

# TB SIG 109

WAR DEPARTMENT TECHNICAL BULLETIN

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## HEADSET H-16/U

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War Department, Washington 25, D. C.

16 November 1944

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### 1. GENERAL.

Headset H-16/U is used in armored vehicles and can be worn under Helmet M-1 (infantry) and crash helmets used by the infantry and armored forces. It consists of an adjustable headband, to fit the contour of the wearer's head, two earcups, each containing a receiver unit, an impedance-matching transformer, and an ear insert. The headset has a total impedance of 8,000 ohms.

### 2. DESCRIPTION.

Headset H-16/U consists of Headband MX-175/U and Earcups MX-239/U (right) and MX-240/U (left).

a. **Headband MX-175/U (fig. 2).** Headband MX-175/U is a soft vinylite-covered, spring-steel band with a 12½-inch cord assembly inclosed in the rubber cover. Two adjustable, sliding brackets are attached to each end of the headband on which the earcups are affixed. The sliding bracket allows the earcups to be extended or retracted along the headband, to enable the wearer to adjust the earcups to fit over the ears and allow the ear inserts to fit comfortably into the ear openings. The headband is constructed as one piece; none of the parts are removable. The steel band will sustain bending to aid in fitting the headset to the contour of the wearer's head.

b. **Earcup MX-239/U and MX-240/U (fig. 2).** Earcup MX-239/U consists of an irregular-shaped magnesium casting and a right earcup assembly. The earcup assembly consists of a soft neoprene ear cushion, shaped to envelop the right ear and fasten to a steel

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plate that fits over the cavity of the chassis assembly; a magnesium cover plate that covers the electrical parts in the chassis assembly; a chassis assembly; and an ear insert. Earcup MX-240/U is similar to Earcup MX-239/U, except that it is shaped to fit the left ear.



*Figure 1. Headset H-16/U in position for operation.*

(1) CHASSIS ASSEMBLY. Each chassis assembly contains a terminal block, an impedance matching transformer, a rubber acoustic tube, and Receiver Unit R-30-U. The electrical connection of the headset is shown in figure 3.

(a) The primary winding of each impedance-matching transformer has an impedance of 4,000 ohms, and is connected to the terminal block. The secondary winding of the transformer has an

impedance of 128 ohms which matches the impedance of Receiver Unit R-30-U. The cord assembly connects the two receiver units through the terminal blocks and terminates in Plug PL-54.

(b) Receiver Unit R-30-U is a miniature, permanent-magnet, diaphragm-type receiver similar to the receiver used in Headset HS-30-U. A rubber acoustic L-shaped tube that has one end at-

