

NAVAIR 13-1-6.7-5

1 August 2002

Change 3 - 1 August 2004

TECHNICAL MANUAL

**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN**

**A/A24A-56 HELMET UNIT, INTEGRATED
(JOINT HELMET MOUNTED CUEING SYSTEM)**

N68936-04-D-0008

**This manual update includes Basic, dated 1 August 2002, thru
Change 3, dated 1 August 2004.**

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NUMERICAL INDEX OF EFFECTIVE WORK PACKAGES/PAGES

List of Current Changes

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 Change 1 1 Jun 2003
 (Incorp IRACs 1 and 2)

Only those work packages/pages assigned to the manual are listed in this index. Insert Change 3 dated 1 August 2004. Dispose of superseded work packages/pages. Superseded and deleted classified work packages/pages shall be destroyed in accordance with applicable regulations. If changed pages are issued to a work package, insert the changed pages in the applicable work package. The portion of text affected in a changed or revised work package is indicated by change bars or the change symbol "R" in the outer margin of each column of text. Changes to illustrations are indicated by pointing hands or change bars, as applicable.

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	NUMBERS		620410-09-02
001 02	NUMERICAL INDEX OF REFERENCE	010 00	HELMET DISPLAY UNIT PART
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002 00	INTRODUCTION	011 00	VISOR ASSEMBLY PART NUMBERS
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LIST OF TECHNICAL PUBLICATIONS DEFICIENCY REPORTS INCORPORATED**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN****A/A24A-56 HELMET UNIT, INTEGRATED
(JOINT HELMET MOUNTED CUEING SYSTEM)**

1. The TPDRs listed below have been incorporated in this issue.

IDENTIFICATION NO./QA SEQUENCE NO.	LOCATION
NONE	

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WARNINGS APPLICABLE TO HAZARDOUS MATERIALS**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN****A/A24A-56 HELMET UNIT, INTEGRATED
(JOINT HELMET MOUNTED CUEING SYSTEM)**

1. INTRODUCTION.

2. Warnings for hazardous materials listed in this manual are designed to warn personnel of hazards associated with such items when they come in contact with them by actual use. Additional information related to hazardous materials is provided in OPNAVINST 5100.23, Navy Occupational Safety and Health (NAVOSH) Program Manual, NAVSUPINST 5100.27, Navy Hazardous Material Control Program, and the DOD 6050.5, Hazardous Materials Information System (HMIS) series publications. For each hazardous material used within the Navy, a Material Safety Data Sheet (MSDS) is required to be provided and available for review by users. Consult your local safety and health staff concerning any question on hazardous chemicals, MSDSs, personal protective equipment requirements, and appropriate handling and emergency procedures and disposal guidance.

3. Complete warnings for hazardous materials referenced in this manual are identified by use of an icon, nomenclature and specification or part number of the material, and a numeric identifier. Each hazardous material is assigned only one numeric identifier. Repeated use of a specific hazardous

material references the numeric identifier assigned at its initial appearance. The approved icons and their application are shown below.

4. In the text of the manual, the caption 'warning' will not be used for hazardous materials. Such warnings will be identified by an icon and numeric identifier. The material nomenclature will also be provided. The user is directed to refer to the corresponding numeric identifier listed in this WP under the heading HAZARDOUS MATERIALS WARNINGS for the complete warning applicable to the hazardous material.

5. Items in italics in the Specification Number or Part Number column of the Work Package Materials Required list indicates the item is a class 1 Ozone Depleting Substance (ODS1).

6. A Technical Data Indoctrination Package is available for the Joint Helmet Mounted Cueing System, PIN number 113909. It is available in VHS format or electronically on the PMA-202 FAILSAFE web site. For further information, contact your local FAILSAFE Representative or Aeromedical Safety Officer.



EXPLANATION OF HAZARD SYMBOLS

**Biohazard**

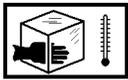
The abstract symbol shows a material that may contain bacteria or viruses that present a health hazard.

**Breathing Hazard**

The symbol of a human figure in a cloud shows that breathing this material can present a health hazard.

**Corrosive (Caustic or Acidic)**

The symbol of drops of a liquid burning a hand shows a material that causes burns to human skin or tissue.

**Cryogenic**

The symbol of a hand in a block of ice shows a material is so cold it will burn your skin on contact.

**Explosive**

The rapidly expanding symbol shows that the material may explode if subjected to high temperature, sources of ignition, or high pressure.

**Eye Protection**

The symbol of a person wearing goggles shows a material that can injure your eyes.

**Fire**

The symbol of a fire shows that a material can ignite and burn you.

**Highly Toxic**

The symbol of a skull and crossbones shows a material that is highly toxic and can be a danger to life and health.

**Ingestion Hazard**

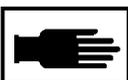
The symbol of a liquid entering the mouth shows that eating or drinking this material can cause a health hazard.

**Oxidizer**

The symbol of an “O” with a flame shows a material that is a fire hazard when near flammable or organic materials.

**Radiation**

The symbol of three circular wedges shows that the material emits radioactive energy and can injure human tissue or organs.

**Skin Hazard**

The hand symbol shows a material that can irritate the skin or enter the body through the skin and cause a health hazard.

Table 1. Hazardous Materials Warnings

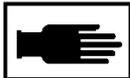
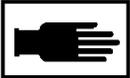
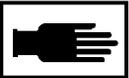
<u>Index</u>	<u>Material</u>	<u>Warning</u>
12	ADHESIVE, EC1357  	ADHESIVE, EC1357 – May cause eye and skin irritation. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.
163	SEALING COMPOUND, MIL-S-22473, GRADE C, COLOR BLUE 	SEALING COMPOUND, MIL-S-22473, GRADE C – May cause skin irritation. Avoid contact with skin and clothing. Wash thoroughly after handling.
203	DETERGENT, GENERAL, PURPOSE, MIL-D-16791, TYPE 1  	DETERGENT, GENERAL, PURPOSE, MIL-D-16791, TYPE 1 – May cause eye and skin irritation. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.
223	SEALING COMPOUND, MIL-S-46163, TYPE 2, GRADE N, COLOR BLUE   	SEALING COMPOUND, MIL-S-46163, TYPE 2, GRADE N – Harmful if swallowed. May cause eye and skin irritation. Wash thoroughly after handling. Avoid contact with eyes, skin and clothing.
302	ADHESIVE, MIL-A-46106   	ADHESIVE, MIL-A-46106 – May cause eye, skin and respiratory irritation. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Avoid breathing dust (vapor, mist, gas). Keep container closed. Use with adequate ventilation.
696	PRIMER, SEALING COMPOUND, MIL-S-22473, GRADE T, FORM R, AEROSOL CAN   	PRIMER, SEALING COMPOUND, MIL-S-22473, GRADE T, FORM R, AEROSOL CAN – Flammable liquid and vapor. May cause eye and skin irritation. Keep away from heat, sparks, and flame. Keep container closed. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Table 1. Hazardous Materials Warnings (Cont)

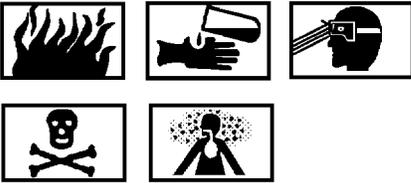
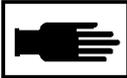
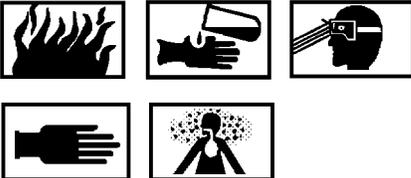
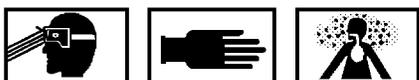
Index	Material	Warning
855	ADHESIVE, MMM-A-1754	Epoxy adhesive, MMM-A-1754 (DEVCON F), is toxic and flammable. Avoid contact with skin and eyes. Use in well ventilated area. Avoid breathing vapors of heated product. Wash hands thoroughly before eating, smoking and using washroom. Store in a cool, dry and well ventilated area. Keep away from heat, sparks, and flame. Avoid contact with strong oxidizing agents. Protection: rubber gloves, chemical goggles and protective skin compound. Half-mask respirator with organic vapor cartridge required in poorly ventilated areas.
		
1001	ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428	ISOPROPYL ALCOHOL, TT-I-735 or MIL-I-10428 – Flammable liquid and vapor. May cause eye, skin and respiratory irritation. Keep away from heat, sparks, and flame. Keep container closed. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Avoid breathing dust (vapor, mist, gas).
		
1069	ADHESIVE, 2216 B/A, GRAY	ADHESIVE, 2216 B/A, GRAY – May cause allergic skin reaction. May cause eye, skin and respiratory irritation. Wash thoroughly after handling. Avoid contact with eyes, skin and clothing. Avoid breathing dust (vapor, mist, gas). Keep container closed. Use with adequate ventilation.
		
1088	SEALING COMPOUND, MIL-S-46163, TYPE 2, GRADE M, COLOR PURPLE	SEALING COMPOUND, MIL-S-46163, TYPE 2, GRADE M, COLOR PURPLE – May cause allergic skin reaction. May cause skin irritation. Wash thoroughly after handling. Avoid contact with skin and clothing.
		
1090	ADHESIVE, MIL-A-5540, CLASS 3, FORM B	ADHESIVE, MIL-A-5540 CLASS 3, FORM B – Flammable liquid and vapor. Causes eye, skin burns. May cause eye, skin and respiratory irritation. Keep away from heat, sparks, and flame. Keep container closed. Use only with adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid breathing dust (vapor, mist, gas). Wash thoroughly after handling.
		

Table 1. Hazardous Materials Warnings (Cont)

<u>Index</u>	<u>Material</u>	<u>Warning</u>
1091 ANTIFOGGING COMPOUND, O-A-549		<p>ANTIFOGGING COMPOUND, O-A-549 – Flammable liquid and vapor. May cause eye, skin and respiratory irritation. Keep away from heat, sparks, and flame. Keep container closed. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Avoid breathing dust (vapor, mist, gas).</p>
1092 ADHESIVE, RTV-102/732		<p>RTV-102/732 Sealant is irritating to skin, eyes, and respiratory tract. Contact with uncured product may irritate the skin and eyes. Causes mild respiratory irritation only in uncured state. Keep sealant off skin, eyes, and clothes. Use eye protection, gloves, and good ventilation. Consult the applicable Material Safety Data Sheet (MSDS) and local Occupational Safety and Health (OSH) regulations for additional information.</p>
1093 ADHESIVE, RTV-154/157		<p>RTV-154/157 Sealant is irritating to skin, eyes, and respiratory tract. Contact with uncured product may irritate the skin and eyes. Causes mild respiratory irritation only in uncured state. Keep sealant off skin, eyes, and clothes. Use eye protection, gloves, and good ventilation. Consult the applicable Material Safety Data Sheet (MSDS) and local Occupational Safety and Health (OSH) regulations for additional information.</p>

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ALPHABETICAL INDEX
OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN

A/A24A-56 HELMET UNIT, INTEGRATED
(JOINT HELMET MOUNTED CUEING SYSTEM)

This WP supersedes WP001 00, dated 1 August 2002

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OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN

A/A24A-56 HELMET UNIT, INTEGRATED
(JOINT HELMET MOUNTED CUEING SYSTEM)

This WP supersedes WP001 01, dated 1 June 2003

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MS24693-4B	011 00 / 1/ 5	135427-1	008 00 / 1/22

<u>PART NO.</u>	<u>WP NO./FIG. NO./ INDEX NO.</u>	<u>PART NO.</u>	<u>WP NO./FIG. NO./ INDEX NO.</u>
189-0494	009 00 / 1/ 5	620540-01-00	008 00 / 1/ 5
189-0638	009 00 / 1/ 4	620540-02-00	008 00 / 1/ 5
24987-9A	010 00 / 2/ 4	620540-03-00	008 00 / 1/ 5
28118	008 00 / 1/ 9	620590-01-03	010 00 / 2/ 1
620050-01-00	008 00 / 1/33	75C2990	008 00 / 1/15
620052-01-00	008 00 / 1/34	79C4401-1	008 00 / 1/14
620054-01-00	008 00 / 1/35	8B01012	010 00 / 2/ 2
620056-02-00	008 00 / 1/36	8B01101	010 00 / 2/ 7
620410-04-02	008 00 / 1/ 4	8B02011	011 00 / 1/ 3
	009 00 / 1/	8B02022	011 00 / 1/ 6
620410-05-02	008 00 / 1/ 4	8B02041	010 00 / 2/ 4
	009 00 / 1/	8B02052	008 00 / 1/26
620410-06-02	008 00 / 1/ 4	8B02061	010 00 / 2/ 6
	009 00 / 1/	8B10131	010 00 / 2/ 9
620410-07-02	008 00 / 1/ 4		012 00 / 2/ 1
	009 00 / 1/	8B10173	010 00 / 2/ 8
620410-08-02	008 00 / 1/ 4	8B10174	010 00 / 2/ 8
	009 00 / 1/	82A5614-20	008 00 / 1/21
620410-09-02	008 00 / 1/ 4	85D7087-1	008 00 / 1/ 6
	009 00 / 1/	85D7087-1P	008 00 / 1/ 8
620480-01-00	009 00 / 1/ 4	85D7087-2	008 00 / 1/
620490-01-00	009 00 / 1/ 2	85D7087-2P	008 00 / 1/ 8
620510-04-05	008 00 / 1/ 3	85D7087-3	008 00 / 1/ 6
620510-05-05	008 00 / 1/ 3	85D7087-3P	008 00 / 1/ 8
620510-06-05	008 00 / 1/ 3	90B7948-1	008 00 / 1/20
620510-07-05	008 00 / 1/ 3	90B7948-2	008 00 / 1/20
620510-08-05	008 00 / 1/ 3	90B7948-3	008 00 / 1/20
620510-09-05	008 00 / 1/ 3	90B7948-4	008 00 / 1/20
620520-01-05	008 00 / 1/ 2	90B7948-5	008 00 / 1/20
	010 00 / 2/	90B7948-6	008 00 / 1/20
620530-01-01	008 00 / 1/ 1	90C7886-1	008 00 / 1/12
	011 00 / 1/	90C7886-2	008 00 / 1/13
620530-03-04	008 00 / 1/ 1	95122A, 3A, 4A, 5A	008 00 / 1/ 7
	011 00 / 1/	95132A, 3A, 4A, 5A	008 00 / 1/ 7
620530-05-01	008 00 / 1/ 1	95142A, 3A, 4A, 5A	008 00 / 1/ 7
	011 00 / 1/	95152A, 3A, 4A, 5A	008 00 / 1/ 7
620532-01-00	011 00 / 1/13	95162A, 3A, 4A, 5A	008 00 / 1/ 7
620534-01-00	011 00 / 1/ 7	96D9441-1	008 00 / 1/18
620536-01-00	011 00 / 1/ 1		

NUMERICAL INDEX OF REFERENCE DESIGNATIONS

**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN**

**A/A24A-56 HELMET UNIT, INTEGRATED
(JOINT HELMET MOUNTED CUEING SYSTEM)**

<u>REF</u>	<u>WP NO./FIG. NO./</u>	
<u>DES</u>	<u>INDEX NO.</u>	<u>PART NO.</u>

NONE

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INTRODUCTION

OFF AIRCRAFT MAINTENANCE WITH ILLUSTRATED PARTS BREAKDOWN

A/A24A-56 HELMET UNIT, INTEGRATED (JOINT HELMET MOUNTED CUEING SYSTEM)

1. PURPOSE AND SCOPE.

2. This manual provides off aircraft maintenance and illustrated parts breakdown information for A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System).

3. REQUISITION AND AUTOMATIC DISTRIBUTION OF NAVAIR TECHNICAL MANUALS.

4. Procedures to be used by Naval activities and other Department of Defense activities requiring NAVAIR technical manuals are defined in NAVAIR 00-25-100 and NAVAIRINST 5605.5A.

5. To automatically receive future changes and revisions to NAVAIR technical manuals, an activity must be established on the Automatic Distribution Requirements List (ADRL) maintained by the Naval Air Technical Data and Engineering Service Command (NATEC). To become established on the ADRL, tell your activity central technical publications librarian. If your activity does not have a library, you may establish your automatic distribution requirements by contacting the Commanding Officer, NATEC, Attn: Distribution, NAS North Island, Bldg. 90, P. O. Box 357031, San Diego, CA 92135-7031. Reconfirmation of these requirements are required, each year, to remain on automatic distribution. Please use your NATEC assigned account number when referring to automatic distribution requirements.

6. If added or replacement copies of this manual are required with no attendant changes in the ADRL, they may be ordered by submitting a MILSTRIP requisition in accordance with NAVSUP 485 to Routing Identifier Code "NFZ". MILSTRIP requisitions can be submitted through your supply office, Navy message, or SALTS to DAAS (Defense Automated Address System), or through the DAAS or NAVSUP web sites. For assistance with a MILSTRIP requisition, contact the Naval Inventory Control Point (NAVICP) Publications and Forms Customer Service at DSN 442-2626 or (215) 697-2626, Monday thru Friday, 0700 to 1600 eastern time.

7. ELECTROSTATIC SENSITIVE DEVICES (ESD).

a. Metallic-oxide semiconductor field effect transistors (MOSFETS), complementary metallic-oxide semiconductors (CMOS), and similar devices are vulnerable to static electricity discharges. Unless correct precautions are used, devices may be damaged before, during, or after installation in their next higher assembly. Refer to NAVAIR 01-1A-23 for special handling instructions.

b. When a device has been identified as being subject to damage from electrostatic discharge, the following symbol is used: **ESD**.

c. When a whole paragraph (including subparagraphs) is considered electrostatic sensitive, only the major paragraph is marked. The symbol **ESD** is placed between the step number and title.

d. When only applicable steps are electrostatic sensitive, only the step is marked. The symbol **ESD** is placed between the step number and title.

8. QUALITY ASSURANCE PROCEDURES.

9. Procedures or parts of procedures which require quality assurance inspection are identified by the letters (QA) after the applicable steps.

10. DEFICIENCY REPORTING.

11. All unusual/recurring failures should be documented by way of a Product Quality Deficiency Report (PQDR) form SF368 and should be sent electronically to craig_l@crane.navy.mil or faxed to (812) 854-4375 (DSN 482) attention L. Craig. Refer to **PACKAGING, WP00800**, for special packaging requirements. Failed parts should be sent by way of the instructions in the supply MRIL, except for Engineering Investigation (EI) failures. Engineering Investigation failed parts should go directly to Naval Surface Warfare Center, Crane, Indiana.

UIC: N00164
 COMMANDER
 NAVSURFWARCENDIV, Crane Division
 300 Highway 361
 Attn: Code 805H (L. Craig) Building 3291
 Crane, IN 47522-5001
 PHONE: (812) 854-2372

which has been subjected to ditching/bailout or ejection be returned to service.

11A. AIRCRAFT ACCIDENT REPORT INSPECTION.

11B. Any Aviation Life Support System Equipment along with related subassemblies or equipment which have been recovered following use in an emergency ditching/bailout or ejection (refer to NAVAIR 13-1-6.2 for personnel and drogue parachutes) will be returned to the nearest Naval Supply Activity for shipment via traceable means to: Code 4.6.3.3, Naval Air Warfare Center Aircraft Division, Bldg 2187, 48110 Shaw Rd., Unit 5, Patuxent River, MD 20670-1906.

11C. Stencil outside of container in 1-inch letters as follows: THIS EQUIPMENT HAS BEEN USED IN AN EMERGENCY. These items of equipment are required for evaluation and determination of design deficiency and to establish requirements for product improvement.

12. SUPPORT EQUIPMENT REQUIRED.

13. Table 1 is a consolidated list of support equipment appearing through this manual and shown in each applicable Support Equipment Required list.

14. MATERIALS REQUIRED.

15. Table 2 is a consolidated list of soft and hard consumable materials used through this manual and shown in each applicable Materials Required list.

NOTE

Under no circumstances will any piece of Aviation Life Support System equipment

Table 1. Support Equipment Required

Nomenclature	Type Designation/Part Number	CAGE
* Adapter	GTMBSS8A	55719
Computer	COMMERCIAL	N/A
Dressmaker's Tape Measure	A-A-1666 (NIIN 00-782-3520)	58536
Drill Bit, Number 16	DBE16A	55719
Drill Bit, Number 25	DBE25A	55719
Drill Bit, Number 28	DBE28A	55719
Drill Bit, Number 29	DBE29A	55719
Drill Bit, Number 32	DBE32A	55719
Drill Bit, Number 33	DBE33A	55719
Drill Bit, Number 40	DBE40A	55719
Hand File (Rough Cut)	9-31310	53800
Heat Gun	ET1600	55719
Helmet Display Unit Test Set Cable	620992-01-00	06VL3
Helmet Mounted Display Test Set	620900-02-01	06VL3
JHMCS Torque Tool Kit	3829AS110	30003
Knife	GGG-K-450	81348
Magnifying Glass	GP200	17866
Metal Spatula	GGG-C-746 (NIIN 00-254-4791)	81348
Navy Combat Edge Leakage Tester, TTU-551/E	3549AS100	30003
Needle Nose Pliers	9-45172	53800
Purge Kit (Ashore)	SC4931-95CLJ54	19200
Purge Kit (Afloat)	268549	13567
Purge Valve Adapter	269390-1	13567
Putty Knife	GGG-K-481	81348
QDC Removal/Insertion Tool	189-0431	99747
QMB	178-5936	99747

Table 1. Support Equipment Required (Continued)

Nomenclature	Type Designation/Part Number	CAGE
Razor Blade	GG-R-60	81348
Ruler	GG-R-791	81348
Safety Goggles	G-G-531	81348
Scissors	3452	70574
Small Hand Held Grinder (Rotary)	84922	18531
Stop Watch	LCD-200	86582
Tape Measure, Cloth	MIL-C-29127	81349
Tensioning Tool	MS90387-1	96906
* Tip, Hex .035	.5H.035-.5	32652
* Tip, Hex .050	120003	32652
* Tip, Hex .050 (Tip Extended)	.75H050-.865	32652
* Tip, Hex 1/16	120116	32652
* Tip, Hex Flat	120141	32652
* Tip, Hex Phillips	120108	32652
* Torque Drive Tool Pouch	TD-TP/C	0D1Z5
* Torque Screwdriver Preset 2 Inch-Ounce	020074	32652
* Torque Screwdriver 2 - 100 Inch-Ounce	6C486	25795
Tweezers	9-45335	53800
Visor Template	81D5189-3 or -4	53655

* Part of JHMCS Torque Tool Kit 3829AS110

NOTE: When an item of support equipment is not available, an approved alternate identified in the activity's Individual Material Readiness List (IMRL) may be substituted.

Table 2. Materials Required

Nomenclature	Specification or Part Number	CAGE
Acid Brush	1127-0004-P10	17794
Adhesive	EC1357 (NIIN 00-165-8614) (NIIN 00-273-8717)	04963
Adhesive	MIL-A-5540, CLASS 3, FORM B (NIIN 00-515-2246)	80244
Adhesive	MMM-A-1754 (NIIN 00-738-6429)	81348
Adhesive	MIL-A-46106 (NIIN 00-225-4548)	81349
Adhesive	RTV-102, RTV-732 (NIIN 00-877-9872)	01139
Adhesive	RTV-154, RTV-157 (NIIN 00-181-8380)	01139
Adhesive	2216 B/A, GRAY, (NSN for 2 oz. tube 8040-00-145-0019)	76381
Antifogging Compound	O-A-549, (NIIN 00-754-2672)	81348
Bracket Kit, Helmet	265030-3	13567
Brush, Soft	A-A-2076 TYPE 1	58536
Canned Air	MS-222	18598
Chalk, White	SS-C-266	81348
Cloth, Lens	73	6J776
Cloth, Lint-free	MIL-C-85043 TYPE 1	76301
Correction Fluid	A-A-212 TYPE 1	80244
Cotton Tip Swab	GG-A-616	81348
Detergent, General Purpose	MIL-D-16791 TYPE 1 (NIIN 00-282-9699)	81349
Distilled Water	COMMERCIAL	N/A
Double-Sided Masking Tape	4962	52152
Emery Cloth (fine grit)	P-C-451	81348
Fastener Tape, Pile, Type I, 2-Inch Width	MIL-F-21840 (NIIN 00-926-4930)	81349

Table 2. Materials Required (Continued)

Nomenclature	Specification or Part Number	CAGE
Glue	A-A-342	58536
Grease Pencil	SS-P-186	81348
Helmet Mount Assembly (AN/AVS-9 (V))	273735-1	13567
Isopropyl Alcohol	TT-I-735 OR MIL-I-10428 (NIIN 00-855-1158) (NIIN 00-855-6160) (NIIN 01-190-2538) (NIIN 01-220-9907)	81348
Kit, Bayonet Receiver	GW9117	60240
Kit, Bladder Assembly	GW9163-01	60240
Leak Test Compound	SNOOP 8 OZ	02570
Manila Folder	UU-F-1206	81348
Masking Tape	A-A-883 TYPE 1	58536
Oxygen, Aviator's	MIL-O-27210 TYPE 1	81349
Pencil, Lead	A-A-2771	58536
Primer, Sealing Compound	MIL-S-22473, GRADE T, FORM R, AEROSOL CAN (NIIN 00-181-8372)	81349
Receptacle Kit, Visor Tang	135427-1	09344
Screw, Pan Head, 6-32 x 0.500-Inch, Black	MS51957-30B (NIIN 00-469-5382)	96906
Seal (QDC), Highvolt	189-0638	99747
Seal (UC), Highvolt	008-017-03	0LE36
Sealing Compound	MIL-S-22473, GRADE C, COLOR BLUE	81349
Sealing Compound	M46163-1-2-1-Y	81349
Sealing Compound	MIL-S-46163, TYPE 2, GRADE M, COLOR PURPLE (NIIN 01-054-3968) (NIIN 01-055-6126) (NIIN 01-069-3046)	81349
Sealing Compound	MIL-S-46163, TYPE 2, GRADE N, COLOR BLUE (NIIN 01-014-5869) (NIIN 01-025-1692) (NIIN 01-104-5392)	81349
Snap Kit	G026-1159-01	60240
Spacer Kit, Bayonet	80B4858 (NIIN 01-141-5916)	72724
String, Lacing	MIL-T-43435	81349
Tape, Double-faced, Vinyl, 1 x 2 Inch	A-A-1243	58536
Tape, Reflective, High Intensity, White, 1-Inch	(NIIN 01-082-8927)	94960
Tape, Reflective, High Intensity, White, 3-Inch	(NIIN 01-078-8660)	94960
Tape, Reflective, Orange, 1-Inch, CL 1	L-S-300 (NIIN 00-656-1494)	81348
Tape, Reflective, Orange, 2-Inch, CL 1	L-S-300 (NIIN 00-656-1186)	81348
Tape, Reflective, Red, 1-Inch, CL 1	L-S-300 (NIIN 00-949-7552)	81348
Tape, Reflective, Red, 3-Inch, CL 1	L-S-300 (NIIN 00-949-7598)	81348
Tape, Reflective, White, CL 3	L-S-300 (NIIN 00-100-2153)	81348
Tape, Reflective, Yellow, 1-Inch, CL 1	L-S-300 (NIIN 00-753-3208)	81348
Tape, Reflective, Yellow, 3-Inch, CL 1	L-S-300 (NIIN 00-057-4545)	81348
Tape, Silicone Rubber	MIL-I-23594	81349
Thread, Nylon, Size E	V-T-295	81348
Visor Tang Kit	620532-01-00	06VL3

16. NONSTANDARD TERMS, SYMBOLS, AND ABBREVIATIONS.

17. Table 3 lists abbreviations/symbols and definitions that do not appear in ASME Y14.38M.

18. REFERENCE MATERIAL.

19. Table 4 is a consolidated list of referenced publications or publications used to define terminology which appear through this manual.

Table 3. Abbreviations/Symbols and Definitions

Abbreviations/Symbols	Definitions
ABC	Automatic Brightness Control
CCA	Circuit Card Assembly
CRT	Cathode Ray Tube
CU	Cable Unit
DU	Display Unit
EAL	Energy Absorbing Liner
EEPROM	Electrical Erasable Programmable Read-Only Memory
EI	Engineering Investigation
EU	Electronics Unit
FOD	Foreign Object Damage
FOV	Field of View
HDU	Helmet Display Unit
HMD	Helmet Mounted Display
HMDTS	Helmet Mounted Display Test Set
HOTAS	Hands on Throttle and Stick
HRC	Helmet Removable Connector
HVI	Helmet Vehicle Interface
HVPS	High Voltage Power Supply
IPD	Interpupillary Distance
IRC	In-Line Release Connector
JHMCS	Joint Helmet Mounted Cueing System
LED	Light Emitting Diode
LOS	Line of Sight
MRIL	Master Repairables Item List
MRU	Magnetic Receiver Unit
MTU	Magnetic Transmitter Unit
PPE	Protective Personal Equipment
QD	Quick Disconnect
QDC	Quick Disconnect Connector
QDR	Quality Deficiency Report
QMB	Quick Mounting Bracket
SRA	Shop Replaceable Assembly
TPL	Thermal Plastic Liner
UC	Universal Connector
UUT	Unit Under Test

Table 4. Reference Material

Document Title	Document Identifier
Abbreviations and Acronyms Aircrew Personnel Protective Equipment Aviation Supply Office Publications Distribution of Aeronautic Technical Publication Engineering Drawings Hazardous Materials Information Systems (HMIS) NATOPS General Flight and Operating Instructions	ASME Y14.38M NAVAIR 13-1-6.7-3 P2300 (series) NAVAIRINST 5605.5A MIL-STD-100 DOD 6050.5 OPNAVINST 3710.7 (series)
Naval Air Systems Command Technical Manual Program Naval Supply Procedures, Volume 1, 2, and 3 Navy Hazardous Material Control Program Navy Occupational Safety and Health (NAVOSH) Program Manual Navy Uniform Source, Maintenance and Recoverability (SMR) Codes	NAVAIR 00-25-100 NAVSUP 485 NAVSUPINST 5100.27 OPNAVINST 5100.23 NAVSUPINST 4423.29
Organizational and Intermediate Maintenance with Illustrated Parts Breakdown - TTU-551/E Leakage Tester Part Number 3549AS100	NAVAIR 17-15GB-505
Oxygen Hose and Communication Test Set - Intermediate Maintenance with Illustrated Parts Breakdown	NAVAIR 17-15BC-22
Rescue and Survival Equipment Standard Maintenance Practices, Electronic Assembly Repair The Naval Aviation Maintenance Program (NAMP)	NAVAIR 13-1-6.5 NAVAIR 01-1A-23 OPNAVINST 4790.2 (series)

20. INTRODUCTION TO THE ILLUSTRATED PARTS BREAKDOWN.

21. **GENERAL.** The complete Illustrated Parts Breakdown (IPB) lists and describes the parts required for equipment support and is used for requisitioning, identifying parts and for illustrating disassembly and assembly relation.

22. **GROUP ASSEMBLY PARTS LIST (GAPL).** The GAPL is made up of a breakdown of the complete unit into subassemblies and detail parts. Attaching parts are identified immediately after the item they attach. If the GAPL is extracted from an automated database, all nomenclatures used in the GAPL are in accordance with MIL-STD-100. If the GAPL is manually generated, all symbols and abbreviations used are in accordance with ASME Y14.38M. The GAPL is a six column format as below.

23. Index Number. In this column index numbers are assigned in numerical sequence and are essentially in disassembly sequence. After the index numbers are

assigned in this column, they are added to the illustration of the equipment/repairable.

24. Part Number. This column lists the prime contractor part number, government standard part number, or other vendor part number.

25. Description. This column lists the item nomenclature plus those modifiers required to identify the item. The GAPL is extracted from an automated database and some words may be shortened. The assemblies, subassemblies, and detail parts are indented to show their relation to the main assembly. Attaching parts are listed immediately after the part they attach. They are identified by the words (ATTACHING PARTS), and are followed by the separation symbol ---*---.

26. Commercial and Government Entity (CAGE) Code Numbers. CAGE codes other than those of the manufacturer identified in paragraph 2 and MIL-STD items are designated by CAGE code numbers in () after the nomenclature of the part. This code is from the Commercial and Government Entity (CAGE) Cataloging Handbook H4/H8. If a code has not been assigned, the vendor's complete name and address appears. The CAGE codes are acceptable with MIL-STD parts and end item manufacturer parts if the GAPL is generated from an automated database.

27. If a part is built to a Specification Control Drawing (SCD), the SCD number will be included in () after the item nomenclature or CAGE code.

28. For all items, for example, hoses, lines, tubes, brackets, cables, and so on, coded for local manufacture, the material from which the item is manufactured will be included in () after the item nomenclature or CAGE code number.

29. Items identified as subject to electrostatic discharge **ESD**, has this symbol before the first word in the description column.

30. Units Per Assembly. This column lists the total number of each part required per assembly or subassembly and are not necessarily the total number used in the end item of equipment. The letters 'AR' (as required) are used for items, for example shims, when the requirement may vary. The abbreviation REF indicates the part has been listed and illustrated elsewhere in the IPB and is included in the listing for reference only.

31. Use On Code. This column indicates the usability of parts on different models or series of the equipment. If no letter appears in this column, the part may be used on all models/series of the end item of equipment. Applicable use on codes are identified on the final sheet of each parts list.

32. An asterisk (*) in the Use On Code column identifies alternate or equivalent parts that are interchangeable. When a letter code is followed by an asterisk in the Use On Code column, only the parts with the same letter code are interchangeable. An alternate part may be used when the preferred part is not available. The asterisk is omitted for the preferred part. Equivalent parts are fully interchangeable. No equivalent part is preferred over another. All equivalent parts are identified by asterisks.

33. Source, Maintenance and Recoverability (SM&R) Code. This column contains the SM&R codes as assigned by the government. Definitions of these codes and parts kits information are contained in NAVSUPINST 4423.29. If the validity of a SM&R code is suspect, refer to the Aviation Supply Office P2300 series publications. Refer to table 6 for SM&R Code explanation.

34. NUMERICAL INDEX OF PART NUMBERS. The Numerical Index of Part Numbers (WP00101)

is a complete alphanumeric tabulation of part numbers or noun names if a part number has not been assigned. Alphabetic O's are considered numeric zeros.

35. Part Number Column. This column lists all part numbers that appear in the Part Number column of the GAPL. This column also lists the identifying noun instead of part number when no part number has been assigned. Part numbers are listed in alphanumeric sequence.

36. Work Package/Figure/Index Number Column. This column lists the WP/Fig/Index No. assigned to the associated part number. The numbers are separated by slashes, the first number being the Work Package in which the part number is located, the second is the Figure Number within the WP and the third number is the index number identifying the part number within the figure.

37. NUMERICAL INDEX OF REFERENCE DESIGNATIONS. The numerical Index of Reference Designations (WP00102) lists the reference designation numbers which have been established for components of the equipment covered. The reference designations are assigned by the contractor.

38. Reference Designation Column. The column lists the assigned reference designation number, arranged in alphanumeric sequence. This list contains all reference designation numbers contained in schematic diagrams and text pertaining to the equipment covered by the IPB.

39. Work Package/Figure/Index Column. This column contains the Work Package, Figure and Index Number reference for parts assigned the reference designation.

40. Part Number Column. This column lists the part number of the item assigned the specific reference designation.

41. HOW TO USE THE ILLUSTRATED PARTS BREAKDOWN. The below instructions are provided to assist the user in researching within the IPB.

42. When The Part Number or Reference Designation Is Not Known. Turn to the Alphabetical Index (WP00100) and select the most applicable Group, System, or Component Work Package.

43. Turn to the WP indicated and locate the desired part on the illustration.

44. From the illustration, get the index number for the desired part. Refer to the GAPL for the item part number, identifying noun name, and any other specific information.

45. When The Part Number is Known. Refer to the Numerical Index of Part Numbers (WP00101). Locate the part number and note the Work Package, Figure, and Index Number assigned to the part number.

46. Turn to the WP and Figure indicated and locate the index number referenced.

47. If a picture representation of the part, or its location is desired, refer to the same index number on the accompanying illustration.

48. When the Reference Designation is Known. Refer to the Numerical Index of Reference Designations (WP00102). Locate the reference designation and note the Work Package, Figure and Index Number assigned to that reference designator.

49. Turn to the WP and Figure indicated and locate the index number referenced.

50. If a picture representation of a part, or its location, is desired, refer to the same index number on the accompanying illustration.

51. WARNINGS, CAUTIONS, AND NOTES.

52. Items of special importance and critical information are identified in warnings, cautions, and notes. Warnings and cautions appear immediately before the step to which they apply. Notes may appear before or after the affected step.



Warnings describe conditions or procedures that could result in injury or death if correct procedures are not followed.



Cautions describe conditions or procedures that could result in damage to or destruction of equipment if correct procedures are not followed.

NOTE

Notes describe or clarify conditions or procedures.

53. RECORD OF APPLICABLE TECHNICAL DIRECTIVES.

54. The technical directives affecting this manual are listed in the Record of Applicable Technical Directives of each affected work package. When all affected A/A24A-56 helmet unit, integrated (Joint Helmet Mounted Cueing System) are modified, the before configuration and the technical directive entry are removed from the affected work package.

55. HISTORICAL RECORD OF APPLICABLE TECHNICAL DIRECTIVES.

56. The Historical Record of Applicable Technical Directives is a list of all technical directives that have ever affected this manual. Refer to table 5. Current technical directives now affecting this manual are listed in the Record of Applicable Technical Directives of each affected work package. When a technical directive is rescinded, the before configuration is removed from the manual and the technical directive entry is removed from each affected work package.

57. A Technical Data Indoctrination Package is available for the Joint Helmet Mounted Cueing System, PIN number 113909. It is available in VHS format or electronically on the PMA-202 FAILSAFE web site. For further information, contact your local FAILSAFE Representative or Aeromedical Safety Officer.

