

# ROUTINE

MWO 1-8415-216-20-1

MWO effective date is 15 October 2002 and completion date is 14 October 2011

## MODIFICATION WORK ORDER

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### MODIFICATION OF HGU-56/P HELMET ASSEMBLY

NSN	P/N
<del>841 5-01 -394-6474</del>	HGU-56/P SIZE XL
<del>841 5-01 -394-8035</del>	HGU-56/P SIZE L
<del>841 5-01 -394-8034</del>	HGU-56/P SIZE M
<del>841 5-01 -394-8036</del>	HGU-56/P SIZE S
<del>841 5-01 -394-8033</del>	HGU-56/P SIZE XS
<del>841 5-01 -394-8032</del>	HGU-56/P SIZE XXS ..

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HEADQUARTERS, DEPARTMENT OF THE ARMY, WASHINGTON, DC.

2 December 2002

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#### REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL. 35898-5000. You may also submit your recommended changes by E-mail directly to [2028@redstone.army.mil](mailto:2028@redstone.army.mil) or by fax 256-842-6546/DSN 788-6546. A reply will be furnished directly to you. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028. For the World Wide Web use: <https://amcom2028.redstone.army.mil>

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

**1. PURPOSE.** To modify the HGU-56/P helmet assembly with the Communications Earplug (CEP), which will increase communications intelligibility while affording a level of hearing protection comparable to that of foam earplugs.

**2. PRIORITY.** The modification is classified ROUTINE.

NOMENCLATURE	NATIONAL STOCK NUMBER	CAGE	PART NUMBER
Helmet Assembly: <b>XXS</b>	8415-01-394-8032	97427	1680-ALSE-101-1
Helmet Assembly: XS	8415-01-394-8033	97427	1680-ALSE-101-2
Helmet Assembly: S	8415-01-394-8036	97427	1680-ALSE-101-3
Helmet Assembly: M	8415-01-394-8034	97427	1680-ALSE-101-4
Helmet Assembly: L	8415-01-394-8035	97427	1680-ALSE-101-5
Helmet Assembly: XL	8415-01-394-6474	97427	1680-ALSE-101-6

NOMENCLATURE	NATIONAL STOCK NUMBER	CAGE	PART NUMBER
Shell Subassembly: S	8415-01-394-8455	97427	1680-ALSE-105-1
Shell Subassembly: M	8415-01-395-2190	97427	1680-ALSE-105-2
Shell Subassembly: L	8415-01-395-2191	97427	1680-ALSE-105-3
Shell Subassembly: XL	8415-01-395-2192	97427	1680-ALSE-105-4
Earcup Assembly	8415-01-395-6841 (for 1680-ALSE-170-1)	97427	1680-ALSE-170-1 or 98C10338-1

**5. PARTS TO BE MODIFIED.** The following items, whether installed or in PLUASL or depot stock, shall be modified: Earcup Shell, and Cord Assembly, Electrical.

NOMENCLATURE	NATIONAL STOCK NUMBER	CAGE	PART NUMBER
Earcup Shell	5965-01-390-8873 (for 1680-ALSE-171-1) or 8415-01-465-3396 (for 98C10337-1)	97427	1680-ALSE-171-1 or 98C10337-1
Cord Assembly, Electrical		97427	1680-ALSE-210-1

**6. APPLICATION.**

- a. Time Compliance Schedule: MWO effective date is 15 October 2002 and completion date is 14 October 2011.
- b. Level of Maintenance: AVUM.
- c. Work force skills. One ALSE Specialist/Technical or personnel with **ASI** of H2/Q2 (ALSE Qualified).
- d. Total man-hours for a single application of ths MWO is 1 hour.

**7. TECHNICAL PUBLICATIONS AFFECTED/CHANGED.** TM 1-8415-216-12&P Dated 13 December 1996.

**8. MODIFICATION KITS/PARTS AND THEIR DISPOSITION.**

- a. MWO Kit Security Classification. Unclassified.

NOMENCLATURE	NATIONAL STOCK NUMBER	CAGE	PART NUMBER
CEP Modification Kit	5965-01488-4332	1JGLO	CEP900-K04

- c. Contents of Kit.

NOMENCLATURE	NATIONAL STOCK NUMBER	CAGE	QTY	PARTNUMBER
Standard CEP		1JGLO	1	CEP199-C01
CEP Interface Harness		1JGLO	1	CEP900-104
CEP Extension Cable, 24"		1JGLO	1	CEP199-X01
Foam Tips, Mixed Sizes, Pkg.		1JGLO	1	CEP300-EMXP
Foam Tips, Standard, Pkg.		1JGLO	1	CEP199-ESTP
Foam Tips, Slim, Pkg.		1JGLO	1	CEP199-ESLP
Foam Tips, Short, Pkg.		1JGLO	1	CEP199-ESHP
Instruction Booklet		97427	1	TP0201

- d. Bulk and Expendable Material.

NOMENCLATURE	NATIONAL STOCK NUMBER	CAGE	QTY	PART NUMBER
Solder, type 40160 rosin core	3439-00-555-4629	81348	AR	QQ-S-571
Flux	3439-00-255-4566	81348	AR	0-F-506
Pencil	NIA	NIA	1	LP

e. Parts Disposition. Not applicable.