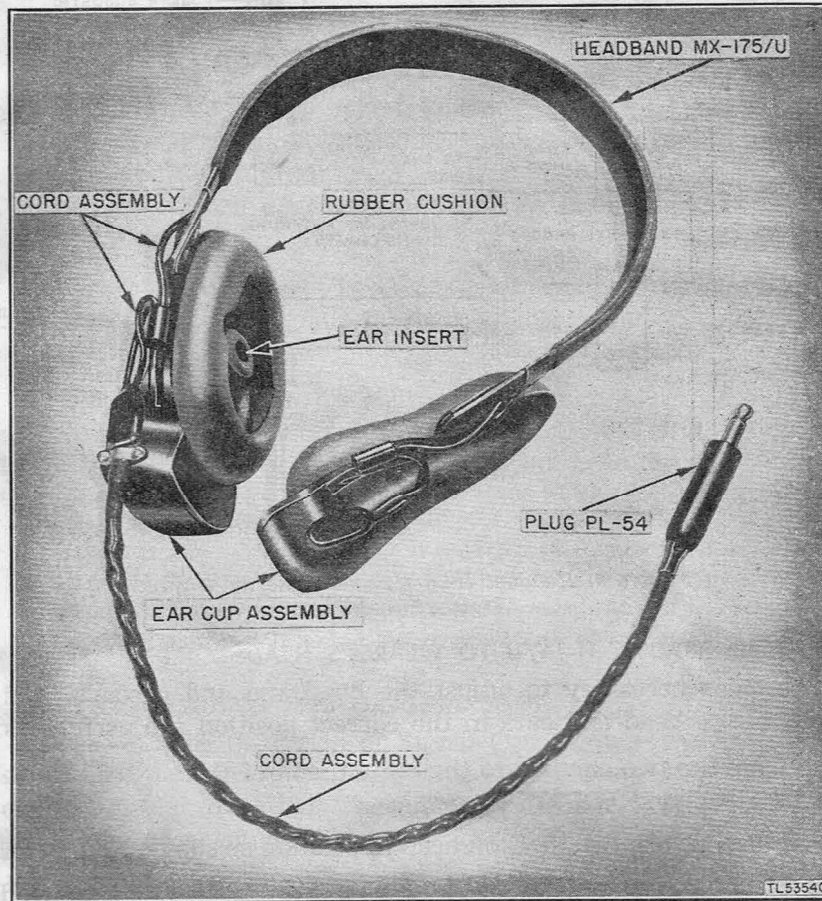


Figure 2. Headset H-16/U, showing component parts.

tached to the output of the receiver unit and a thin membrane, attached to the other end, is used to provide an air column to conduct the sound from the receiver diaphragm to the ear insert. The membrane is used to broaden the frequency response. The membrane end of the receiver acoustic tube fits into a hole in the metal flange on the magnesium cover plate.

(2) EAR INSERTS. The ear inserts are accordion-like collapsible, neoprene tubes that fit over the round, metal flange on the cover plate, and provide an air column for conducting the sound from the receiver rubber acoustic tube to the ear drum of the listener. The inserts also serve as a partial seal against external noise.

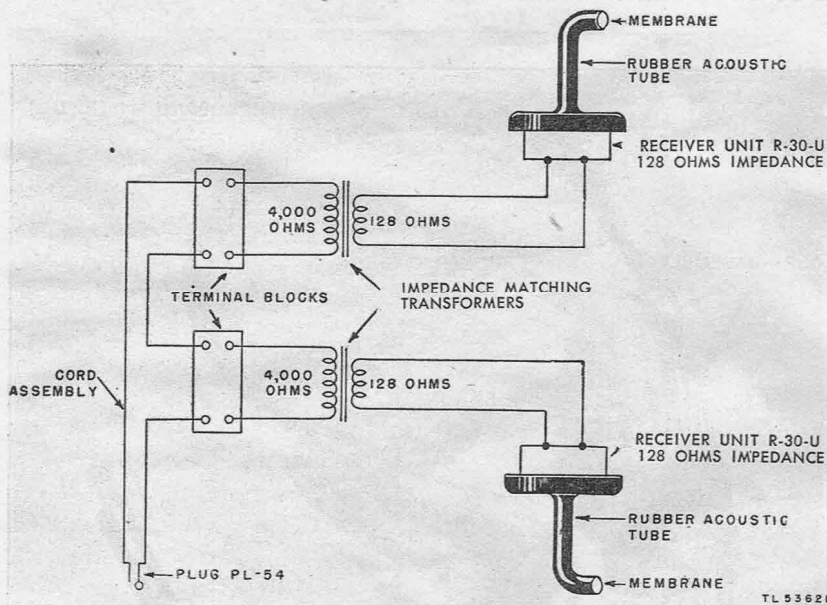


Figure 3. Headset H-16/U, schematic diagram.

