ¼” from the lips. Using the headset in this manner ensures optimal performance, especially in high-noise environments.

#### *Volume Controls*

The Series 9800 headsets have individual volume controls for the right and left ears. This provides the wearer maximum flexibility to adjust volume and balance.

#### *Mic-Mute Switch*

The push-button switch located on the dome opposite the mic boom on each headset is a “microphone-mute” switch. When this switch is in the “OUT” position, the microphone is disabled. The user can still hear other activity on the system but cannot speak over the radios. With this switch in the “IN” position, the microphone is enabled, and the user can transmit over the radios.

#### *PTT Switches*

The Body PTT Switch is used to transmit over the radio. Optionally, a Remote PTT Switch may be installed in a convenient location.

### Auxiliary Audio Input

#### *Auxiliary Audio*

The Auxiliary audio input is used to provide entertainment audio to the user. Upon reception of communications from either of the two radios, the auxiliary audio level will mute approximately 40dB. This level can be changed by internal adjustment (see **Appendix C**).

## 8. Testing & Troubleshooting

### Parts/Tools Required

- q Completion of the previous installation sections (1-6) in their entirety
- q Read section **7. Operation**
- q An assistant (optional)

### Test Procedure

- q Double-Check all connections and wiring from the previous sections.
- q Complete connections of power cables to power source.
- q Turn on power at the pick-off point/source.
- q Verify that receive audio from both radios and AUX input (if installed) is heard in the headset.
  - o Mic-Mute switch on Headset can be in either position.
- q Verify transmit access to Radio 1 and Radio 2 (if equipped).
  - o Ensure switch on headset is in the "IN" position.
  - o Using a scanner or an assistant at another radio, verify that you can hear, key, and speak over the selected radio using the Body PTT switch and Remote PTT switch (if installed). Verify Tx audio level. If adjustment is necessary, refer to **Appendix C** for Tx modulation adjustment.
  - o Repeat this procedure for Radio 2.

## Troubleshooting

Symptom	Possible Cause(s)
No (or low) radio receive audio	<ol style="list-style-type: none"><li>1. Headset Station power on?</li><li>2. Radio turned on?</li><li>3. Radio's volume setting up to an audible level (on radio)?</li><li>4. Radio's volume setting up to an audible level (on Headset Station)?</li><li>5. Check radio settings/wiring.</li></ol>
No radio transmit	<ol style="list-style-type: none"><li>1. Headset Station power on?</li><li>2. Radio turned on?</li><li>3. Check Mic-Mute switch on headset.</li><li>4. Check radio settings/wiring.</li></ol>
Cannot hear Auxiliary audio	<ol style="list-style-type: none"><li>1. Headset Station power on?</li><li>2. Aux source connected and volume setting up to an audible level?</li></ol>
Too low or too high radio transmit audio	<ol style="list-style-type: none"><li>3. See <b>Appendix C</b> for adjustment information.</li></ol>
Other audio level problems	<ol style="list-style-type: none"><li>1. See <b>Appendix C</b> for adjustment information.</li></ol>