	NUMBER			
1/4-inch drill bit	5133-00-988-5703	55719	1	DBC 1/4
<b>1/8-inch drill bit</b>	5133-00-988-5695	55719	1	DBC 1/8
3/8-inch drill bit	5133-00-988-5711	55719	1	DBC 3/8
<b>Electric drill</b>	5130-00-935-7354	<b>40684</b>	1	<b>SP6039</b>
Jeweler's screwdriver set	5120-00-288-8739	81348	1	GGG-S1808
Long-nose pliers	5120-01-367-7245	75347	1	D203-6
Small, narrow-blade screwdriver	5120-00-278-1283	81348	1	GGGS-121 TY1CL1
Soldering iron with small tip, not to exceed 40 watts	3439-00-618-6623	97049	1	D550-3
<b>Wire strippers</b>	<b>5110-01-442-6982</b>	<b>05479</b>	<b>1</b>	<b>11045-INS</b>
Knife, craftsman's	5110-01-111-6416	81348	1	GGG-K-00450
Awl, scratch	5120-01-428-5131	1CV05	1	69-007
Steel ruler	5120-00-180-9656	03397	1	430C
Scissors	5110-00-203-9642	50980	1	GGG-S00278
Wrench, box and open-end combination	5120-00-228-9505	81348	1	GGG-W-636
Intercommunications Unit	5985-01-457-8419	97427	1	6015-1

10. MODIFICATION PROCEDURES. These procedures begin on the next page of this *MWO* and are **also** contained in COTS Instruction Booklet TP0201, CAGE 97427 included with the CEP Modification Kit.

a. Description. Communications Earplug (CEP) Modification Kit for **HGU-56/P** Helmet.

(1) The Communications Earplug (CEP) is designed to protect the ears from aircraft noise and to provide communications. The CEP consists of wiring with two earplug modules and a connector end. The earplug modules feature foam tips that provide sound attenuation comparable to that of foam earplugs. A plastic tube on the CEP supports each foam tip and channels communications into the ears. The connector end of the CEP attaches to a connector on the rear of the helmet.

(2) The CEP modification kit consists of a CEP cable, an interface harness, and an extension cable. The interface harness allows the CEP cable to work with the existing helmet communications system and provides a jack permitting connection and detachment of the CEP. The extension cable connects the CEP to the helmet connector when the M45 mask hood is worn.

(3) This MWO provides instructions for installing and using the CEP

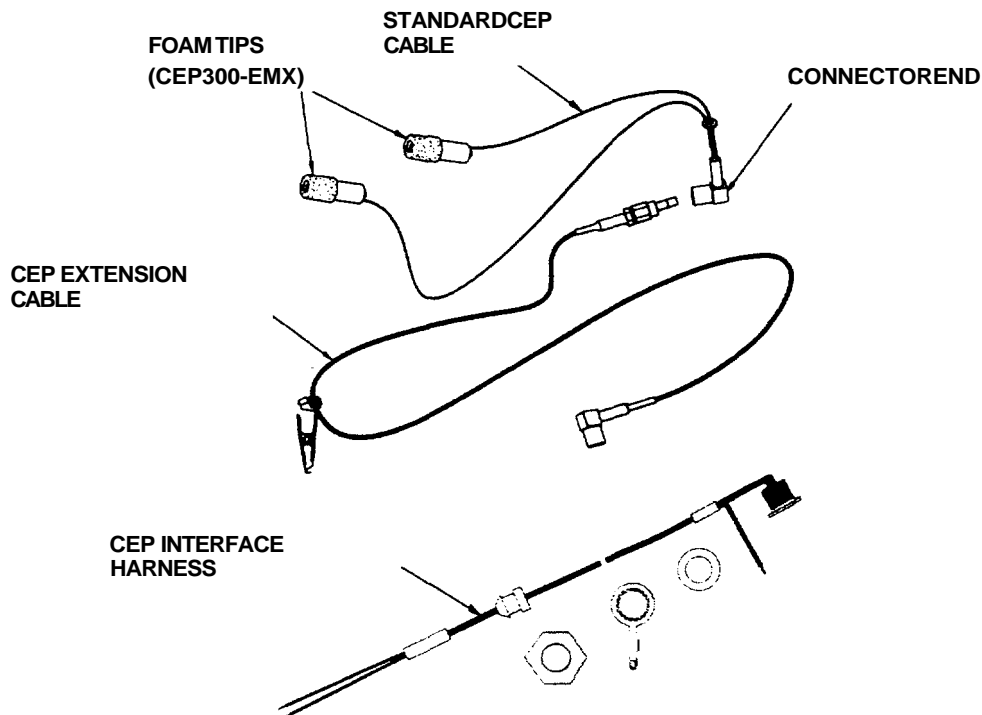


Figure 1. CEP Modification Kit.

b. Installation. Installation of the CEP modification kit requires (1) attaching the connector to the helmet, (2) attaching the interface harness to the communications cord leads inside the right earcup, and (3) checking the earcup fit.

(1) Attaching CEP Interface Harness (CEP900-I04) to Helmet.

(a) Position the helmet with the right shell eardome down (resting on the table) and the interior facing you, with the chinstrap unlaced from the D-rings.

(b) Referring to Figure 2, remove the right earcup from the helmet and remove the earseal.

(c) Remove the receiver retainer, the receiver, and the filler pad from the earcup.

(d) Using a jeweler's screwdriver, remove the communications cord leads from the receiver.

(e) Remove the communications cord with the grommet from the earcup.