### 3. FITTING HEADSET H-16/U TO WEARER'S HEAD.

The steps necessary to adjust the headband and earcups to fit the wearer's head and ears in the correct position are as follows:

- a. Slide the two earcups to the bottom end of the slotted bracket on the Headband MX-175-U.
- b. Place Headset H-16/U on head in position as shown in figure 1.
- c. Place the first and second fingers of the left hand on the headband strap above the left earcup, and put the thumb under the earcup. Do the same with the right hand.
- d. Adjusting both earcups at the same time, hold the headband and strap in place with first and second fingers and raise the cups to the correct position with thumbs.
- e. When in correct position, Earcups MX-239/U and MX-240/U will rest comfortably about the ears and the rubber ear inserts will fit into the ear openings.

f. If ear cushions do not exert uniform pressure against the side of head, Headband MX-175/U may be bent to give a satisfactory fit.

#### 4. MAINTENANCE.

**NOTE:** Failure or unsatisfactory performance of equipment used by Army Ground Forces and Army Service Forces will be reported on W.D., A.G.O. Form No. 468 (Unsatisfactory Equipment Report). If Form No. 468 is not available, see TM 38-250. Failure or unsatisfactory performance of equipment used by Army Air Forces will be reported on Army Air Forces Form No. 54 (unsatisfactory report).

Special care should be taken to keep the ear inserts clean at all times. If the ear inserts become clotted with dirt or other foreign matter, the performance of Headset H-16/U will be impaired. The ear inserts are attached so they can easily be removed for cleaning.

**a. Removal of Ear Insert.** To remove ear insert, press the ball of the thumb against the side of the ear insert and exert pressure until the insert releases.

**b. Replacing Ear Insert.** To replace ear insert, place one side of ear insert over the metal mounting flange. Stretch the opposite side of the ear insert until it can be snapped on to the flange. Twist the insert, pushing down at the same time to assure that the insert is in the correct position.

**WARNING:** When ear inserts are removed for cleaning or for other purposes, do not remove or tamper with the membrane at the opening of the tube, as this will impair the performance of the membrane.

#### 5. MOISTUREPROOFING AND FUNGIPROOFING.

**a. General.** The operation of Signal Corps equipment in tropical areas where temperature and relative humidity are extremely high requires special attention. The following items represent problems which may be encountered in operation:

- (1) Transformer windings fail.
- (2) Electrolytic action takes place in transformer windings, causing eventual break-down.
- (3) Hook-up wire and cable insulation break down. Fungus growth accelerates deterioration.
- (4) Moisture forms electrical leakage paths on terminal boards, causing flash-overs and crosstalk.

**b. Retreatment Following Repair.** Headset H-16/U has been treated to be moisture- and fungus-resistant. If repairs are made, the

equipment should be retreated for moistureproofing and fungiproofing as described below.

**c. Treatment.** A moistureproofing and fungiproofing treatment has been devised which, if properly applied, provides a reasonable degree of protection against fungus growth, insects, corrosion, salt spray, and moisture. The treatment involves the use of a moisture- and fungi-resistant varnish applied with a spray gun or brush. Refer to TB SIG 13, Moistureproofing and Fungiproofing Signal Corps Equipment, for a detailed description of the varnish-spray method of moistureproofing and fungiproofing, and the supplies and equipment required in this treatment.

**CAUTION: Varnish spray may have toxic effects if inhaled. To avoid inhaling spray, use respirator if available; otherwise, fasten cheesecloth or other cloth material over nose and mouth.**

**d. Step-by-step Instructions for Treating Headset H-16/U.**

(1) PREPARATION. Make all repairs and adjustments necessary for proper operation of the equipment.

(2) DISASSEMBLY (fig. 4).

(a) Remove the ear inserts as described in paragraph 4a.

(b) Remove the steel plate with the ear cushions attached by unscrewing the three screws located in the area about the insert flange.

(c) Remove the cover plate by unscrewing the three screws holding it to the chassis assembly and prying up at the lower edge of the cover plate with a screwdriver.

(d) Unscrew the shell from Plug PL-54 and push the shell back on the cord.

(e) Clean all dirt, dust, rust, fungus, oil, grease, etc., from the equipment to be processed.

(3) MASKING. Replace four screws in the threaded holes now visible in the chassis assembly. The screws will mask the threads during treatment.