Table 5. Historical Record of Applicable Technical Directives

None

Table 6. Navy Application of Joint Uniform SM&R Codes

SOURCE			MAINTENANCE			
1st POS	2nd POSITION		3rd POSITION		4th POSITION	
MEANS OF ACQUIRING SUPPORT			USE: LOWEST LEVEL AUTHORIZED TO REMOVE/ REPLACE THE ITEM.		REPAIR: LOWEST LEVEL WITH CAPABILITY AND RESOURCES TO PERFORM COMPLETE REPAIR ACTION.	
P	A	ITEM: STOCKED	O	ORG/UNIT	O	ORG/UNIT
	B	ITEM: STOCKED, INSURANCE				
	C	ITEM: STOCKED, DETERIORATIVE				
	D	ITEM: SUPPORT, INITIAL ISSUE OF OUTFITTING & STOCK ONLY FOR ADDITIONAL INITIAL ISSUE	2	MINESWEEPER	2	MINESWEEPER
	E	EQUIPMENT: SUPPORT, STOCKED FOR INITIAL ISSUE OR OUTFITTING OF SPECIFIED MAINTENANCE ACTIVITIES	3	SUBMARINES	3	SUBMARINES
	F	EQUIPMENT: SUPPORT, NONSTOCKED, CENTRALLY PROCURED ON DEMAND	4	AUX/AMPHIB	4	AUX/AMPHIB
	G	ITEM: STOCKED FOR SUSTAINED SUPPORT. UNECONOMICAL TO PRODUCE AT A LATER TIME	5	DESTROYER, FFG	5	DESTROYER, FFG
	H	ITEM: STOCKED, CONTAINS HAZMAT. HMIS/MSDS REPORTING REQUIRED	6	CRUISER/CARRIER	6	CRUISER/CARRIER
	R	TERMINAL OR OBSOLETE, REPLACED	G	ASHORE AND AFLOAT	G	ASHORE AND AFLOAT
Z	TERMINAL OR OBSOLETE, NOT REPLACED					
K	D	ITEM: DEPOT O/H & MAINTENANCE KITS	H	I/ASHORE	H	I/ASHORE
	F	ITEM: MAINTENANCE KIT, PLACE AT O, F, H, L				
	B	ITEM: IN BOTH DEPOT REPAIR AND MAINT. KITS				
M	O	MFR OR FAB AT UNIT LEVEL	K	CONTRACTOR FACILITY	K	CONTRACTOR FACILITY
	F	MFR OR FAB AT INTERMEDIATE/DS LEVEL				
	H	MFR OR FAB AT INTERMEDIATE/GS LEVEL				
	L	MFR OR FAB AT SPECIALIZED REPAIR ACTIVITY (SRA)				
	G	MFR OR FAB AT ASSEMBLED AFLOAT OR ASHORE				
D	MFR OR FAB AT DEPOT MAINTENANCE LEVEL					
A	O	ITEM: ASSEMBLED AT ORG/UNIT	L	INTERMEDIATE SRA	L	INTERMEDIATE SRA
	F	ITEM: ASSEMBLED AT INTERMEDIATE LEVEL - AFLOAT				
	H	ITEM: ASSEMBLED AT INTERMEDIATE LEVEL - ASHORE	D	DEPOT	D	DEPOT
	L	ITEM: ASSEMBLED AT SRA				
	G	ITEM: ASSEMBLED AFLOAT OR ASHORE				
	D	ITEM: ASSEMBLED AT DEPOT MAINTENANCE LEVEL				
X	A	ITEM: REQUISITION NEXT HIGHER ASSEMBLY	Z	REF ONLY	Z	NON-REPAIRABLE
	B	ITEM: NOT PROCURED OR STOCKED, AVAILABLE THRU SALVAGE, REQ. BY CAGE/PART NUMBER				
	C	INSTALLATION DRAWING, DIAGRAM, INSTRUCTION SHEET, IDENTIFY BY CAGE/PART NUMBER			B	RECONDITION
	D	NON-STOCKED, OBTAIN VIA LOCAL PURCHASE				

RECOVERABILITY		SERVICE OPTION CODE	
5th POSITION		6th POSITION	
DISPOSITION: WHEN UNSERVICEABLE OR UNECONOMICALLY REPAIRABLE, CONDEMN OR DISPOSE.		ASSIGNED TO SUPPORT ITEMS TO CONVEY SPECIFIC INFORMATION TO THE SERVICE'S LOGISTICS COMMUNITY/OPERATING FORCES.	
O	ORG/UNIT	1	I-LEVEL 1ST DEGREE
F	I/AFLOAT	2	I-LEVEL 2ND DEGREE
G	ASHORE AND AFLOAT	3	I-LEVEL 3RD DEGREE
H	I/ASHORE	6	COMMERCIAL ITEM, ORGANICALLY MFR'D
K	DLR; CONTRACTOR FACILITY	8	NON-CONSUMABLE; 2ND DEGREE ENGINE I-LEVEL
		9	NON-CONSUMABLE; 3RD DEGREE ENGINE I-LEVEL
L	INTERMEDIATE SRA LEVEL	E	END TO END TEST
		J	INTER-SERVICE DLR REPAIRABLE BELOW D-LEVEL
D	DLR; CONDEMN OR DISPOSE AT DEPOT	P	PROGRESSIVE MAINTENANCE
Z	NON-REPAIRABLE	R	GOLD DISC REPAIR
A	NON-REPAIRABLE BUT REQUIRES SPECIAL HANDLING	T	TRAINING DEVICES

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**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN**

DESCRIPTION AND PRINCIPLES OF OPERATION

**A/A24A-56 HELMET UNIT, INTEGRATED
(JOINT HELMET MOUNTED CUEING SYSTEM)**

Reference Material

None

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Record of Applicable Technical Directives

None

1. DESCRIPTION.

2. A/A24A-56 HELMET UNIT, INTEGRATED (JOINT HELMET MOUNTED CUEING SYSTEM).

3. The A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) is a display system used to display cueing symbology for navigation, weapons and sensors at high off boresight angles. The system uses miniature components mounted on a detachable helmet display unit (HDU). This helmet display unit (HDU) allows symbology to be projected on the pilot's visor. See [figure 1](#).

4. The (HDU) has a built in hinge pivot that allows symbology to be displayed and fold clear of the visor assembly when the visor is retracted.

NOTE

On the HDU mating connector there is a smaller pin that is a safety device of the CROWBAR safety circuitry. DO NOT try to pull pin out.

5. The (HDU) is made up of the components listed below:

- a. cathode ray tube (CRT) assembly
- b. relay optics assembly
- c. magnetic receiver unit (MRU)
- d. camera
- e. automatic brightness control (ABC) sensor
- f. up-look reticles (puppers)
- g. visor assembly.

6. CATHODE RAY TUBE (CRT) ASSEMBLY.

7. The cathode ray tube (CRT) provides the various symbology to be projected on the visor assembly.

8. The CRT assembly is made of a light-weight housing that provides a means of attachment to the relay optics assembly using a quarter turn locking flange.

9. A CRT EEPROM and a cathode ray tube make up the remainder of the CRT assembly. The CRT

EEPROM contains the serial number, elapsed time, fault record and electron beam correction data.

Each of these components are permanently bonded to the total CRT assembly. The CRT assembly has one electrical connector and weighs 2.3 ounces.

10. RELAY OPTICS ASSEMBLY.

11. The relay optics assembly is made up of four lenses and two mirrors within a light-weight plastic housing. It provides the optical transmission of the symbology produced by the CRT assembly on the visor assembly.

12. MAGNETIC RECEIVER UNIT (MRU).

13. The magnetic receiver unit (MRU) is a miniature version of the magnetic transmitter unit. It contains three coils that represent the X, Y, and Z axes of the system.

14. CAMERA.

15. The camera is monochromatic with a field of view (FOV) the same as the HDU 20° FOV. The camera image is combined with display symbology by the electronic unit (EU). This composite video is available for recording purposes.

16. AUTOMATIC BRIGHTNESS CONTROL SENSOR.

17. The automatic brightness control (ABC) sensor, is used to determine ambient light and adjust the CRT brightness to maintain a constant display contrast ratio.

18. UP-LOOK RETICLES.

19. The up-look reticle assemblies provide a pair of symbols known as puppers. When selected, using HOTAS, these symbols are used for high off-boresight targeting. The up-look reticles are not adjustable and the reticle projected is 27.5° above and 30° left or right of the eye.

20. VISOR ASSEMBLY.

21. The visor assembly provides two functions. First, it provides the pilot with protection from sun and wind. Second, it provides a surface for symbology to be presented.

22. The visor can be rotated back over the top part of the helmet. A locking device is used in both the

retracted and deployed visor positions to make sure the visor does not move.

23. UPPER HELMET VEHICLE INTERFACE.

24. The upper helmet vehicle interface (HVI) is one of two electrical cables connecting the HDU to the aircraft. The voltages and signals required to operate the HDU pass through this cable.

25. The upper HVI is routed through the helmet and terminates at the quick disconnect connector (QDC). The upper HVI contains the universal connector (UC), the helmet release connector (HRC), and the top half of the hip-mounted QDC.

26. The UC allows the display unit (DU) to be removed from the helmet. The UC provides a means to attach other devices, for example, night vision goggles, to the existing helmet system. The HRC provides a break point that allows the helmet to leave the pilot's head cleanly, so the helmet is not pulled back toward the pilot. The QDC provides the interface between the pilot and the aircraft.

27. TECHNICAL CHARACTERISTICS.

28. The HDU technical characteristics include the Field of View (FOV) of 20° monocular and weighing approximately 4.0 pounds.

29. PRINCIPLES OF OPERATION.

30. [Figure 1](#) shows the helmet display unit components. [Figure 2](#) shows a block diagram of the helmet display unit.

31. CATHODE RAY TUBE ASSEMBLY.

32. The cathode ray tube (CRT) assembly produces the symbols that are reflected over the pilot's right eye. The signal from the universal connector is passed to the microcontroller. The CRT uses a

characterization PROM to store the CRT unique normalization parameters.

33. RELAY OPTICS ASSEMBLY.

34. The relay optics assembly routes the image from the CRT to the visor assembly.

35. MAGNETIC RECEIVER UNIT.

36. The magnetic receiver unit (MRU) receives the transmitted magnetic signal from the magnetic transmitter unit (MTU) and provides a signal to the electronics unit line of sight module. The signal is used to determine the line of sight (LOS) and position of the pilot's head.

37. CAMERA.

38. The camera field of view is the same as the helmet. A video signal is transmitted between the electronics unit (EU) and the camera by way of the HVI. The camera records the pilot's view. The electronics unit combines the pilot's view with the displayed symbology on the image for recording purposes.

39. AUTOMATIC BRIGHTNESS CONTROL SENSOR.

40. The automatic brightness control (ABC) sensor senses ambient light and adjusts the CRT brightness to maintain a constant display contrast ratio.

41. UP-LOOK RETICLES (PUPPERS).

42. The up-look reticles are two light emitting diodes (LED) which are displayed on the HDU visor. When enabled, the electronics unit determines which LED to activate, based on the pilot's head position, and modifies the HDU LOS output to consider the angle of the activated up look reticle.

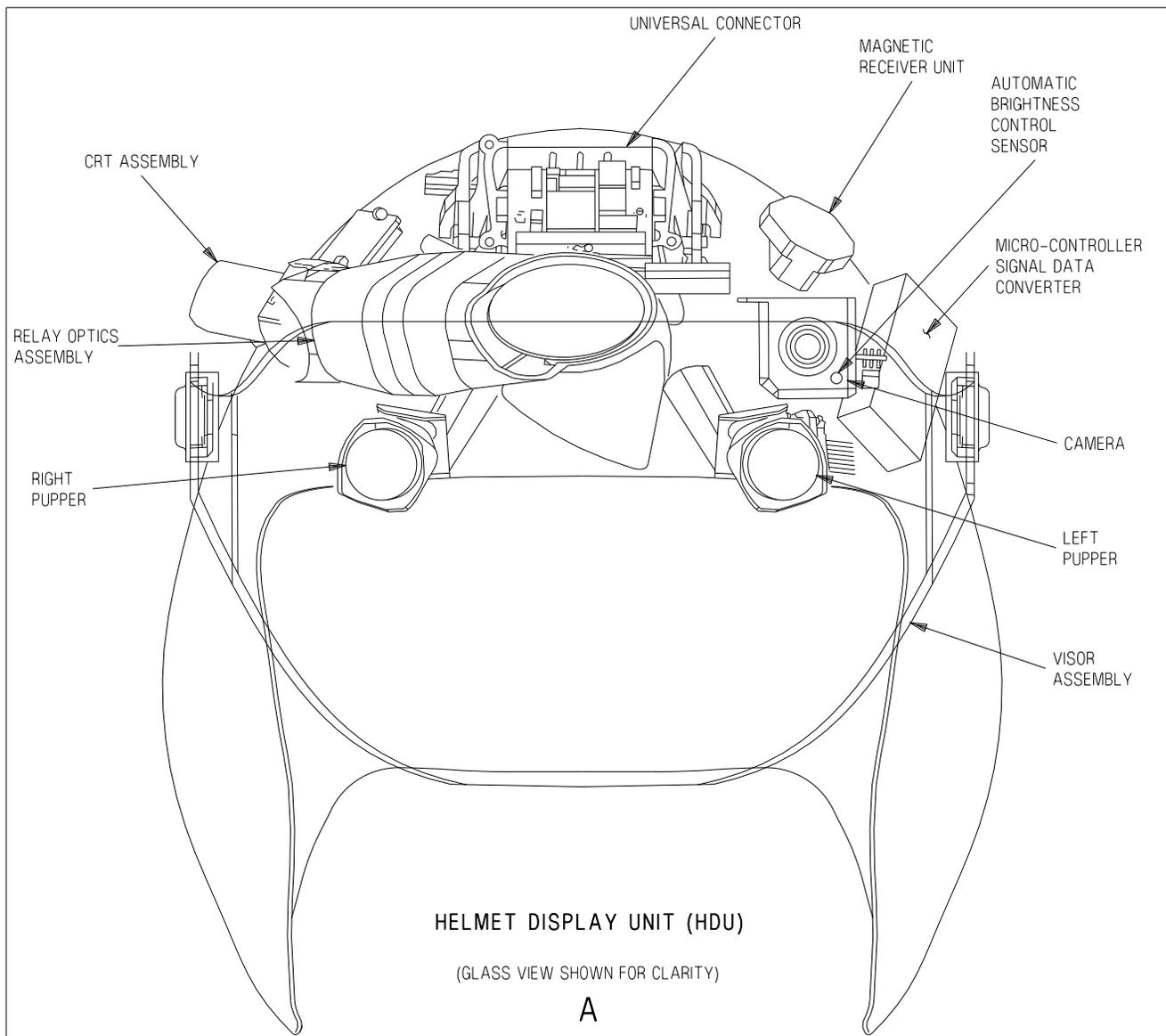
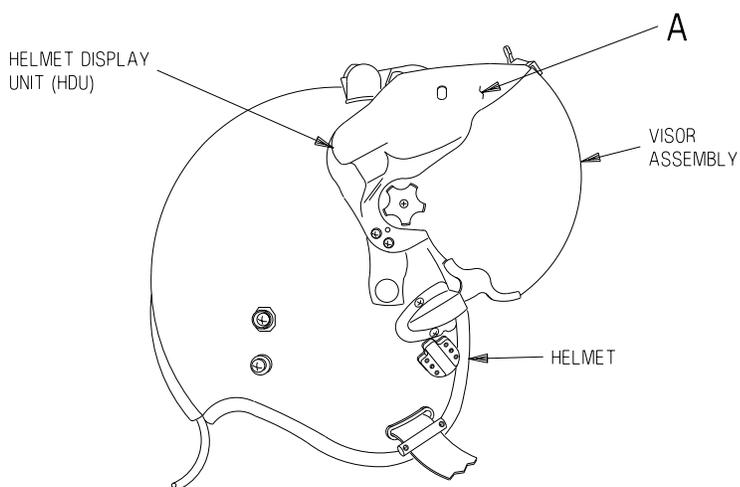


Figure 1. Helmet Display Unit

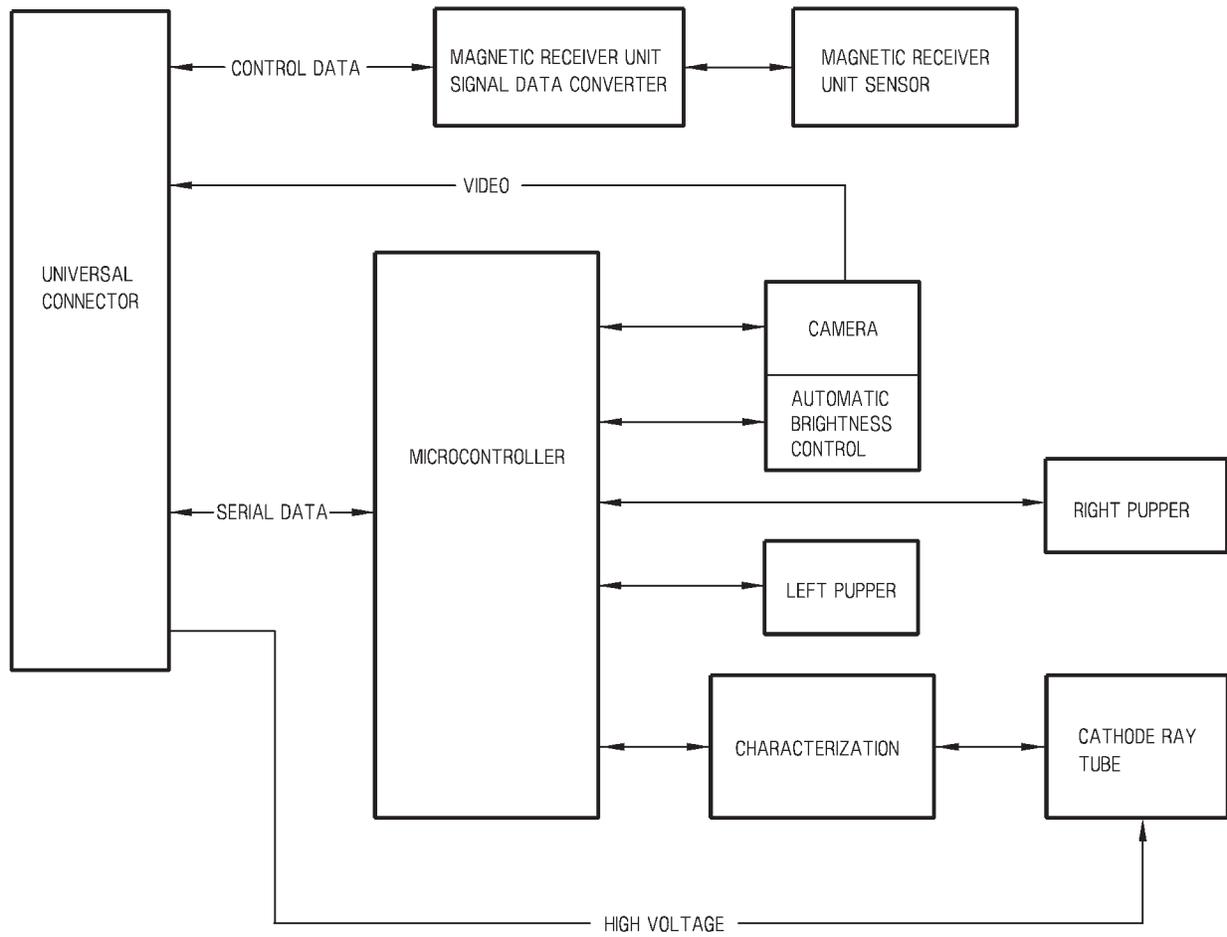


Figure 2. Helmet Display Unit Block Diagram

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**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN**

TESTING AND TROUBLESHOOTING

**A/A24A-56 HELMET UNIT, INTEGRATED
(JOINT HELMET MOUNTED CUEING SYSTEM)**

Reference Material

Description and Principles of Operation	WP003 00
Cleaning and Inspection	WP005 00
A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System)	WP008 00
Upper Helmet Vehicle Interface	WP009 00
Helmet Display Unit	WP010 00
Purge Relay Optics Assembly	WP012 00

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Record of Applicable Technical Directives

None

1. TESTING.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Computer	COMMERCIAL	N/A
Helmet Display Unit Test Set Cable	620992-01-00	06VL3
Helmet Mounted Display Test Set	620900-02-01	06VL3
QMB	178-5936	99747

Materials Required

None

NOTE

Functional test must be done to A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) before each flight.

2. Functionally test the A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) on the Helmet Mounted Display Test Set (HMDTS). The HMDTS comes supplied with Unit Under Test (UUT) test cable, RS232 cable, DB9 to DB25 adapter, and power cable. The HMDTS requires a computer with the below characteristics as a host:

- a. IBM PC compatible
- b. MICROSOFT WINDOWS 95/98/2000/NT
- c. 16 MB of RAM
- d. 5 MB of available hard disk space
- e. 1 available serial port

3. INITIAL SETUP.

4. CABLING.



To prevent damage to equipment, make sure that the HMDTS power switch is in the OFF position.

a. Connect RS232 cable from J4 of the HMDTS to an unused serial port of the computer (Use the DB9 to DB25 adapter if required). Refer to figure 1.

b. Connect HMDTS power cable from J5 of the test set to an AC power source (85-120vac, 47-63 Hz).

c. Connect UUT test cable, to J1, J2, and J3 of the HMDTS.

5. SOFTWARE INSTALLATION.

a. Power up the host computer if it is not already on.

NOTE

The HMDTS software has been added to the Navy Marine Corps Intranet (NMCI) Central Design Authority (CDA) list. NMCI users should contact their local help desk for software installation. All other users should contact the CDA POC at (812) 854-2372.

b. If HMDTS software has been loaded, go to paragraph 9 OPERATION.

6. CONTROLS.

7. The substeps below describe the controls of the HMDTS.

a. **START:** Starts the testing sequence. A message window above this button provides the operator with information concerning the test sequence.

b. **ABORT:** Aborts testing and shuts down the high voltages to the UUT.

c. ACCEPT/RECORD: Receives the testing results and records the data to the hard drive on the host computer only in the occurrence of a failure. The data recorded is in ASCII text format and is made up of the below information:

- (1) Failed Tests
- (2) HMD Serial Number
- (3) CRT Assembly Serial Number
- (4) IPD Switch Setting
- (5) HMD Elapsed Time Indicator
- (6) CRT Elapsed Time Indicator
- (7) Test Set Serial Number
- (8) Test Date and Time
- (9) Fault Record

d. EXIT: Exits the test environment and returns to the operating system desktop display.

e. PATTERN BRIGHTNESS: Sets the primary display pattern intensity in 1/4 full-scale increments. The default value is 1/2. When the intensity is changed using the radio buttons, the pattern may blank for a short period of time as values are loaded in the test set and other parameters are adjusted. This is a result of the test set having only one serial input from the host PC which must control the test set and its HVPS (CU) as well as the HMD. Activation of the Custom subcontrol allows the operator to vary the brightness over a wider range of values by moving a slider. The slider position is received and the display brightness is changed when the operator releases the control.

f. PASS and FAIL Buttons: The below tests require the test operator to evaluate the results. In each case a pair of PASS/FAIL buttons is provided for the operator to activate.

- (1) Primary Display
- (2) HMD Camera
- (3) Puppets
- (4) QMB Interlock

g. HELP Menu: The HELP menu provides both help information and information about the HMDTS software. When HELP is selected, various help information windows appear as the operator drags the mouse cursor over the screen areas. To disable the help feature, deactivate it in the HELP menu. The ABOUT window provides added information about the software.

8. INDICATORS.

NOTE

For all LED indicators, Green = pass or closed, and RED = fail or open.

a. TOP ROW INDICATOR: The top row of indicators provides display of the UUT configuration and the HMDTS serial number. The elapsed times are updated each 60 seconds while the test is running.

b. PUPPETS: The operation of the puppets is displayed in two windows. The text area between the windows shows which puppet has been commanded and the intensity or blink rate.

c. ABC SENSOR: The ABC sensor meter display shows the output of the ABC sensor with 75 % of full-scale equal to the ambient light at the start of testing.

d. SERIAL COMMUNICATIONS: The serial communications LED monitors the data to and from the microcontroller within the UUT. In the case where there are intermittent failures, the Failed Attempts indicator displays a running count of failed transmissions.

e. MRU: MRU LED indicates the status of the Helmet Tracker MRU test.

f. TEST SET BIT: The Test Set BIT LED indicates the status of the HMDTS Built-in Test.

g. TEST PATTERN: The primary display pattern produced by the test set is displayed in the central window.

h. HV INTERLOCK: The Interlock LED indicates the status of the HV Interlock. This signal goes from the Test Set through the test cable, helmet cable, and helmet and is wrapped around in the HDU.

i. QMB: The QMB LED indicates the status of the QMB located in the Pilot Side QDC. The QMB is a magnetically enabled switch that is only closed in the presence of a strong magnet placed in close proximity to the switch.

j. HDU EEPROM Fault Record: The window displays data read from the HDU and CRT EEPROM fault records in interpreted test format. The data displayed represents system faults detected and set by the aircraft Electronics Unit (EU). These values are not under the control of the HMDTS.

k. SOFTWARE CONTROL/VERSION NUMBER: The HMDTS software control/version number is located at the upper right hand corner of the test set window. The operator should refer to this number in any reports issued.

9. OPERATION.

NOTE

The HMDTS is operated in either helmet mounted display test or camera alignment mode. The HMDTS is not

designed to do both functions simultaneously. Before launching the helmet test software, close the camera alignment software on the PC. Before launching the camera alignment software, close the helmet test software on the PC.

a. Determine whether the HMDTS is to be used for HMD functional testing or camera alignment. These two operating modes are mutually exclusive. If the HMDTS is to be used for helmet display unit functional testing, go to the next step. If the HMDTS is to be used for camera alignment, go to OPERATION FOR CAMERA ALIGNMENT, WP010 00.

WARNING

If any arcing or similar noise is heard, immediately abort the test.

b. Connect the Unit Under Test (UUT) to the HMDTS using the QDC. If QDC will not mate, push plunger (release button) in while pushing QDC halves together until an audible click is heard. Demate QDC and then try to remate normally.

c. Power on the test set using TEST SET POWER.

d. Power on host computer and monitor.

e. Select the HMDTS icon from the desktop of the host computer. The main window of the test software is displayed on the computer monitor.

f. Using the mouse, click on the "Start" button from the main window of the test software that is displayed on the computer monitor.

g. The message window above the "Start" button displays the status of the test set operations.

h. Wait until the message reads "Test Running" before continuing.

i. The helmet should be placed securely on the operator's head or table and the visor rotated into operating position.

j. Observe the operation of the primary display and puppers. The primary display should match the Test Pattern window on the computer screen. The puppers should operate in the below continuous sequence:

- (1) Left pupper HIGH brightness.
- (2) Left pupper LOW brightness.
- (3) Right pupper HIGH blink rate.
- (4) Right pupper LOW blink rate.

k. Activate the applicable PASS or FAIL buttons for the Primary Display Test and Puppets Test.

l. Observe the HELMET CAMERA LCD monitor on the HMDTS front panel. This monitor provides continuous display of the HMD Camera.

m. Activate the applicable PASS or FAIL buttons for the Camera Test.

n. Connect the upper QDC to the QMB. Note that the QMB display LED shows CLOSED (GREEN) when the magnet exists and OPEN (RED) when there is no magnet.

o. Activate the applicable PASS or FAIL buttons for the QMB.

p. Activate ACCEPT/RECORD. This completes the testing process. If any operator tests were not done, a message is displayed requesting the operator to enter PASS or FAIL for those tests. If the ABC sensor (WP003 00) was inconclusive (for example, three readings did not vary from ambient by at least 10 %), the operator is instructed to hold their hand in front of the sensor for approximately 3 seconds. If a previous record for an individual HDU exist (i.e., same serial number), the operator is prompted with alternates to overwrite the existing file or keep the file under a new name.

q. Disconnect the A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) from the UUT test cable. The HMDTS may be left in the powered on state if more helmet units are to be tested or power off when not in use for a significant amount of time.

r. On the computer, close the helmet mounted display test software by selecting EXIT.

10. TROUBLESHOOTING.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Computer	COMMERCIAL	N/A
Helmet Display Unit	620992-01-00	06VL3
Test Set Cable		
Helmet Mounted	620900-02-01	06VL3
Display Test Set		
QMB	178-5936	99747

Materials Required

None



HIGH VOLTAGE EXISTS - Do not try testing if any arcing noises are heard from the helmet.

11. When replacement of part specified in testing procedures does not correct the failure, refer to Helmet Display Unit Schematic, figure 2, to isolate the problem.

12. ERROR MESSAGES. Refer to table 1.



Do not try to repair bent pins. Doing so may damage mating connector permanently. Replace equipment.

a. For all failures, be sure all cables are correctly connected, the QDC is correctly mated, and the HDU securely latched to the helmet by way of the UC.

b. If the failure continues, the operator should note the details of error messages, if any, and should include any and all information pertinent to the failure on any test failure report issued.

NOTE

other users should contact the CDA POC at (812) 854-2372.

The HMDTS software has been added to the Navy Marine Corps Intranet (NMCI) Central Design Authority (CDA) list. NMCI users should contact their local help desk for software installation. All

c. If the fault isolation leads to suspect HMDTS, contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372.

Table 1. Error Messages

Error Messages	Possible Causes	Remedy
1. Unable to Communicate	1. Test Set not powered. 2. Test Set RS232 cable not correctly connected. 3. RS232 Cable fault. 4. Test Set hardware fault. 5. Not correctly loaded test set software on host PC. 6. PC COM Port not correctly configured. 7. Another application currently using the COM Port.	1. Correctly connect power. 2. Inspect and fully connect. 3. Replace cable - 1:1 connection. NO Null Modem. 4. Replace HMDTS. 5. Contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372. 6. Refer to user manual for host PC. Be sure COM Port in use is configured in the default or industry standard mode for that port. (Usually address 3F8H and IRQ4 for COM 1 and 2F8H and IRQ3 for COM 2). 7. Close the offending application and retry.
2. CRT Checksum Failed	Checksum for any block of data within the CRT EEPROM is not correct when read by the HMDTS.	Replace CRT (WP01000).
3. CRT Serial Number Does Not Match (Update Unavailable)	CRT and/or the HDU has not been updated to the most current revision of EEPROM format which permits CRT interchangeability in the field. The operator is given the selection of proceeding with the test or aborting. This configuration is not recommended, as the system optical distortion error will be outside the nominal range.	Return HDU to Depot for required updates (WP00800).

Table 1. Error Messages (Continued)

Error Messages	Possible Causes	Remedy
4. DU Checksum Failed	Checksum for any block of data within the DU EEPROM is not correct when read by the HMDTS.	Replace [H]DU [WP008] [0].
5. DU Checksum Failed and CRT Checksum Failed	Checksum for any block of data within the CRT and DU EEPROM is not correct when read by the HMDTS.	Replace [H]DU [WP008] [0].
6. CRT Serial Number does not Match “Do you want to produce new coefficients...”	<ol style="list-style-type: none"> 1. Result of field replacement of the CRT assembly. The operator is given the alternate to produce new optical distortion coefficients for the system or aborting testing. 2. If replacement of the CRT has not been done, there is the possibility of data corruption in either EEPROM that is not detectable with the checksum feature. 	<ol style="list-style-type: none"> 1. If generation is done, the data in both EEPROMS will then match and no further messages of this type should be seen. 2. [] Replace [H]DU [WP008] [0].
7. CRT Serial Number does not Match “DU stored data, however...?”	CRT and/or HDU has not been updated to the most current revision of EEPROM format.	Continue with testing or abort. Continuing with testing will result in optical distortion of the pattern.
8. Attempted Invalid State	Programming logic error.	<ol style="list-style-type: none"> 1. Contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372. 2. Replace HMDTS.
9. Invalid Communications Port	Programming logic error.	<ol style="list-style-type: none"> 1. Contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372. 2. Replace HMDTS.
10. CU/DU response not correct	<ol style="list-style-type: none"> 1. Defective HDU or HMDTS CU. 2. RS232 Cable between host PC and test set has an intermittent connection. 3. UUT Test Cable has a break or intermittent connection. 	<ol style="list-style-type: none"> 1. [] Replace [H]DU [WP008] [0]. 2. Inspect and replace if required. 3. Inspect and replace if required.
11. ETI Checksum Failure	1. Defective HDU.	1. [] Replace [H]DU [WP008] [0].

Table 1. Error Messages (Continued)

Error Messages	Possible Causes	Remedy
	<ol style="list-style-type: none"> 2. RS232 Cable between host PC and test set has an intermittent connection. 3. UUT Test Cable has a break or intermittent connection. 	<ol style="list-style-type: none"> 2. Inspect and replace if required. 3. Inspect and replace if required.
 <p>Do not try to repair bent pins. Doing so may permanently damage mating connector.</p>		
<p>12. Error Communicating with the MRU</p>	<ol style="list-style-type: none"> 1. Defective MRU. 2. RS232 Cable between host PC and test set has an intermittent connection. 3. UUT Test Cable has a break or intermittent connection. 4. Defective HMDTS. 	<ol style="list-style-type: none"> 1. Remove and reconnect HDU to UC. If error still exists, replace HDU (WP008 00). 2. Inspect and replace if required. 3. Inspect and replace if required. 4. Replace HMDTS.
<p>13. Time-out waiting for MRU sync to change</p>	<ol style="list-style-type: none"> 1. Defective MRU. 2. RS232 Cable between host PC and test set has an intermittent connection. 3. UUT Test Cable has a break or intermittent connection. 4. Defective HMDTS. 	<ol style="list-style-type: none"> 1. Remove and reconnect HDU to UC. If error still exists, replace HDU (WP008 00). 2. Inspect and replace if required. 3. Inspect and replace if required. 4. Replace HMDTS.
<p>14. Test Set Built in Test Failure</p>	<p>HMDTS BIT failures.</p>	<p>Replace HMDTS.</p>
<p>15. Serial Port Write Time-out</p>	<ol style="list-style-type: none"> 1. RS232 Cable between host PC and test set has an intermittent connection. 2. UUT Test Cable has a break or intermittent connection. 	<ol style="list-style-type: none"> 1. Inspect and replace if required. 2. Inspect and replace if required.

Table 1. Error Messages (Continued)

Error Messages	Possible Causes	Remedy
	3. Defective HDU or HMDTS.	3. Replace HDU (WP008 00) or HMDTS.
		
Do not try to repair bent pins. Doing so may permanently damage mating connector.		
16. Serial Port Read Time-out	1. RS232 Cable between host PC and test set has an intermittent connection. 2. UUT Test Cable has a break or intermittent connection. 3. Defective HDU or HMDTS.	1. Inspect and replace if required. 2. Inspect and replace if required. 3. Replace HDU (WP008 00) or HMDTS.
17. Can Not Continue	1. CRT or HDU does not contain the factory-installed information. 2. RS232 Cable between host PC and test set has an intermittent connection. 3. UUT Test Cable has a break or intermittent connection. 4. Defective HMDTS.	1. Replace CRT (WP010 00) or HDU (WP008 00). 2. Inspect and replace if required. 3. Inspect and replace if required. 4. Replace HMDTS.
18. Test Set Error, CU Reports...	1. Failure of the CU detected by its internal BIT circuitry. 2. If the condition persists.	1. Remove connectors and inspect for bent pins. Remate all connectors and wiggle cable between connectors with the test set operating to inspect for intermittent connections in the cabling. Replace UUT Test Cable, or subassembly with bent pins. 2. Replace HMDTS.
19. Test Set Error, Anode/Focus	HDU Failure detected by CU BIT.	Remove and reconnect HDU to UC. If error still exists, replace HDU (WP008 00).

Table 1. Error Messages (Continued)

Error Messages	Possible Causes	Remedy
 Do not try to repair bent pins. Doing so may permanently damage mating connector.		
20. Test Set Error, DDIP Reports...	CU Faults 1. There is a possibility of an intermittent UUT Test Cable or not correctly mated connector. Remove connectors and inspect for bent pins. Remate all connectors and wiggle cable between connectors with the test set operating to inspect for intermittent connections in the cabling. 2. Defective HMDTS.	1. Replace UUT Test Cable, or subassembly with bent pins. 2. Replace HMDTS.
21. Test Set Error, Deflection Fail	Inspect for intermittent UUT Test Cable, not correctly mated connectors, or bent pins.	Replace UUT Test Cable, or subassembly with bent pins.
22. Test Set Error, Cathode Fail	Inspect for intermittent UUT Test Cable, not correctly mated connectors, or bent pins.	Replace UUT Test Cable, or subassembly with bent pins.
23. Test Set Error, Filament Open	1. Inspect for intermittent UUT Test Cable, not correctly mated connectors, or bent pins. 2. Defective CRT.	1. Replace UUT Test Cable, or subassembly with bent pins. 2. Replace CRT (WP010 00).
24. Test Set Error, Crowbar	1. HDU not correctly seated. 2. HDU has failed.	1. Reconnect HDU to UC. 2. Replace HDU with known good HDU (WP008 00). If problem clears, replace HDU. If problem continues, replace UHVI (WP009 00).

Table 1. Error Messages (Continued)

Error Messages	Possible Causes	Remedy
25. Power Supply Fail	<ul style="list-style-type: none"> 11vdc fail ±12vdc fail ±15vdc fail +27vdc fail 	Replace HMDTS.
26. Power Supply Has Shut Down For Unknown Reasons	<ul style="list-style-type: none"> 1. RS232 Cable between host PC and test set has an intermittent connection. 2. UUT Test Cable has a break or intermittent connection. 3. Broken or intermittent connection between the QDC and the CRT in the HDU. 4. Defective CU. 	<ul style="list-style-type: none"> 1. Inspect and replace if required. 2. Inspect and replace if required. 3. Inspect the helmet and HDU connection at the UC for bent pins. Remate all connections from the test set to the HDU. Replace HDU or helmet (WP00800). 4. Replace HMDTS.
27. Interlock Failure	<ul style="list-style-type: none"> 1. RS232 Cable between host PC and test set has an intermittent connection. 2. UUT Test Cable has a break or intermittent connection. 3. Broken or intermittent connection between the QDC and the CRT in the HDU. 4. Defective CU. 	<ul style="list-style-type: none"> 1. Inspect and replace if required. 2. Inspect and replace if required. 3. Inspect the helmet and HDU connection at the UC for bent pins. Remate all connections from the test set to the HDU. Replace HDU or helmet (WP00800). 4. Replace HMDTS.
28. DU EEPROM Map File Does Not Exist	File was either not created by the program or was deleted before being loaded into DU EEPROM.	<ul style="list-style-type: none"> 1. Abort and restart the test set software and do the instructions for generating new coefficients on the host PC. 2. If that fails to correct the problem, shutdown and restart the host PC.

Table 1. Error Messages (Continued)

Error Messages	Possible Causes	Remedy
29. CRT EEPROM Map File Does Not Exist	File was either not created by the program or was deleted before being loaded into CRT EEPROM.	<ol style="list-style-type: none"> 1. Abort and restart the test set software and do the instructions for generating new coefficients on host PC. 2. If that fails to correct the problem, shutdown and restart the host PC.
30. Missing Pattern File	“Test Pattern.txt” is not in the same directory as the program. One or the other has moved or the pattern file was deleted.	Contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372.
31. Error - Cannot Proceed: New Offset Location Resides Outside Limit Region	<ol style="list-style-type: none"> 1. Error in entering one or both of the camera offset values. 2. Mechanical misalignment of the camera causing the needed offset values to be too large. 3. Failure in the HMDTS. 	<ol style="list-style-type: none"> 1. Repeat camera alignment procedure. 2. Return HDU (WP00800). 3. Replace HMDTS.