(g) Remove the template page from the middle of the booklet TP0201, included with the CEP Modification Kit. Cut the template out in accordance with the procedures on the template page.

**NOTE**

A copy of the template is at Figure 14. However, use the template from TP0201, which is on card stock. If you need to reproduce the template found in this **MWO**, ensure that the copy you make has not been enlarged or reduced, or the placement of the drilled hole will be wrong.

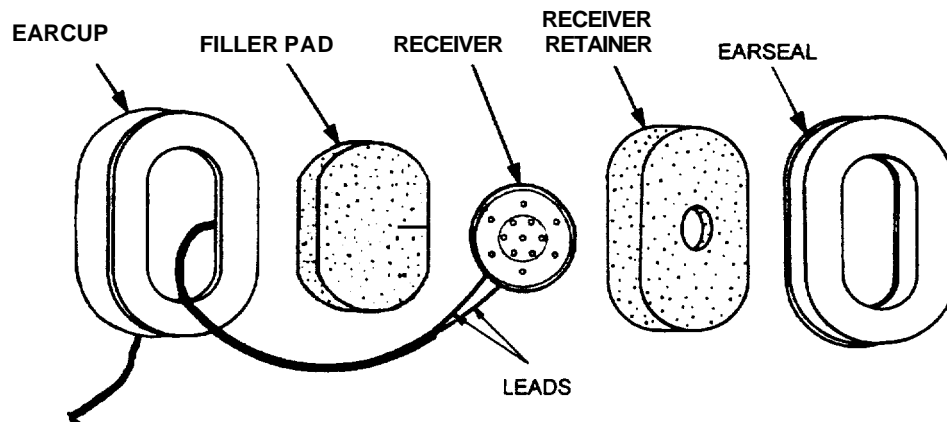


Figure 2. Earcup with Pads and Earphone Removed.

- (g) Position the helmet **so** that the right rear side is facing you.
- (h) Check the size of the helmet.
- (i) Depending upon the helmet size, position one of the four large holes along the top of the template over the right rear retention screw (located next to the eardome) as in Figure 3.

#### Note

Ensure that the template follows the contour of the helmet shell.

- (j) Align the curve at the bottom of the template with the helmet shell edge beading. If the helmet has a cap plug align the curve on the left side of the template with the cap plug.
- (k) Depending upon the helmet size, select the hole to **be** drilled. Using a pencil or an awl, mark the location of the hole to **be** drilled, in the shell, through the template hole labeled DRILL CENTER MARK. Verify that the point located on the right side of the helmet, is one inch above the cut line, and is midway on the flat plane of the transition between the sphere of the helmet and the earcup dome.

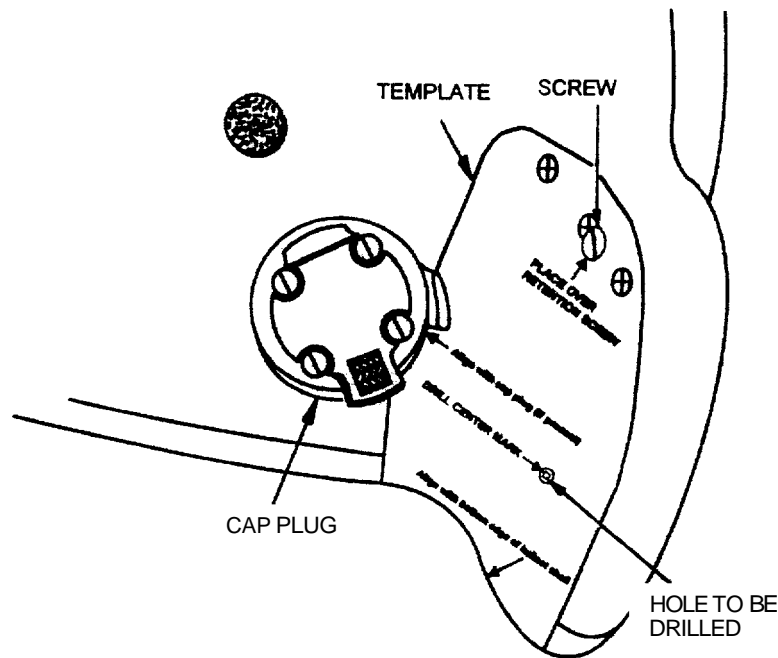


Figure 3. Template Placed on Helmet.

**WARNING**

When the helmet shell is drilled in step (k), the drill bit may penetrate the shell very quickly. To avoid injury, keep hands away from the inside of the helmet when drilling.

**CAUTION**

When performing step (k), hold the drill perpendicular to the helmet shell to prevent damage to the shell and the energy-absorbing liner. Ensure that the earcup, the wires, and the retention assembly inside the helmet shell are away from the area where the hole is to be drilled to prevent damage. If the helmet shell is not drilled in the following manner, delamination of the shell layers could occur, making the helmet shell unserviceable.

- (l) Drill a 1/8-inch hole into the marked location.
- (m) Drill a 1/4-inch hole into the 1/8-inch hole.
- (n) Drill a 3/8-inch hole into the **1/4-inch** hole.
- (o) Use a razor knife to remove any frayed helmet **fibers** resulting from drilling.



(p) Referring to Figure 4, slide the large black spacer over the wires of the interface harness and onto the connector.