(4) DRYING. Place equipment in oven or under heat lamps for 2 to 3 hours at 165°F ( $\pm 5^\circ$ ).

(5) VARNISHING.

(a) Apply three coats of moistureproofing and fungiproofing varnish (Lacquer, Fungus-resistant, Spec No. 71-2202 (Stock No. 6G1005.3) or equal) with brush to interior of chassis assembly making certain to thoroughly cover all parts therein. Air-dry after

the first and second application. After the third application, before the varnish dries, the headset is reassembled.

**CAUTION:** Care should be exercised not to cover the membrane end of acoustic coupling tube.

(b) Apply three coats of varnish to interior of brass body piece of Plug PL-54 thoroughly covering conductors, terminals, and screws. Air-dry between applications. Do not apply varnish to the threaded portion, tip, and sleeve of Plug PL-54.

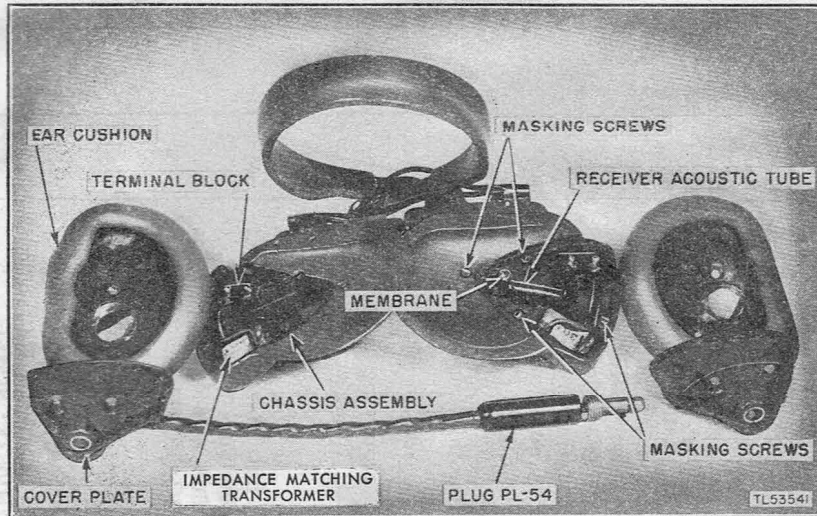


Figure 4. Headset H-16/U, disassembled.

(6) REASSEMBLY.

(a) Remove the four masking screws.

(b) Clean all contacts with varnish remover, and burnish the contacts.

(c) Reassemble the headset and test its operation (Plug PL-54 is reassembled after the varnish is dried).

(7) MARKING. Mark the headset "MFP" and date of treatment on the upper surface of the vinylite headband cover.

EXAMPLE: MFP—24 October 1944.

∞ 6. MAINTENANCE PARTS LIST FOR HEADSET H-16/U (SIGNAL CORPS STOCK NO. 2B800-16).

Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Run-ning spares	Orign stock	3d ech	4th ech	5th ech	Depot stock
		<p><b>NOTE:</b> Headset H-16/U manufactured by Permoflux Corporation differs slightly in construction from Headset H-16/U manufactured by National Scientific Products Corporation. When ordering maintenance parts, determine the manufacturer of the equipment and order by Signal Corps stock number, manufacturer, and manufacturer's number as shown in this maintenance parts list.</p>							
	6G212.2	CEMENT, cellulose: waterproofing sealer; 2 oz tube; Permoflux M-121; Prestite Eng Corps #11544 Cabin type.	1			*	*		*
	6Z1932-31	CLAMP, cable: 0.017" half hard cold rolled steel; iridite over cadmium; 3/16" x 5/8" x 1/8" over-all; Permoflux #1644; Natl Scient Prod dwg #139D1061G; SC-D-14619-2.	1			*	*		*
	2B275-1	CUSHION, LH earcup: headset rec; molded olive drap neoprene; irregular circular shaped; 0.05" thk section, 3-1/2" x 2-5/8" x 5/8" over-all; Permoflux #1603; Natl Scient Prod part/dwg #107B1063X; SC-D-14622-5.	1			*	*		*