13. FAILURE INDICATIONS. Refer to table 2



Do not try to repair bent pins. Doing so may damage mating connector permanently. Replace equipment.

a. For all failures, be sure all cables are correctly connected, the QDC is correctly mated, and the HDU securely latched to the helmet by way of the UC.

b. If the failure continues, the operator should note the details of error messages, if any, and should

include any and all information pertinent to the failure on any test failure report issued.

c. If the fault isolation leads to suspect HMDTS, contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372.

d. If the fault isolation leads to suspect the HDU, first test with a known good HDU. If the display is good, replace CRT of suspected HDU. If display is bad with good HDU, test with known good helmet assembly. If the display is good, then replace the upper HVI of suspected HDU. If the display is still bad, suspect the HMDTS. Replace HMDTS.

Table 2. Failure Indications

Fault Indication	Possible Causes	Remedy
 Do not try to repair bent pins. Doing so may damage mating connector permanently.		
1. Bright Spots On Display If bright spots are shown on the display even when the display intensity is reduced to a low value, one of the below problems may be the cause.	There is a break (open) electrical connection between the HMDTS and the HDU electronics or a wrong G2 setting in the CRT EEPROM.	Inspect all connection points for bent pins and then remate connectors. Then test by wiggling the cabling at each connection point. Finally try another helmet or HDU. If changing any component prevents the condition from occurring, replace that component.
2. Intermittent Operation	Loose or intermittent test set UTT cable at either the test set or the QDC (not correctly connected) or not correctly mated HDU to helmet UC.	Remove Test Set connectors and inspect for bent pins. Remate all connectors and wiggle cable between connectors with the test set operating to inspect for intermittent connections in the cabling.
3. Loss of Pattern or No Pattern	Failed CRT or wrong test setup.	Make sure HDU is secure on the helmet, UC is latched completely, and QDC is fully engaged (CLICK when mated), and Test Set Cable is fully attached to HMDTS.
4. Blurred Image, Distorted, or Partially Missing Symbology.	Moisture in Optics Module, finger prints on optics, or failed CRT.	If finger prints exist, clean optics (WP005 00). If blurred image remains and moisture exists, purge Relay Optics Assembly (WP012 00). If blurred image or partially missing symbology remains, replace CRT (WP010 00). If replacing CRT does not fix problem, replace HDU (WP008 00).
 Do not try to repair bent pins. Doing so may damage mating connector permanently.		

Table 2. Failure Indications (Continued)

Fault Indication	Possible Causes	Remedy
<p>5. HMD Camera</p> <p>No image on HMDTS.</p>	<p>Wrong viewing angle for test set display. Intermittent or broken signal path between HMDTS and HDU.</p>	<p>LCD displays have limited viewing angles. Reposition for a more perpendicular view and move the helmet to see if there is motion in the display.</p> <p>Inspect all connection points for bent pins and then remate connectors. Then test by wiggling the cabling at each connection point. Finally try another helmet or HDU. If changing any component prevents the condition from occurring, replace that component.</p>
<p>6. Puppets</p> <p>No puppets seen even though test set indicates they should be flashing and there are no test set errors or lack of communications with the HDU.</p>	<p>Intermittent or broken signal path between HMDTS and HDU.</p>	<p>Inspect all connection points for bent pins and then remate connectors. Then test by wiggling the cabling at each connection point. Finally try another helmet or HDU. If changing any component prevents the condition from occurring, replace that component.</p>
<p>7. QMB Interlock</p>	<p>If the QMB Interlock switch fails to change from red to green, the possibility of not correctly placing the magnet or using too weak of a magnet may be the cause of the failure.</p>	<p>Using a known good helmet, verify the placement and strength of magnet used are correct. If the Interlock switch changes from red to green with the replacement helmet, replace the suspected helmet upper HVI. If test fails with a known good helmet and magnet, exit the test set software and restart, or contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372.</p>



Do not try to repair bent pins. Doing so may permanently damage mating connector.

Table 2. Failure Indications (Continued)

Fault Indication	Possible Causes	Remedy
<p>8. ABC Sensor</p> <p>Failure to complete a pass indication even after partly obscuring the sensor.</p>	<p>If there are no communications errors noted by the test set, the possible causes are:</p> <p>Not covering the ABC sensor completely.</p> <p>Not covering the ABC sensor for a long enough period of time.</p> <p>Defective ABC sensor.</p>	<p>Retry obscuring the sensor in the presence of stronger (ambient) light for about 3 seconds.</p> <p>If ABC sensor still does not operate, replace HDU (WP00800).</p>
<p>9. HMDTS Not Operating</p>	<p>If the HMDTS does not appear to be operating and there are no error messages, there is a possibility of corrupt HMDTS software residing on the Host PC.</p>	<p>Contact your local help desk to uninstall and reinstall the HMDTS software. If problem persists, call your CDA POC at (812) 854-2372. If this does not correct the problem, replace the HMDTS.</p>
<p>10. Test Set Intermittent Operation</p>	<p>Loose or intermittent test set UTT cable at either the test set or the QDC (not correctly connected) or not correctly mated HDU to helmet UC.</p>	<p>Remove connectors and inspect for bent pins. Remate all connectors and wiggle cable between connectors with the test set operating to inspect for intermittent connections in the cabling.</p>
<p>11. Test Set Overheating</p>	<p>Air vents obstructed or internal fan not operating.</p>	<p>Make sure the air vents on the HMDTS are not obstructed and that the internal fan is operating. Turn the unit off for 30 minutes.</p>

14. SHUTDOWN.



Do not disconnect test set cables from tester while power is applied.

- a. Power down test set.

- b. Power down computer.

- c. Disconnect test set from computer.

15. SOFTWARE UPDATES.

16. Released versions of the HMDTS software will be updated for all users through NMCI. For units that do not have access to NMCI contact CDA POC at (812) 854-2372.

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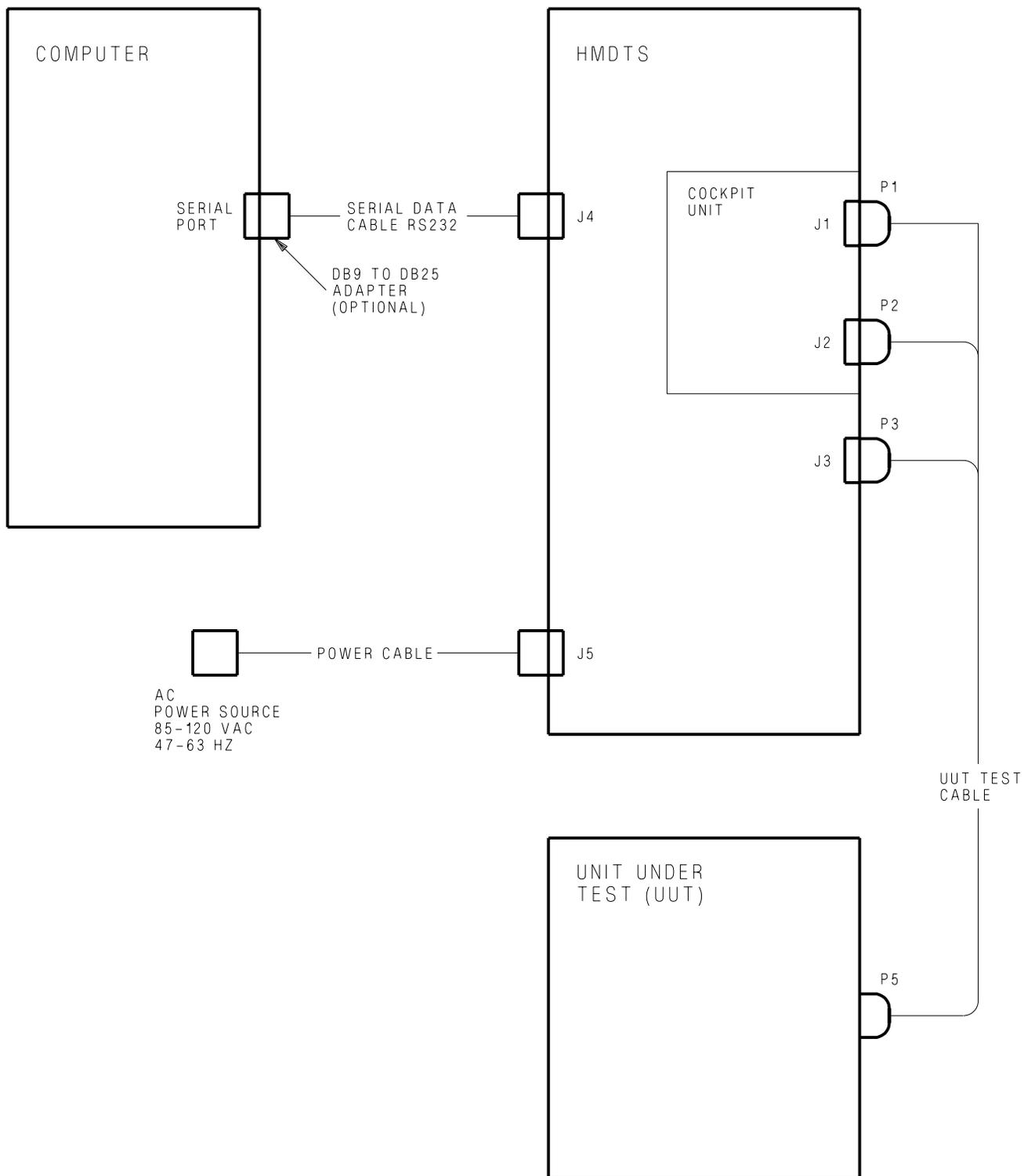


Figure 1. Test Set Hookup

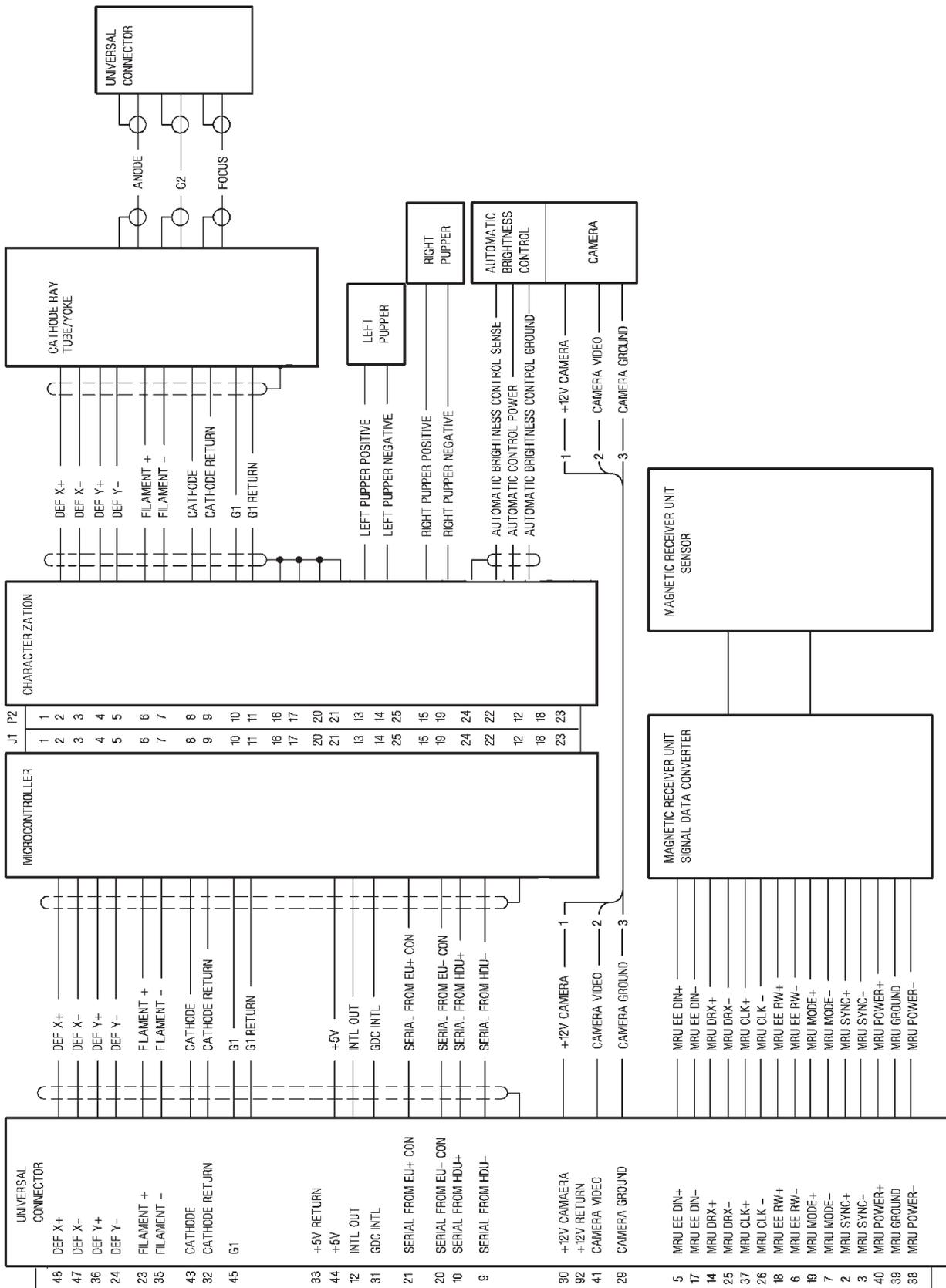


Figure 2. Helmet Display Unit Schematic

**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN**

CLEANING AND INSPECTION

**A/A24A-56 HELMET UNIT, INTEGRATED
(JOINT HELMET MOUNTED CUEING SYSTEM)**

Reference Material

Testing and Troubleshooting	WP004 00
A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System)	WP008 00
Upper Helmet Vehicle Interface	WP009 00
Helmet Display Unit	WP010 00
Visor Assembly	WP011 00
Purge Relay Optics Assembly	WP012 00
Organizational and Intermediate Maintenance with Illustrated Parts	
Breakdown - TTU-551/E Leakage Tester, Part Number 3549AS100	NAVAIR 17-15GB-505
The Naval Aviation Maintenance Program (NAMP)	OPNAVINST 4790.2 (series)

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Record of Applicable Technical Directives

None

1. INTRODUCTION.

2. This work package (WP) provides cleaning and inspection procedures for the Visor Assembly, Cathode Ray Tube Assembly, Relay Optics Assembly, Upper Helmet Vehicle Interface, Zetaliner, TPL assembly and helmet assembly.

3. PREFLIGHT/POSTFLIGHT INSPECTIONS. The Preflight Inspection on the A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) is made up of a visual inspection done by the aircrewmember, as well as, a functional test (WP00400) done by the survival equipmentman (PR) and aircrewmember before each flight. To do the visual inspection, inspect for the general condition of the helmet assembly. Refer to INSPECTION, this WP.

4. The Postflight Inspection is a visual inspection done after the flight by the aircrewmember.

5. SPECIAL INSPECTIONS. The Special Inspection shall be done each 90 days at the organizational level and shall be made up of a visual inspection, a functional test and a thorough cleaning of the helmet assembly.

5A. HDU usage should be recorded monthly using the Helmet Display Unit (HDU) Usage Log (WP01000 paragraph 22A). ETI readings should be taken as close to the last day of the month as possible.

6. The helmet bladder leakage test is to be done each 360 days or as required and documented in accordance with OPNAVINST 4790.2 series. Refer to INSPECTION, this WP.

7. After cleaning and inspection procedures are done, refer to WP00400 for testing of the HMDTS.

8. CLEANING.

Support Equipment Required

None

Materials Required

Nomenclature	Specification or Part Number
Antifogging Compound	O-A-549, NIIN 00-754-2672
Brush, Soft	A-A-2076 TYPE 1
Canned Air	MS-222
Cloth, Lens	73
Cloth, Lint-free	MIL-C-85043 TYPE 1
Detergent, General Purpose	MIL-D-16791 TYPE 1, NIIN 00-282-9699
Distilled Water	COMMERCIAL
Double-Sided Masking Tape	4962
Isopropyl Alcohol	TT-I-735 or MIL-I-10428, NIIN 00-855-1158, NIIN 00-855-6160, NIIN 01-190-2538, NIIN 01-220-9907



Make sure water is not allowed to get in the Universal Connector or the Helmet Release Connector.

9. VISOR. (WP01100)

a. Using canned air, remove any loose dirt, dust, or foreign material on visor.



**DETERGENT, GENERAL, PURPOSE,
MIL-D-16791, TYPE 1**

203

b. Wash off remaining dust and dirt with general purpose detergent and clean lint-free cloth.

c. Lightly pat dry visor with lint-free cloth.



ANTIFOGGING COMPOUND, O-A-549 1091

d. After cleaning visor, apply an antifogging compound to the visor using a dry lint-free cloth.

10. CATHODE RAY TUBE ASSEMBLY. (WP01000)



CRT assembly is fragile and can be damaged easily. Be careful in handling to prevent scratching. Do not use abrasive cleaner or polish on CRT assembly.

a. Using canned air, remove any loose dirt, dust, or foreign material on cathode ray tube assembly.

b. Wash off remaining dust and dirt using distilled water and a clean lint-free cloth.

c. Lightly pat dry CRT with lens cloth.

11. RELAY OPTICS ASSEMBLY. (WP01200)



Relay optics assembly is fragile and can be damaged easily. Be careful in handling to prevent scratching and breakage. Do not use abrasive cleaners or polish on relay optics assembly.

a. Using canned air, remove any loose dirt, dust, or foreign material on relay optics assembly.

b. Wash off remaining dust and dirt using distilled water and a clean lint-free cloth.

c. Lightly pat dry relay optics assembly with lens cloth.

12. HDU OPTICS AND PUPPER CLEANING. (WP01000)

a. Using canned air, remove any loose dirt, dust, or foreign material on HDU optics and puppers.

b. Wash off remaining dust, dirt, smudges, or film from relay optics or pupper using distilled water and a lint-free cloth.



ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 1001

c. If further cleaning is required, clean using a lint-free cloth and isopropyl alcohol. Apply liberally, exercising caution, with force not to damage optics. On completion of cleaning, wipe with lint-free cloth.

13. UPPER HELMET VEHICLE INTERFACE AND QDC. (WP00900)

a. Using canned air, remove any loose dirt, dust, or foreign material on upper helmet vehicle interface (HVI) and QDC.



ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 1001

b. Wash off remaining dust particles, lint, or cloth fibers by brushing with isopropyl alcohol. Do not bend pins. On completion of cleaning, blow out connector using canned air.

14. ZETALINER. (WP00800)



DETERGENT, GENERAL, PURPOSE, MIL-D-16791, TYPE 1 203

a. Using general purpose detergent, hand wash or machine wash, gentle cycle, the zetaliner. To remove excess water, rinse and squeeze lightly.

b. Hang to dry in a warm location. Make sure the zetaliner is completely dry before reinstalling in the helmet.

15. TPL ASSEMBLY. (WP00800)

a. Remove cover assembly from TPL assembly.



DETERGENT, GENERAL, PURPOSE, MIL-D-16791, TYPE 1 203

b. Clean cover assembly and TPL by hand washing using general purpose detergent and distilled water.

c. Thoroughly rinse in clean water and air dry.

d. Apply new double-sided masking tape to cover assembly and reassemble TPL assembly.

16. HELMET ASSEMBLY. (WP00800)



DETERGENT, GENERAL, PURPOSE, MIL-D-16791, TYPE 1 203

a. Clean helmet assembly using general purpose detergent and lint-free cloth. Mild abrasive scouring powder may be used to remove stains or scuff marks.

b. Wipe helmet assembly clean using water dampened lint-free cloth to remove general purpose detergent.

c. Clean chin/nape strap assembly and fitting pads using a lint-free cloth dampened with general purpose detergent.

d. Wipe clean using lint-free cloth dampened with clean water.

17. INSPECTION.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Navy Combat Edge Leakage Tester, TTU-551/E	3549AS100	30003
Stop Watch	LCD-200	86582
Tensioning Tool	MS90387-1	96906

Materials Required

Nomenclature	Specification or Part Number
Brush, Soft	A-A-2076 TYPE 1
Canned Air	MS-222
Cloth, Lint-free	MIL-C-85043 TYPE 1
Correction Fluid	A-A-212 TYPE 1
Isopropyl Alcohol	TT-I-735 or MIL-I-10428, NIIN 00-855-1158, NIIN 00-855-6160, NIIN 01-190-2538, NIIN 01-220-9907
Leak Test Compound	SNOOP 8 OZ
Oxygen, Aviator's	MIL-O-27210 TYPE 1

18. VISOR. (WP01100)

a. Inspect visor assembly for damage, cracks, scratches, and any signs of stress. Any distortion of symbology is cause for rejection.

b. Inspect visor tangs on visor assembly for integrity and correct configuration.

c. Make sure all latches are intact and work correctly.

19. CATHODE RAY TUBE ASSEMBLY. (WP01000)

a. Inspect CRT and CCA for damaged and loose wiring.

b. Inspect helmet visor for possible damage due to CRT.

20. RELAY OPTICS ASSEMBLY. (WP01200)

a. Inspect relay optics assembly for damage and moisture/fogging. If moisture/fogging exists, purge relay optics assembly per WP01200.

21. HDU CORROSION CONTROL.

a. Visually inspect the HDU connector, CRT, and mating helmet connector for FOD or corrosion. If FOD exists on connector, blow out using canned air.



ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 1001

b. Remove corrosion from HDU connector or CRT using a soft brush and isopropyl alcohol. Apply liberally, exercising caution, with force not to bend pins. Continue cleaning until corrosion is removed. On completion of cleaning, wipe CRT with lint-free cloth, and blow out HDU connector using canned air.

c. If corrossions continue, return HDU to depot.

22. UPPER HELMET VEHICLE INTERFACE. (WP00900)

a. Inspect the upper HVI for damaged or broken wires.

b. Inspect nomex braiding for breaks or fraying.

c. Inspect QDC and UC connectors for damaged pins or sign of arcing near high voltage pins.

d. Visually inspect QDC and UC seals, using a magnifying glass, looking for cracks, tears, or brittleness.

e. QDC and UC seals must be replaced each 90 days. Refer to WP00900. (QA)

23. HVI QDC. (WP00900)



Components of the HDU are extremely sensitive. Be careful when handling this equipment.

a. Inspect QDC contacts for corrosion, FOD, or damage.

Replacement of seals will be done on a 90 day interval to prevent damage to equipment.

b. Visually inspect the High Voltage Seals using a magnifying glass. Look for excessive wear (tearing, fraying, or potted), signs of arching, or seal discoloration. If seals are damaged refer to HVI QDC HIGH VOLTAGE SEAL REPLACEMENT, WP00900.

c. High Voltage Seals must be replaced each 90 days. Refer to HVI QDC HIGH VOLTAGE SEAL REPLACEMENT, WP00900. (QA)

d. Inspect positioning disk located on back side of the pilot side QDC on the lower end of the HVI Cable Assembly for evidence of edge chipping, cracking or broken/missing pieces. If chipping, cracking or broken/missing pieces are found, replace the UHVI QDC Cable Assembly. (WP00900).

24. ZETALINER. (WP00800)

a. Remove the zetaliner from the helmet.

b. Inspect zetaliner cover fabric for cleanliness, deterioration, worn spots, tears, cuts, broken or skipped stitches.

c. Inspect the conform foam for deterioration of material.

d. Replace as required.

e. Make sure zetaliner has been marked with correction fluid. Two dots in the front and one dot in rear.

f. Reinstall the zetaliner.

g. Restore communication cord to its correct location.

25. TPL ASSEMBLY. (WP00800)

a. Remove TPL assembly from helmet.

b. Inspect TPL assembly for cleanliness, deterioration, worn spots, tears or cuts.

c. Replace as required.

d. Reinstall TPL assembly in helmet.

26. HELMET ASSEMBLY. (WP00800)

a. Inspect chin/nape strap assembly for loose or broken stitching, snap fastener retention and fraying.

- b. Inspect helmet assembly for splits, cracks, chips and delamination.
- c. Inspect all other hardware for damage, security, corrosion and other defects.
- d. Inspect edgeroll for rips, tears, splits or loosening from helmet shell.
- e. Inspect communication cables and cordsets for cut, split or abraded insulation.
- f. Inspect earcup assembly for correct retention to helmet shell assembly.
- g. Inspect earpads for sound attenuation and pliability.
- h. Inspect oxygen mask receivers for correct function and tension to helmet shell assembly.

27. HELMET BLADDER LEAKAGE TEST.

28. Frequency Of Test. This test is to be done each 360 days or as required and documented per OPNAVINST 4790.2 series.

WARNING

When working with oxygen, make sure that clothing, tubing, fittings and equipment are free of oil, fuel, hydraulic fluid and/or combustible material. Fire or explosion can result when even slight traces of combustible materials come in contact with oxygen under pressure.

CAUTION

Make sure hoses are not kinked when doing helmet bladder leakage test.

NOTE

Do not try to do any maintenance without becoming thoroughly familiarized with TTU-551/E Navy Combat Edge Leakage Tester.

Before doing leakage test, make sure a pretest has been done on the TTU-551/E Navy Combat Edge Leakage Tester per NAVAIR 17-15GB-505.

NOTE

For index numbers referred to in this WP, refer to [figure 1](#).

29. Test Setup.

a. Make sure test set INLET pressure valve (7, [figure 1](#)) is OFF and oxygen supply cylinder valve is fully closed.

b. Connect regulator (2) to oxygen supply cylinder. Make sure regulator (2) is not loaded by turning pressure adjustment handle counterclockwise until spring tension is released.

c. Make sure oxygen flow control valve (3) attached to regulator (2) is closed.

d. Fully open the oxygen supply cylinder slowly. Relieve any excess pressure indicated on regulator outlet gage (10) by opening and closing the oxygen flow control valve (3).

e. Connect oxygen hose (5) to quick disconnect fitting (4) of regulator and connect the other end of oxygen hose (5) to the test set oxygen INLET (6).

f. Open oxygen flow control valve (3).

g. Adjust regulator (2) until 1.0 psig is indicated on regulator outlet gage (10).

h. Attach helmet bladder hose assembly (13) to oxygen OUTLET quick connect (9) port. Attach intermediate helmet bladder hose assembly (16) to helmet bladder adapter (11) of helmet bladder hose assembly (13). Connect helmet bladder hose (12) to intermediate helmet bladder hose assembly (16) using quick disconnects.

30. System Test.

CAUTION

Inflating the bladder to pressures that exceed 2.5 psig will damage the bladder. Any helmet bladder subjected to pressure in excess of 2.5 psig must be removed from service.

NOTE

No adjustment to regulator (2) should be required during the filling process.

a. Prepare the helmet bladder by removing the thermo-plastic liner (TPL) or zetaliner and loosen the helmet bladder from the energy absorbent liner in the helmet shell.

b. Turn test set INLET pressure valve (7) to the ON position.

c. Allow the pressure reading on low pressure gage (8) to stabilize. Pressure in the bladder should indicate 1.0 ± 0.1 psig. Adjust pressure reading on low pressure gage (8) by turning pressure adjusting handle on regulator (2) as required to get 1.0 ± 0.1 psig.

d. Turn test set INLET pressure valve (7) to the OFF position.

e. Using stop watch, time low pressure gage (8) reading. Leakage shall not exceed 0.1 psig in 30 seconds. If leakage exceeds allowable limit, do Leak Isolation per [paragraph 31](#), this WP.

f. Disconnect intermediate helmet bladder hose assembly (16) from the helmet bladder hose (12).

g. Secure helmet bladder to the energy absorbent liner in the helmet shell and reinstall TPL or zetaliner.

h. If more helmet bladders are to be tested, attach the intermediate helmet bladder hose assembly (16) to the helmet bladder adapter (11) and repeat System Test per [paragraph 30](#), this WP.

31. Leak Isolation.

a. Turn test set INLET pressure valve (7) to the ON position.

b. Using leak test compound, test for leakage of helmet bladder quick disconnects and hose. If leakage is detected, do substeps below:

(1) Turn INLET pressure valve (7) to OFF.

(2) Replace helmet bladder quick disconnects and/or hose as required. Attach replacement connector and/or hose using a cable tie with tension set to 3.

(3) Retest helmet bladder assembly. Do System Test per [paragraph 30](#), this WP.

c. If no leakage is indicated while using leak detection compound, do Bladder Decay Test per [paragraph 31](#), this WP.

32. Bladder Decay Test.

a. Turn test set INLET pressure valve (7) to the OFF position.

b. Disconnect helmet bladder hose (12) from intermediate helmet bladder hose assembly (16).

c. Remove intermediate helmet bladder hose assembly (16) from helmet bladder adapter (11).



Cut through head of cable tie using diagonal cut pliers. Do not try to cut strap underneath head.

d. Carefully cut the cable tie securing the male connector to the helmet bladder hose (12) and remove the connector.

e. Connect helmet bladder adapter (11) of helmet bladder hose assembly (13) to the helmet bladder hose (12).



Inflating the bladder to pressures that exceed 2.5 psig will damage the bladder. Any helmet bladder subjected to pressure in excess of 2.5 psig must be removed from service.

NOTE

No adjustment to regulator (2) should be required during the filling process.

f. Turn test set INLET pressure valve (7) to the ON position.

g. Allow the pressure reading on low pressure gage (8) to stabilize. Pressure in the bladder should indicate 1.0 ± 0.1 psig. Adjust pressure reading on low pressure gage (8) by turning pressure adjusting handle on regulator (2) as required to get 1.0 ± 0.1 psig.

h. Turn test set INLET pressure valve (7) to the OFF position.

i. Using stop watch, time low pressure gage (8) reading. Leakage shall not exceed 0.1 psig in 30

seconds. If helmet bladder leakage exceeds allowable leakage limits, disconnect helmet bladder hose (12) from helmet bladder adapter (11), replace helmet bladder (WP008 00) and do System Test per paragraph 30, this WP.

j. If more helmet bladders are to be tested, attach the intermediate helmet bladder hose assembly (16) to the helmet bladder adapter (11) and repeat Bladder Decay Test per paragraph 32, this WP.

k. Document in accordance with OPNAVINST 4790.2 series. (QA)

33. Securing Test Set.

a. Disconnect intermediate helmet bladder hose assembly (16) from helmet bladder hose assembly (13).

b. Disconnect helmet bladder hose assembly (13) from test set oxygen OUTLET quick connect (9).

c. Close oxygen supply cylinder.

d. Turn test set INLET pressure valve (7) to the ON position to bleed pressure from test set.

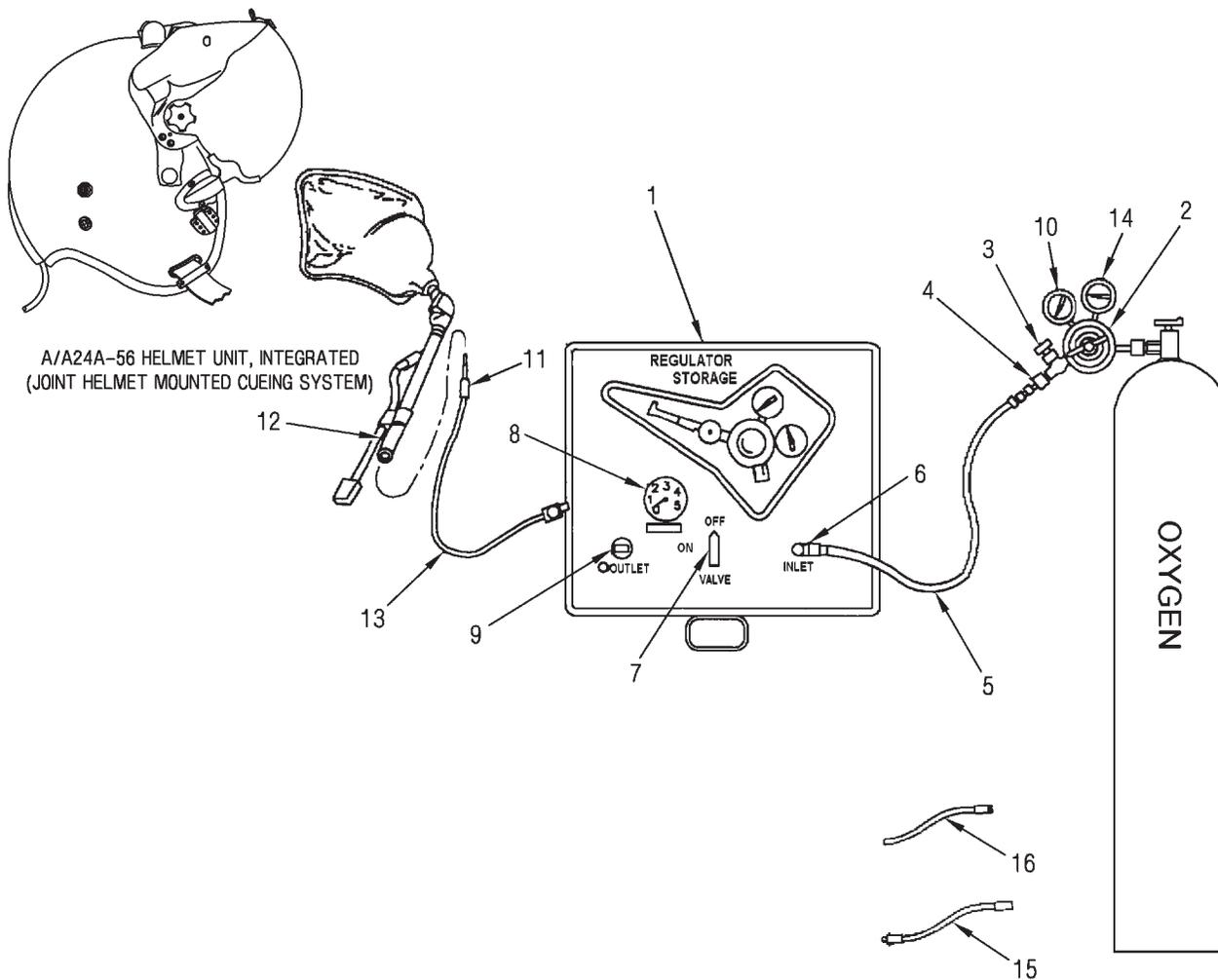
e. Turn regulator (2) counterclockwise until spring tension is released.

f. Close oxygen flow control valve (3) and turn test set INLET pressure valve (7) to the OFF position.

g. Disconnect all hoses from test set and regulator (2) and stow in lid of test set.

h. Disconnect regulator (2) from oxygen supply cylinder and stow in space provided in test set.

i. Stow all hoses and fittings/caps in space provided in test set.



LEGEND

- | | |
|------------------------------------|---|
| 1. LEAKAGE TESTER TEST SET | 11. HELMET BLADDER ADAPTER |
| 2. REGULATOR | 12. HELMET BLADDER HOSE |
| 3. OXYGEN FLOW CONTROL VALVE | 13. HELMET BLADDER HOSE ASSEMBLY |
| 4. QUICK DISCONNECT FITTING | 14. REGULATOR INLET GAGE |
| 5. OXYGEN HOSE | 15. ADAPTER CAP ASSEMBLY |
| 6. OXYGEN INLET (QUICK DISCONNECT) | 16. INTERMEDIATE HELMET BLADDER HOSE ASSEMBLY |
| 7. INLET PRESSURE VALVE | |
| 8. LOW PRESSURE GAGE (0-5 PSIG) | |
| 9. OXYGEN OUTLET QUICK CONNECT | |
| 10. REGULATOR OUTLET GAGE | |

Figure 1. TTU-551/E Leakage Tester

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**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN**

HELMET ASSEMBLY BUILDUP

**A/A24A-56 HELMET UNIT, INTEGRATED
(JOINT HELMET MOUNTED CUEING SYSTEM)**

Reference Material

Testing and Troubleshooting	WP004 00
HDU Alignment/IPD Adjustment	WP007 00
A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System)	WP008 00
Upper Helmet Vehicle Interface	WP009 00
Visor Assembly	WP011 00
Rescue and Survival Equipment	NAVAIR 13-1-6.5
Aircrew Personal Protective Equipment (Helmets and Masks)	NAVAIR 13-1-6.7-3
Oxygen Hose and Communication Test Set - Intermediate Maintenance with Illustrated Parts Breakdown	NAVAIR 17-15BC-22
NATOPS General Flight and Operating Instructions	OPNAVINST 3710.7 (series)
The Naval Aviation Maintenance Program (NAMP)	OPNAVINST 4790.2 (series)

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Record of Applicable Technical Directives

None

1. INTRODUCTION.

2. This work package (WP) provides helmet assembly buildup procedures. This WP is made up of sizing and helmet configuration buildup. Refer to [WP008 00, figure 1](#), to assist in indicating which part numbers for the required helmet shell assembly should be requisitioned for the helmet configuration buildup.

3. After helmet assembly buildup procedures are done, refer to [WP004 00](#) for testing on the HMDTS.

4. SIZING.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Tape Measure, Cloth	MIL-C-29127	81349

Materials Required

None

5. GENERAL.

6. The concept of sizing as used in this WP refers to the basic methods to be done by the Aircrew Survival Equipmentman for requisitioning the correct size helmet shell from supply. When the basic helmet shell assembly size has been determined and requisitioned, the helmet shell assembly is ready for buildup to the ultimate configuration desired.

7. The helmet shell assembly required for each configuration is determined by the helmet shell size and the type of visor assembly needed for the helmet configuration buildup. The illustrated parts breakdown ([WP008 00, figure 1](#)) indicates which helmet assembly part number is required for each configuration.

8. HELMET SIZING.

9. To select the correct size helmet shell assembly for the aircrewmember, do substep below:

a. If TACAIR helmets are available, aircrewmember should trial fit to make sure that correct size is ordered. If TACAIR helmets are not available, measure the circumference of the head, at the hatband, with a cloth tape measure. Refer to [figure 1](#) as a guide for sizing.



AFE559-30-1-006

Figure 1. Head Circumference Measurement

NOTE

Sizing instructions are provided only as general guidance. Because of the wide variation in head shapes to be encountered, it is not possible to give detailed guidance. The helmet is designed to provide lightweight head protection and should fit close to the head. For this reason, aircrewmember's should be fitted with the smallest helmet size that provides an acceptable fit.

b. When the correct size has been determined, requisition the helmet assembly through normal supply channels. Refer to [table 1](#) for helmet assembly sizing part number information.