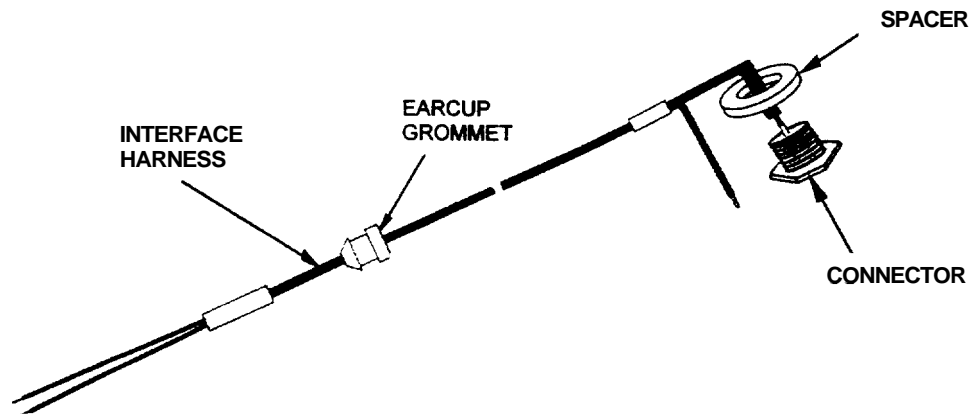


Figure 4. CEP Interface Harness.

(q) From outside the helmet, insert the black and white wires of the interface harness through the drilled hole so that the grommet is completely through hole, the head of the connector is against the spacer, and the spacer is against the outside of the helmet as shown in Figure 5.

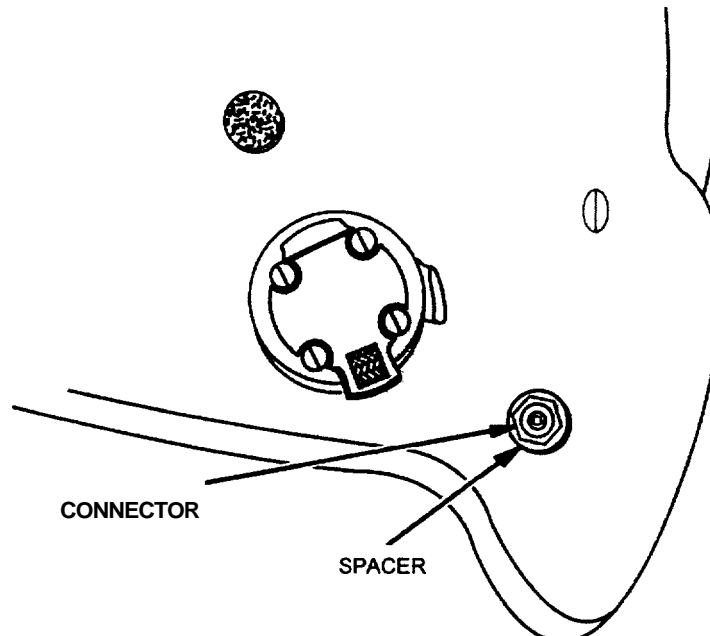


Figure 5. CEP Connector.

NOTE

The earcup grommet may be difficult to pull through the helmet shell.

(r) From inside the helmet, slide the ground lug over the wires and onto the connector, followed by the nut. Ensure that the unattached ground wire is pulled through the ground lug and nut as shown in Figure 6.

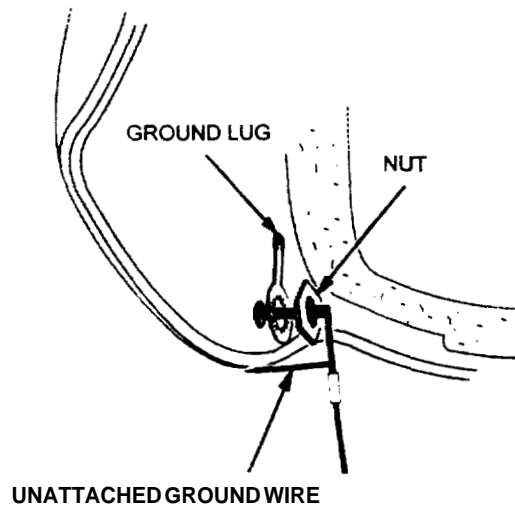


Figure 6. CEP Interface Harness (Inside View).

(s) Ensure that the ground lug is oriented toward the crown of the helmet as shown in Figure 7. Tighten the nut using the 7/16-inch open-end wrench. Ensure that the nut is tight enough that the ground lug will not rotate when pushed.

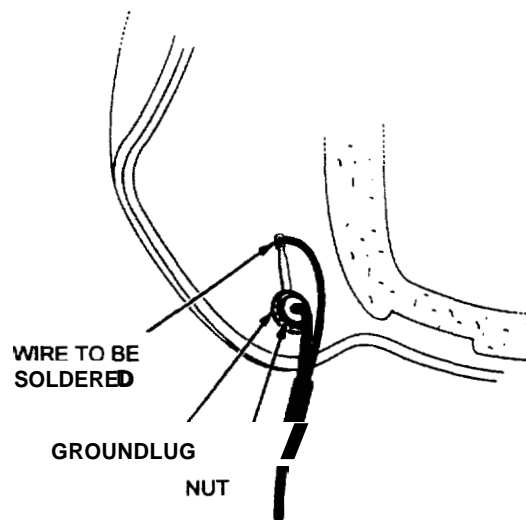


Figure 7. CEP Interface Harness Installed.