2B275	CUSHION, RH earcup: headset rec; molded olive drab neoprene; irregular circular shaped; 0.05" thk section, 3-1/2" x 2-5/8" x 5/8" over-all; Permoflux #1602; Natl Scient Prod part/dwg #107B1062X; SC-D-14622-6.	1	*	*	*
2B800-16/1	GASKET, synthetic rubber: neoprene; black; 7/8" x 7/16" x 1/32" thk; Permoflux #1619; Natl Scient Prod dwg #107D1079X; SC-D-14633-6.	2	*	*	*
2B735-175	HEADBAND ASSEMBLY MX-175/U: earcup headset rec; olive drab enamel and vinylite paint; 2 cond cord approx 13-1/2" lg with Plug PL-54; Permoflux #GA-60; Natl Scient Prod dwg #133B1076A; SC-D-14628.	1	*	*	*
2B800-16/6	INSERT, earcup: headset rec; black neoprene; accordion-like tubular collapsible, fitting entrance to ear; approx 1/4" hole through center; 25/32" diam x 25/32" lg over-all; Permoflux #1606; Natl Scient Prod part/dwg #107B1043X; SC-D-14623-7.	2	*	*	*
2Z7154	PLUG PL-54: 2-way single shank; tubular, black ethyl cellulose shell; shank 3/8" diam x 2-3/8" lg; shell 1/2" diam x 1-21/32" lg; over-all approx lg 2-29/64"; Permoflux #GA-52; Natl Scient Prod part/dwg #104D1081X; SC-D-338.	1	*	*	*

\* Indicates stock available.

6. MAINTENANCE PARTS LIST FOR HEADSET H-16/U (SIGNAL CORPS STOCK NO. 2B800-16) (contd).

Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Run-ning spares	Orgn stock	3d ech	4th ech	5th ech	Depot stock
	6L6256-2.7B	SCREW, machine: Fil H; steel, dull black nickel; #2-56 x 1/8".	4			*	*		*
	6L6256-3.5ON	SCREW, machine: Fil H; steel, cadmium; #2-56 x 3/16".	4			*	*		*
	6L6264-1-1.3	SCREW, machine: Fil H; brass; #2-64 x 0.081", head 0.155 diam; with 0.046" axial hole; Permoflux #1420; SC-D-338-3.	2			*	*		*
	6L6256-2.7B	SCREW, machine: FH; steel; dull black nickel; #2-56 x 1/8".	2			*	*		*
	6L6256-3.7BS	SCREW, machine: FH; steel; dull black nickel; #2-56 x 3/16".	10			*	*		*
	6L6256-8.47S	SCREW, machine: FH; steel; cadmium; #2-56 x 1/2".	2			*	*		*
	6L18506-3.32BD	SCREW, machine: slotted head, set; cold finished steel, dull black nickel; #6-40 x 3/16" lg over-all; extended pin, dog point; Permoflux part #1607; Natl Scient Prod part/dwg #110D1050A; SC-D-14619-3.	4			*	*		*
	2Z7154/1	SHELL, plug: ethyl cellulose, black, molded; 1/2" diam x 1-21/32" lg over-all; Permoflux #1423; SC-D-338-1, marked "PL-54".	2			*	*		*