Table 1. Helmet Assembly Sizing Guide

Circumference (Inches)	Comparable Hat Size	Shell and Liner Size Required	Part Number
21 - 22.5	7 or less	Medium	90A8045-1
22.5 - 24	7 1/4	Medium/Large	
	7 1/2	Large	90A8045-2
24 - 24.9	7 7/8 or more	Extra-Large	90A8045-3

NOTES

 When possible, the aircrewmember should be fitted with the smallest sized helmet that will provide a safe comfortable fit.

10. HELMET CONFIGURATION BUILDUP.

Support Equipment Required

None

Materials Required

None

11. GENERAL.

12. The helmet shell assembly required for each helmet configuration varies according to aircraft mission and type visor assembly required. [Table 1](#), along with the information in the illustrated parts breakdown ([WP008 00](#), [figure 1](#)), will assist in indicating which part number for the required helmet shell assembly should be requisitioned for the helmet assembly configuration buildup.

13. When the basic helmet shell assembly and components are received, carefully inspect the shipping containers for evidence of damage or signs of abuse. Open each container and verify that all the required items have been included. If any parts are defective, damaged or missing, replace all parts in the shipping container, prepare a Quality Deficiency Report (QDR) ([WP002 00](#)) and contact the applicable authority. When the helmet shell assembly components have been accepted, it may be built up by adding or removing major components in order to get the desired helmet assembly configuration for the required application.

14. ASSEMBLY OF COMPONENTS.

15. Order of Assembly. Refer to [table 2](#) for components and order of assembly required to make the various helmet assembly configurations. Fabricated components and parts shall be installed on the helmet shell assembly in accordance with and in the order shown in [table 2](#).

NOTE

For clarification in determining the right and left side of the helmet assembly during buildup, assume the helmet to be donned by the aircrewmember and determine helmet sides relative to the aircrewmember's right and left sides.

Table 2. Assembly of Components

Order of Assembly	Component/Assembly To Be Installed	Page Reference
1	Installation of Reflective Tape on Helmet Assembly	6
2	Installation of Visor Snap Fasteners	7
3	Installation of Helmet Bladder Kit	8
4	TPL Liner Fitting	9
5	Zetaliner Fitting	12
6	Helmet Component Adjustments	18
7	Installation of Oxygen Mask Bayonet Receivers	19
8	Fabrication and Installation of Bayonet Receiver Shims	21
9	Fabrication and Installation of Bayonet Receiver Tapered Shims	22
10	Installation of Pile Tape on Helmet Assembly	23
11	Installation of Upper HVI	24
12	IPD Adjustment	24
13	Visor Trimming	24
14	Installation of Visor Tangs	33
15	Installation of Visor Tang Receivers	34
16	Installation of Helmet Plate Assembly AN/AVS-9	41

16. INSTALLATION OF REFLECTIVE TAPE ON HELMET ASSEMBLY.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Heat Gun	ET1600	55719

Materials Required

Nomenclature	Specification or Part Number
Cloth, Lint-free	MIL-C-85043 TYPE 1
Detergent, General Purpose	MIL-D-16791 TYPE 1, NIIN 00-282-9699
Tape, Reflective, High Intensity, White, 1-Inch*	NIIN 01-082-8927
Tape, Reflective, High Intensity, White, 3-Inch*	NIIN 01-078-8660
Tape, Reflective, Orange, 1-Inch, CL 1	L-S-300 (NIIN 00-656-1494)
Tape, Reflective, Orange, 2-Inch, CL 1	L-S-300 (NIIN 00-656-1186)
Tape, Reflective, Red, 1-Inch, CL 1	L-S-300 (NIIN 00-949-7552)
Tape, Reflective, Red, 3-Inch, CL 1	L-S-300 (NIIN 00-949-7598)
Tape, Reflective, White, CL 3	L-S-300 (NIIN 00-100-2153)
Tape, Reflective, Yellow, 1-Inch, CL 1	L-S-300 (NIIN 00-753-3208)
Tape, Reflective, Yellow, 3-Inch, CL 1	L-S-300 (NIIN 00-057-4545)

* High intensity grade white tape provides greatest total reflectiveness and is most preferred for visual detection. Submit requisitions for high intensity grade tape to routing identifier code ZNC.

a. Install reflective tape on helmet shell assembly per substeps below:



DETERGENT, GENERAL, PURPOSE, MIL-D-16791, TYPE 1

203

(1) Clean outside of helmet shell assembly with damp lint-free cloth and general purpose detergent to remove all traces of grease, salt or foreign material.

(2) Remove all traces of cleaning agent with a clean damp cloth. Dry with a clean, dry cloth.

(3) Inspect all surfaces of the helmet shell assembly for obvious signs of cracks, soft parts, splits or other defects which would be cause for replacement of the item. Chipped paint shall not be cause for replacement of helmet shell assembly. Defective helmet shell assemblies shall be disassembled and replaced and damaged parts shall be disposed of per the correct directives. Undamaged parts shall be kept for replacement on other helmet shell assemblies.



Refurbishment of helmet shell assembly by other than removal or replacement of reflective tape is unauthorized.

(4) Aviator helmet assemblies shall be taped per the provisions of OPNAVINST 3710.7 series (General NATOPS) and any Type Commander Directives. (QA)



Application of any type of coating on top of reflective tape is not authorized.

NOTE

Use of heat gun increases adhesion of the reflective tape.

(5) Remove protective backing from reflective tape and put in desired position on helmet shell assembly surface. Avoid excessive stretching, air bubbles and wrinkles. To get maximum adhesion, apply firm pressure to tape or use heat gun. Strip overlap should be minimized.

(6) Document per OPNAVINST 4790.2 series. (QA)

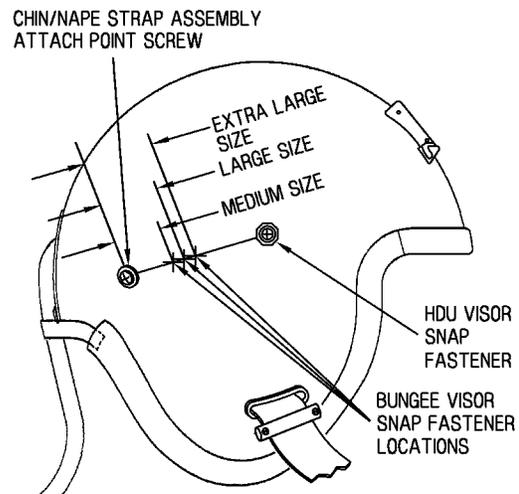
17. INSTALLATION OF VISOR SNAP FASTENERS.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Drill Bit, Number 32	DBE32A	55719

Materials Required

Nomenclature	Specification or Part Number
Adhesive	RTV-102/732, NIIN 00-877-9872
Pencil, Lead Snap Kit (2)	A-A-2771 G026-1159-01



006002

Figure 2. Bungee Visor Snap Fastener Location

18. LOCATION AND INSTALLATION OF BUNGEE VISOR SNAP FASTENER STUDS.

a. Make sure HDU is removed from helmet.

b. Locate and install bungee visor snap fastener studs on helmet assembly per substeps below:

(1) Position helmet on work bench with the left-hand side facing the technician.

(2) On the helmet shell exterior surface, use a measuring device as a guide and a lead pencil and mark a line across the helmet shell from the center of the HDU visor snap fastener rearward to the center of the chin/nape strap assembly attach point screw. Refer to figure 2.

(3) Repeat step 18.b.(2) on other side of helmet assembly.

(4) From the center of the right-hand chin/nape strap assembly attach point screw using a measuring device, measure forward along the line drawn in step 18.b.(2) toward the HDU visor snap fastener 2 5/8 inches on a medium size helmet, 2 7/8 inches on a large size helmet, and 3 inches on an extra large size helmet.

(5) Using a lead pencil, make a mark at the applicable position on the helmet shell. Repeat above procedure for the other side of the helmet.

NOTE

When drilling holes in helmet assembly shell, make sure drill is held perpendicular to helmet assembly shell surface.

(6) At the marked hole locations, drill each screw hole using a number 32 drill bit. Deburr holes.



ADHESIVE, RTV-102/732

1092

NOTE

Snap kit P/N G026-1159-01 is made up of a snap fastener, flat washer, screw, lock washer, and nut.

(7) Apply RTV to the first few threads of each screw.

(8) With flat washer, lock washer and nut positioned on the interior surface of the helmet shell at the drilled location, attach snap fastener to outer surface of helmet using screws. Tighten securely in position.

(9) Install earcups into earcup cavities of helmet and contact aircrewmember to arrange a post maintenance fit check.

(10) Document per OPNAVINST 4790.2 series. (QA)

19. HDU VISOR SNAP FASTENERS.

a. Helmet assembly comes from supply with HDU visor snap fasteners installed. To remove and replace HDU visor snap fasteners, refer to [WP008 00](#).

20. INSTALLATION OF HELMET BLADDER KIT.

Support Equipment Required

None

Materials Required

Nomenclature	Specification or Part Number
Adhesive	MIL-A-46106, NIIN 00-225-4548
Chalk, White	SS-C-266
Kit, Bladder Assembly	GW9163-01

a. Install pile fasteners and hook fastener on bladder assembly per [figure 3](#) and [substeps](#) below:

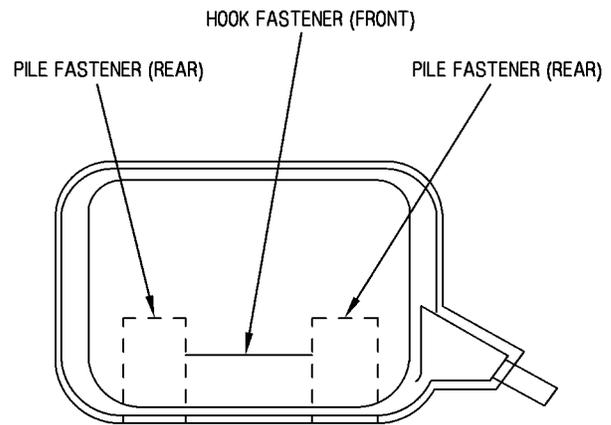
(1) With helmet upright on work bench, position bladder assembly in helmet assembly interior centered against rear inner surface of the energy absorbent liner with the identification label visible.

(2) Make sure bladder lays flat against the energy absorbent liner and lower edge of bladder is even with and parallel to the nape area edgeroll of the helmet assembly with helmet bladder inlet tube oriented toward the left helmet earcup cavity.

(3) Maintaining centered position, lift lower edge of bladder up to expose hook fastener tabs installed on the energy absorbent liner.

(4) Using white chalk, lightly mark location for installation of mating pile fastener tabs on the underside of the bladder.

(5) Remove bladder from helmet assembly and put label side down on work bench.



BLADDER SUBASSEMBLY

Figure 3. Bladder Fastener Location

006003

(6) Remove backing from pile fastener tabs and press firmly in position at marked locations on the bladder.

(7) Turn bladder over; determine center of bladder and mark using white chalk on bottom edge of bladder.

(8) Remove backing from hook fastener tab, align center of tab with mark on bladder centerline, and install tab horizontally along bottom edge of bladder.

(9) Put bladder in helmet assembly interior to verify correct fastener tab alignment and positioning.

(10) Document per OPNAVINST 4790.2 series. (QA)

b. Insert bladder in helmet assembly and attach it to the fastener tabs on the energy absorbent liner.

c. Make sure bladder lies smoothly across the surface of the energy absorbent liner and is correctly aligned with the nape edgeroll.

d. Make sure the helmet bladder inlet tube is oriented toward the left helmet earcup cavity.

e. Pull helmet bladder inlet tube through the helmet assembly from the inside outward.

f. Put inlet supply tube over the inlet connector QD. Refer to figure 4

g. Push inlet connector QD flush against the helmet assembly exterior. Make sure there is no twisting of bladder or inlet helmet bladder inlet tube.

h. Secure bladder inlet tube to inlet connector QD with tiedown strap making sure the head of the tiedown strap is positioned on the underside of the inlet connector QD.



ADHESIVE, MIL-A-46106

302

i. Apply adhesive to screws.

j. Install inlet connector QD cover over inlet connector QD and secure to helmet assembly using screws and washers.

k. Document per OPNAVINST 4790.2 series. (QA)

l. Do HELMET BLADDER LEAKAGE TEST per WP00500.

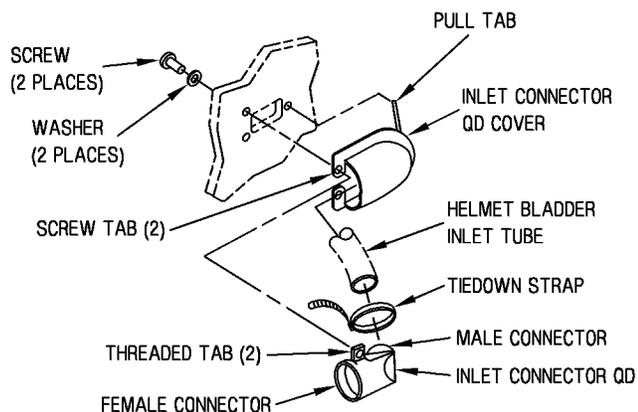


Figure 4. Bladder Installation

006004

21. TPL LINER FITTING.

Support Equipment Required

None

Materials Required

Nomenclature	Specification or Part Number
Tape, Double-faced, Vinyl, 1 x 2 Inch	A-A-1243
Thread, Nylon, Type E	V-T-295

22. INSTALLATION OF TPL ASSEMBLY. Install TPL (6 or 8, figure 1, WP00800) to the helmet assembly per substeps below:

a. If 1 x 2 inch pressure-sensitive hook fastener tabs are not on the inside surface of the energy absorbing liner, installation is required. Do substeps below:

(1) Install two tabs on the inside front of the energy absorbing liner left and right of center over the eyes, 1/8 inch from front edge of the liner.

(2) Install two tabs in the rear approximately 1 1/2 inches left and right of center and 1/2 inch from the bottom edge of the liner.

b. To prevent bunching of TPL cover fabric, secure the TPL cover to the preformed layer assembly using four 1 x 2 inch pieces of double-sided tape per substeps below. Refer to figure 5, this WP.

(1) Position the cloth cover over the preformed layer assembly. The single seam is positioned to the rear.

(2) Position tape strips with the 2-inch length horizontal at the front, rear and both sides of the preformed layer assembly under the cover fabric overlap.

(3) Press cover in position over the tape strips.

c. Put the TPL inside the helmet shell by squeezing the TPL sides together to clear the ear-cups. Make sure large holes on top of the TPL are facing forward. Release TPL and attach liner cover to hook fastener tabs. Refer to figure 6

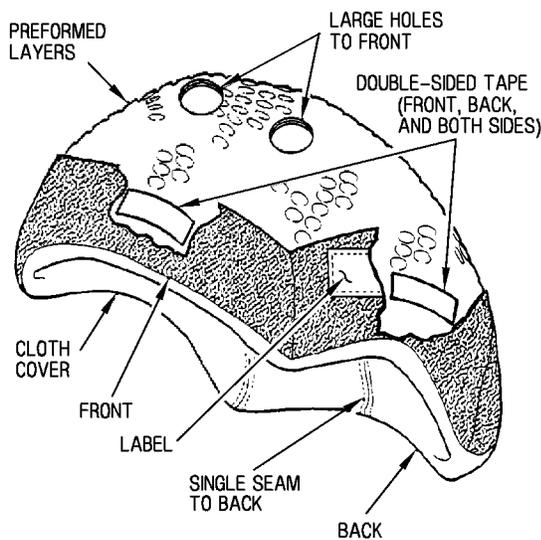


Figure 5. Preventing Bunching of TPL

006005

aircrewmember's head without changing the fit. Remove layers from the inside of the TPL assembly to relieve pressure and to make the best fit.

TPL layers can be modified by cutting out areas in the layer/layers over the hot spots or pressure points. No cutting should be done on the layer that comes in contact with the aircrewmember's head (the inside layer). The size and shape of the removed area of TPL should match the shape and size of the irritated area on the aircrewmember's head. Circular shapes, (i.e. penny, nickel, quarter and so on) work best for correction of hot spots, while half round shapes (i.e. half-moon, quarter-moon and crescent-moon) usually get rid of areas of pressure.

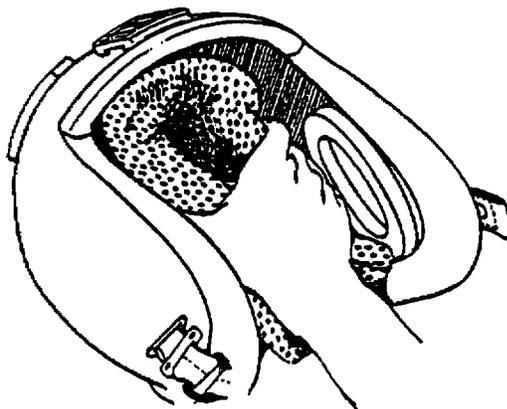


Figure 6. Putting TPL in Helmet Shell

006006

a. After preliminary adjustments to the TPL have been completed, have the aircrewmember put on the helmet to inspect fit and comfort. If further adjustment/modification is required, do next step.

WARNING

The TPL assembly requires a minimum of two layers and a maximum of five layers to provide correct fit.

d. Make sure front edge of the TPL is aligned with the front edge of the energy absorbing liner inside the helmet and that the TPL is centered in the helmet.

23. FITTING THE TPL ASSEMBLY. Fit the TPL assembly to the aircrewmember's by doing substeps below.

NOTE

Remove layers from the outside of the TPL assembly to lower the helmet on the

b. Remove TPL layers one at a time from the liner. Pressure relief around the ears can be achieved by removing layers from the outside of the liner. Number each layer as it is removed (first layer No. 1, second layer No. 2 and so forth) to aid in reassembly, if required. Remove up to, but no more than, three layers from the assembly. Inspect for correct fit after each layer is removed.

c. If a satisfactory fit has been achieved, have the aircrewmember remove the helmet.

d. If after the above steps have been done and a safe, stable fit cannot be obtained, the TPL may

be heated so that it conforms to the aircrewmember's head shape. Do CUSTOM FITTING OF TPL ASSEMBLY per next step.



To prevent heat damage to the TPL plastic layers, do not store the helmet in a closed cockpit or automobile. Temperatures in these closed areas can exceed 200° F (93.3° C) on an 85° F (30° C) day.

24. CUSTOM FITTING OF TPL ASSEMBLY. Custom fit TPL assembly per substeps below.

NOTE

Refer to AMSO for nearest location of a suitable oven for heating the TPL.

a. Reassemble the TPL by replacing the removed layers in the order in which they were removed. After the TPL is assembled, secure the layers by passing a heated soldering pencil through all five layers at the initial attachment point.

b. Reinstall TPL cover on the layers before heating.

c. Set the oven rack to the lowest position and heat the oven to 200° ± 5° F. Put a thermometer on the rack in a position where it may be observed during the whole heating process.

d. Thoroughly brief the aircrewmember on the fitting procedures, emphasizing those to be done by the aircrewmember.



Do not try to heat the TPL in a microwave oven (which will not heat the layers) or toaster oven (which will damage the liner).

Do not remove the cloth; the TPL is heated as a unit.

Monitor the oven temperature constantly to avoid overheating. Do not leave the TPL unattended while heating.

e. After 15 minutes, make sure the oven is stabilized at the pre-set temperature and put the TPL with the fabric side down in the center of the oven rack. Set timer. Refer to [table 3](#).

Table 3. Maximum Heating Time per Number of Layers

Numbers of Layers	Time (Minutes)
5	8
4	7
3	6
2	5

NOTE

Heating characteristics of ovens vary. The time stated above is a guideline and may have to be adjusted to suit your oven.

f. To allow easy positioning of the heated liner into the helmet, put masking tape over the rear hook fastener tapes on the energy absorbing liner.



The TPL plastic layers will be hot. When removing the TPL from the oven, touch the fabric cover only.

NOTE

The below steps are to be done by the aircrewmember assisted by the Aircrew Survival Equipmentman (PR), and should be completed within 30 seconds of removal of the heated liner from the oven.

g. Remove the TPL from the oven, touching only the fabric-covered part. Squeeze the sides of the TPL to clear the earcups and insert the heated TPL into the helmet with the wide end toward the front. The Aircrew Survival Equipmentman (PR) should hold the rear part of the TPL tightly against the energy-absorbing liner during donning to make sure the TPL does not bunch up in the rear.

h. With the TPL symmetrically aligned in the helmet, have the aircrewmember hook thumbs over the edgeroll, spread the helmet slightly and rotate the helmet rearward and down to don. Make sure edgeroll on the helmet brow is positioned just out of the line of sight as the aircrewmember looks up.

i. Have the aircrewmember apply down pressure on helmet with palms of hands until the ears are centered in the earcups. Maintain this pressure for five minutes.

j. Have the aircrewmember release down pressure at the end of five minutes. Inspect helmet fit. If required, remove one layer from the inside of the TPL and repeat steps b through j. If the fit is satisfactory.

k. When a satisfactory fit is achieved, have the aircrewmember doff the helmet. Lift the rear part of the TPL away from the energy-absorbing liner and remove masking tape from the hook fastener tapes. Secure TPL to the hook fastener tapes.

l. Document per OPNAVINST 4790.2 series. (QA)

25. ZETALINER FITTING.

Support Equipment Required

None

Materials Required

Nomenclature	Specification/ Part Number
Correction Fluid	A-A-212 TYPE 1
Emery Cloth (fine grit)	P-C-451
Isopropyl Alcohol	TT-I-735 or MIL-I-10428, NIIN 00-855-1158, NIIN 00-855-6160, NIIN 01-190-2538, NIIN 01-220-9907

26. SELECTING THE CORRECT LENGTH SIZE OF ZETALINER.

a. Measure the TPL from front to back (figure 9).

b. Count the number of TPL layers and then refer to table 5 to select the correct thickness of the zetaliner.

c. Using the TPL length and thickness refer to table 4 and select the corresponding zetaliner part number.

27. ZETALINER INSTALLATION.

a. Remove TPL from helmet.

(1) Inspect the Energy Absorbing Liner (EAL) for looseness, wrong fit, holes, cracks, or torn fabric.



ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428

1001

NOTE

It may be required to clean the EAL area with isopropyl alcohol before attaching the hook tapes.

- (a) Install the hook tapes on EAL if not installed.
- (b) Remove the self-adhesive from the package and cut the self-adhesive hook fastening strip into 4 pieces.
- (c) Rough up surface of EAL with emery cloth or other suitable alternate to allow adhesive of hook to stick correctly.
- (d) Trim the corners of the hook adhesive. Attach the adhesive side to the EAL (figure 7).
- (e) Put two pieces of tape front and rear of helmet shell.
- (f) Front tapes should not be in center, position tapes left and right of center (figure 7).

(2) For combat edge, complete the attachment of hook and pie fasteners in accordance with paragraph 20, INSTALLATION OF HELMET BLADDER KIT, this WP.

(3) Remove the zetaliner from the package.

NOTE

When the hook and loop is attached to the helmet liner it may be required to realign the zetaliner on the helmet.

(4) Identify front and top of zetaliner (figure 8). Insert liner top-side first and with the front of the liner towards the front of the helmet.

(5) Make sure the zetaliner is centered in the helmet.

- (a) Press the zetaliner against the hook fastening strips at the front.
- (b) Make sure the front and rear edges of the zetaliner is flushed with the EAL and does not protrude past the edge-roll.
- (c) Press the zetaliner against the center and then the strips at the back of the helmet next.
- (d) Restore the communication cord to its correct location.

(6) Zetaliner Fitting Procedures.

- (a) Don skull cap if normally worn.
- (b) Have the aircrewmember don helmet.
- (c) Inspect helmet browline offset to center eye position (Figures 11 and 12). Helmet offset is 1.75 - 2.25 inches. Zetaliner can be moved slightly forward or aft to increase or decrease offset.
- (d) Adjust earcups, add, cut or adjust spacers as required.
- (e) Connect chin strap.
- (f) Adjust nape strap.
- (g) Deleted.
- (h) Have aircrewmember to subjectively evaluate fit and make any required adjustments.

Table 4. Sizing Chart for Zetaliner

Part Number	Helmet Size	Thickness
95122A	Medium	1/4"
95123A	Medium	3/8"
95124A	Medium	1/2"
95125A	Medium	5/8"
95132A	Medium	1/4"
95133A	Medium	3/8"
95134A	Medium	1/2"
95135A	Medium	5/8"
95142A	Large/X-Large	1/4"
95143A	Large/X-Large	3/8"
95144A	Large/X-Large	1/2"
95145A	Large/X-large	5/8"
95152A	X-Large	1/4"

Table 4. Sizing Chart for Zetaliner (Continued)

Part Number	Helmet Size	Thickness
95153A	X-Large	3/8"
95154A	X-Large	1/2"
95155A	X-Large	5/8"
95162A	X-Large	1/4"
95163A	X-Large	3/8"
95164A	X-Large	1/2"
95165A	X-Large	5/8"

Table 5. TPL and Zetaliner Comparison

Number of TPL Layers	Zetaliner Thickness
NOTE	
To select the correct zetaliner thickness, review the information below and then select the part number that meets the thickness size in table 1 . Also the length of the zetaliner is a factor. It may be required to try a thinner or thicker zetaliner for a correct fit.	
2 TPL Layers	1/4" Zetaliner
3 TPL Layers	3/8" Zetaliner
4 - 5 TPL Layers	1/2" Zetaliner
5 + TPL Layers	5/8" Zetaliner



Excessive correction fluid applied to EAL will damage the liner.

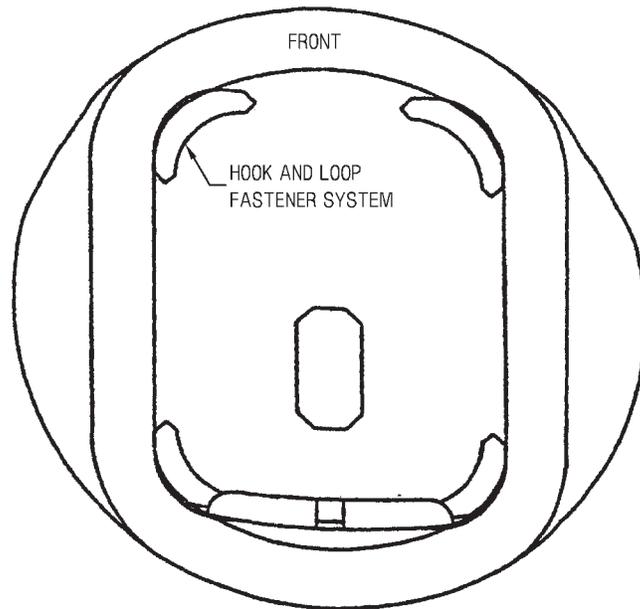
(7) Marking of EAL. Zetaliner placement in helmet after fitting has a direct affect on mask adjustment, offset, and comfort. Report to crewmember if zetaliner is removed and installed.

- (a) Apply correction fluid sparingly and press against the EAL to make sure of correct reinstallation of the zetaliner when removed.

NOTE

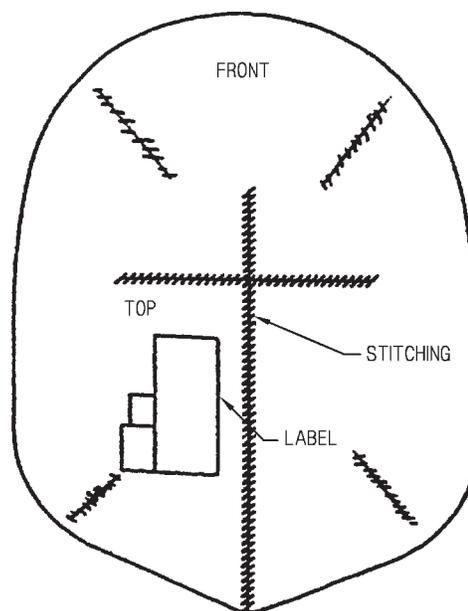
Before marking the zetaliner and EAL, make sure the helmet has been correctly fitted to the crewmember. Zetaliner will be marked to coincide to the EAL markings. It may be required for the crewmember to fly with the helmet to make sure of the correct comfort position for the zetaliner before doing the marking procedures.

- (b) Use two dots of correction fluid in front and one in the rear ([figure 10](#)).



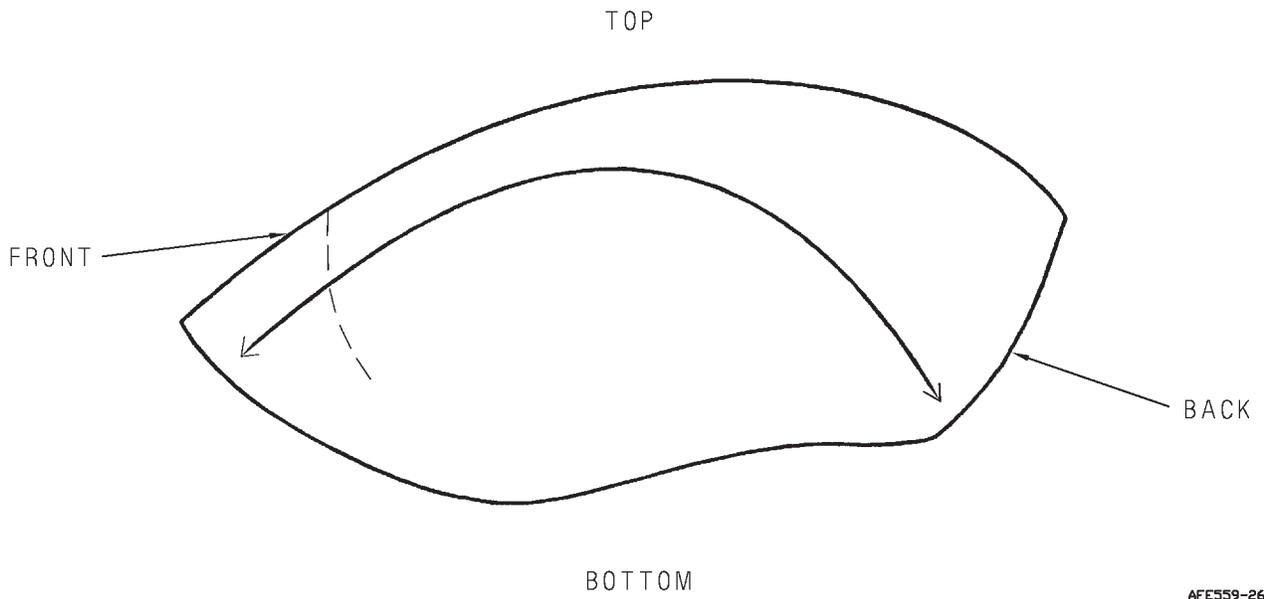
AFE559-24-1-001

Figure 7. Bottom (inside) Attachment of the Hook and Loop Fastener



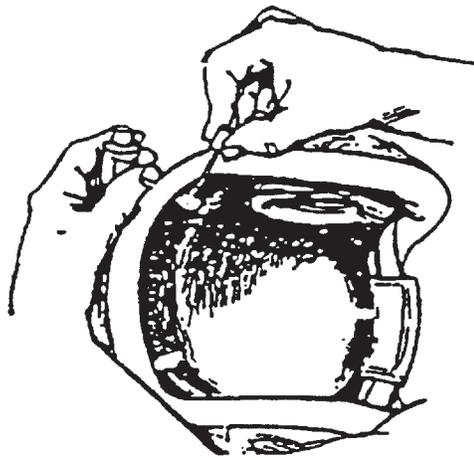
AFE559-25-1-001

Figure 8. Top (outside) Attachment of the Hook and Loop Fastener



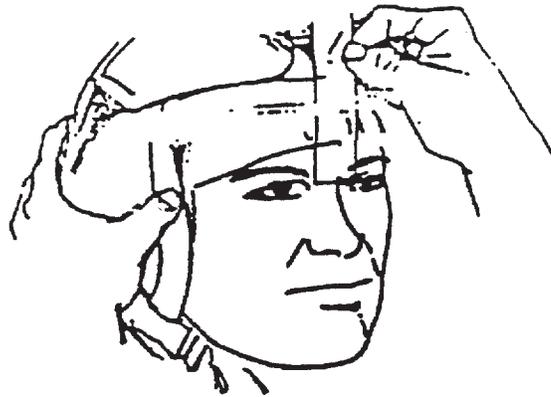
AFE559-26-1-001

Figure 9. Zetaliner Length Measurement



AFE559-27-1-001

Figure 10. Mark Zetaliner and EAL



AFE559-28-1-001

Figure 11. Inspect Eye Offset to Helmet Browline

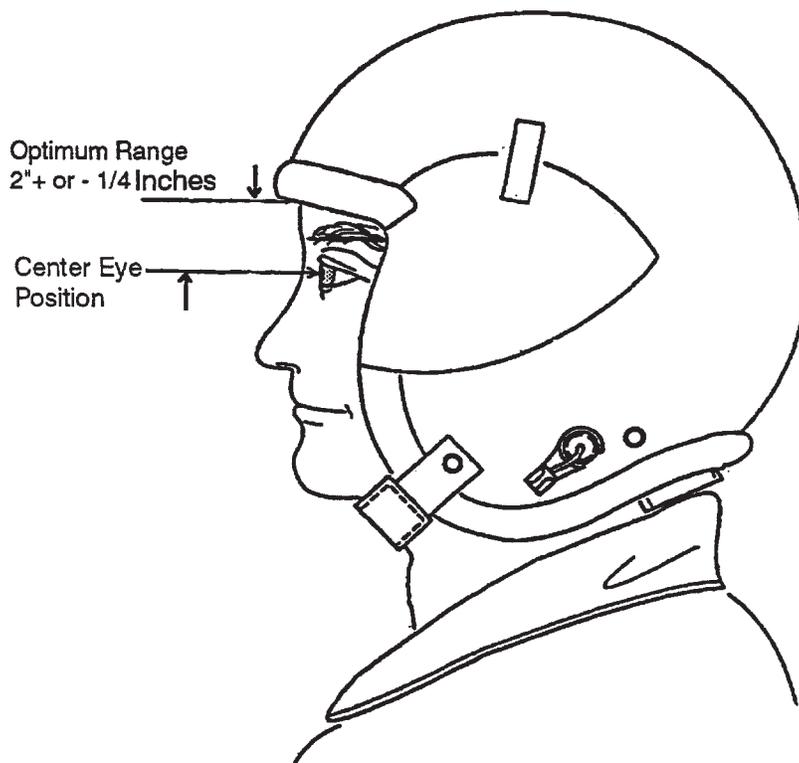


Figure 12. Eye Offset to Helmet Browline

AFE559-29-1-001

28. HELMET COMPONENT ADJUSTMENTS.

Support Equipment Required

None

Materials Required

None

a. Have the aircrewmember don the helmet per substeps below. Refer to figure 13.



Spread helmet only enough to allow ease of donning and doffing. Excessive spreading may damage helmet.

- (1) Hook thumbs in earcups and spread helmet slightly.
- (2) Put edgeroll on helmet brow against forehead.
- (3) Rotate helmet toward the rear and down on head.

NOTE

The edgeroll on the helmet brow should be positioned just out of the aircrewmember's line of sight as the aircrewmember looks up.



Figure 13. Donning Helmet

006013

b. Rotate the helmet toward the rear until the edgeroll on the brow is out of the field-of-view.

c. Inspect earcup position, making sure the earseals completely surround the ears.

NOTE

For best sound attenuation and comfort, the earseals should be compressed to about half of their initial thickness.

Earcup spacer pads can be used whole, cut into quarters or cut in half along or across.

d. Inspect earseal compression. If required, adjust compression by adding earcup spacer pads. Refer to figure 14.

NOTE

Because of anatomical variations (e.g. unusual head breadth, thick/muscular neck) some aircrewmember's will be unable to don the helmet with the barrel clamps installed. In these instances, removal of the clamps from the integrated chin/nape strap is authorized.

e. Loosen clamp screws and slide clamps down as far as possible on the nape strap. Adjust the nape straps for a snug fit. Slide the clamps up until they contact the shell and tighten screws. Clamps will now hold adjusted nape straps in position.

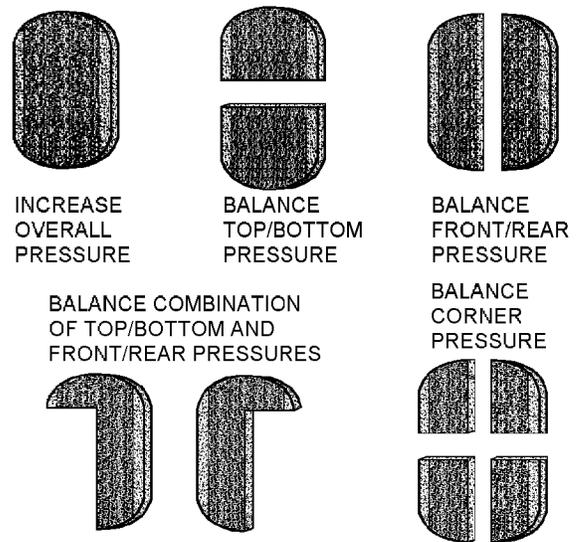


Figure 14. Earseal Compression

006014

f. Tighten chin strap to the desired tension. When the desired tension is attained, the chin strap can be fastened and unfastened by way of the snap fastener and stud on opposite end of the chin strap.

g. After a trial wearing period of approximately 30 minutes, have the aircrewmember evaluate the helmet fit. If the aircrewmember is satisfied with the fit, continue with the helmet buildup. If the helmet does not fit correctly, (for example, pressure points exist, the helmet is too tight or sits high on aircrewmember's head or aircrewmember complains of hot spots) have aircrewmember describe and point out areas where the problem is located. Take note of the location, size and shape of any exposed skin areas that appear irritated (red color or grooves in soft tissue of scalp). To correct these fit problems, do TPL LINER FITTING or ZETALINER FITTING, this WP.

29. INSTALLATION OF OXYGEN MASK BAYONET RECEIVERS.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Drill Bit, Number 25	DBE25A	55719
Scissors	3452	70574

Materials Required

Nomenclature	Specification or Part Number
Adhesive	EC1357, NIIN 00-165-8614, NIIN 00-273-8717
Kit, Bayonet Receiver	GW9117
Pencil, Lead	A-A-2771
Thread, Nylon, Size E	V-T-295



Make sure TPL assembly/zetaliner and chin/nape strap assembly are correctly fitted and adjusted to aircrewmember's head before drilling holes in helmet shell assembly. Location/alignment of the bayonet receivers are not adjustable.

a. Have aircrewmember don correctly fitted helmet assembly.