**NOTE**

In step (t), ensure that the soldering is performed by qualified personnel, and in accordance with ANSI/J-STD-001.

(t) Using long-nose pliers, carefully bend the ground lug to about a **45** degree angle from the shell **so** that it reaches the unconnected ground wire. **Insert** the stripped end of the unconnected ground wire through the small hole at the end of the ground lug. Wrap the exposed part of the wire once around the end of the ground lug. Solder the wire. Bend the ground lug flush with the inside surface of the helmet shell.

(2) Attaching the **CEP** interface harness (CEP900-I04) to earcups.

**CAUTION**

**To avoid damage to the earcup shell, ensure that the pilot hole is located properly as specified in step (a) below.**

(a) Use an awl to make a pilot hole 7/16 inch below (as worn) the center of the existing hole. (See Figure 8.)

(b) Lay the earcup on a flat surface, and drill a 1/4-inch hole into the pilot hole. (See Figure 8.)

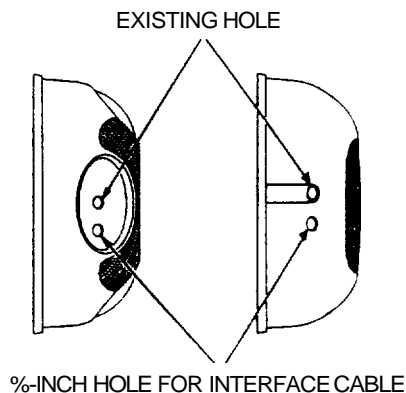


Figure 8. Earcup Showing Location of Interface Harness.

(c) Carefully pull the part of the communications cord that extends into the right earcup *out* from behind the energy-absorbing liner.

(d) Reinsert the communications cord with the grommet back into the previously existing communication cord hole in the earcup from which it was removed. Carefully pull more **of** the communications cord into the earcup to allow easier access to the metal tips **of** the communications cord leads. When pulling the cord, be careful not to damage the energy-absorbing liner.

**CAUTION**

**When pulling the cord through the grommet in step (e) below, do not pull on the thin white or black wires.**

(e) From outside the earcup, insert the interface harness into the newly drilled hole and seat the grommet. (See Figure 8.) Pull additional wire through the grommet into the earcup to make soldering connections easier.

(9) Carefully expose no more than  $\frac{1}{8}$  inch of bare wire at the pin connector on the black communications cord either by sliding the insulation back or by stripping the insulation away.

(g) If necessary, strip the black lead of the interface harness to  $\frac{3}{16}$  inch.

(h) Using long-nosed pliers, bend the stripped end of the interface harness into a hook and fit the hook around the exposed wire of the black communications cord lead as shown in the attachment detail in Figure 9.

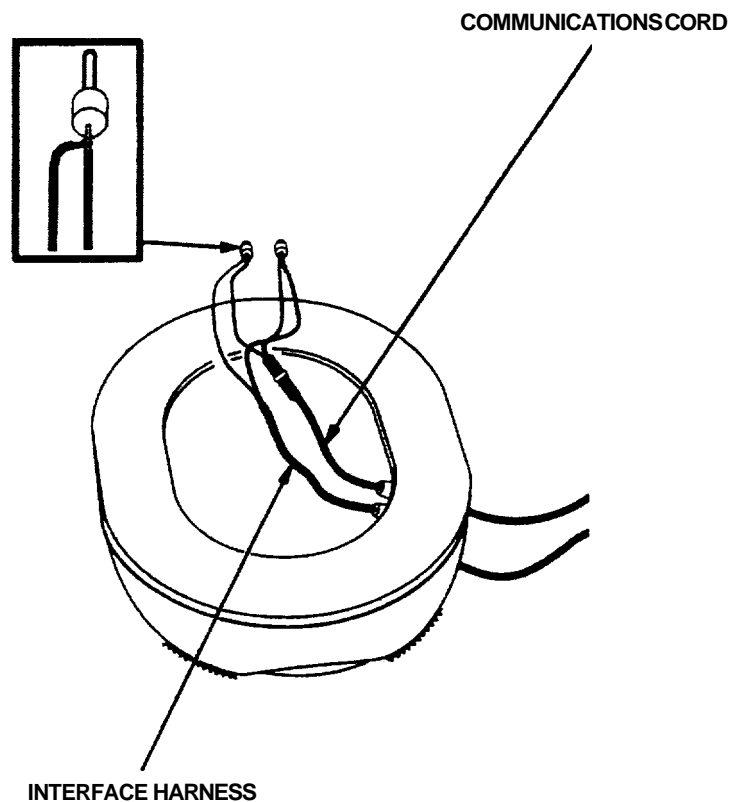


Figure 9. CEP Interface Harness Connected to Communications Cord.

**CAUTION**

In step (l) below, use only rosin core solder when soldering the wires.

**NOTE**

In step (i) below, ensure that the soldering is performed by qualified personnel, and in accordance with **ANSI/J-STD-001**.

(i) Solder the hook and the exposed wire to form a single junction.

(j) Repeat steps (f)-(i) above, to connect the white lead of the interface harness to the white lead of the communications cord.

**NOTE**

The receiver is not polarized. In step (k) below, the white and black leads can be attached to the receiver either way.

(k) Using a jeweler's screwdriver, reattach the receiver. Figure 10 shows the completed connection.