**Table 4: 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.

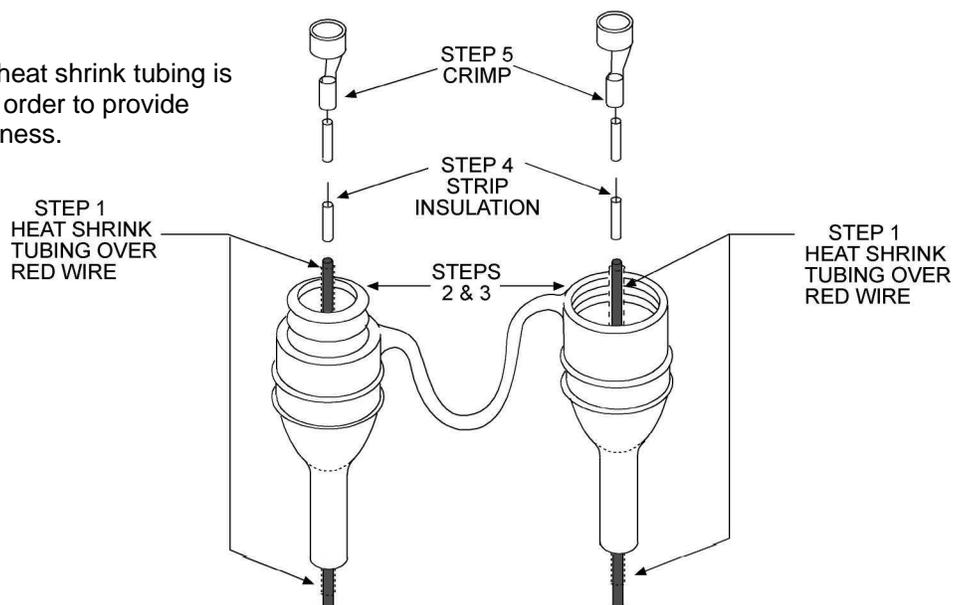


Figure A1: Proper assembly of Fuse Holder Kit (40688G-47)

## Appendix B

### Headset Station Adjustments

#### *Radio 1 & Radio 2 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 Radio 1, locate and adjust R3 on the inside of the SOLO Headset Station. For Radio 2, locate and adjust R4. (see **Figure B1** for the locations of these components). Turning the potentiometers clockwise will increase the levels and counter-clockwise will decrease the levels. Use a jeweler's screwdriver to make these adjustments. Please note that these are single-turn potentiometers, so be careful not to force them past their stops.

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.

#### *Radio 1 & Radio 2 Receive Audio Level Adjustments*

The factory has pre-set the receive audio adjustment potentiometers to levels which should be acceptable in most applications. Remember, you can adjust these levels with the Radio 1 & Radio 2 Volume controls also. Should the need arise to change these settings, the installer may do so by the following procedure:

To increase or decrease the receive audio levels for Radio 1, locate and adjust R82 inside the SOLO Headset Station. For Radio 2, locate and adjust R83. (see **Figure B1** for the locations of these components). For these adjustments, turning the potentiometers clockwise will increase the audio levels and counter-clockwise will decrease the audio levels.

#### *Auxiliary Input Mute Level Adjustment*

This adjustment changes the level that the auxiliary audio will be heard in the background when either the captain/co-captain PTT, or when one of the radios is receiving a transmission. The factory has preset the mute level of the Auxiliary Input. However, should adjustments be necessary, they can be achieved by locating and moving J5 and J18 to the desired positions inside the SOLO Headset Station, as shown in **Figure B1**. These jumpers should both always be set to the same dB position.

#### *Auxiliary Input Mute Threshold Adjustment*

This adjustment changes the audio level that must be present from Radio 1 or Radio 2 in order to mute the auxiliary input. To change, locate R8 inside the Headset Station (see **Figure B1**). Turn this potentiometer all the way clockwise to completely disable any muting from occurring. If this potentiometer is turned all the way counter-clockwise, the auxiliary input will always be muted.

#### *Auxiliary Input Mute Time-Out Adjustment*

This adjustment changes the length of time between when the auxiliary audio is muted (because of PTT or radio reception) and when the auxiliary audio returns to full level. The factory has pre-set this setting to about 4 seconds. To change this value, locate and adjust R7 inside the Headset Station.