NOTE

Aircrewmember's who will be wearing personal prescription glasses, aviator sunglasses or laser spectacles during flight should be wearing those items while fitting the mask.

b. With helmet correctly fitted and oriented on head, have aircrewmember hold oxygen mask in correct position on face.

c. Insert each bayonet of oxygen mask harness assembly into a bayonet receiver to the second locking position. The projections on bayonet receiver should be positioned toward the tip end of the oxygen mask bayonet.

d. While aircrewmember holds correctly adjusted oxygen mask to face, make sure straps of oxygen mask have equal tension.

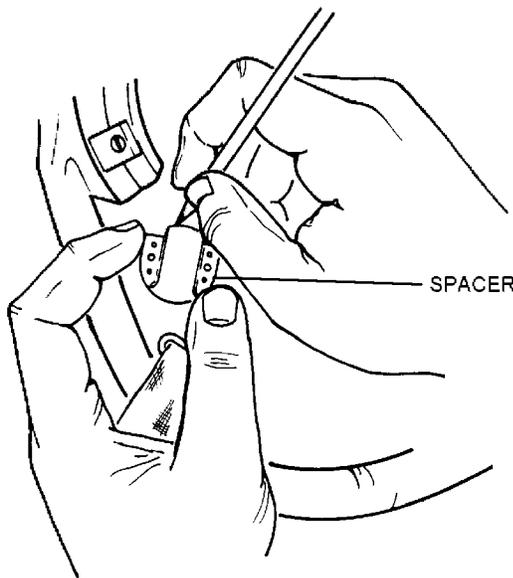
NOTE

Make sure placement of bayonet receivers are no closer than 1/2 inch from edge roll of helmet shell assembly.

e. While holding bayonet receiver assemblies firmly against the helmet shell assembly, make sure offset bayonet is flush with and parallel to helmet shell assembly edgeroll.

f. Trace each bayonet receiver with a lead pencil on the helmet shell assembly. Do not use marker or grease pencil.

g. While holding only the bayonet receiver spacers against the helmet shell assembly at marked positions, use a lead pencil to mark the location of the upper receiver screw hole on the right and left hand sides of the helmet shell assembly. Refer to [figure 15](#).



006015

Figure 15. Marking Bayonet Receiver Placement

NOTE

When drilling holes in helmet shell assembly, make sure drill is held perpendicular to helmet shell assembly.

h. Remove mask and helmet from wearer and remove earcup assemblies. Hold pile fastener fabric inside helmet shell assembly away from area to be drilled. At the marked hole locations, drill each screw hole using a number 25 drill bit.

i. Attach spacers and receivers to helmet shell assembly using the upper screw, lock washer and backplate. Do not tighten screw more than four turns, allowing the assembly to rotate to its best location for the user, during mask fitting.

j. Reinstall earcup assemblies and have aircrew-member don helmet assembly and oxygen mask assembly, again inserting each bayonet into the second locking position of receiver.

NOTE

If experiencing difficulty inserting bayonet into receiver as a result of the helmet shell edgeroll, fabricate and install bayonet receiver shims per paragraphs 30 and 31.

k. Readjust the straps on the mask tightening upper left and lower right straps together, then upper right and lower left straps together, keeping mask centered on face and equalizing tension on straps. While tightening straps, allow bayonet receivers to rotate freely to their best location for the individual. Refer to figure 16.

l. Make sure comfortable, air tight fit of the mask is achieved by having crewman breathe while manually twisting the oxygen hose to cut off air supply through hose. If leaks occur between mask and face, inspect by doing substeps below:

(1) Make sure correct mask size has been issued.

(2) Inspect fit of nape strap.

m. Using the receiver as a template, mark position of the remaining hole in the right and left hand receivers on the helmet shell surface with a lead pencil. Remove earcups from helmet shell interior and remove installed receivers.

n. Drill remaining holes by doing procedures detailed in paragraph 29h. Install spacers and receivers on helmet shell at drilled locations using screws, lock washers and backplates. Tighten mounting screws securely making sure receiver and spacer conform to the contour of the helmet surface.

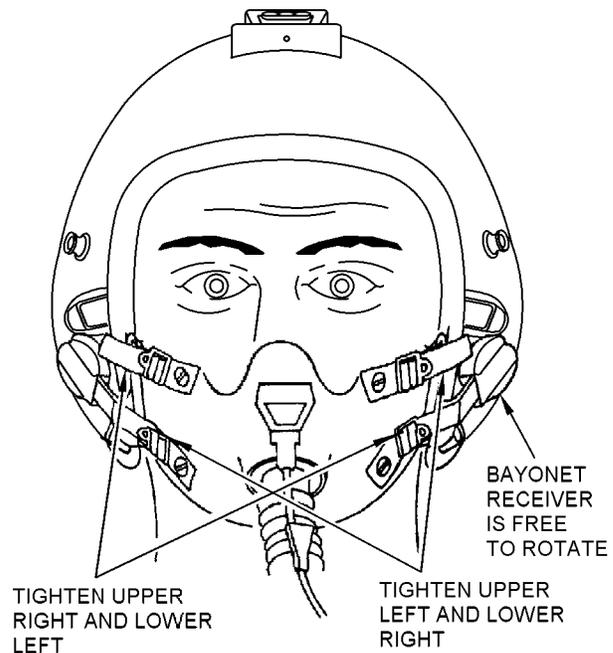


Figure 16. Bayonet Positioning

006016



ADHESIVE, EC1357

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o. Using adhesive, glue down pile fastener tape over backplate.

p. Replace earcup assemblies.

q. Do functional test on Oxygen Mask Assembly per NAVAIR 17-15BC-22.



When mask is issued temporarily for transporting passengers or crewmembers or if worn for a trial fitting, the straps require not to be cut but, folded under and tacked to prevent possible injury to face and eyes during bailout or ejection.

r. Cut excess adjustment strap to aircrew preference but, not less than 1.5 inches.

s. Sear cut end of each strap.

t. If desired by aircrewmember, oval shaped opening in buckle may be tacked to the strap using two turns of size E nylon thread, doubled. Tie with surgeon's knot and secure with square knot.

u. Document per OPNAVINST 4790.2 series. (QA)

30. FABRICATION AND INSTALLATION OF BAYONET RECEIVER SHIMS.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Hand File (Rough Cut)	9-31310	53800
Small Hand Held Grinder (Rotary)	84922	18531

Materials Required

Nomenclature	Specification or Part Number
Adhesive	EC1357, NIIN 00-165-8614, NIIN 00-273-8717
Adhesive	MIL-A-46106, NIIN 00-225-4548
Screw, Pan Head, 6-32 x 0.500-Inch, Black	MS51957-30B, NIIN 00-469-5382
Spacer Kit, Bayonet	80B4858, NIIN 01-141-5916

NOTE

Shims are fabricated from spacers provided in spacer kit 80B4858. Shims are intended for use by aircrew wearing helmets that aircrew physiognomy causes difficulty attaching the offset bayonets to the receivers.

a. Remove spacers from the package.

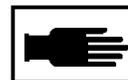
b. Position a spacer between the jaws of a bench vise with one raised projection facing the technician and clamp in position.

c. Using a small hand held rotary grinder with a grinding drum or a rough cut hand file, grind or file raised projection flush next to surface of spacer.

d. Loosen vise and position remaining raised projection into position, clamp in position and repeat grinding/filing procedure.

e. Remove right and left earcups from helmet shell earcup cavity pile fastener material and position earcups clear of work area. Pull installed pile fastener material away from the interior surface of the earcup cavity and fold clear of work area.

f. Remove four screws, four lock washers and two backplates securing installed spacers and receivers to helmet shell exterior, dispose of screws but keep remaining items for use during installation.



NOTE

A small amount of adhesive may be applied to each screw before adding lock washer and backplate.

g. Using P/N MS51957-30B screws, lock washers and backplate, reinstall shim, spacer and receiver on helmet shell exterior. Make sure concave surface of shim is flush with helmet shell exterior before securing in position.



ADHESIVE, EC1357

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h. Using adhesive, bond pile fastener material in position on interior surface of earcup cavity.

31. FABRICATION AND INSTALLATION OF BAYONET RECEIVER TAPERED SHIMS.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Hand File (Rough Cut)	9-31310	53800
Small Hand Held Grinder (Rotary)	84922	18531

Materials Required

Nomenclature	Specification or Part Number
Adhesive	EC1357, NIIN 00-165-8614, NIIN 00-273-8717
Adhesive	MIL-A-46106, NIIN 00-225-4548
Screw, Pan Head, 6-32 x 0.500-Inch, Black	MS51957-30B, NIIN 00-469-5382
Spacer Kit, Bayonet	80B4858, NIIN 01-141-5916

NOTE

Shims are fabricated from spacers provided 80B4858. They are intended for use by aircrew experiencing difficulty inserting the bayonet into the jaw receiver because of either individual physiognomy or helmet shell/edge roll interference.

a. Remove spacers and fabricate required shims by doing the below procedure on each spacer.

(1) Position the spacer to be modified between the jaws of a bench vise with one of the raised projections facing the technician and clamp in position.

(2) Starting at the forward rivet head positioning dimple, use a small hand held rotary grinder with a grinding drum or a rough cut hand file and grind or file evenly rearward on the raised projection reducing the profile of the projection from 4/32 of an inch to 1/32 of an inch on the aft tang.

(3) Repeat the grinding or filing on the opposite protrusion, making sure the aft tang finished dimension is 1/32 of an inch.

(4) Do steps a.(1) thru a.(3) above on the remaining spacer.

(5) Sand the ground or filed surfaces of both newly fabricated shims smooth. Verify the desired dimensions have been achieved and the shims are uniform in appearance.

b. Remove right and left earcups from helmet shell earcup cavity pile fastener material and position earcups clear of work area. Pull installed pile fastener material away from the interior surface of the earcup cavity and fold clear of work area.

c. Remove four screws, four lock washers and two backplates securing installed spacers and receivers to helmet shell exterior, dispose of screws but keep remaining items for use during installation.



ADHESIVE, MIL-A-46106

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NOTE

A small amount of adhesive may be applied to each screw before adding lock washer and backplate.

d. Using new MS51957-30B screws, lock washers and backplate, reinstall shim, spacer and receiver on helmet shell exterior. Make sure concave surface of shim is flush with helmet shell exterior before securing in position.



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e. Using adhesive, bond pile fastener material in position on interior surface of earcup cavity.

32. INSTALLATION OF PILE TAPE ON HELMET ASSEMBLY.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Scissors	3452	70574

Materials Required

Nomenclature	Specification or Part Number
Acid Brush	1127-0004-P10
Adhesive	EC1357, NIIN 00-165-8614, NIIN 00-273-8717
Fastener Tape, Pile, Type I, 2-Inch Width	MIL-F-21840, NIIN 00-926-4930
Pencil, Lead	A-A-2771

NOTE

Use of any size of type pile fastener tape available through local supply is authorized. Black or olive green are preferred colors.

Refer to NAVAIR 13-1-6.5, Rescue and Survival Equipment, for addition of hook tape to emergency signal light.

a. Raise visor to full up position and lock in position with visor lock knob.

b. At a point 0.25 inch aft of raised visor, center a 2 x 2 piece of pile fastener tape on crown of helmet shell assembly. Hold in position and trace lightly around pile fastener tape with a lead pencil to make an outline on the surface of the reflective tape installed on the helmet shell assembly. Refer to [figure 17](#).

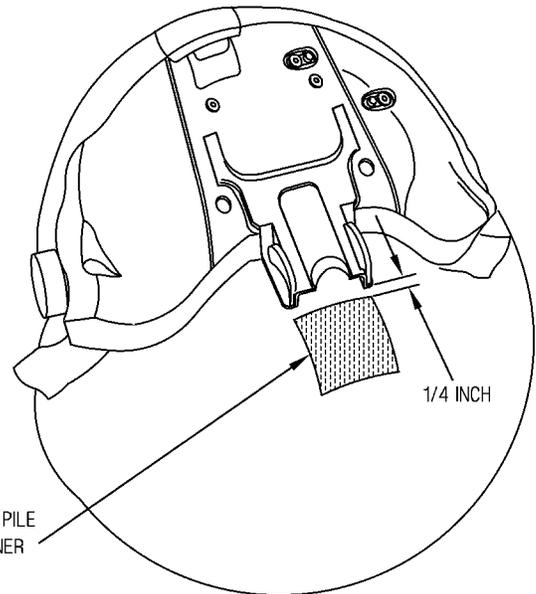


Figure 17. Pile Tape Location

006017



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c. Apply adhesive with acid brush to outlined area and allow adhesive to dry for 30 minutes.

d. Apply adhesive to underside of pile fastener tape and a second coat of adhesive to helmet area with acid brush. Allow adhesive to become tacky (approximately 15 minutes).

e. Press pile fastener tape firmly on prepared area on helmet shell assembly.

f. Document per OPNAVINST 4790.2 series. (QA)

33. INSTALLATION OF UPPER HVLI.

Support Equipment Required

None

Materials Required

None

a. Upper HVI is received from supply completely installed in helmet shell assembly. If upper HVI is not completely installed, refer to WP00900 for installation procedures.

b. Refer to WP00900 for maintenance of upper HVI.

34. IPD ADJUSTMENT.

Support Equipment Required

None

Materials Required

None

a. Do IPD ADJUSTMENT per WP00700.

35. VISOR TRIMMING.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Cloth Tape Measure	MIL-C-29127	81349
Knife	GGG-K-450	81348
Razor Blade	GG-R-60	81348
Safety Goggles	G-G-531	81348
Small Hand Held Grinder (Rotary)	84922	18531
Visor Template	81D5189-3 or -4	53655

Materials Required

Nomenclature	Specification/ Part Number
Grease Pencil	SS-P-186
Masking Tape	A-A-883 TYPE 1
Pencil, Lead	A-A-2771

a. Do the standard oxygen mask fitting procedures (see NAVAIR 13-1-6.7-3).

b. Verify IPD Adjustment is complete per WP00700 before continuing.

c. Verify visor down lock latch is in the nominal position (Figure 18, Sheet 1).

d. Install visor on helmet display unit (HDU).

e. Rotate visor to the down position.

NOTE

Do not do next step until the oxygen mask and combat edge equipment, if installed, have been leak tested and passed.

f. Put a small piece of masking tape even with the top edge of visor on HDU. Tape should be approximately centered on HDU (Figure 18, Sheet 2).

g. Remove visor from helmet display unit (HDU).

h. Apply masking tape down center and sides of the visor on both inside and outside (Figure 18, Sheet 3).

i. Using a knife or razor blade, trim excess masking tape from the edge of visor.

j. Install the visor on the HDU per WP01100.

k. Lower and lock visor in the down position and make pencil mark on the masking tape on the HDU (Figure 18, Sheet 2).

NOTE

Make sure oxygen mask is in the normal flight position with both bayonets inserted into the receiver and the chin strap fastened.

Once the aircrewmember has donned the helmet, it should remain on the aircrewmember until directed to be removed to allow for setting of the liner. Premature removal of the helmet will affect the fitting of the visor during the trimming process and may adversely affect the final fit.

l. Rotate visor to the up position and have aircrewmember don helmet and oxygen mask. Make sure the mask is centered on the aircrewmember's face and nose.

m. Lower the visor until it latches or contacts the edgeroll or oxygen mask. If visor contacts edgeroll before contacting oxygen mask, grind visor per substeps below until visor latches or contacts oxygen mask.

(1) Mark where the visor contacts the edgeroll with a grease pencil.

(2) Remove visor from HDU.



Grinding the visor polycarbonate lens produces a dust which is irritating to the eyes and respiratory system. During grinding, wear eye protection and avoid breathing dust.

Heating the polycarbonate above its melting temperature can also produce vapors which are irritating. Avoid heating material above its melting point.

Protective Personal Equipment (PPE), should be worn as determined by local Industrial Hygienist or Ship's Safety Officer in accordance with NAVAIR A1-NAOSH-SAF-000.



Remove no more than 1/8 inch of visor material at a time. Removing more than 1/8 inch of the visor at a time will damage the visor.

(3) Wearing appropriate PPE, and using a small hand held rotary grinder, remove small amounts of visor material at points marked with a grease pencil. Install visor on HDU per WP0100 and have aircrewmember don helmet and oxygen mask.

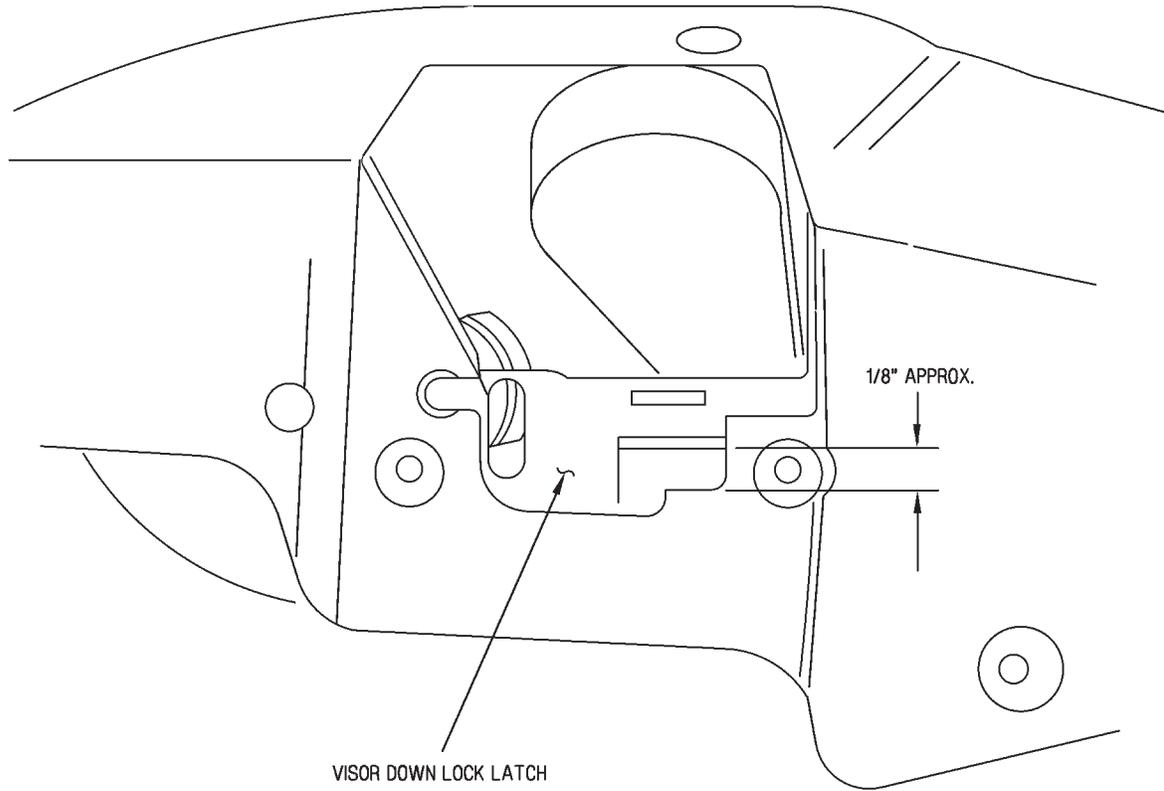
(4) Rotate visor to the latch down position or until it contacts the oxygen mask. If visor still contacts the edgeroll, repeat steps m(1) through m(4), this WP.

n. With visor rotated down, contacting the crown of the oxygen mask, make a mark on the HDU masking tape (figure 18, sheet 4).

n1. Remove the visor from the HDU.

o. Measure and record the distance between the marks recorded in step k, and step n on the HDU masking tape (figure 18, sheet 4).

p. Measure up, from nose cutout position, the distance recorded in step b, on the visor and make a grease pencil mark (figure 18, sheet 5).



VISOR DOWN LOCK LATCH POSITION

Figure 18. Visor Trimming (Sheet 1 of 6)

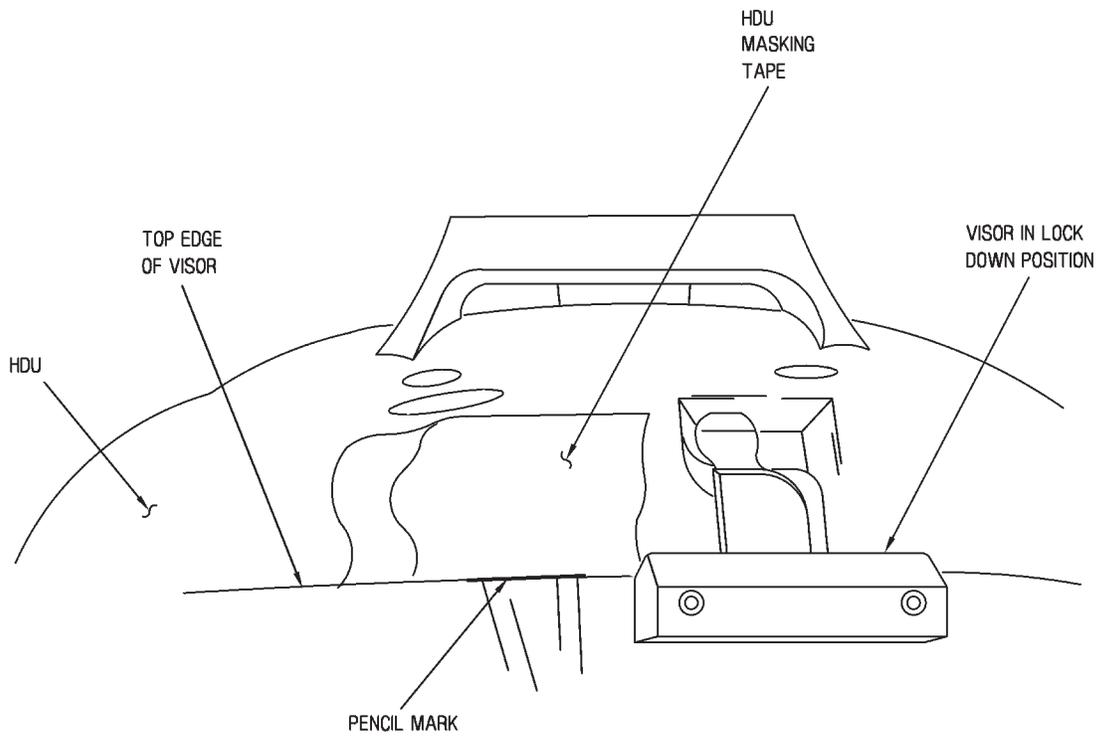


Figure 18. Visor Trimming (Sheet 2)

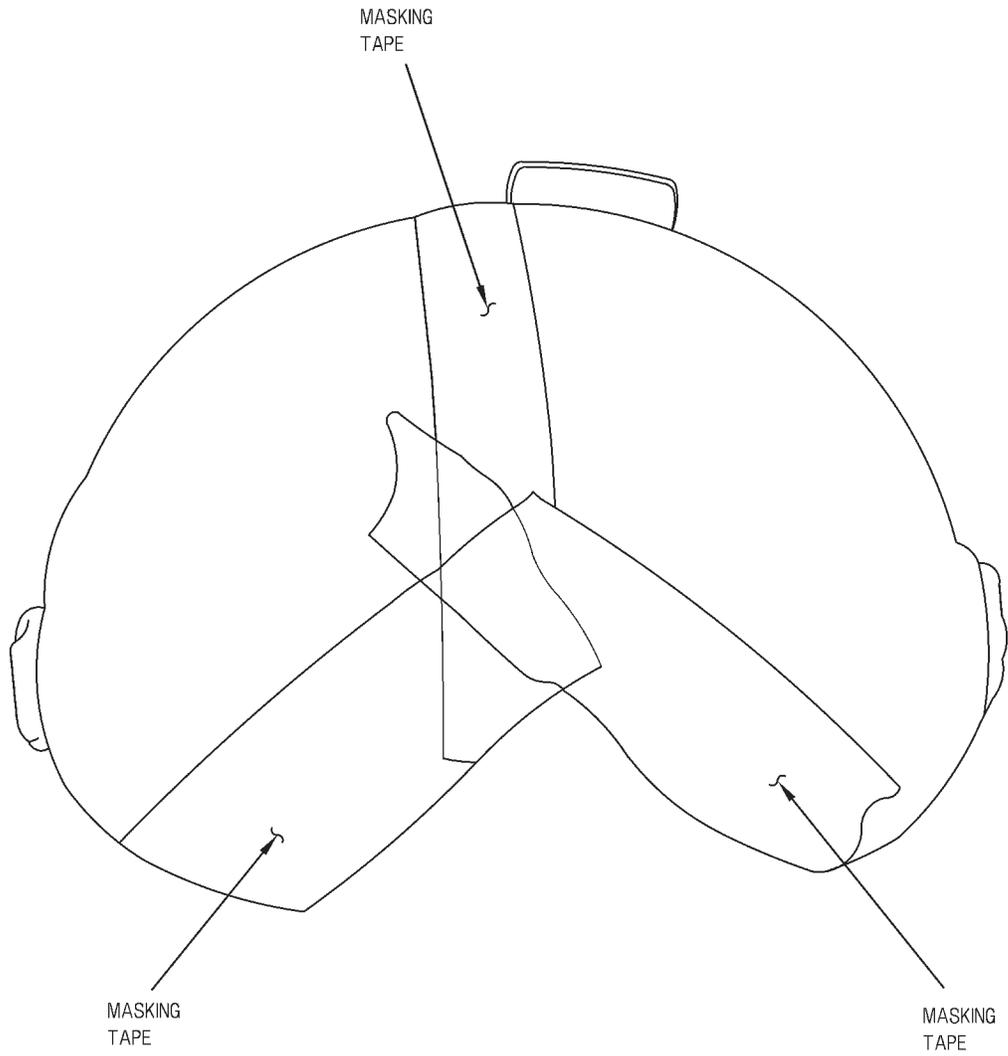


Figure 18. Visor Trimming (Sheet 3)

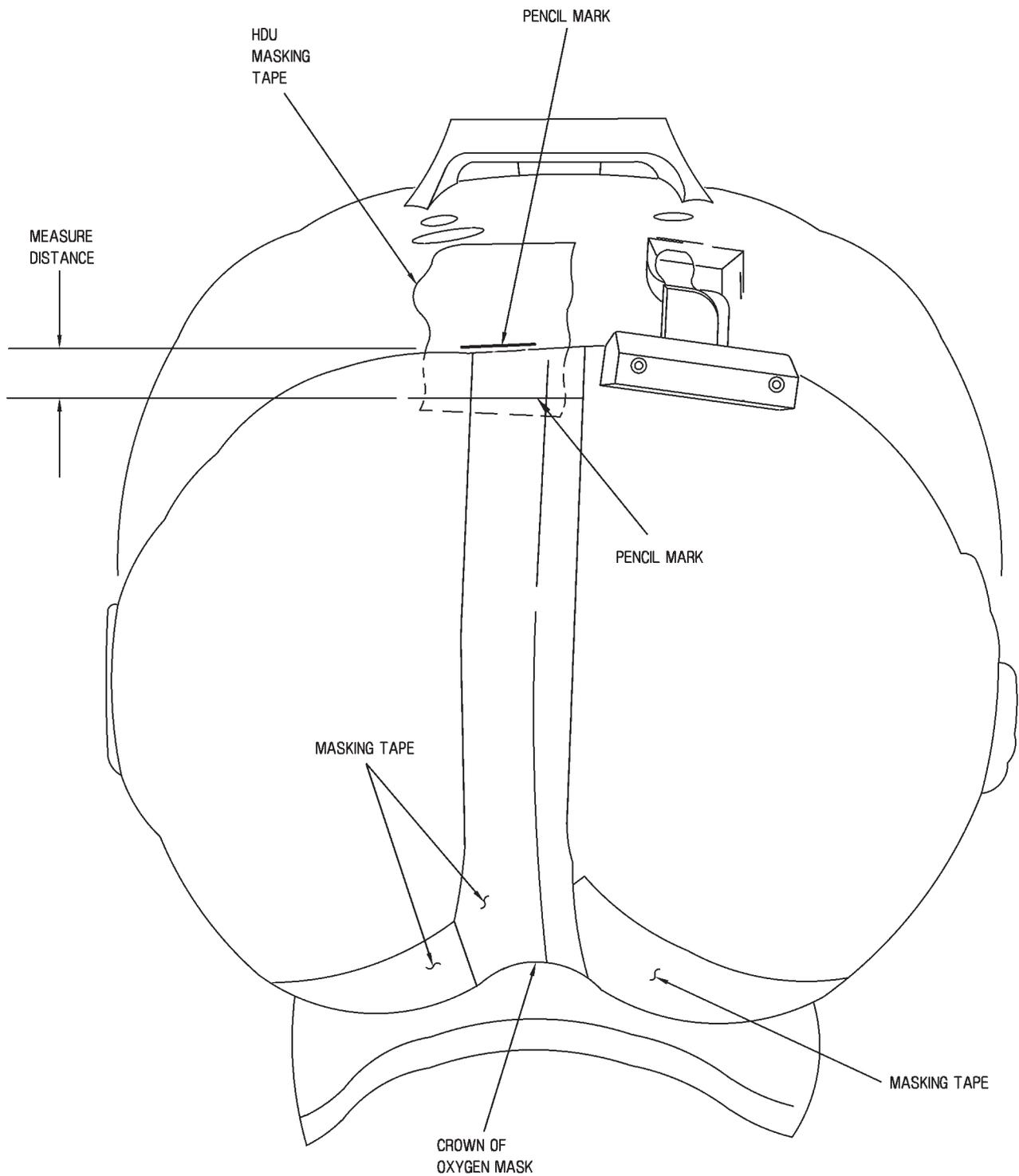
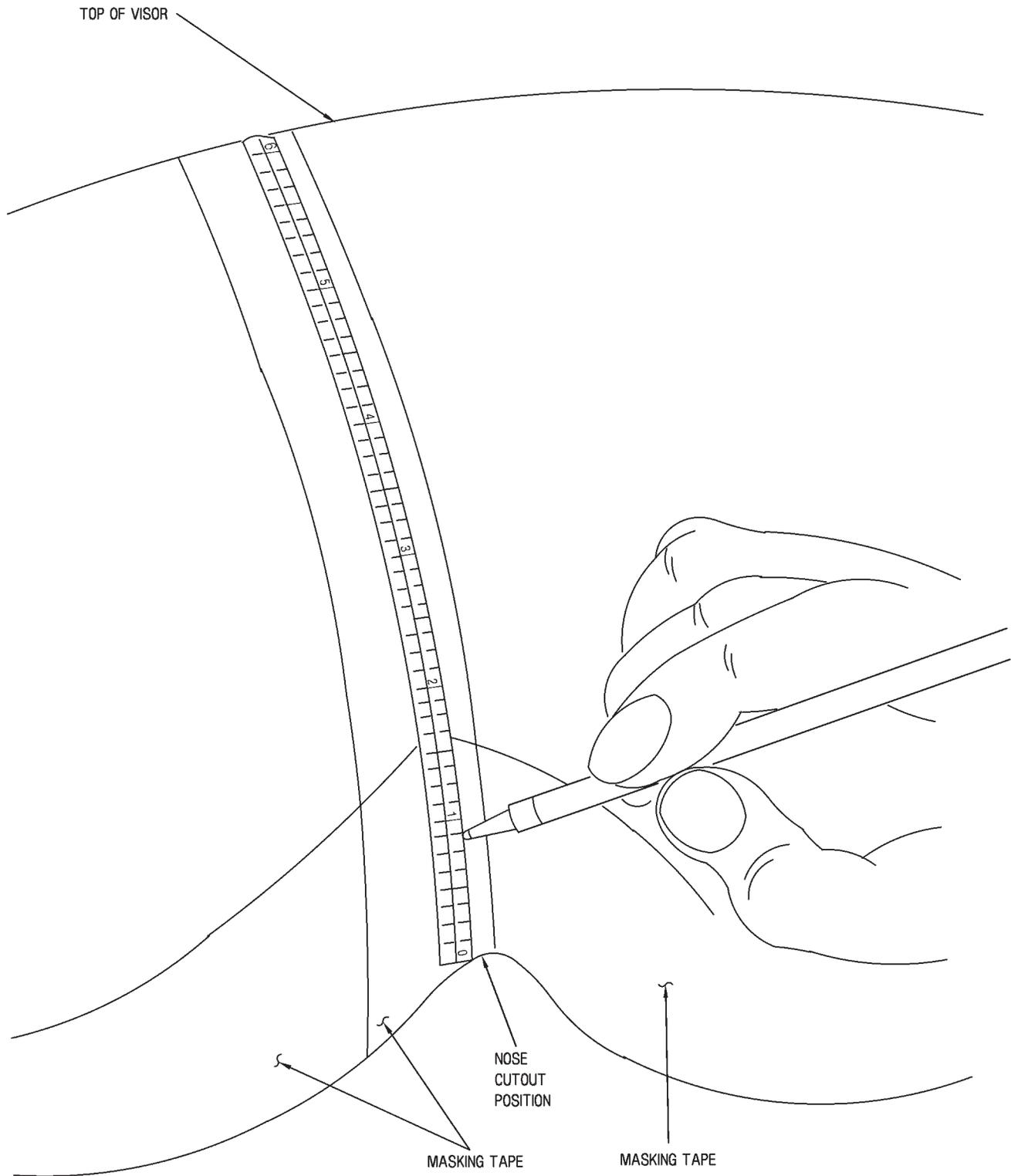
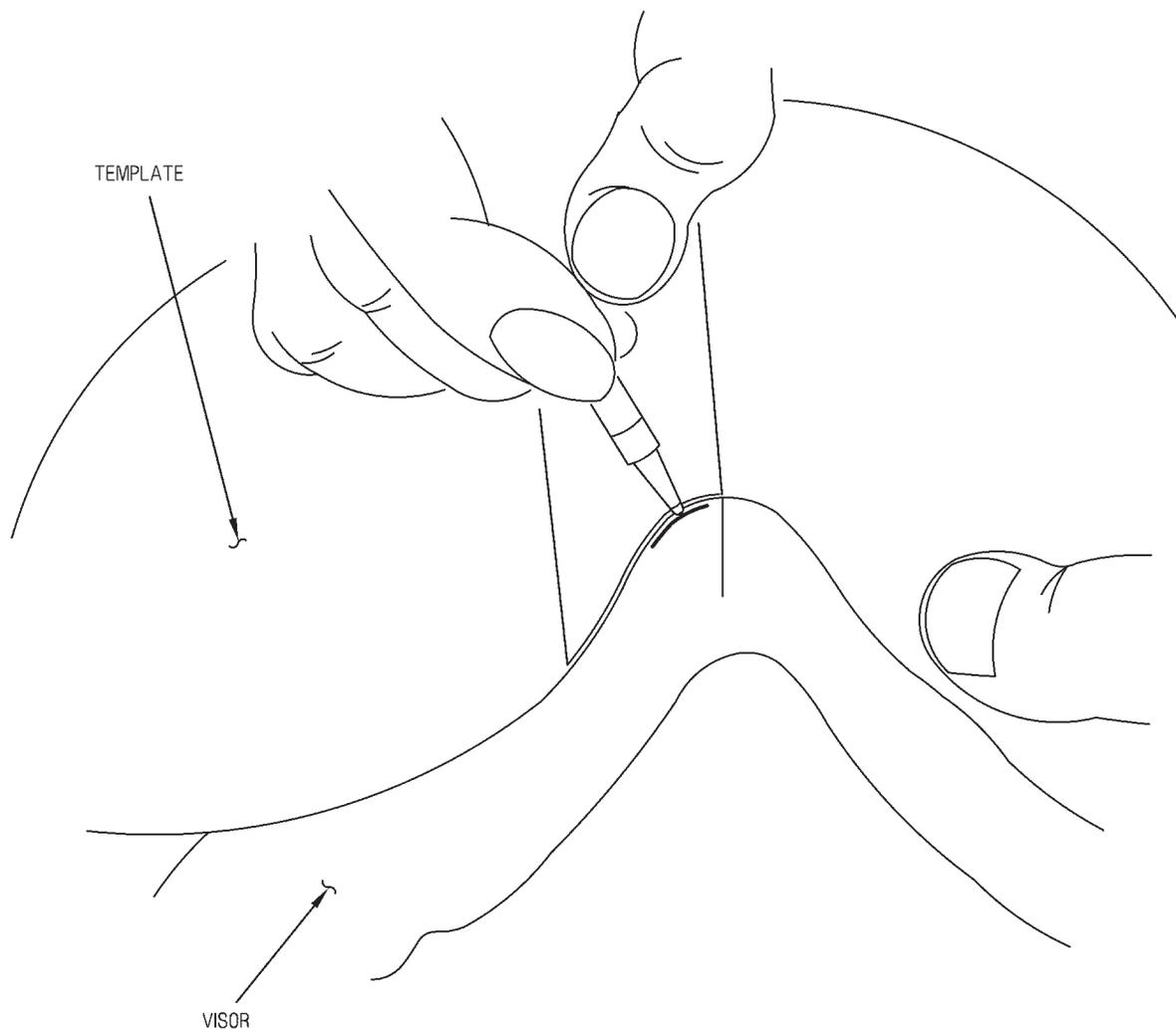


Figure 18. Visor Trimming (Sheet 4)



MARKING THE VISOR FOR THE
NOSE CUTOUT POSITION

Figure 18. Visor Trimming (Sheet 5)



MARKING THE VISOR WITH THE
NOSE CUTOUT TEMPLATE

Figure 18. Visor Trimming (Sheet 6)


CAUTION

Be careful with template not to scratch or damage visor.

NOTE

Do not use factory trimmed nose cutout of new visor as the guide for lateral positioning of the nose cutout template on the visor. The nose cutout template and the factory trimmed nose cutout of the visor may not be in the same lateral position on the visor. Use Combat Edge Visor/Bungee Visor as template.

q. Position applicable oxygen mask nose cutout template on front of visor so the highest point is aligned with both the vertical and horizontal lines of mask  (figure 18, .

r. Trace a grease pencil line along the bottom edge of oxygen mask nose cutout of trimming template  (figure 18, .

s. Remove visor template from the front of visor.


WARNING

Grinding the visor polycarbonate lens produces a dust which is irritating to the eyes and respiratory system. During grinding, wear eye protection and avoid breathing dust.

Heating the polycarbonate above its melting temperature can also produce vapors which are irritating. Avoid heating material above its melting point.

Protective Personal Equipment (PPE), should be worn as determined by local Industrial Hygienist or Ship's Safety Officer in accordance with NAVAIR A1-NAOSH-SAF-000.


CAUTION

Remove no more than 1/8 inch of visor material at a time. Removing more than 1/8 inch of the visor at a time will damage the visor.

t. Wearing appropriate PPE, trim the visor using a the small hand held rotary grinder, from the bottom edge of the visor to grease pencil mark. Use the outline marks from the bungee visor as a guide during grinding to assist in obtaining the correct nose cutout for the mask used. Verify fit between 1/8-inch increments to prevent the removal of too much visor material.