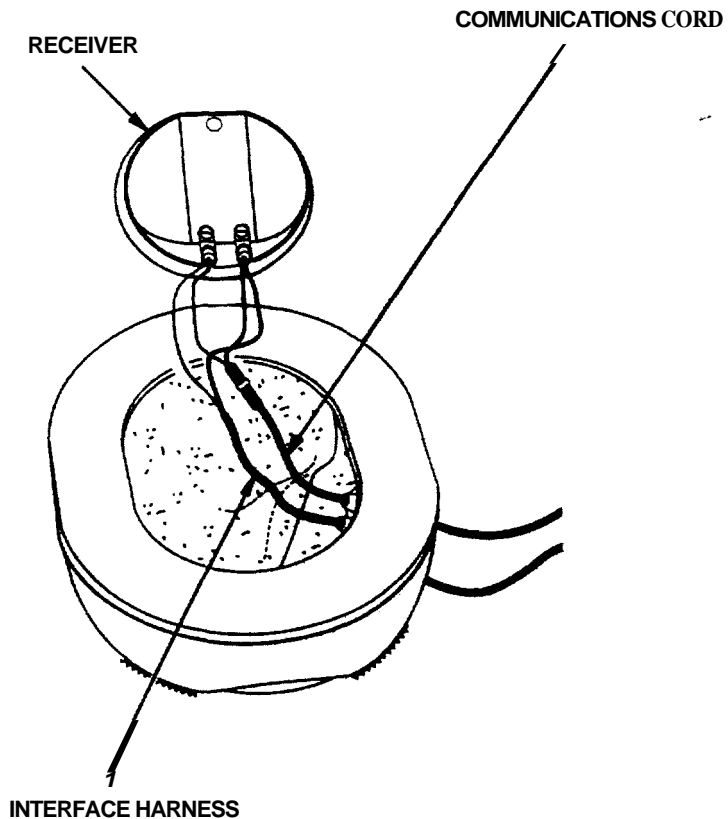


Figure 10. Earcup Reassembly

(l) From outside the earcup, carefully pull the excess wire from the communications cord and the interface harness back through the grommets, being careful not to pull the CEP interface cable beyond the point at which the shrink tubing touches the grommet.

(m) Insert the filler pad, the receiver, and the receiver retainer back into the earcup, and reinstall the earseal. Refer to Figure 2 for proper order of parts.

(n) Route the earcup with the interface harness through the retention assembly using the same path that is originally followed.

(o) Reattach the earcup to the earcup retainer pad in its original position.

(p) Route excess cable between the energy-absorbing liner and the helmet shell, being careful not to damage the cable or the liner.

(q) Plug CEP into the jack in the helmet and the communications cord into the intercommunications unit and check for proper operation of the CEP and the receivers.

(3) Checking earcup fit.

(a) Have the user don the helmet.

(b) Check the earcup fit, ensuring that the ears are properly centered in the earcups. Adjust the earcups if necessary in the same way as with the standard HGU-56/P.

(c) Sizing, use, and care of the CEP (CEP199-C01). For optimum hearing protection, the correct foam tip size must be selected. In addition, the CEP must be donned properly and cared for properly.

#### 1 Selecting the Correct Foam Tip (CEP300-EMXP) Size

Foam tip sizes include standard, slim, and short. Select the correct foam tip size as follows:

- a If you wear the orange or blue triple-flange earplug, select the standard foam tip.
- b If you wear the green earplug, select the slim foam tip.
- c A small percentage of users may require the short foam tip.
- d If the correct size cannot be determined, ask your flight medical staff for help.

## 2 Donning the CEP and Checking the Fit

a Attach the proper foam tip to each earplug by threading the plastic end of the foam tip onto the earplug. Do not tighten too much; tighten only enough to seat the foam tip onto the CEP housing. About one revolution of the plastic end is usually enough.

b Drape the CEP over your shoulders and on either side of your neck from the back so that the earplug attached to the shorter cord is on your right and the longer cord is on your left. (One way to remember this is "Long is Left.") This will ensure that the connector end is positioned toward the right in the back so it will reach the helmet connector.

## WARNING

**Do not force the earplug into the ear. This may cause the foam tip to be pushed back, exposing the plastic tube inside. This will diminish hearing protection and may cause injury to the ear canal. Ensure that the proper foam tip is attached to each earplug before inserting the earplug into the ear canal.**

c Compress the foam tip (Figure 11) of one earplug to about 1/3 of its original diameter by rolling it between your thumb and index finger. This will ease insertion into the ear. Do not squeeze the foam tip flat. When compressing the foam tip, do not allow a crease to form. This will diminish hearing protection.

d Hold the earplug housing (Figure 11) between the thumb and index finger on your hand on the same side as the earplug being fitted. With your other hand, reach behind your head and pull your ear on the same side as the earplug up and away from your head. This will straighten the ear canal to ease earplug insertion. Carefully insert the foam tip of the earplug into the ear.