### *Auxiliary Input Balance Adjustments*

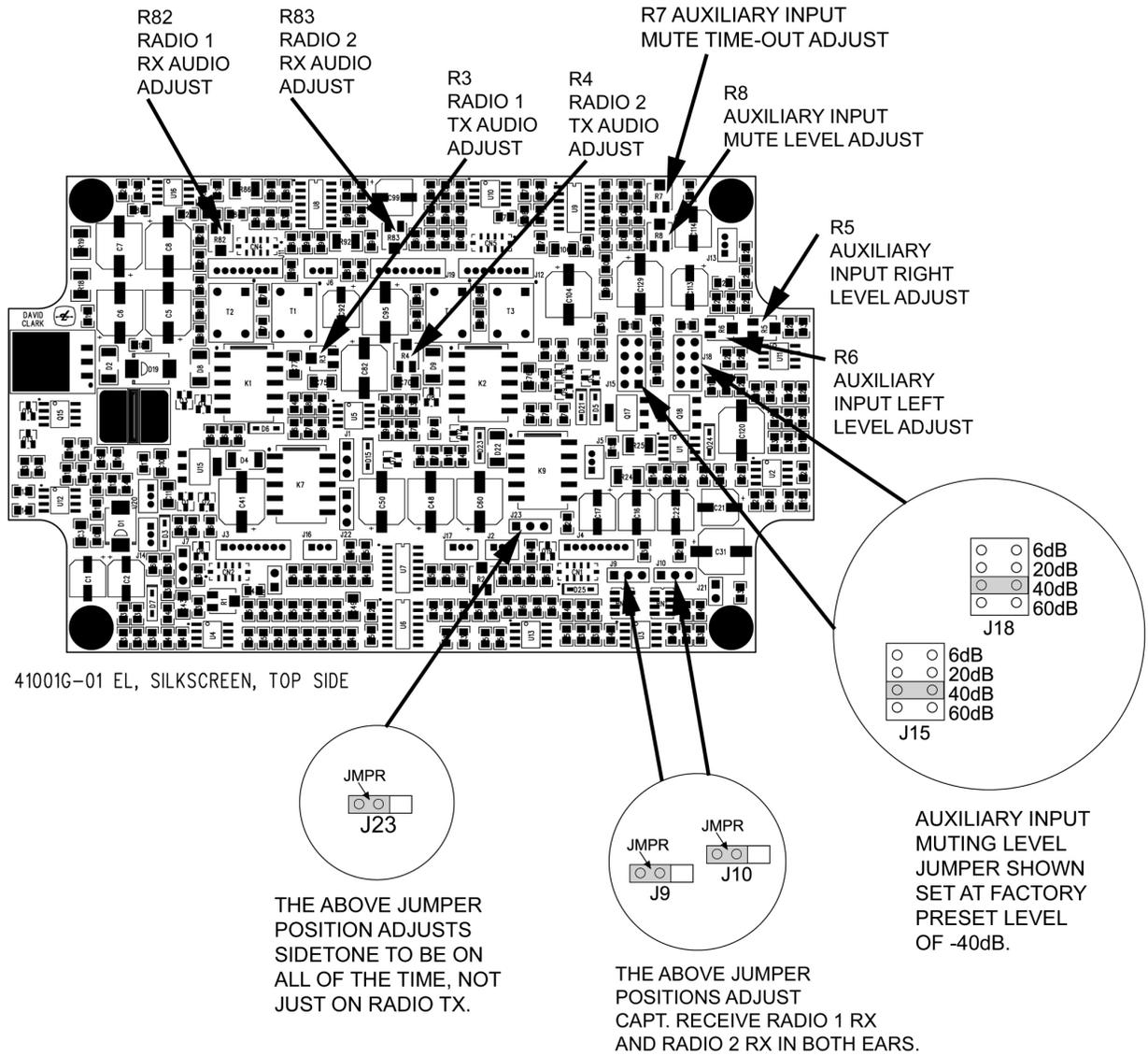
To modify the left/right balance of the auxiliary input, adjust R6 for the left channel and R5 for the right channel. Turning the potentiometer clockwise will increase the level. These components are found inside the SOLO Headset Station and can be located by examining **Figure B1**.

### *Radio Left/Right Rx Audio Separation*

The factory default for the SOLO System is such that Radio 1 receive audio is heard only in the left ear of the headset and Radio 2 receive audio is heard only in the right ear of the headset. However, there is an option to hear both Radio 1 and Radio 2 audio in both sides of the headset. To make this adjustment, locate jumpers J9 and J10 inside the SOLO Headset Station (See **Figure B1**). To enable, move both J9 and J10 to their alternate positions.

### *Sidetone on all-of-the-time*

The factory default for the SOLO System is such that the user's sidetone is only heard during radio transmit. To enable sidetone all-of-the-time, locate jumper J23 and move it to its alternate position (see **Figure B1**).



**Figure B1: Adjustment & Jumper Locations**

## Appendix C

### Environmental Specifications

The David Clark SOLO System is designed to meet the following environmental requirements:

1. Temperature:	-20 to +70 deg C Operational -40 to 85°C Storage
2. Humidity:	0 – 95% Non-condensing 4 cycles 96 hours
3. Salt Fog:	MIL-STD-810E Method 509.3 96 hours in 5% NaCl solution
4. Shock:	MIL-STD-810E Method 515.4 Sawtooth pulse 20 g 11 ms
5. Vibration:	MIL-STD-810E Method 514.4 Category 9 for Marine 1 to 50 Hz at 8 g RMS

**Table C1: Environmental Specifications**