NOTE

Make sure the oxygen mask is in the normal flight position and the chin strap is secured and tightened correctly.

u. Deleted.

v. Install visor on HDU and lower the visor to the down lock position or until the visor contacts the oxygen mask or face.

w. If visor interferes with the oxygen mask or face, mark the bottom edge of the visor, remove and trim.

x. Continue this process until the visor can be lowered to the down lock position with a gap from 1/16 to 3/16 inch between the bottom edge of the visor and the aircrewmember's face and oxygen mask.

NOTE

The visor may contact the oxygen mask while the aircrewmember is doing look up test.

y. Make sure the visor does not contact the face when the aircrewmember looks up, left or right.

z. Rotate visor assembly up.

aa. Remove visor from HDU.


CAUTION

Metal objects may destroy visor if used to remove masking tape.

ab. Using fingers or a non-marring tool, remove masking tape from visor. Be careful not to damage visor.

ac. Make sure aircrewmember's IPD is still aligned correctly before proceeding with helmet buildup. If adjustment to helmet IPD is required, do IPD  .

ad. Document per OPNAVINST 4790.2 series. (QA)

ae. Have aircrewmember remove helmet.

36. INSTALLATION OF VISOR TANGS.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Knife	GGG-K-450	81348
Razor Blade	GG-R-60	81348
Safety Goggles	G-G-531	81348
Small Hand Held Grinder (Rotary)	84922	18531

Materials Required

Nomenclature	Specification or Part Number
Adhesive	2216 B/A, GRAY, NIIN 00-145-0019
Cotton Tip Swab	GG-A-616
Double-Sided Masking Tape	4962
Emery Cloth (fine grit)	P-C-451
Grease Pencil	SS-P-186
Isopropyl Alcohol	TT-I-735, or MIL-I-10428, NIIN 00-855-1158, NIIN 00-855-6160, NIIN 01-190-2538, NIIN 01-220-9907
Masking Tape	A-A-883 TYPE 1
Visor Tang Kit	620532-01-00

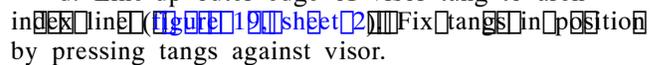
a. Cut 8-10 pieces of double-sided masking tape 1/8 inch wide by 1/2 inch long.

b. Put the double-sided masking tape in several areas on the back side of the left and right visor tangs (figure 19, sheet 1).

NOTE

Visor tangs should match as closely as possible the contour of the visor obtained during the trimming process.

c. Lower the visor to the lock down position.

d. Line-up outer edge of visor tang to arch in  by pressing tangs against visor.

e. Remove visor from HDU.

f. Turn visor over and trace bottom edge contour of visor tangs with a grease pencil.

g. Remove visor tangs from visor.

h. Trim visor along grease pencil marks (figure 19, sheet 3).

i. Using a sharp knife or razor blade, deburr the lower edge of the visor where visor was trimmed.

j. Trial fit the visor tangs directly to visor.

k. If tangs do not fit or rock in position, locate high spots on visor.

l. Mark high spots with a grease pencil.



Grinding the visor polycarbonate lens produces a dust which is irritating to the eyes and respiratory system. During grinding, wear eye protection and avoid breathing dust.

Heating the polycarbonate above its melting temperature can also produce vapors which are irritating. Avoid heating material above its melting point.

Protective Personal Equipment (PPE), should be worn as determined by local Industrial Hygienist or Ship's Safety Officer in accordance with NAVAIR A1-NAOSH-SAF-000.

m. Wearing appropriate PPE, use a small hand held rotary grinder and trim the visor.

n. Repeat steps j through m until visor tangs fit firmly in position.

n1. Position visor tangs in their final location on visor. Make sure there are no visible gaps between visor tangs and visor (figure 19, sheet 2).

o. Secure visor tangs, in position, to visor with double-sided masking tape (figure 19, sheet 4).

p. Attach the visor to the HDU.

q. Lower the visor to the lock down position.

r. If tangs interfere with the helmet edge roll when rotating the visor to the lock down position, reposition visor tangs by moving tangs away from edge roll. Repeat visor grinding steps through m. as necessary to eliminate interference using care to remove as little visor material as possible.

37. BOND VISOR TANGS IN POSITION.

a. Position visor tangs in their final location on visor. Make sure there are no visible gaps between visor tangs and visor (figure 19, sheet 2).

b. Using small pieces of masking tape, mark the edges of the visor tangs on the front and rear surfaces of visor.

c. Remove the visor tangs.



ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 1001

d. Clean area with isopropyl alcohol where visor tangs and visor will be mated. Allow to air dry.

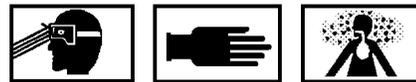
e. Using fine grit emery cloth, roughen up the surface of the visor within the masked area on the front and back surface of the visor and roughen up the surface of the visor tang gluing area. The abraded area on the visor should have a dull appearance.

f. Remove masking tape from visor and visor tangs.



ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 1001

g. Clean visor tangs and visor with isopropyl alcohol. Allow to air dry.



ADHESIVE, 2216 B/A, GRAY

1069



Adhesive should be applied within 90 minutes of mixing base and accelerator.

Adhesive should be applied to visor tangs evenly to prevent running on visor assembly.

h. Apply a uniform bead of adhesive with wooden end of cotton tip swab or any other suitable applicator, to both visor tangs and visor surfaces.

NOTE

All masking tape should be removed before bonding visor tangs to visor.

i. Install visor tangs on visor. Make sure a 3-5 mm thick bond line is achieved between visor tangs and visor.



ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 1001

j. Clean up excessive adhesive from front and back of visor with cotton tip swabs and isopropyl alcohol.

k. Inspect and make sure no visible gaps are between visor tangs and visor.



Allow adhesive to dry per manufacturer specifications listed below.

l. Use masking tape to hold visor tangs in position until adhesive reaches handling strength, approximately 8-12 hours (figure 19, sheet 4).

m. Even though the visor can be safely handled after 8-12 hours, allow 7 days for adhesive to fully cure before issuing to aircrewmember for flight.

n. Document per OPNAVINST 4790.2 series. (QA)

38. INSTALLATION OF VISOR TANG RECEIVERS.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Drill Bit, Number 28	DBE28A	55719
Safety Goggles	G-G-531	81348

Materials Required

Nomenclature	Specification or Part Number
Double-Sided Masking Tape	4962
Pencil, Lead	A-A-2771
Receptacle Kit, Visor Tang	135427-1

- a. Attach display unit to helmet shell.
- b. Attach visor to display unit.
- c. Lower the visor to the lock down position.
- d. Apply double-sided masking tape to helmet side of tang receiver mounting flange.



Grinding the mounting flange material produces a dust which is irritating to the eyes and respiratory system. During grinding, wear eye protection and avoid breathing dust.

Heating the polycarbonate above its melting temperature can also produce vapors, which are irritating. Avoid heating material above its melting point.

PPE should be worn as determined by local Industrial Hygienist or Ship's Safety Officer in accordance with NAVAIR A1-NAOSH-SAF-000.

e. Position the left and right tang receivers (part of visor tang receptacle kit P/N 135427-1) so the ends of the visor tang is inside the tang receiver. If necessary, and wearing appropriate PPE, trim the mounting flange material slightly with a hand held grinder to allow the tang receiver mounting flange to clear screw heads or bayonet receivers.

f. Secure the visor tang receivers to the helmet shell temporarily by pushing them against helmet shell in desired location.

g. Rotate the visor up and down several times to make sure visor tangs clear tang receivers.

h. Mark the visor tang receiver mounting holes using a lead pencil (figure 20).

i. Make sure visor tangs go into the tang receivers when rotating the visor to the lock down position.

j. If tangs interfere with edge of tang receiver when rotating the visor to the lock down position, reposition visor tangs by moving tangs away from edge roll or grind receiver. If the tang receiver interferes with the snap or bayonet receiver, grinding of receiver to remove interference area is acceptable.

k. Inspect visor operation.

l. Inspect clearance of visor tang receivers.

m. Remove HDU and visor from helmet.

n. Remove earcups.

n1. Remove visor tang receiver from helmet.

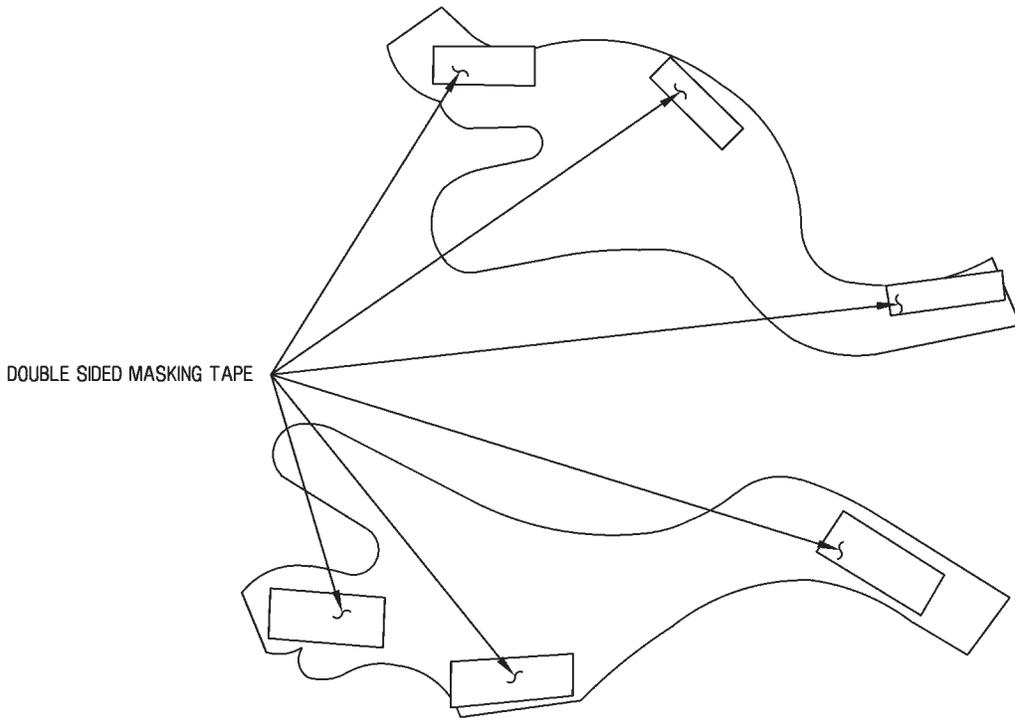
o. Using a number 28 drill bit, drill a hole through each of the marked hole positions.

p. Deleted.

q. Remove double-sided masking tape from back side of visor tang receiver flange.

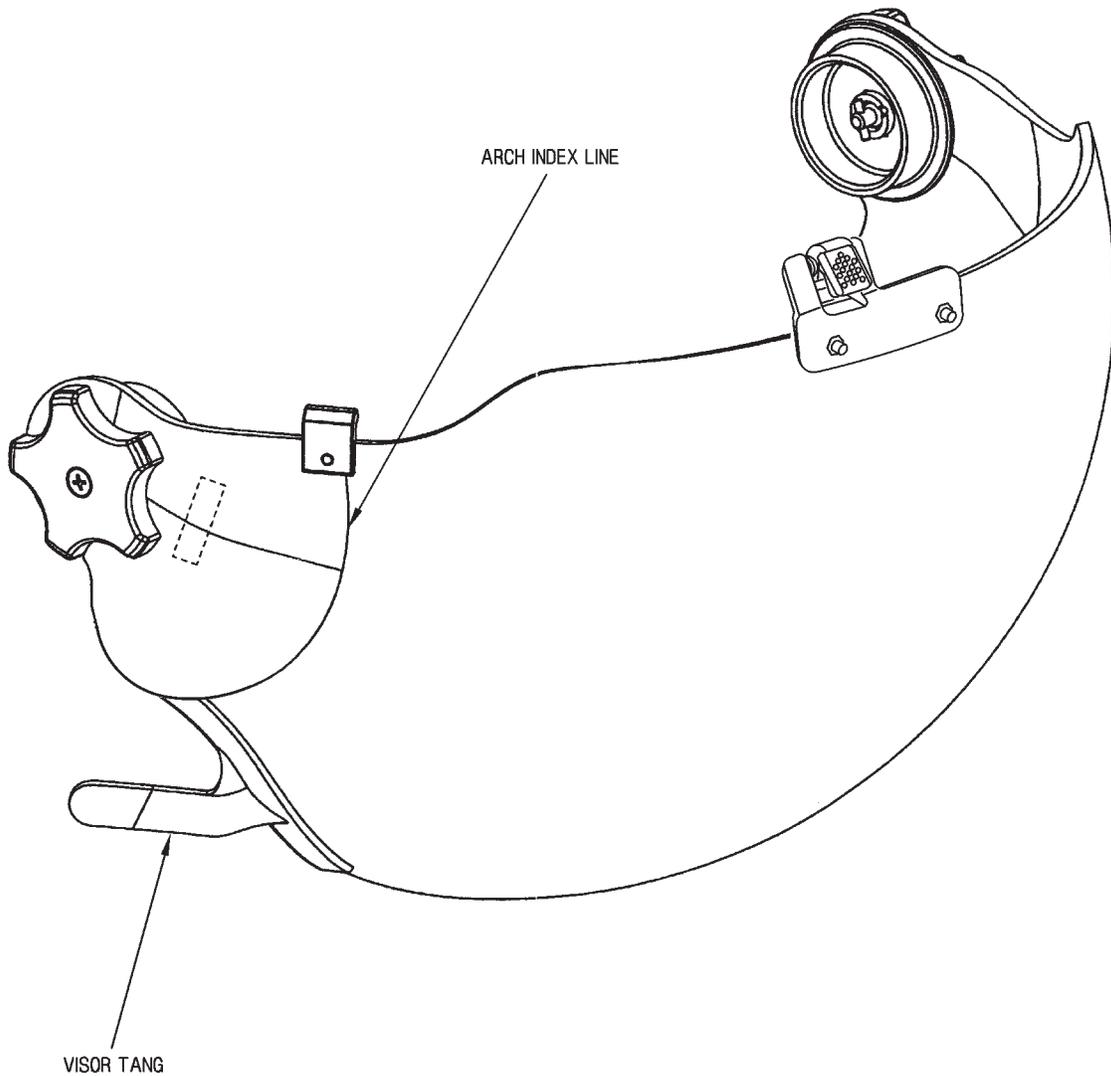
r. Replace visor tang receiver flange on helmet.

s. Attach visor tang receiver with screws, lock washers and nuts (from outside in) provided in visor tang receptacle kit P/N 135427-1.



PREPARING THE VISOR TANGS FOR VISOR TRIMMING

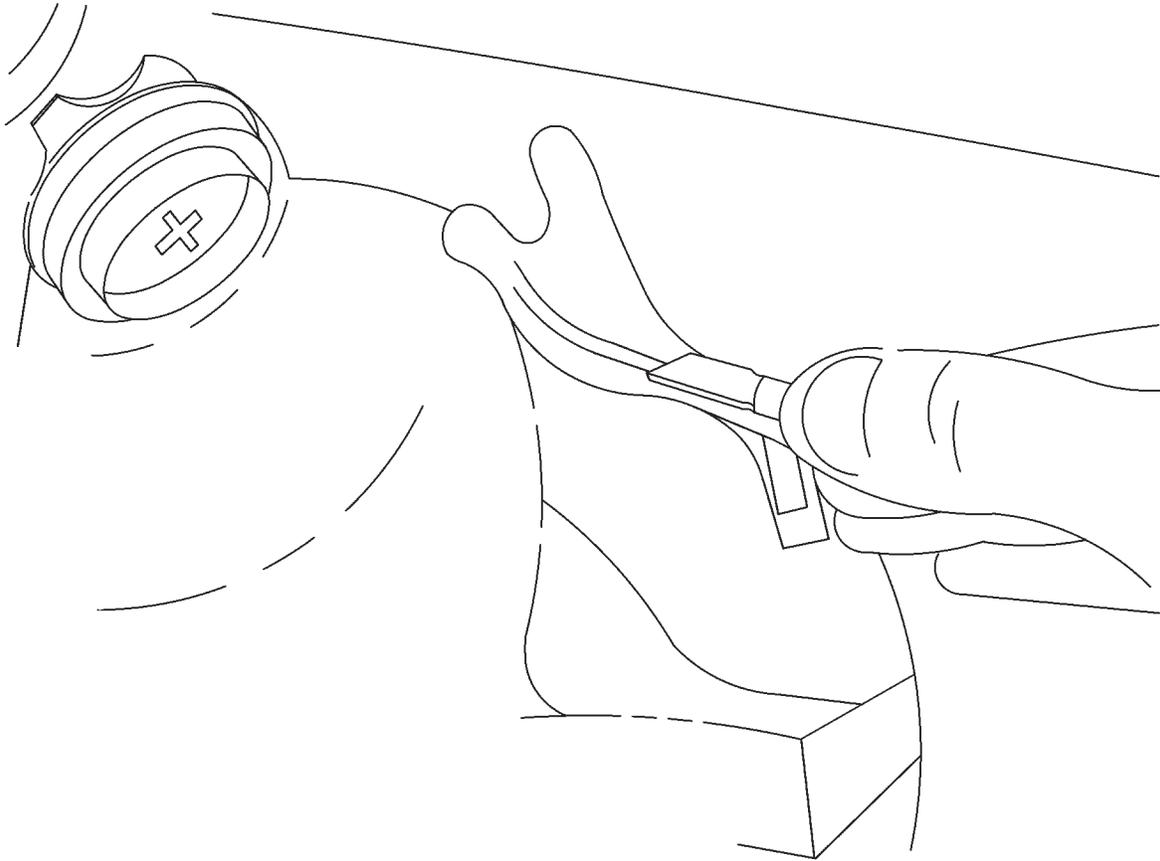
Figure 19. Visor Tang Trimming (Sheet 1 of 4)



(RIGHT VIEW)

LOCATING THE VISOR TANG POSITION ON THE VISOR

Figure 19. Visor Tang Trimming (Sheet 2)



MARKING THE VISOR TO TRIM FOR VISOR TANGS

Figure 19. Visor Tang Trimming (Sheet 3)

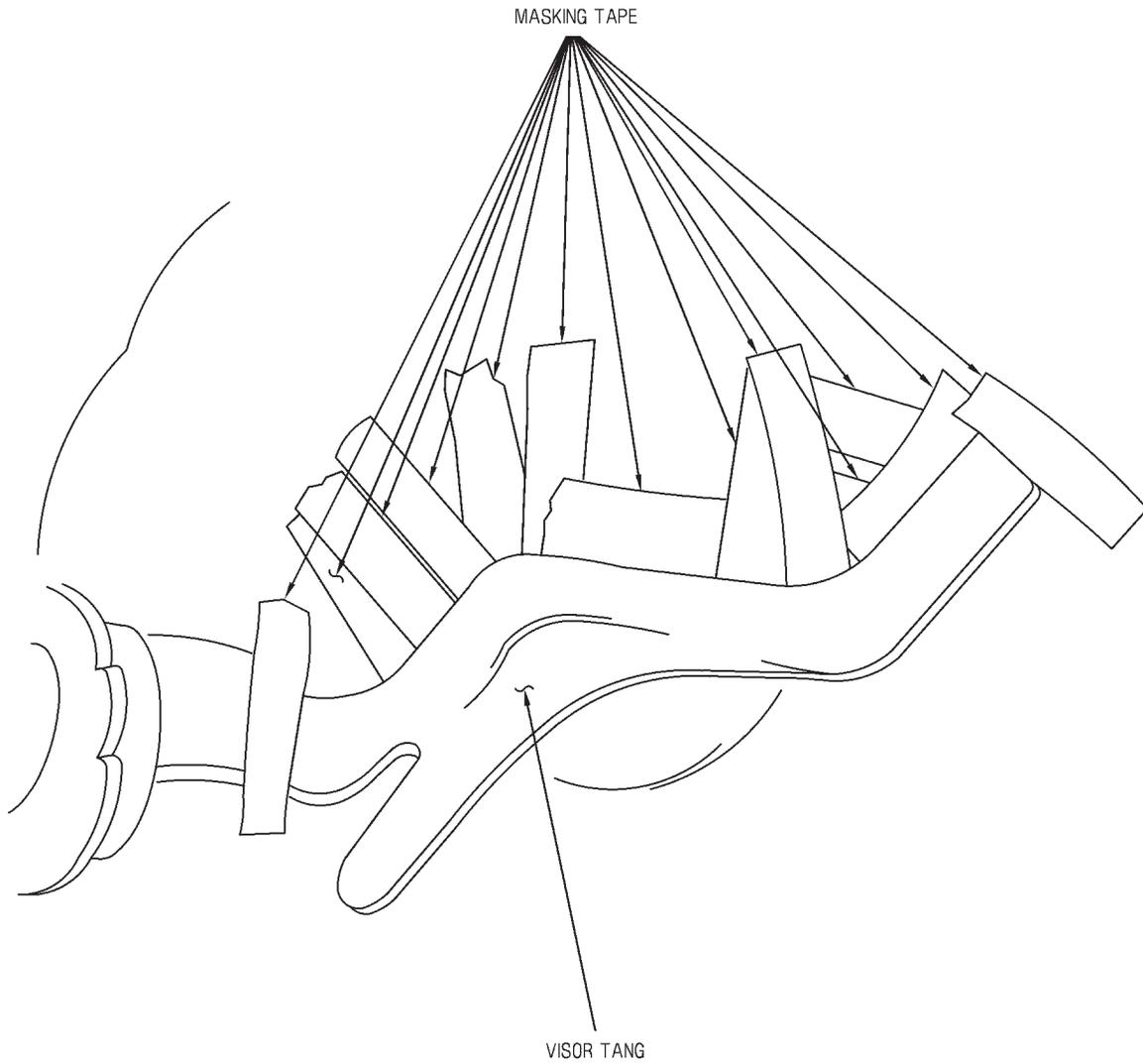
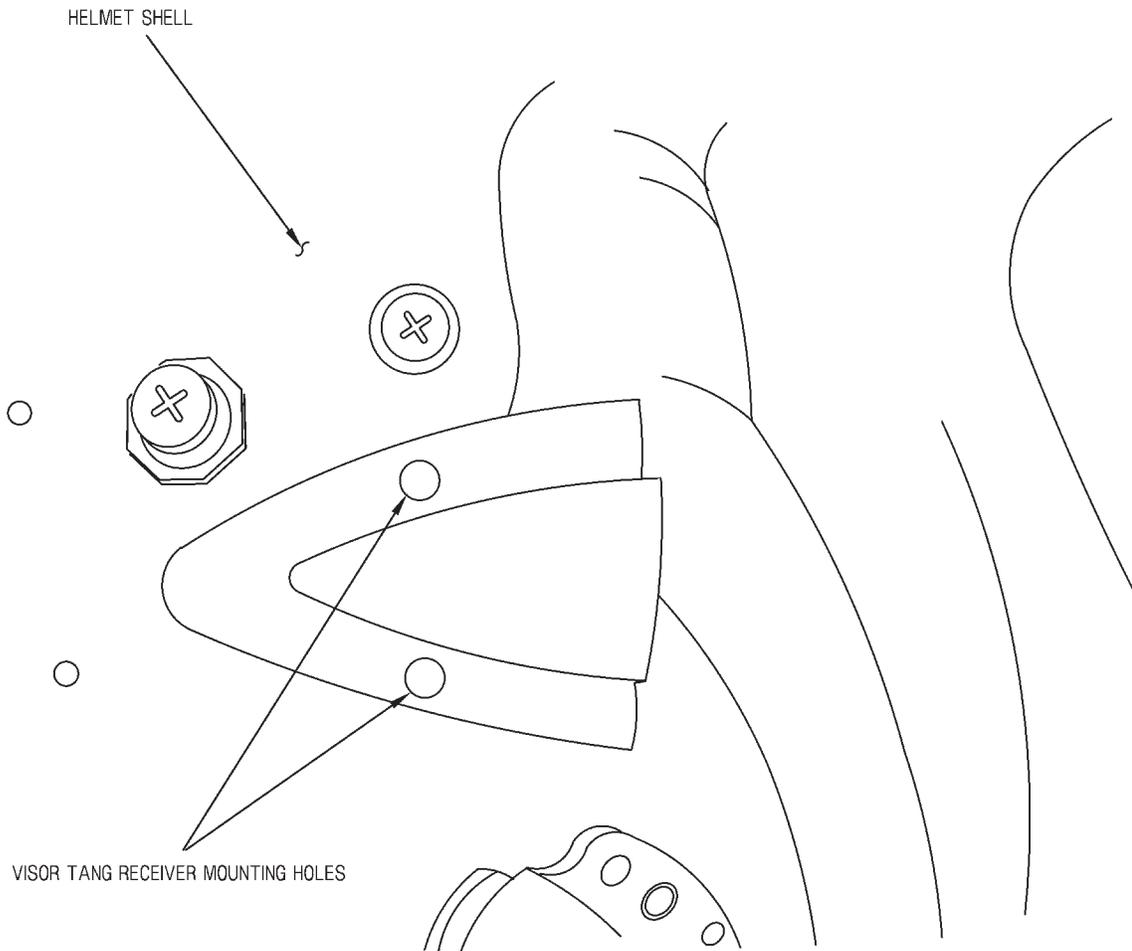


Figure 19. Visor Tang Trimming (Sheet 4)



MOUNTING HOLE LOCATIONS FOR THE
VISOR TANG RECEIVERS

Figure 20. Visor Tang Receivers

6-39. INSTALLATION OF NIGHT VISION IMAGE INTENSIFIER SET (NVIIS) AN/AVS-9 (V) HELMET MOUNT ASSEMBLY.

Support Equipment Required

None

Materials Required

Quantity	Description	Reference Number
1	Drill Bit, Number 16	DBE16A, NIIN 00-189-9261
1	Drill Bit, Number 40	DBE40A, NIIN 00-189-9285
1	Metal Spatula	GGG-C-746, NIIN 00-680-2634
1	Tape Measure, Dressmaker's	A-A-1666, NIIN 00-782-3520
As Required	Adhesive	MIL-A-5540, CLASS 3, FORM B, NIIN 00-142-9913, NIIN 00-515-2246
As Required	Adhesive	RTV 102/732, NIIN 00-877-9872
As Required	Adhesive	RTV 154/157, NIIN 00-181-8380
1	Bracket Kit, Helmet [Note]	265030-3
1	Helmet Mount Assembly (AN/AVS-9 (V))	273735-1
As Required	Tape, Pressure Sensitive	A-A-1243, NIIN 00-782-6220

Notes: 1. Bracket Kit P/N 265030-3 contains all required hardware to attach the P/N 273735-1 Helmet Mount Assembly to the JHMCS Helmet Shell; four #6-32 hex head screws, four lock washers, left hand mounting bracket (thick concave bracket), right hand mounting bracket (thin concave bracket) and two interior backing plates.

NOTE

Prior to installation of the helmet mount assembly, ensure the crewmember's helmet has been properly fit, adjusted and that all visual alignment procedures have been satisfactorily completed.

a. Detach the two lift-the-dot snap fasteners securing the forward edges of the Helmet Display Unit (HDU), lift and unlock the HDU latch and remove the unit from the helmet. Set HDU aside for reinstallation.

b. Invert the helmet on the workbench; remove the TPL or Zetaliner, set aside for reinstallation. Keeping the helmet inverted, detach the earcups from the helmet earcup cavity pile fastener material and position them clear of work area.

c. Loosen and remove the two screws securing the Upper Helmet Vehicle Interface (UHVI) cable clamp to the nape of the helmet, remove the upper portion of the clamp from the interior of the helmet and set aside for re-assembly.

d. On the exterior of the helmet, loosen and remove the two screws and flat washers from the underlying lock washers and flanged nuts securing the integrated chin/nape strap to the rear of the helmet. Loosely reassemble the removed items onto the grommeted ends of the chin/nape strap to prevent twisting or position shift during maintenance.



Use extreme caution when removing energy absorbing liner assembly. Use of liner removal aids, other than the approved metal spatula or ruler is not authorized and may damage the liner, which will result in reduced impact protection.

e. Invert helmet on workbench with the brow of the helmet facing the technician, at the center of the nape of the helmet, carefully insert a thin metal spatula (or a 12-inch by 1-inch metal ruler may be used) between the inner surface of the helmet shell bottom edge of the lower half of the two piece energy absorbing (EA) liner. Using the spatula as a lever, pull inward and upward on the liner, until the lower edge of the liner can be grasped with the free hand.

f. Rotate the lower half of the EA liner approximately 90 degrees to the left or right to clear the earcup cavity edgeroll and completely withdraw the rear half from the helmet shell interior. Withdraw the front half of the EA liner from the helmet shell interior, rotating as necessary to clear the earcup cavity edgeroll.

g. Place the helmet upright on the workbench with the brow of the helmet facing the technician. Locate the center of the allan screw hole on the front surface of the Universal Connector (UC), then using a cloth measuring tape, measure downward from the center of the hole toward the brow edgeroll. Ensuring the tape measure is flat on the helmet surface, using a number 2 medium lead pencil, draw a vertical line downward on the helmet shell, from the allan screw hole toward the leather edgeroll identifying helmet brow centerline.

NOTE

When measuring exposed threads on the left hand latching screw, ensure measurement is taken from the rear edge of the cylindrical nut and not from the hexagonal latching screw lock nut.

h. Adjust helmet mount assembly left hand latching screw to leave .250-inch of threads exposed, when measured from the rear edge of the threaded cylindrical nut. Ensure the latching screw lock nut is loosened.

i. Using a number 2 medium lead pencil, place an alignment mark on the bottom edge of the helmet mount assembly at the center (11/16ths of an inch) of the ledge formed by the bracket of the vertical height adjustment mechanism.

j. Position the helmet mount assembly across the brow of the helmet, with the lower edge resting level along the upper edge of the helmet brow edgeroll.

k. Using the alignment mark made in [step i.](#), align the helmet mount assembly over the vertical centerline mark on the brow edgeroll.

l. Visually verify the alignment of the mark made on the helmet mount assembly with the vertical centerline mark on the brow edgeroll, and ensure the lower edge of the mount assembly lies evenly across the upper edge of the helmet brow edgeroll. (QA)

m. Maintaining alignment, press the mount assembly firmly into place on the helmet brow. Apply masking tape to the right and left extensions of the mount assembly starting downward from the crown of the helmet, over the middle of each extension, continuing downward over the brow edgeroll wrapping under the brow. Secure the free end of the tape to the inner surface of the helmet.

NOTE

During installation of the required hardware, it may be necessary to cut one of the brow edgeroll securing stitches at the right or left hand corner of the brow edgeroll to facilitate proper orientation and positioning of the mount assembly brackets.

The right hand mounting bracket features two latching notches, one deep notch and one shallow notch, with four attaching screw slots. These features have been incorporated to permit minor adjustments to the mount assembly's position on the helmet to optimize eye relief and interpupillary distance adjustments of the Night Vision Image Intensifier Sets (NVIIS) for each crewmember.

n. Cut two pieces of pressure sensitive tape 1-inch wide by 2-inches long. Center the right hand

mounting bracket onto the exposed adhesive side of one of the 2-inch long tape sections and position the left hand mounting bracket onto the remaining tape section.

o. Using a rotary head punch, punch holes in the pressure sensitive tape at the center of the fore and aft attaching screw slots closest to the shallow latching notch on both the right and left hand mounting brackets. Remove the protective backing from the remaining side of the pressure sensitive tape.

p. Position the right hand side of the helmet toward the technician. Position the right-hand mounting bracket under the mount assembly latching hook, with the shallow notch facing down and away from the center of the helmet. Engage the mount assembly latching hook into the shallow notch of the right-hand mounting bracket.

q. Using hand pressure, press downward firmly on the right mount assembly extension, position the concave surface of the right hand mounting bracket flush with the surface of the helmet shell, ensuring the inboard edge of the mounting bracket is parallel to the right hand edge of the mount assembly. Press bracket firmly into place on the helmet shell.

r. Maintaining this alignment, using a number 2 medium lead pencil, place a mark on the helmet shell, through the hole punched in the tape, at the center of the fore and aft attaching screw slots closest to the shallow notch, designating drilling locations for the bracket attaching screws.

s. Position helmet on workbench with the left side of the helmet toward the technician. Lift the locking latch and insert the head of the previously adjusted latching screw into the center cutout of the left-hand mounting bracket (thick concave bracket). Close the locking latch, ensuring the head of the latching screw remains centered in the left-hand bracket cutout.

t. Using hand pressure, press down firmly on the left mount assembly extension, position the concave surface of the left mounting bracket flush with the surface of the helmet shell. The head of the latching screw must remain centered in the cutout, and the inner edge of the mounting bracket must be positioned parallel to the left edge of the mount assembly. Press bracket firmly into place on the helmet shell.

u. Maintaining this alignment, using a number 2 medium lead pencil, place a mark on the helmet shell, through the hole punched in the tape, at the center of the fore and aft attaching screw slots, designating drilling locations for the bracket attaching screws.

v. Remove masking tape from the mount assembly and the helmet shell; remove mount assembly and set aside for use in alignment check, leaving the mounting brackets in place at their designated locations.

w. Attach the HDU to the universal connector and visually verify that no interference exists between the HDU and the mounting brackets. As a final check, from a standard sheet of paper cut a 4-inch by 8-inch piece to use as a go-no-go gage, slide the paper between the HDU housing and the brackets. If resistance is felt, the bracket is contacting the inner surface of the housing and the bracket must be repositioned. Refer to steps 14 through 19. (QA)

x. After satisfactorily completing the interference check, remove the brackets from the helmet shell, remove the pressure sensitive tape from the brackets, properly dispose of the tape and set brackets aside for use during assembly.

y. At selected locations on the right and left-hand sides of the helmet, using a no. 40 (0.098) drill bit, drill a pilot hole. Use a no. 16 drill bit to enlarge each of the four holes to the finished dimension of 0.177-inch.

NOTE

Apply a small amount of RTV to the first few threads of the left and right-hand mounting bracket attaching screws, and to the chin/nape strap attaching screws.

z. Position a backing plate, with the flat surface of the backing plate toward the interior surface of the left hand side of the helmet shell, align the built in nuts of the backing plate beneath the two drilled attaching screw holes. On the outer surface of the helmet, align the left hand mounting bracket over the drilled holes, with the center cutout toward the top of the helmet, and secure in place with a 5/64-inch allen key, using two screws and lock washers.

aa. Repeat the installation procedure for the right hand mounting bracket, ensuring the shallow notch of the bracket faces down and away from the top of the helmet.

ab. Place helmet mount assembly into position on the helmet shell, engage the right hand latching hook, lift the locking latch, placing the head of the left hand latching screw into the center cutout of the left mounting bracket and close the locking latch. If the helmet mount assembly is too loose, adjust the latching screw to provide the desired tension, ensuring the mount assembly is centered on the helmet when the locking latch is closed. Once desired

tension is achieved, tighten the latching screw lock nut to maintain proper position. Remove the helmet mount assembly from helmet and set aside during reinstallation of removed internal helmet components.

ac. Invert helmet on workbench and reinstall the front half of the two piece energy absorbing liner, ensuring front edge of liner is flush with the inner surface of the helmet shell brow edgeroll. Holding the front half of the liner in place, insert the back half of the liner into the helmet, ensure both portions of the liner are centered within the helmet, then push the rear liner into place.

ad. Reinstall the upper portion of the HVI cable clamp onto the nape area of the helmet, using the two attaching screws.

ae. Attach the integrated chin/nape strap to the attachment points on the rear of the helmet using two screws, flat washers, locking washers and flanged nuts.

af. Attach earcups to the pile fastener fabric on the interior of the helmet earcup cavity.

NOTE

If during crewmember goggle fit process, difficulty is experienced in obtaining proper eye relief or interpupillary distance using goggle adjustments, minor adjustments to the position of the helmet mount assembly may be accomplished by means of right hand mounting bracket attaching slot selection. To adjust the position of the mount assembly slightly to the right (as worn), place the attaching screws in the inboard attaching slots. To adjust position of the mount assembly slightly to the left (as worn), install the right hand mounting bracket with the deep notch facing down and away from the center of the helmet, using the attaching slots closest to the deep notch.

ag. Contact crewmember to schedule an NVIIS adjustment and alignment appointment.

ah. Upon completion of NVIIS fit verification, if helmet brow edgeroll securing stitching was cut to accommodate mounting bracket installation, apply adhesive to the exposed helmet surface and the underside of the edgeroll leather, and wait 15 minutes. After 15 minutes, press the edgeroll leather firmly into place on the helmet shell.

ai. Make appropriate entries on required record cards, in accordance with OPNAVINST 4790.2 Series Manual Instructions. (QA)

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**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN**

HDU ALIGNMENT/IPD ADJUSTMENT

**A/A24A-56 HELMET UNIT, INTEGRATED
(JOINT HELMET MOUNTED CUEING SYSTEM)**

Reference Material

Introduction	WP002 00
Testing and Troubleshooting	WP004 00
Helmet Assembly Buildup	WP006 00
Visor Assembly	WP011 00

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Record of Applicable Technical Directives

None

1. IPD ADJUSTMENT.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
* Adapter Computer	GTMB8A COMMERCIAL	55719 N/A
Helmet Display Unit Test Set Cable	620992-01-00	06VL3
Helmet Mounted Display Test Set	620900-02-01	06VL3
QMB	178-5936	99747
Ruler	GG-R-791	81348
Scissors	3452	70574
* Tip, Hex .050	120003	32652
* Torque Screwdriver 2 - 100 Inch-Ounce	6C486	25795

* Part of JHMCS Torque Tool Kit 3829AS110

Materials Required

Nomenclature	Specification or Part Number
Glue	A-A-342
Manila Folder	UU-F-1206

2. DISPLAY EXIT PUPIL AND DISPLAY AIMING.

- a. Do HELMET ASSEMBLY BUILDUP per WP006 00.
- b. Make a copy of figure 1 and figure 2.

NOTE

The aiming target should be put at crewmember's eye level within ±3 inches.

- c. Position the aiming target (figure 1) at least 8 feet away from seated crewmember.
- d. Using scissors, cut pupil locator (figure 2) out along black edge.

NOTE

The manila folder should be less than 1/16 inch thick and should not have any sharp edges or corners.

e. Glue pupil locator (figure 2) on manila folder and trim manila folder to match size and shape of pupil locator.

f. Using a rotary-head punch (common hand tool), make a hole 1/8 to 1/4 inch at marked position on pupil locator.

g. Put helmet mounted display test set (HMDTS) as close to crewmember as possible.

3. MEASURE INTERPUPILLARY DISTANCE (IPD).

NOTE

Room should be brightly lit for procedure.