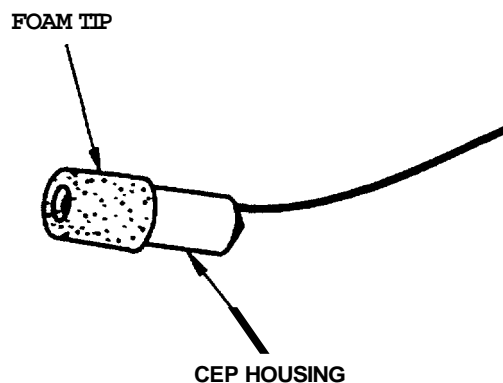


Figure 11. Earplug.

e Ensure that the earplug is positioned so that the wire rests in the notch at the bottom of the ear canal. Hold the plug for a few seconds until the foam expands inside the ear and will hold the plug in place.

f Repeat Steps c through e for the ~~other~~ earplug.

g Check the fit of each earplug by moving a cupped hand near the ear. The user should not perceive any change in sound level. If the sound level changes, this indicates an improper seal; repeat steps c through e with new foam tips. If the foam tips still do not seal properly, repeat steps c through g with the next larger foam tip size. If the foam tips still do not seal properly, consult the local hearing conservation officer.

#### NOTE

If you are not wearing a CB protective mask, do not perform Steps h and i. The CEP extension cable (CEP199-X01) should be used only with a CB protective mask.

h If the M45 mask is to be worn, connect the CEP to the extension cable as shown in Figure 12. Then, don the mask.

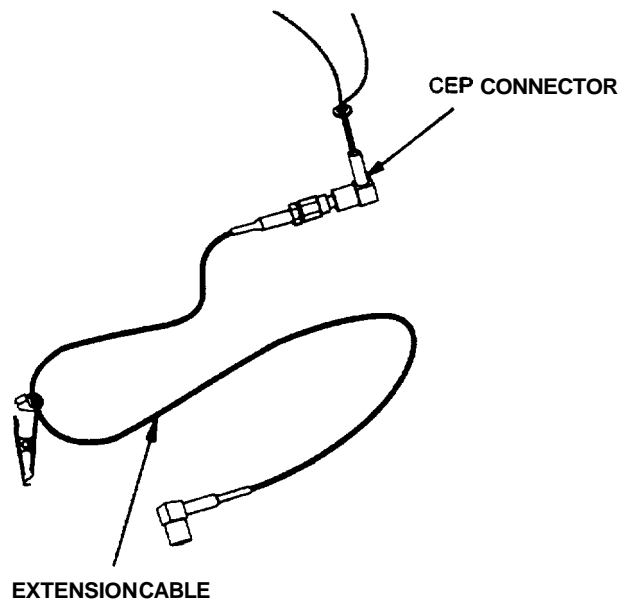


Figure 12. CEP and Extension Cable.



i If the M45 mask is worn, connect the extension cable to the helmet before donning the helmet. (See Figure 13).

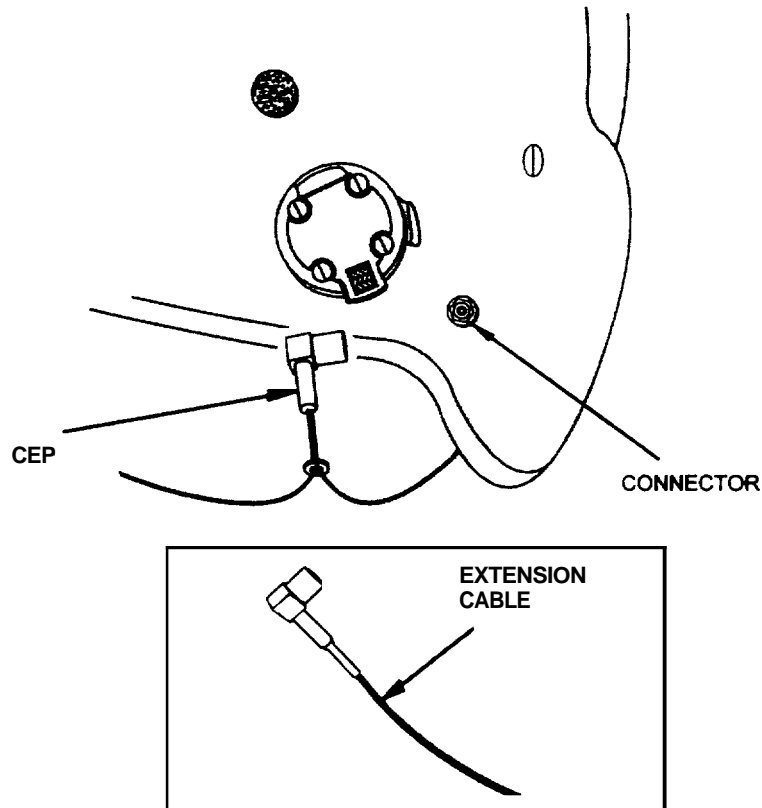


Figure 13. CEP and Extension Cable Connector

j Don the helmet.

k If the M45 mask is NOT worn, and you have NOT performed steps h through i, grasp the CEP connector end with the right hand. Push the connector end onto the connector on the right rear of the helmet. (See Figure 13.)

**WARNING**

**Ensure that the volume level of the audio sent to the CEP is reduced.  
Damage to the wearer's ears may result if the volume level is not reduced.**

l Plug the communications cord into the intercommunications unit and check for proper operation of the CEP and the receivers.

(4) Removing the CEP.

(a) If you are not wearing the M45 mask and are NOT using the extension cable, disconnect the CEP connector end from the helmet connector before removing the helmet. If you are wearing a CB protective mask, remove the helmet; disconnect the extension cable from the helmet; disconnect the extension cable from the CEP after removing the CB protective mask; and proceed with step (c) below.

(b) Remove the helmet.