2B800-16/11	SPRING, earcup: headset rec; piano wire; cadmium; irregular shaped #21AS & W ga wire approx 1-3/8" lg over-all; Permoflux #1660; SC-D-14623-9.	2	*	*	*
	<b>RIGHT-HAND EARCUP ASSEMBLY MX-239/U GROUP</b> Parts as Manufactured by Permoflux Corp				
2B450-239	EARCUP ASSEMBLY MX-239/U, RH: headset rec; olive drab enamel and vinylite paint; 4,000 ohms; approx 2-3/4" x 4-1/4" x 1-3/4" over-all; Permoflux #GA-44; SC-D-14620.	1	*	*	*
2B800-16/2	CASTING, RH earcup: headset rec; Dowmetal "R" magnesium; olive drab enamel and vinylite paint; housing for transf-rec assem; irregular shaped casting, 2-3/4" x 4-1/4" x 1-1/8" over-all; engraved "MX-239/U RIGHT"; Permoflux #1600; SC-D-14625-2.	1	*	*	*
2B800-16/4	CHASSIS ASSEMBLY, RH earcup: headset rec; transf-rec unit for MX-239/U; Permoflux #GA-46; SC-D-14632.	1	*	*	*
2B800-16/8	COVER, RH earcup: headset rec; steel plate; olive drab enamel and vinylite paint; mounts earcup cushion; concave cold rolled with 1/4" flange around outer edge; 3-1/2" x 2-5/8" x 3/8" over-all; Permoflux #1604; SC-D-14621-2.	1	*	*	*

ii \* Indicates stock available.

6. MAINTENANCE PARTS LIST FOR HEADSET H-16/U (SIGNAL CORPS STOCK NO. 2B800-16) (contd).

Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Run-ning spares	Orgn stock	3d ech	4th ech	5th ech	Depot stock
	2B800-16/7	COVER PLATE, RH earcup: headset rec; Dowmetal "R" magnesium; olive drab enamel and vinylite paint; covers earcup cavity containing transf-rec assem; triangular shaped casting, 2-1/2" x 2-1/4" x 1/2" over-all; Permoflux #GA-58; SC-D-14622-4.	1				*		*
	2B450-239	Parts as Manufactured by National Scientific Products Corp  EARCUP ASSEMBLY MX-239/U, RH: headset rec; olive drab enamel and vinylite paint; 4,000 ohms; approx 2-3/4" x 4-1/4" x 1-3/4" over-all; Natl Scient Prod part/dwg #133D1098X; SC-D-14620.	1			*	*		*
	2B800-16/2	CASTING, RH earcup: headset rec; Dowmetal "R" magnesium; olive drab enamel and vinylite paint; transf-rec assem housing irregular shaped casting 2-3/4" x 4-1/4" x 1-1/8" over-all; stamped "MX-239/U RIGHT"; Natl Scient Prod part/dwg #134BI045A; SC-D-14625-2.	1				*		*

2B800-16/4	1	CHASSIS ASSEMBLY, RH earcup: headset rec; transf-rec unit for RH earcup assem MX-239/U; Natl Scient Prod part/dwg #133B1092A; SC-D-14632.	*
2B800-16/8	1	COVER, RH earcup: headset rec; steel plate; olive drab enamel and vinylite paint; mounts earcup cushion; concave cold rolled with 1/4" flange around outer edge; 3-1/2" x 2-5/8" x 3/8" over-all; Natl Scient Prod part/dwg #117B1011A; SC-D-14621-2.	*
2B800-16/7	1	COVER PLATE, RH earcup: headset rec; Dow-metal "R" magnesium; olive drab enamel and vinylite paint; covers earcup cavity containing transf-rec assem; triangular shaped casting, 2-1/2" x 2-1/4" x 1/2" over-all; Natl Scient Prod part/dwg #133D1102A; SC-D-14622-4.	*
2B450-240	1	LEFT-HAND EARCUP ASSEMBLY MX-240/U GROUP Parts as Manufactured by Permoflux Corp EARCUP ASSEMBLY MX-240/U, LH: headset rec; olive drab enamel and vinylite paint; 4,000 ohms; approx 2-3/4" x 4-1/4" x 1-3/4" over-all; Permoflux #GA-45; SC-D-14620.	*

\* Indicates stock available.