- a. Stand to the side of aircrewmember.
- b. Position yourself at arms length and eye level to the crewmember.
- c. Have crewmember focus on target.
- d. Put small ruler on the bridge of crewmember's nose.
- e. Measure the distance between crewmember's pupils and record this measurement.

4. SETTING INTERPUPILLARY DISTANCE (IPD).

- a. Remove helmet display unit (HDU) from helmet by unlatching visor latch.
- b. Using IPD measurement recorded in step 3.e, refer to table 1 to determine correct map selector switch setting and IPD setting on HDU.
- c. If IPD adjustment is required on HDU, locate the IPD adjustment locking screws on top of HDU (figure 3).
- d. Note the current IPD settings.
- e. Loosen IPD adjustment locking screws on HDU (figure 3).



Be careful not to scratch or damage relay optics when adjusting IPD screws.

f. Hold on to the relay optics assembly (figure 4, sheet 1).

NOTE

Moderate force may be required to slide the relay optics assembly to the left or right.

g. Slide the relay optics assembly to the left or right until in desired position (table 1 and figure 3).

h. Using hex .050 tip, adapter, and torque screwdriver, torque the IPD adjustment locking screws to 31-33 inch-ounces (figure 3). (QA)

i. Verify the stop pin is firmly against the end of slot if a narrow or wide setting (table 1) is selected (figure 3).



Be sure correct maintenance practices are followed when working with electrostatic sensitive devices (ESD) (WP002 00).

j. **[ESD]** Locate map selector switches on the display unit microcontroller (figure 4, sheet 1).



Use caution when rotating map selector switches. These switches can be damaged easily by applying excessive down force or torque.

k. **[ESD]** Set switches as applicable (table 1).

Table 1. Map Selector Switch Settings

Measured IPD	59 - 64 mm (2 1/3 - 2 1/2 inches)	64 - 69 mm (2 1/2 - 2 3/4 inches)	64 - 69 mm (2 1/2 - 2 3/4 inches)	69 - 74 mm (2 3/4 - 2 7/8 inches)
IPD Adjustment Locking Screws (Figure 3)	Narrow (Left)	Nominal	Nominal	Wide (Right)
Map Selector Switch 1 (Figure 4)	Full Counter-clockwise	Full Counter-clockwise	Full Clockwise	Full Clockwise
Map Selector Switch 2 (Figure 4)	Full Clockwise	Full Counter-clockwise	Full Clockwise	Full Counter-clockwise

NOTE

For nominal measured IPD, Switch 1 and 2 must both be set fully clockwise or fully counterclockwise.

5. EXIT PUPIL ALIGNMENT.



Be careful not to damage connector pins when attaching HDU to helmet.

a. Attach the helmet display unit (HDU) to helmet.

- (1) Put HDU over universal connector.
- (2) Engage HDU latch making sure fully seated.
- (3) Snap side latches on HDU.

b. Attach the visor to the HDU. Refer to [WP011 00](#).

c. Connect the upper helmet vehicle interface (HVI) to the quick disconnect connector (QDC) on the Helmet Mounted Display Test Set (HMDTS) ([WP004 00](#)).

d. Turn on test set.

e. Start HMD Test on PC.

f. Make sure the map selector switch setting is correct ([table 1](#)).

g. Confirm switch setting, nominal, narrow or wide agrees with the IPD setting on test set.

NOTE

Make sure liner and earcups are positioned correctly in helmet.

h. Have crewmember put on helmet.

i. Position nape strap snug and flat at the base of skull.

j. Have crewmember attach chin strap.

k. Have crewmember face aiming target.

NOTE

Target should be at least 8 feet away from seated crewmember. Target should be at eye level ± 3 inches.

l. Lower the visor until it contacts crewmember's face.

m. Have crewmember confirm display is visible.

NOTE

If a zetaliner is used, it may be required to try a thinner or thicker zetaliner for a correct fit ([WP006 00](#)).

If display cannot be correctly aimed to allow the helmet to sit on the crewmember's head in the correct position, it may be required to fit crewmember with a different size helmet shell, or remove thermal plastic liner (TPL) layers.

n. Make sure the center of display pattern is at the same height as the target.

(1) If display is too high, rotate helmet forward.

(2) If display is too low, rotate helmet backward.

6. SETTING VERTICAL POSITION OF EXIT PUPIL.

NOTE

This procedure establishes an eye position and should be reverified after mask fitting.

a. Make sure HMDTS is ON ([steps 5d and 5e](#)).

b. Rotate the visor to the up position.

c. Have the crewmember, using their right eye, closing left, look through the pupil locator at the target ([figure 4, sheet 2](#)).

NOTE

The pupil locator should be positioned so the circle and cross-hair pattern on the pupil locator is facing away from the crewmember. Put the pupil locator as close to the crewmember's face as possible.

d. Dim the lights in the room.

e. Lower the visor until it contacts the face or pupil locator.

f. Note the location of the green spot of light relative to the pupil locator.

NOTE

Make sure helmet is aligned on crewmember's head. Make adjustments as required.

If a zetaliner is used, it may be required to try a thinner or thicker zetaliner for a correct fit ([WP006 00](#)).

(1) If the center of the light is above the pupil locator cross-hair, remove a layer of the thermal plastic liner (TPL) or zetaliner.

NOTE

The correct up/down position of the display is obtained when the approximate center of the spot of light is even with, or no more than 1/8 inch below, the horizontal cross hair on the pupil locator.

(2) If the center of the light is below the pupil locator cross hair by more than 1/8 inch, adjust liner.

g. Make sure that the large circle target of the pupil locator is completely within the green spot of light produced by the display.

NOTE

Make sure helmet is aligned on crewmember's head. Make adjustments as required.

h. If the spot of light is too far to the left or right, the IPD needs to be adjusted. Refer to IPD ADJUSTMENT, this WP.

i. When target circle on the pupil locator is completely contained within the green spot of light, have crewmember remove pupil locator.

j. Make sure the display orientation relative to the aiming target is correct.

k. Put on oxygen mask.

l. Lower visor, insert pupil locator, and verify large circle target of pupil locator is still completely within the green spot of light produced by the display.

m. Turn test set OFF and disconnect quick disconnect connector (QDC).

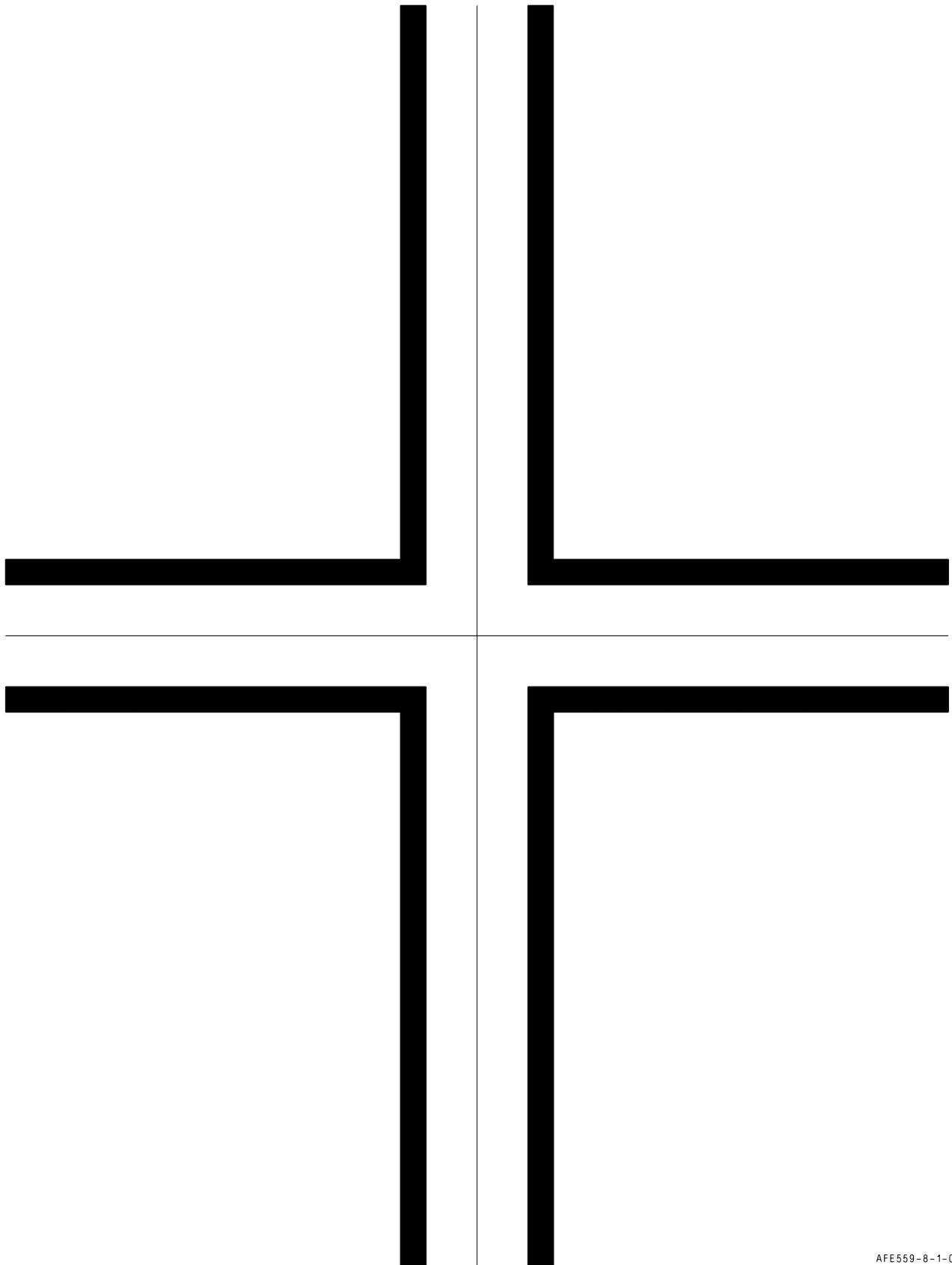
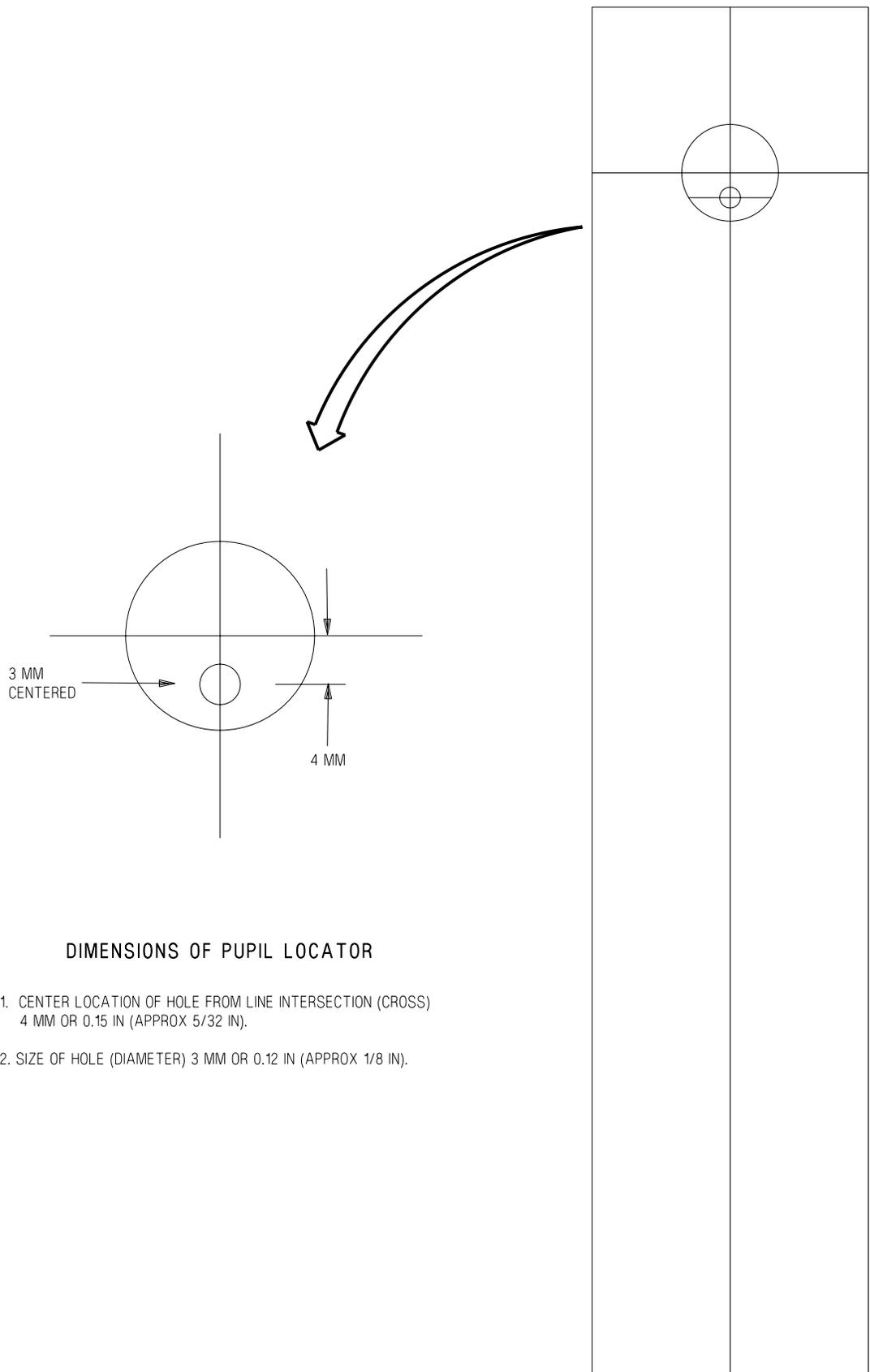


Figure 1. Aiming Target



DIMENSIONS OF PUPIL LOCATOR

1. CENTER LOCATION OF HOLE FROM LINE INTERSECTION (CROSS)
4 MM OR 0.15 IN (APPROX 5/32 IN).
2. SIZE OF HOLE (DIAMETER) 3 MM OR 0.12 IN (APPROX 1/8 IN).

Figure 2. Pupil Locator

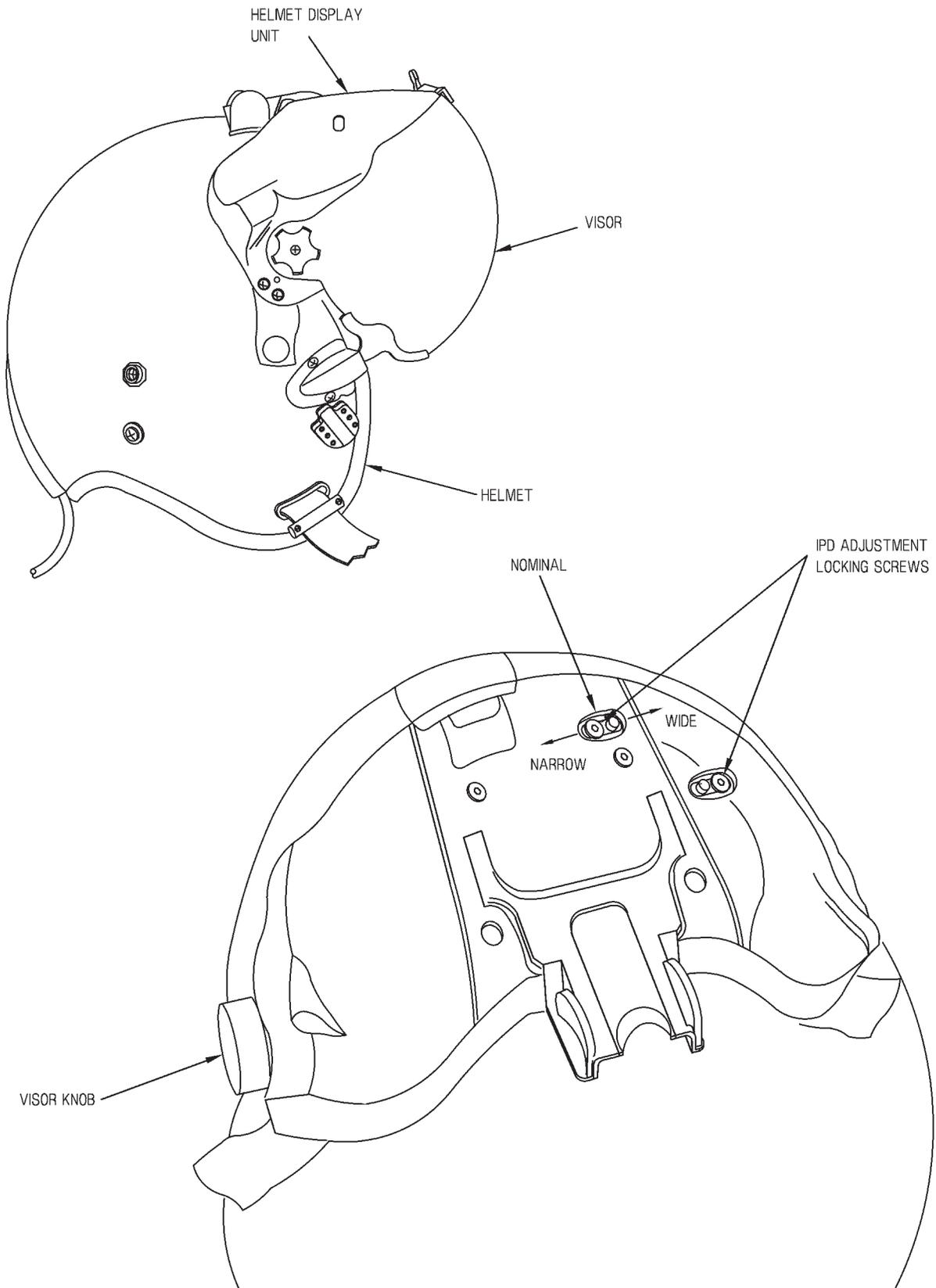


Figure 3. Helmet Display Unit

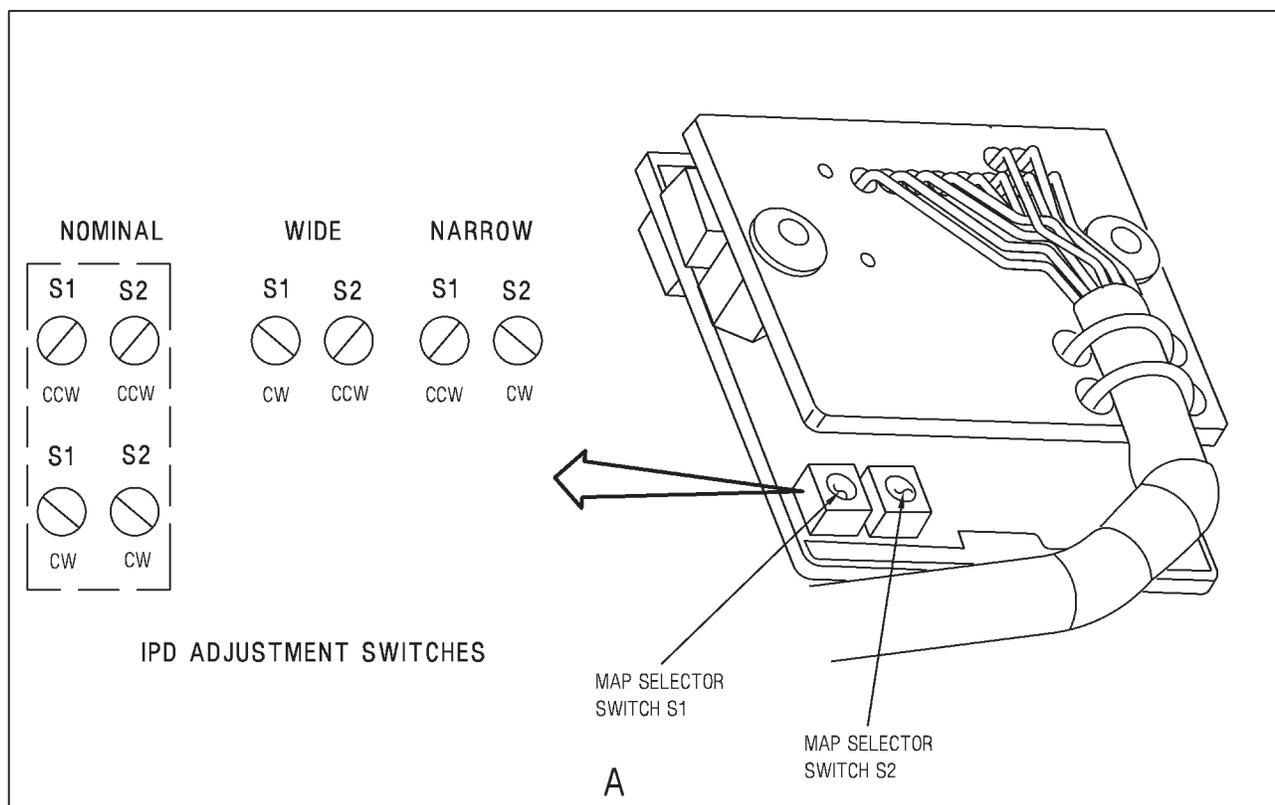
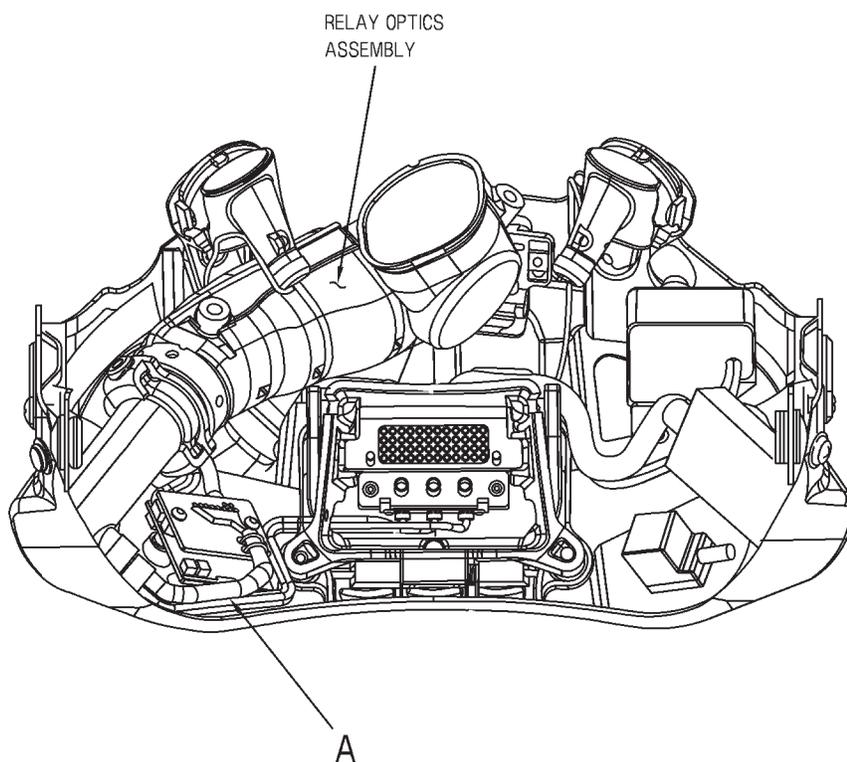


Figure 4. HDU Alignment (Sheet 1 of 2)

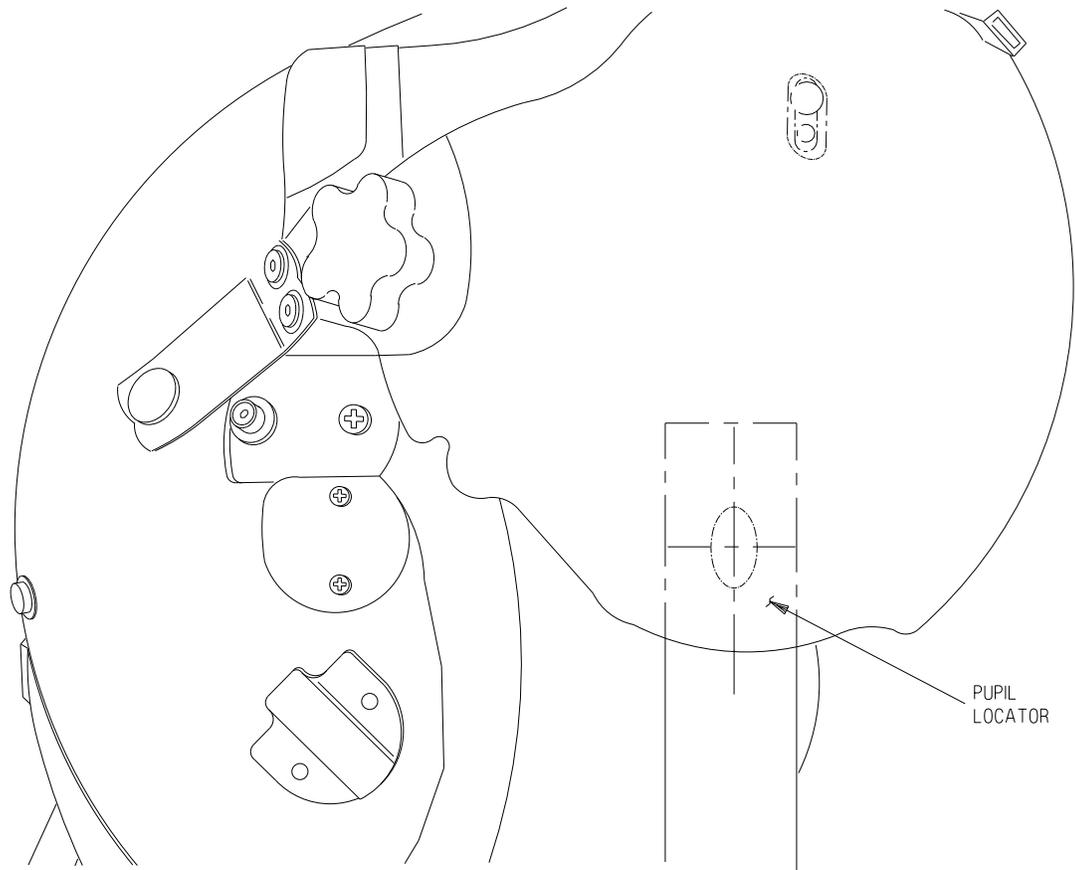


Figure 4. HDU Alignment (Sheet 2)

**OFF AIRCRAFT MAINTENANCE
MAINTENANCE WITH ILLUSTRATED PARTS BREAKDOWN**

**A/A24A-56 HELMET UNIT, INTEGRATED
(JOINT HELMET MOUNTED CUEING SYSTEM)**

Reference Material

Introduction	WP002 00
Testing and Troubleshooting	WP004 00
Cleaning and Inspection	WP005 00
Helmet Assembly Buildup	WP006 00
Upper Helmet Vehicle Interface	WP009 00
Helmet Display Unit	WP010 00
Visor Assembly	WP011 00
Oxygen Hose and Communication Test Set - Intermediate Maintenance with Illustrated Parts Breakdown	NAVAIR 17-15BC-22

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Helmet Shell Repair	5
Replacement of Pile Tape	5
Replacement of Reflective Tape	4

Record of Applicable Technical Directives

None

1. REMOVAL.

Support Equipment Required

None

Materials Required

None

NOTE

The below steps remove the helmet display unit (HDU) and visor assembly from helmet assembly to allow access for maintenance of helmet assembly.

- a. Remove visor cover from visor assembly (1, [figure 1](#), sheet 1), if installed.



Be careful not to scratch visor assembly.

- b. Gently rotate both visor knobs on visor assembly (1, sheet 1) backward.
- c. Pull visor knobs away from helmet display unit (2, sheet 1).
- d. Lift visor assembly (1, sheet 1) away from helmet display unit (2, sheet 1).
- e. Install visor cover on visor assembly (1, sheet 1), if available.
- f. Refer to [WP011 00](#) for further disassembly of visor assembly (1, sheet 1).



Be sure correct maintenance practices are followed when working with electrostatic sensitive devices (ESD) ([WP002 00](#)).

- g. **ESD** Remove helmet display unit (2, sheet 1) from helmet/HVI (3, sheet 1) per substeps below:
 - (1) Release visor snaps attaching helmet display unit (2, sheet 1) to helmet/HVI (3, sheet 1).

- (2) Unlatch universal connector with HDU latch and remove helmet display unit (2, sheet 1) from helmet/HVI (3, sheet 1).

- h. Refer to [WP010 00](#) for further disassembly of helmet display unit (2, sheet 1).

2. DISASSEMBLY.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Metal Spatula	GGG-C-746	81348

Materials Required

None

NOTE

This is a complete disassembly of the helmet assembly; however, disassemble only to the amount required for repair.

- a. Put flyer's helmet (5, [figure 1](#), sheet 1) upright on padded work surface.
- b. Remove TPL liner kit (6, sheet 2), zetaliner (7, sheet 2), or helmet liner (8, sheet 2) from flyer's helmet (5, sheet 2).
- c. If softseal hushkit configuration is used, remove softseal hushkit (9, sheet 2), earphone (10, sheet 2) and earcup fitting padset (11, sheet 2) from flyer's helmet (5, sheet 2).
- d. If standard earcup configuration is used, remove RH earcup (12, sheet 2), LH earcup (13, sheet 2), earphone (10, sheet 2), foam pad (14, sheet 2), earpad seal (15, sheet 2), and earcup fitting padset (11, sheet 2) from flyer's helmet (5, sheet 2).
- e. Remove cord assembly (16, sheet 2) and jack-black retainer (17, sheet 2) per substeps below:
 - (1) Remove cord assembly (16, sheet 2) connector from jack-black retainer (17, sheet 2).
 - (2) Remove jack-black retainer (17, sheet 2) from cord assembly (16, sheet 2) grommet.
 - (3) Remove cord assembly (16, sheet 2) and grommet from flyer's helmet (5, sheet 2).

f. Remove bladder assembly kit (18, sheet 3) per substeps below:

(1) Remove two screws and two washers from flyer's helmet (5, sheet 3).

(2) Pull bladder free from hook and pile fasteners attached to the energy absorbent liner (19, sheet 2).

(3) Remove inlet connector QD cover and pull female inlet connector QD outward allowing helmet bladder inlet tube to protrude out of flyer's helmet (5, sheet 3) pass-through hole.



Carefully cut laterally through tiedown strap head using diagonal cut pliers. Do not try to cut under strap head.

(4) Cut and remove tiedown strap securing helmet bladder inlet tube to female inlet connector QD.

NOTE

If bladder inlet tube is damaged in removal, cut through tube to ease completion of bladder removal.

(5) Remove bladder from flyer's helmet (5, sheet 3).

g. Remove chin/nape strap assembly kit (20, sheet 2) from flyer's helmet (5, sheet 2) per substeps below:

(1) Remove screws, flat washers, lock washers and flanged nuts securing the chin/nape strap assembly kit (20, sheet 2) to the rear of the flyer's helmet (5, sheet 2).

(2) Pull left and right nape straps through nape pad and chin/nape grommet and completely remove nape straps from flyer's helmet (5, sheet 2).

(3) Remove nape pad from inside of flyer's helmet (5, sheet 2).

(4) Remove nape strap clamps, as required.

(5) Remove chin strap from nape strap, as required.

h. Remove energy absorbent liner (19, sheet 2) per substeps below:



Removal of energy absorbent liner requires considerable care and work to avoid damage to the liner.

(1) Invert flyer's helmet (5, sheet 2) to expose the energy absorbent liner (19, sheet 2).

(2) With flyer's helmet (5, sheet 2) inverted on the work surface, position helmet brow area closest to the technician and insert a thin, flexible metal spatula (a 12 inch x 1 inch metal rule can be used) between the inner surface of the helmet shell and the energy absorbent liner (19, sheet 2).

NOTE

The energy absorbent liner is made up of two pieces and is removed one piece at a time.

(3) With the spatula at the center of the liner, gently pry inward and up on one piece of the energy absorbent liner (19, sheet 2) to get enough clearance to allow grasping the liner with the free hand.

(4) Remove energy absorbent liner (19, sheet 2) from flyer's helmet (5, sheet 2).

NOTE

Bayonet receiver kit is made up of two screws, two lock washers, two backplates, two spacers, and two bayonet receivers.

i. Remove bayonet receiver kit (21, sheet 3) from flyer's helmet (5, sheet 2) by removing screws, lock washers, backplates, spacers and bayonet receivers from flyer's helmet (5, sheet 2).

j. Remove visor tang receptacle kit (22, sheet 3) per substep below:

NOTE

Visor tang receptacle kit is made up of four screws, four lock washers, four nuts, and two visor tangs.

(1) Remove screws, lock washers, and nuts securing visor tangs to flyer's helmet (5, sheet 2).

k. Remove and discard three set screws (24, sheet 1) on interconnect mount (23, sheet 1). New screws shall be used for reinstallation.

l. Remove and discard four screws (25, sheet 1), then remove four washers (26, sheet 1) and interconnect mount (23, sheet 1) from flyer's helmet (5, sheet 1). New screws shall be used for reinstallation.

m. Remove upper helmet vehicle interface (4, sheet 1) from helmet/HVI (3, sheet 1) per WP00900, only if required.

n. Remove two screws (31, sheet 1) and bridge assembly (30, sheet 1) from helmet subassembly (27, sheet 1).

o. Remove snap kit (28, sheet 1) from helmet subassembly (27, sheet 1) per substep below:

(1) Remove screws, lock washers, flat washers, and nuts securing snap kit (28, sheet 1) to helmet subassembly (27, sheet 1).

p. Remove earphone pad (32, sheet 1) from shell subassembly (29, sheet 1).

3. CLEANING.

Support Equipment Required

None

Materials Required

None

a. Refer to WP00500 for cleaning.

4. INSPECTION.

Support Equipment Required

None

Materials Required

None

a. Refer to WP00500 for inspection.

5. REPAIR.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Putty Knife	GGG-K-481	81348

Materials Required

Nomenclature	Specification or Part Number
Adhesive	MMM-A-1754, NIIN 00-738-6429
Cloth, Lint-free	MIL-C-85043 TYPE 1
Emery Cloth (fine grit)	P-C-451
Isopropyl Alcohol	TT-I-735 or MIL-I-10428, NIIN 00-855-1158, NIIN 00-855-6160, NIIN 01-190-2538, NIIN 01-220-9907
Masking Tape	A-A-883 TYPE 1

6. REPLACEMENT OF REFLECTIVE TAPE. If reflective tape must be removed from helmet assembly, do substeps below:

NOTE

Removal of reflective tape requires considerable care and work.

a. To minimize damage to the surface, carefully work a beveled (not sharp) short blade putty knife under the edge of the reflective tape, stripping the sheeting from the adhesive.



ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 **1001**

b. Remove old adhesive with a lint-free cloth dampened with isopropyl alcohol.

c. Refer to INSTALLATION OF REFLECTIVE TAPE ON HELMET ASSEMBLY, WP00600 for installation of new reflective tape.

d. Document per OPNAVINST 4790.2 series. (QA)

7. REPLACEMENT OF PILE TAPE. To replace pile tape on the helmet assembly, do substeps below:

a. To minimize damage to the surface, carefully work a beveled (not sharp) short blade putty knife under the edge of the pile tape and remove from helmet assembly.



ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 1001

b. Remove old adhesive with a lint-free cloth dampened with isopropyl alcohol.

c. Refer to INSTALLATION OF PILE TAPE ON HELMET ASSEMBLY, WP00600, for installation of new pile tape.

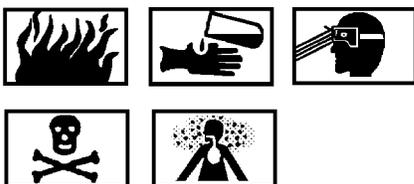
d. Document per OPNAVINST 4790.2 series. (QA)

8. HELMET SHELL REPAIR. Repairs to the helmet shell are limited to the filling of holes as a result of repositioning components on the helmet shell.

a. Prepare helmet exterior by removing reflective tape from the area surrounding holes to be filled. Sand this area lightly with fine grit emery cloth, as required.

b. Make sure helmet interior is free from components and accessible.

c. On helmet interior, firmly apply masking tape over hole(s) to be filled.



ADHESIVE, MMM-A-1754 855

d. On a clean, dry, flat surface, thoroughly stir the adhesive, making sure it is blended in a smooth, uniform color.

NOTE

Overfilling the holes with adhesive slightly will compensate for settling as it dries.

e. Using a putty knife or suitable alternate, fill holes completely with adhesive.

f. Allow adhesive to dry completely.

g. Using fine grit emery cloth, sand away excess adhesive from the helmet shell surface, as required.

h. Remove masking tape from helmet interior.

i. Refer to INSTALLATION OF REFLECTIVE TAPE ON HELMET ASSEMBLY, WP00600 for installation of new reflective tape on helmet exterior.

j. Document per OPNAVINST 4790.2 series. (QA)

9. ASSEMBLY

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
* Adapter	GTMB88A	55719
* Tip, Hex .050	120003	32652
* Tip, Hex 1/16-Inch	120116	32652
* Tip, Hex Phillips	120108	32652
* Torque Screwdriver 2 - 100 Inch-Ounce	6C486	25795

* Part of JHMCS Torque Tool Kit 3829AS110

Materials Required

Nomenclature	Specification or Part Number
Adhesive	MIL-A-46106, NIIN 00-225-4548
Primer, Sealing Compound	MIL-S-22473, GRADE T, FORM R, AEROSOL CAN, NIIN 00-181-8372
Sealing Compound	MIL-S-22473, GRADE C, COLOR BLUE, NIIN 00-964-7537, NIIN 00-081-2333, NIIN 00-823-7917
Sealing Compound	MIL-S-46163, TYPE 2, GRADE N, COLOR BLUE, NIIN 01-014-5869, NIIN 01-025-1692, NIIN 01-104-5392

a. Install interconnect mount (23, figure 1, sheet 1) on flyer's helmet (5, sheet 1) and secure with four screws (25, sheet 1) and four d-shape washers (26, sheet 1). Position straight edge of washer so as not to interfere with upper HVI ribbon cable, using 1/16-inch hex tip, adapter and torque screwdriver (P/N 6C486). Tighten four screws (25, sheet 1) to 23 - 25 inch ounces. (QA)

b. If upper helmet vehicle interface (4, sheet 1) needs to be installed, refer to WP00900 for installation procedures.