(c) Remove each earplug by grasping the housing and pulling the earplug out of the ear.

(d) Store the CEP in the container provided.

(e) Store the CEP extension cable in a marked container so that it is available when needed.

(5) Care of the CEP.

(a) Do not leave the CEP attached to the helmet when not in use; always store the CEP in the container provided.

(b) When the foam tips become soiled, remove them from the earplugs. Hand-wash the foam tips with warm water and mild soap, and allow them to air-dry. Do not wash the foam tips any more than necessary (about once a week); the more often they are washed, the sooner they will wear out.

(c) With normal use, the foam tips will last about one month. Discard the foam tips if the foam is degraded or pulled away from the plastic tube inside.

(6) Instructions for Cutting Template Out (Figure 14).

(a) **cut** out the template. Cut out the screw locator circle (above the notation PLACE THE PROPER SCREW HOLE OVER THE RIGHT REAR RETENTION SCREW) for your helmet size.

(b) **cut** an X through the circles representing the "DRILL CENTER MARK" circle for your helmet size.

(c) Making sure the template conforms to the shape of the helmet, place large hole that you cut out over the retention screw.

(d) Align the curve on the left with the helmet cap plug (if it exists.)

- (e) Align the bottom curve of the template with the bottom edge of the helmet shell.
- (9) Mark the **drill** location in the center of the “ **Drill** Enter Mark” hole where you **cut** the X.

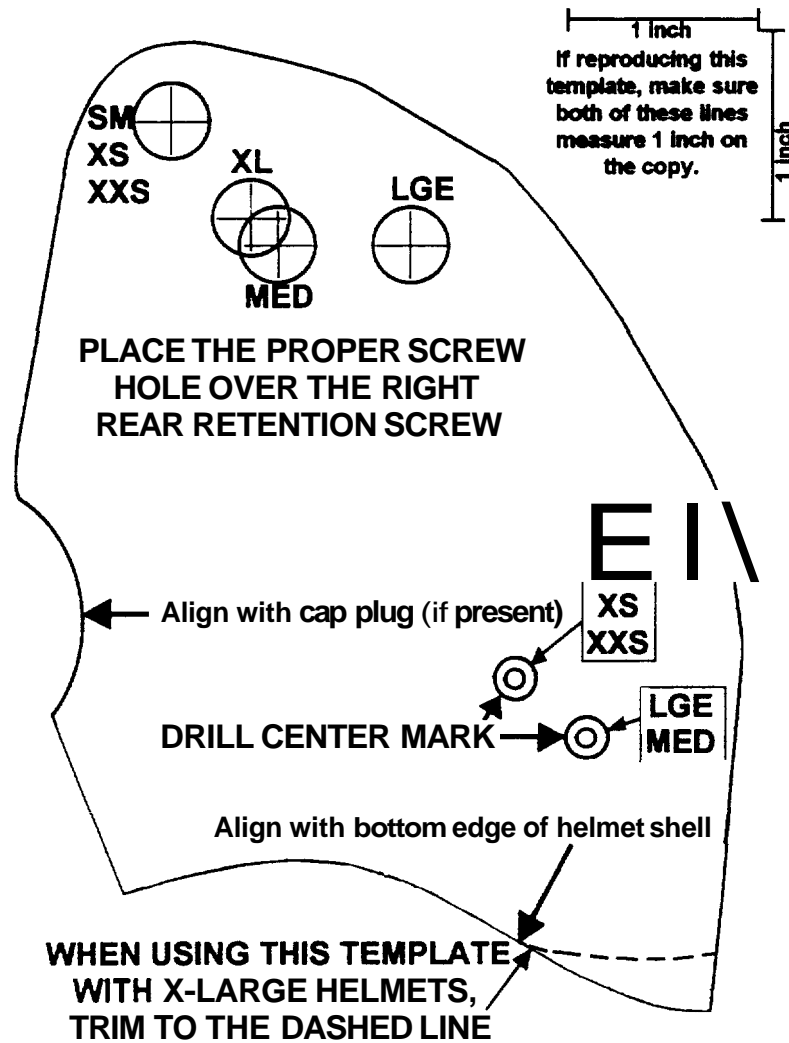


Figure 14. Template.

**11. Calibration Requirements.** Not applicable.

**12. Weight and Balance Data.** Not applicable

**13. Quality Assurance Requirements.** Not applicable.

**14. Recording and Reporting of the Modification.** Use DA Form 2408-22 and DA Form 2407 to record compliance. Mail the completed DA Form 2407 to:

Commander  
US Army Aviation and Missile Command  
ATTN: AMSAM-MMC-MA-01 (L. Morgan)  
Redstone Arsenal, AL 35898-5230

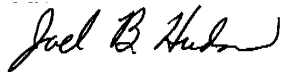
**15. Materiel Change (UC) Number.** This MWO is authorized by MC number 1-01-01-0013.

**16. Modification Identification.** Compliance with this MWO can be verified by visual inspection of the rear of the right ear cup to ensure the CEP connector is installed.



By Order of the Secretary of the Army:

Official:



**JOEL B. HUDSON**  
Administrative Assistant to the  
Secretary of the Army  
0229701

**ERIC K. SHINSEKI**  
General, United States Army  
Chief of Staff

DISTRIBUTION:

To be distributed in accordance with Initial Distribution Number (IDN) 314070, requirements for MWO 1-8415-216-20-1.