6. MAINTENANCE PARTS LIST FOR HEADSET H-16/U (SIGNAL CORPS STOCK NO. 2B800-16) (cont'd).

Ref symbol	Signal Corps stock No.	Name of part and description	Quan per unit	Run-ning spares	Orgn stock	3d ech	4th ech	5th ech	Depot stock
	2B800-16/3	CASTING, LH earcup: headset rec; Dowmetal "R" magnesium; olive drab enamel and vinylite paint; housing for transf-rec assem; irregular shaped casting, 2-3/4" x 4-1/4" x 1-1/8" over-all; engraved "MX-240/U LEFT"; Permoflux #1601; SC-D-14625-1.	1				*		*
	2B800-16/5	CHASSIS ASSEMBLY, LH earcup: headset rec; transf-rec unit for MX-240/U; Permoflux #GA-47; SC-D-14632.	1				*		*
	2B800-16/9	COVER, LH earcup: headset rec; steel plate; olive drab enamel and vinylite paint; mounts earcup cushion; concave cold rolled with 1/4" flange around outer edge, 3-1/2" x 2-5/8" x 3/8" over-all; Permoflux #1605; SC-D-14621-1.	1				*		*
	2B800-16/10	COVER PLATE, LH earcup: headset rec; Dowmetal "R" magnesium; olive drab enamel and vinylite paint; covers earcup cavity containing transf-rec assem; triangular shaped casting, 2-1/2" x 2-1/4" x 1/2" over-all; Permoflux #GA-59; SC-D-14622-3.	1				*		*

Parts as Manufactured by National Scientific Products Corp						
2B450-240	EARCUP ASSEMBLY MX-240/U, LH: headset rec; olive drab enamel and vinylite paint; 4,000 ohms; approx 2-3/4" x 4-1/4" x 1-3/4" over-all; Natl Scient Prod part/dwg #133D1099X; SC-D-14620.	1	*	*	*	*
2B800-16/3	CASTING, LH earcup: headset rec; Dowmetal "R" magnesium; olive drab enamel and vinylite paint; transf-rec assem housing; irregular shaped, 2-3/4" x 4-1/4" x 1-1/8" over-all; stamped "MX-240/U LEFT"; Natl Scient Prod part/dwg #134B1046A; SC-D-16425-1.	1	*	*	*	*
2B800-16/5	CHASSIS ASSEMBLY, LH earcup: headset rec; transf-rec unit for LH earcup assem MX-240/U; Natl Scient Prod part/dwg #133B1096A; SC-D-14632.	1	*	*	*	*
2B800-16/9	COVER, LH earcup: headset rec; steel plate; olive drab enamel and vinylite paint; mounts earcup cushions; concave cold rolled with 1/4" flange around outer edge, 3-1/2" x 2-5/8" x 3/8" over-all; Natl Scient Prod part/dwg #117B1010A; SC-D-14621-1.	1	*	*	*	*
2B800-16/10	COVER PLATE, LH earcup: headset rec; Dowmetal "R" magnesium; olive drab enamel and vinylite paint; covers earcup cavity containing transf-rec assem; triangular shaped casting 2-1/2" x 2-1/4".	1	*	*	*	*

\* Indicates stock available.

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,  
*Chief of Staff.*

OFFICIAL:

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*Major General,*  
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IC 7: T/O 7-22; 7-23; 7-27; 7-29.

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IC 9: T/O 9-67.

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IC 11: T/O 11-7; 11-7S; 11-18; 11-47; 11-57; 11-87S; 11-97; 11-107; 11-127; 11-237; 11-287; 11-557; 11-587; 11-592; 11-597; 11-617.

IC 17: T/O 17-2; 17-12; 17-13; 17-14; 17-17; 17-19; 17-20-1; 17-22; 17-27; 17-29; 17-37; 17-46S; 17-47S; 17-49S; 17-56; 17-57; 17-60-1; 17-98S; 17-116; 17-117.

IC 18: T/O 18-10-1; 18-27; 18-28; 18-36; 18-37.

IC 19: T/O 19-57.

IC 44: T/O 44-76; 44-77.

IC 55: T/O 55-37.

(For explanation of symbols see FM 21-6.)