NOTE

Tighten two side set screws before tightening front set screw. Alternate tightening sequence between left and right-hand set screws to keep the Universal Connector (UC) centered in the mount prior to applying torque.

c. Install upper helmet vehicle interface into the interconnect mount (23, sheet 1) using set screws (24, sheet 1).

d. Using hex tip .050, adapter, and torque screwdriver P/N 6C486, tighten left and right screws (24, sheet 1) to 15 - 17 inch-ounces. (QA)

e. Using hex tip .050, adapter, and torque screwdriver P/N 6C486, tighten bottom set screw (24, sheet 1) to 15 - 17 inch-ounces. (QA).

f. Install earphone pad (32, sheet 1) in shell subassembly (29, sheet 1), if required.



PRIMER, SEALING COMP, MIL-S-22473, GRADE T, FORM R, AEROSOL CAN 696



SEALING COMPOUND, MIL-S-46163, TYPE 2, GRADE N, COLOR BLUE 223

g. Apply sealing compound primer and sealing compound to screws (31, sheet 1).



Allow for a small amount of white protective cushion of grommet on upper HVI cord to show before tightening.

Do not overtighten screws.

h. Attach upper HVI cord to helmet subassembly (27, sheet 1) and secure with bridge assembly (30, sheet 1) and two screws (31).

i. Using hex phillips tip, adapter, and 6C486 torque screwdriver, tighten screws (31) 89.6 to 94.4 inch-ounce allowing a small amount of grommet on upper HVI cord to show. (QA)

NOTE

Snap kit G026-1159-01 is made up of a screw, lock washer, flat washer, nut, and fastener.

j. Install snap kit (28, sheet 1) on helmet subassembly (27) per substeps below:



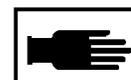
SEALING COMPOUND, MIL-S-22473, GRADE C, COLOR BLUE 163

(1) Apply sealing compound to screw.

(2) Attach fastener and screw on outside of helmet subassembly (27, sheet 1).

(3) On inside of helmet subassembly (27, sheet 1), secure fastener with flat washer, lock washer, and nut.

k. Install visor tang receptacle kit (22, sheet 3) on flyer's helmet (5, sheet 2) per substeps below:



SEALING COMPOUND, MIL-S-22473, GRADE C, COLOR BLUE 163

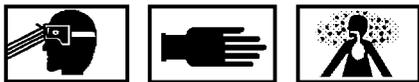
NOTE

Visor tang receptacle kit 135427-1 is made up of four screws, four lock washers, four nuts, and two visor tangs.

(1) Apply sealing compound to screws.

(2) Install visor tangs on flyer's helmet (5, sheet 2) and secure with screws, lock washers, and nuts.

1. Install bayonet receiver kit (21, sheet 3) on flyer's helmet (5, sheet 2) per substeps below:



ADHESIVE, MIL-A-46106

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NOTE

Bayonet receiver kit GW9117 is made up of two screws, two lock washers, two backplates, two spacers, and two bayonet receivers.

(1) Apply adhesive to screws.

NOTE

Each spacer should be fitted against the riveted side of the bayonet receiver.

(2) Put spacer under each bayonet receiver on flyer's helmet (5, sheet 2).

(3) Put lock washer on each screw and insert screws through the backplate and through the flyer's helmet (5, sheet 2) from the inside.

(4) Tighten screws so that bayonet receivers and spacers are firmly attached to flyer's helmet (5, sheet 2).

m. Install chin/nape strap assembly kit (20, sheet 2) on flyer's helmet (5, sheet 2) per substeps below:

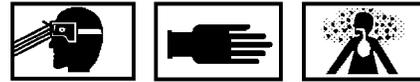
(1) Position nape pad inside flyer's helmet (5, sheet 2).

(2) Install left and right nape straps through the chin/nape grommets on flyer's helmet (5, sheet 2) from outside to inside.

NOTE

Nape straps can be carefully pushed through the nape pad using a common screwdriver.

(3) Carefully push left and right nape straps through the nape pad.



ADHESIVE, MIL-A-46106

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(4) Apply a small amount of adhesive to the first few threads of the screws (part of chin/nape strap assembly kit).

(5) Install screws, flat washers, lock washers and flanged nuts securing nape pad to the rear of the flyer's helmet (5, sheet 2).

(6) Assemble chin strap to nape strap.

(7) Install nape strap clamps on nape strap.

(8) Adjust chin/nape assembly kit (20, sheet 2), as required.

n. Install energy absorbent liner (19, sheet 2) in flyer's helmet (5) per substeps below:



Installation of energy absorbent liner requires considerable care and work to avoid damage to the liner.

NOTE

The energy absorbent liner is made up of two pieces that are installed in helmet subassembly.

(1) Correctly orientate the two pieces that make up the energy absorbent liner (19, sheet 2).

(2) Install energy absorbent liner (19, sheet 2) in flyer's helmet (5) one piece at a time, making sure not to damage liner during installation.

NOTE

For bladder assembly kit component location, refer to figure 1 in sheet 3, detail F.

o. Install bladder assembly kit (18, sheet 3) in flyer's helmet (5, sheet 2) per substeps below:

(1) If installing a new helmet bladder assembly kit (18, sheet 3), make sure pile fasteners and hook fasteners are installed properly on bladder (part of bladder assembly kit). Refer to **INSTALLATION OF HELMET BLADDER KIT, WP00600**.

(2) Insert bladder in flyer's helmet (5, sheet 2) and attach it to the fastener tabs on the energy absorbent liner (19, sheet 2).

(3) Make sure bladder lies smoothly across the surface of the energy absorbent liner (19, sheet 2) and is correctly aligned with the nape edgeroll.

(4) Make sure the helmet bladder inlet tube is oriented toward the left helmet earcup cavity.

(5) Pull helmet bladder inlet tube through the flyer's helmet (5, sheet 3) from the inside outward.

(6) Put helmet bladder inlet tube over the inlet connector QD.

(7) Push inlet connector QD flush against the flyer's helmet (5, sheet 3) exterior. Make sure there is no twisting of bladder or helmet bladder inlet tube.

(8) Secure helmet bladder inlet tube to inlet connector QD with tie down strap, making sure the head of the tie down strap is positioned on the underside of the inlet connector QD.



ADHESIVE, MIL-A-46106

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(9) Apply adhesive to two screws.

(10) Install inlet connector QD cover over inlet connector QD and secure to flyer's helmet (5, sheet 3) using two screws and two washers.

p. Install cord assembly (16, sheet 2) and jack retainer (17, sheet 2) in flyer's helmet (5, sheet 2) per substeps below:

(1) Install cord assembly (16, sheet 2) in flyer's helmet (5, sheet 2). Make sure cord assembly (16, sheet 2) grommet is correctly positioned in flyer's helmet (5) to allow jack retainer (17, sheet 2) to hook on.

(2) Install jack retainer (17, sheet 2) on cord assembly (16, sheet 2) grommet located on the outside of flyer's helmet (5).

(3) Secure cord assembly (16, sheet 2) connector in jack retainer (17, sheet 2).

q. If softseal hushkit configuration is used, install softseal hushkit (9, sheet 2), earphone (10, sheet 2) and earcup fitting padset (11, sheet 2) in flyer's helmet (5, sheet 2).

r. If standard earcup configuration is used, install RH earcup (12, sheet 2), LH earcup (13, sheet 2), earphone (10, sheet 2), foam pad (14, sheet 2), earpad seal (15, sheet 2), and earcup fitting padset (11, sheet 2) in flyer's helmet (5, sheet 2).

s. Install TPL liner kit (6, sheet 2), zetaliner (7, sheet 2), or helmet liner (8, sheet 2) in flyer's helmet (5, sheet 2).

t. Document per OPNAVINST 4790.2 series. (QA)

10. INSTALLATION.

Support Equipment Required

None

Materials Required

None

a. Position helmet display unit (2, sheet 1) over interconnect mount (23, sheet 1) on helmet/HVI (3, sheet 1) and engage HDU latch on helmet display unit (2, sheet 1).

b. Attach visor snaps securing the helmet display unit (2, sheet 1) to helmet/HVI (3, sheet 1).

c. Install visor assembly (1, sheet 1) on helmet display unit (2, sheet 1) per substeps below.

(1) Pull visor knobs apart from each other by 1/2 inch.

(2) Position visor knobs over visor bushing receivers on helmet display unit (2, sheet 1).

(3) Press visor knobs together until visor bushings are firmly seated.

(4) Gently rotate both visor knobs forward until visor knobs lock in position.

d. Functional test helmet/HVI (3, sheet 1) per NAVAIR 17-15BC-22.

e. Do HELMET BLADDER LEAKAGE TEST per WP00500, as required.

f. Test A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) per WP00400.

g. Document per OPNAVINST 4790.2 series. (QA)

11. PACKAGING.

Support Equipment Required

None

Materials Required

None

12. PACKAGING REQUIREMENTS FOR THE HELMET DISPLAY UNIT P/N 620520-01-05.

a. When a helmet display unit (2, figure 1) fails, it must be returned in a Navy reusable shipping

container P/N 15450-200, NSN 8145-01-262-2983 for packaging depot level repairables.

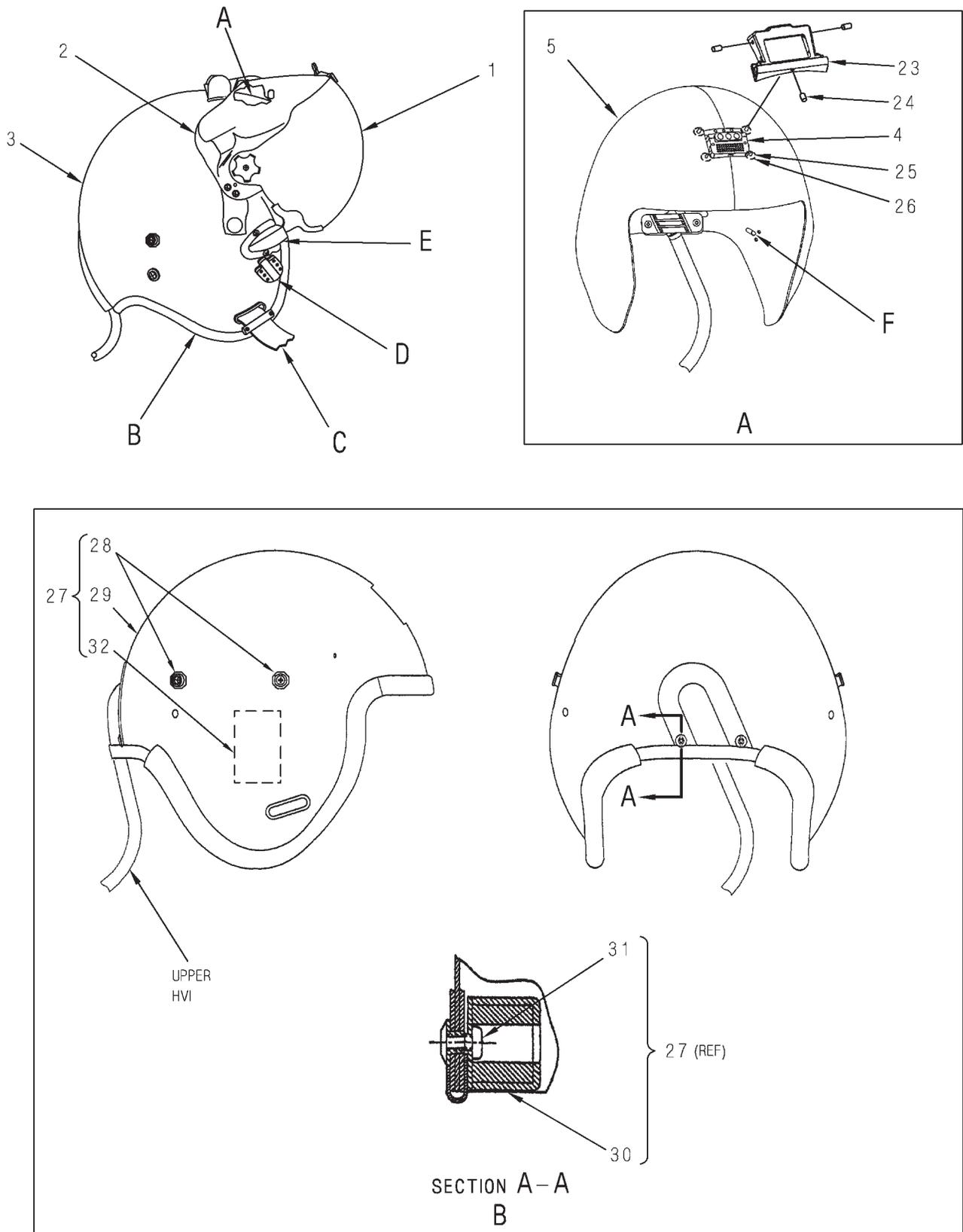
b. The helmet display unit (HDU) should be put inside a tight fitting box with enough bubble wrap to protect the HDU per MIL-STD-2073. Master Repairables Item List (MRIL) will give shipping address.

12A. PACKAGING REQUIREMENTS FOR THE HMDTS P/N 620900-02-01. When an HMDTS fails, it must be returned under the guidance called out in the MRIL for packaging and shipping instructions.

13. ILLUSTRATED PARTS BREAKDOWN.

a. For illustrated parts breakdown of the A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System), refer to figure 1

b. Refer to INTRODUCTION TO THE ILLUSTRATED PARTS BREAKDOWN, WP00200.



AFE559-39-1-008

Figure 1. A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) (Sheet 1 of 8)

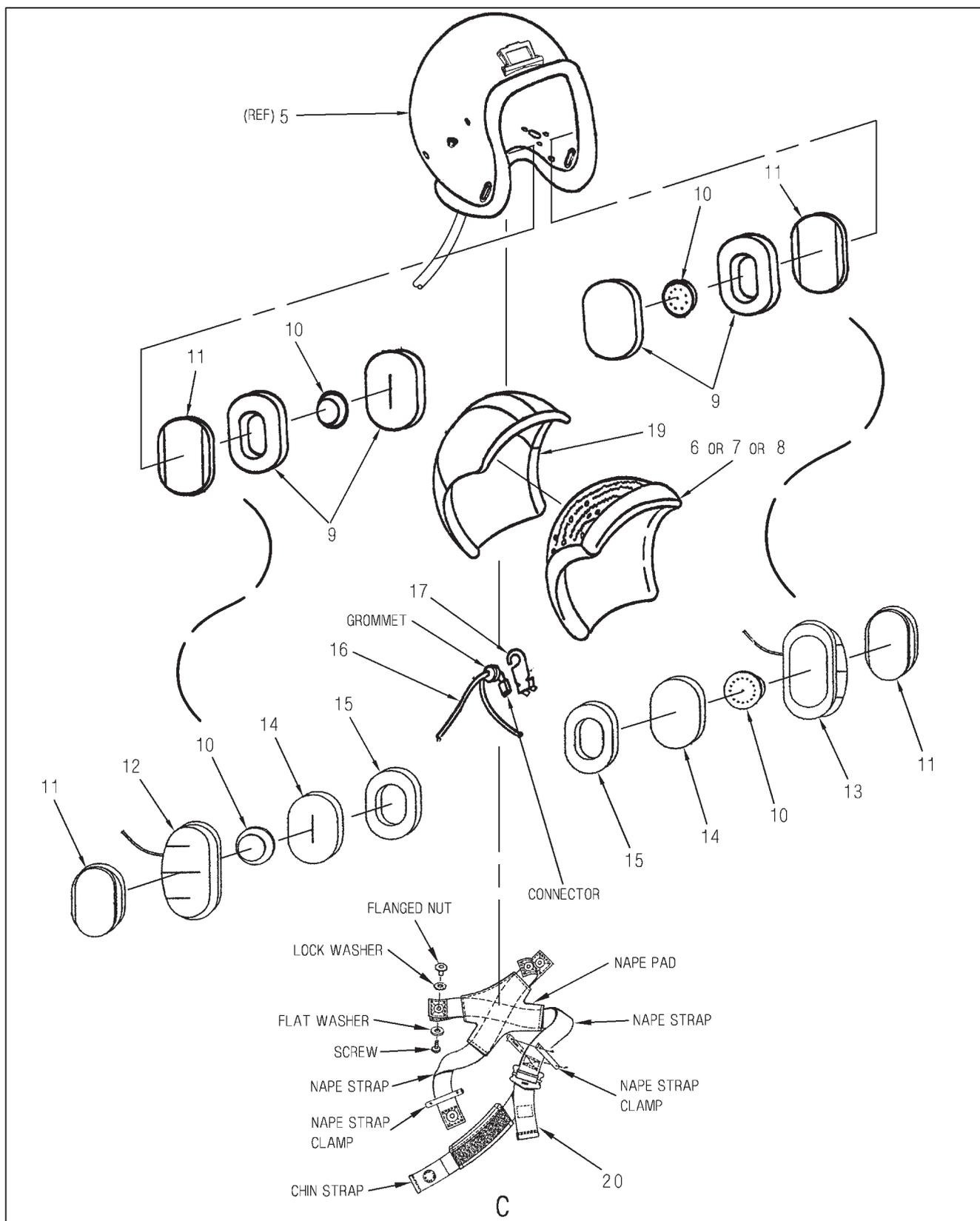
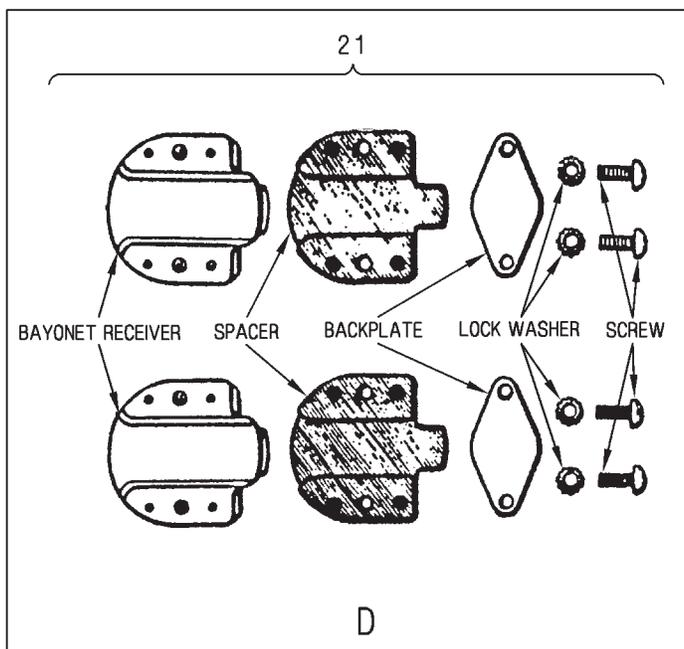
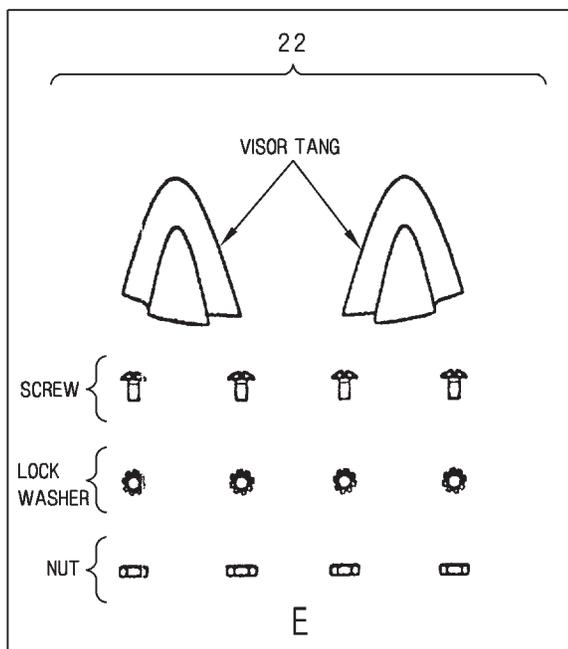
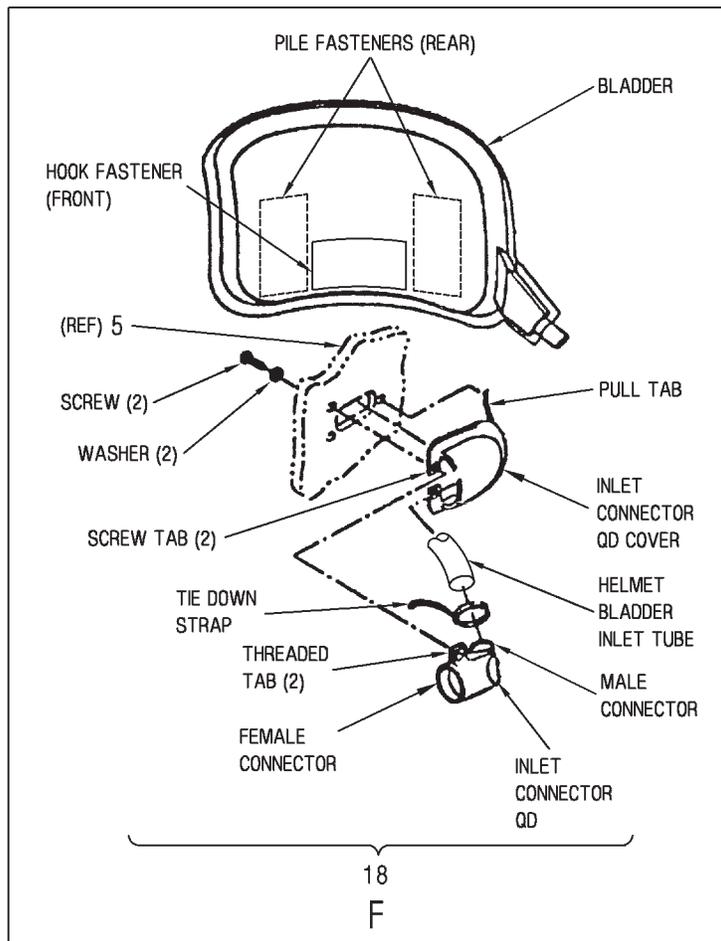


Figure 1. A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) (Sheet 2)



AFE559-39-3-008

Figure 1. A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) (Sheet 3)

INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USE ON CODE	SM&R CODE
		A/A24A-56 HELMET UNIT, INTEGRATED ... (JOINT HELMET MOUNTED CUEING SYSTEM)/06VL3/	1		
1	620530-01-01	. VISOR ASSEMBLY, CLEAR (PATCH)..... /BREAKDOWN, WP011 00/	1		PA000
	620530-03-04	. VISOR ASSEMBLY, (PATCH)..... /BREAKDOWN, WP011 00/	1		PA000
	620530-05-01	. VISOR ASSEMBLY, HIGH CONTRAST..... (PATCH)/BREAKDOWN, WP011 00/	1		PA000
2	620520-01-05	. HELMET DISPLAY UNIT (HDU)..... /BREAKDOWN, WP010 00/	1		PA00K
	135015-59	. HELMET DISPLAY UNIT (HDU) /09344/.. /BREAKDOWN, WP010 00/	1	*	PA00K
3	620510-08-05	. HELMET/HVI, MEDIUM, 98%.....	1		A0000
	620510-09-05	. HELMET/HVI, MEDIUM, 3%.....	1		A0000
	620510-06-05	. HELMET/HVI, LARGE, 98%.....	1		A0000
	620510-07-05	. HELMET/HVI, LARGE, 3%.....	1		A0000
	620510-04-05	. HELMET/HVI, X-LARGE, 98%.....	1		A0000
	620510-05-05	. HELMET/HVI, X-LARGE, 3%.....	1		A0000
4	620410-04-02	. . INTERFACE, UPPER HELMET VEHICLE.. (EXTRA LARGE 98%) /BREAKDOWN, WP009 00/	1		PA00K
	135421-8	. . INTERFACE, UPPER HELMET VEHICLE.. (EXTRA LARGE 98%) /09344/ /BREAKDOWN, WP009 00/	1	*	PA00K
	620410-05-02	. . INTERFACE, UPPER HELMET VEHICLE.. (EXTRA LARGE 3%) /BREAKDOWN, WP009 00/	1		PA00K
	135421-11	. . INTERFACE, UPPER HELMET VEHICLE.. (EXTRA LARGE 3%) /09344/ /BREAKDOWN, WP009 00/	1	*	PA00K
	620410-06-02	. . INTERFACE, UPPER HELMET VEHICLE.. (LARGE 98%) /BREAKDOWN, WP009 00/	1		PA00K
	135421-5	. . INTERFACE, UPPER HELMET VEHICLE.. (LARGE 98%) /09344/ /BREAKDOWN, WP009 00/	1	*	PA00K
	620410-07-02	. . INTERFACE, UPPER HELMET VEHICLE.. (LARGE 3%) /BREAKDOWN, WP009 00/	1		PA00K
	135421-6	. . INTERFACE, UPPER HELMET VEHICLE.. (LARGE 3%) /09344/ /BREAKDOWN, WP009 00/	1	*	PA00K
	620410-08-02	. . INTERFACE, UPPER HELMET VEHICLE.. (MEDIUM 98%) /BREAKDOWN, WP009 00/	1		PA00K
	135421-2	. . INTERFACE, UPPER HELMET VEHICLE.. (MEDIUM 98%) /09344/ /BREAKDOWN, WP009 00/	1	*	PA00K

Figure 1. A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) (Sheet 4)

INDEX NO.	PART NUMBER	DESCRIPTION							UNITS PER ASSY	USE ON CODE	SM&R CODE
		1	2	3	4	5	6	7			
	620410-09-02	.	.	INTERFACE, UPPER HELMET VEHICLE..					1		PAOOK
				(MEDIUM 3%)/BREAKDOWN, WPO09							
				00/							
	135421-3	.	.	INTERFACE, UPPER HELMET VEHICLE..					1	*	PAOOK
				(MEDIUM 3%)/09344/							
				/BREAKDOWN, WPO09 00/							
5	620540-03-00	.	.	HELMET, FLYER'S, MEDIUM.....					1		PA000
	135420-59	.	.	HELMET, FLYER'S, MEDIUM.....					1	*	PA000
				/09344/							
	620540-02-00	.	.	HELMET, FLYER'S, LARGE.....					1		PA000
	135420-49	.	.	HELMET, FLYER'S, LARGE.....					1	*	PA000
				/09344/							
	620540-01-00	.	.	HELMET, FLYER'S, X-LARGE.....					1		PA000
	135420-39	.	.	HELMET, FLYER'S, X-LARGE.....					1	*	PA000
				/09344/							
6	G026-1093-03	.	.	. KIT, TPL LINER, X-LARGE.....					1		PAOZZ
				/60240/							
	85D7087-3	.	.	. KIT, TPL LINER, X-LARGE.....					1	*	PAOZZ
				/72724/							
	G026-1093-02	.	.	. KIT, TPL LINER, LARGE.....					1		PAOZZ
				/60240/							
	85D7087-2	.	.	. KIT, TPL LINER, LARGE.....					1	*	PAOZZ
				/72724/							
	G026-1093-01	.	.	. KIT, TPL LINER, MEDIUM.....					1		PAOZZ
				/60240/							
	85D7087-1	.	.	. KIT, TPL LINER, MEDIUM.....					1	*	PAOZZ
				/72724/							
7	95162A,3A,4A,5A	.	.	. ZETALINER, X-LARGE WIDE					1		PAOZZ
	95152A,3A,4A,5A	.	.	. ZETALINER, X-LARGE.....					1		PAOZZ
	95142A,3A,4A,5A	.	.	. ZETALINER, LARGE.....					1		PAOZZ
	95132A,3A,4A,5A	.	.	. ZETALINER, MEDIUM.....					1		PAOZZ
	95122A,3A,4A,5A	.	.	. ZETALINER, SMALL.....					1		PAOZZ
8	GW9174-01	.	.	. LINER, HELMET MEDIUM /60240/...					1		PAOZZ
	85D7087-1P	.	.	. LINER, HELMET MEDIUM /60240/...					1	*	PAOZZ
				/72724/							
	GW9174-02	.	.	. LINER, HELMET LARGE /60240/....					1		PAOZZ
	85D7087-2P	.	.	. LINER, HELMET LARGE /60240/....					1	*	PAOZZ
				/72724/							
	GW9174-03	.	.	. LINER, HELMET X-LARGE /60240/..					1		PAOZZ
	85D7087-3P	.	.	. LINER, HELMET X-LARGE /60240/..					1	*	PAOZZ
				/72724/							
9	28118	.	.	. HUSHKIT, SOFTSEAL /OWY76/.....					1		PAOZZ
10	GW9291	.	.	. EARPHONE /60240/.....					2		PAOZZ
11	G026-1092-02	.	.	. PADSET-EARCUP FITTING /60240/..					1		PAOZZ
12	GW9292-01	.	.	. EARCUP, RH /60240/.....					1		PAOZZ
	90C7886-1	.	.	. EARCUP, RH /97427/.....					1	*	PAOZZ
13	GW9292-02	.	.	. EARCUP, LH /60240/.....					1		PAOZZ
	90C7886-2	.	.	. EARCUP, LH /97427/.....					1	*	PAOZZ
14	G026-1090-01	.	.	. PAD, FOAM /60240/.....					1		PAOZZ
	79C4401-1	.	.	. PAD, FOAM /97427/.....					1	*	PAOZZ
15	GW9241-01	.	.	. SEAL, EARPAD /60240/.....					1		PAOZZ

Figure 1. A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) (Sheet 5)

INDEX NO.	PART NUMBER	DESCRIPTION							UNITS PER ASSY	USE ON CODE	SM&R CODE
		1	2	3	4	5	6	7			
16	75C2990	. . .	SEAL, EARPAD /72794/.....						1	*	PAOZZ
	GW9147	. . .	CORD ASSEMBLY, ELECT /60240/...						1		PAOZZ
	M22442/37-4708	. . .	CORD ASSEMBLY, ELECT /81349/...						1	*	PAOZZ
17	G030-1046-03	. . .	RETAINER, JACK-BLACK /60240/...						1		PAOZZ
18	GW9163-01	. . .	KIT, BLADDER ASSEMBLY /60240/..						1		PAOZZ
	96D9441-1	. . .	KIT, BLADDER ASSEMBLY /97427/..						1	*	PAOZZ
19	G026-1248-03	. . .	ENERGY ABSORBENT LINER (EAL),..						1		PAOZZ
			X-LARGE /60240/								
	G026-1248-02	. . .	ENERGY ABSORBENT LINER (EAL),..						1		PAOZZ
			LARGE /60240/								
	G026-1248-01	. . .	ENERGY ABSORBENT LINER (EAL),..						1		PAOZZ
			MEDIUM /60240/								
20	GW9135-03	. . .	KIT, STRAP ASSEMBLY,.....						1		PAOZZ
			CHIN/NAPE, X-LARGE GRAY /60240/								
	90B7948-3	. . .	KIT, STRAP ASSEMBLY,.....						1	*	PAOZZ
			CHIN/NAPE, X-LARGE GRAY /72724/								
	GW9135-06	. . .	KIT, STRAP ASSEMBLY,.....						1		PAOZZ
			CHIN/NAPE, X-LARGE BLACK /60240/								
	90B7948-6	. . .	KIT, STRAP ASSEMBLY,.....						1	*	PAOZZ
			CHIN/NAPE, X-LARGE BLACK /72724/								
	GW9135-02	. . .	KIT, STRAP ASSEMBLY,.....						1		PAOZZ
			CHIN/NAPE, LARGE GRAY /60240/								
	90B7948-2	. . .	KIT, STRAP ASSEMBLY,.....						1	*	PAOZZ
			CHIN/NAPE, LARGE GRAY /72724/								
	GW9135-05	. . .	KIT, STRAP ASSEMBLY,.....						1		PAOZZ
			CHIN/NAPE, LARGE BLACK /60240/								
	90B7948-5	. . .	KIT, STRAP ASSEMBLY,.....						1	*	PAOZZ
			CHIN/NAPE, LARGE BLACK /72724/								
	GW9135-01	. . .	KIT, STRAP ASSEMBLY,.....						1		PAOZZ
			CHIN/NAPE, MEDIUM GRAY /60240/								
	90B7948-1	. . .	KIT, STRAP ASSEMBLY,.....						1	*	PAOZZ
			CHIN/NAPE, MEDIUM GRAY /72724/								
	GW9135-04	. . .	KIT, STRAP ASSEMBLY,.....						1		PAOZZ
			CHIN/NAPE, MEDIUM BLACK /60240/								
	90B7948-4	. . .	KIT, STRAP ASSEMBLY,.....						1	*	PAOZZ
			CHIN/NAPE, MEDIUM BLACK /72724/								
21	GW9117	. . .	KIT, BAYONET RECEIVER /60240/..						1		PAOZZ
	82A5614-20	. . .	KIT, BAYONET RECEIVER /72724/..						1	*	PAOZZ

Figure 1. A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) (Sheet 6)

INDEX NO.	PART NUMBER	DESCRIPTION							UNITS PER ASSY	USE ON CODE	SM&R CODE
		1	2	3	4	5	6	7			
22	135427-1	.	.	.					1		PAOZZ
											TANG /09344/
23	135391-1	.	.	.					1		PAOZZ
											/09344/
											(ATTACHING PARTS)
24	PC88037-1	.	.	.					3		PAOZZ
											SCREW, SET, CUP POINT
											/09344/
25	PC91047-24	.	.	.					4		PAOZZ
											SCREW /09344/
26	8B02052	.	.	.					4		PAOZZ
											WASHER, D-SHAPE /09344/
	10414-SS-12A	.	.	.					4	*	PAOZZ
											WASHER, D-SHAPE /51506/
											---*---
27	G026-1244-03	.	.	.					1		PAOOO
											HELMET SUBASSEMBLY,
											X-LARGE /60240/
	G026-1244-02	.	.	.					1		PAOOO
											HELMET SUBASSEMBLY,
											LARGE /60240/
	G026-1244-01	.	.	.					1		PAOOO
											HELMET SUBASSEMBLY,
											MEDIUM /60240/
28	G026-1159-01	.	.	.					1		PAOZZ
											SNAP KIT /60240/
29	G026-1241-01	.	.	.					1		XAOZZ
											SHELL SUBASSEMBLY
											MEDIUM /60240/
	G026-1241-02	.	.	.					1		XAOZZ
											SHELL SUBASSEMBLY
											LARGE /60240/
	G026-1241-03	.	.	.					1		XAOZZ
											SHELL SUBASSEMBLY
											X-LARGE /60240/
30	G026-1249-01	.	.	.					1		PAOZZ
											BRIDGE ASSEMBLY
											/60240/
31	MS51957-28B	.	.	.					2		PAOZZ
											SCREW /96906/
32	G026-1254-01	.	.	.					1		PAOZZ
											PAD, EARPHONE /60240/
33	620050-01-00	†	.	.					1		PAOOO
											HELMET BAG ASSEMBLY
34	620052-01-00	†	.	.					1		PAOZZ
											HELMET BAG
35	620054-01-00	†	.	.					1		PAOZZ
											DU BAG
36	620056-02-00	†	.	.					1		PAOZZ
											VISOR BAG
37	MF-246-1	†	.	.					1		PAOZZ
											HELMET BAG STRAPS

† NOT ILLUSTRATED.

* ALTERNATE OR EQUIVALENT PARTS. (WP002/0/INTRO)

Figure 1. A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) (Sheet 7)

**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN**

UPPER HELMET VEHICLE INTERFACE (HVI)

**PART NUMBERS 620410-04-02, 620410-05-02, 620410-06-02, 620410-07-02, 620410-08-02 AND
620410-09-02**

Reference Material

Introduction	WP002 00
Testing and Troubleshooting	WP004 00
Cleaning and Inspection	WP005 00
A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System)	WP008 00

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Upper Helmet Vehicle Interface, Figure 1	6

Record of Applicable Technical Directives

None

1. REMOVAL.

Support Equipment Required

None

Materials Required

None

a. Unlatch helmet display unit (HDU) from helmet.



Be careful when removing energy absorbing liner, ribbon-type cable runs underneath.

b. Remove earcups, TPL/zetaliner, bladder assembly kit, and energy absorbing liner from helmet per **DISASSEMBLY, WP00500**

c. Loosen set screws (1, **figure 1** sheet 2) on interconnect mount.

d. Remove and discard screws (3, sheet 2) from helmet clamp. New screws shall be used for reinstallation.

e. Remove upper helmet vehicle interface (HVI) from helmet.

2. CLEANING.

Support Equipment Required

None

Materials Required

None

a. Refer to **WP00500** for cleaning.

3. INSPECTION.

Support Equipment Required

None

Materials Required

None

a. Refer to **WP00500** for inspection.

4. INSTALLATION.

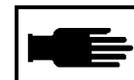
Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
* Adapter	GTMBS8A	55719
* Tip, Hex Phillips	120108	32652
* Tip, Hex .050	120003	32652
* Torque Screwdriver	6C486	25795
2 - 100 Inch-Ounce		

* Part of JHMCS Torque Tool Kit 3829AS110

Materials Required

Nomenclature	Specification or Part Number
Primer, Sealing Compound	MIL-S-22473, GRADE T, FORM R, AEROSOL CAN, NIIN 00-181-8372
Sealing Compound	MIL-S-46163, TYPE 2, GRADE N, COLOR BLUE, NIIN 01-014-5869, NIIN 01-025-1692, NIIN 01-104-5392



PRIMER, SEALING COMP, MIL-S-22473, GRADE T, FORM R, AEROSOL CAN 696



SEALING COMPOUND, MIL-S-46163, TYPE 2, GRADE N, COLOR BLUE 223

a. Apply sealing compound primer and sealing compound to screws (3, sheet 2).

b. Attach upper HVI to helmet shell using bridge assembly and screws (3, sheet 2).

c. Align raised notch on bridge assembly with groove on grommet.



Allow for a small amount of white protective cushion of grommet on upper HVI to show before tightening.

Do not overtighten screws.

d. Using hex phillips tip, adapter, and torque screwdriver P/N 6C486, tighten screws (3, sheet 2) 89.6 to 94.4 inch-ounce securing bridge assembly. (QA)

NOTE

When installing upper helmet vehicle interface, tighten two side set screws before tightening front set screw. Alternate tightening sequence between left and right-hand set screws to keep the universal connector (UC) centered in the mount prior to applying torque.

e. Install upper helmet vehicle interface into the interconnect mount using set screws (1, sheet 2).



Do not overtighten screws.

f. Using hex tip .050, adapter, and torque screwdriver P/N 6C486, tighten left and right-hand screws (1, sheet 2) to 15 - 17 inch-ounces. (QA)

g. Using hex tip .050, adapter, and torque screwdriver P/N 6C486, tighten bottom set screw (1, sheet 2) to 15 - 17 inch-ounces. (QA)

h. Inspect lower center of universal connector to make sure there is no gap between the universal connector and interconnect mount.

i. Make sure helmet assembly interconnect is correctly installed. (QA)

j. Install energy absorbing liner, bladder assembly kit, TPL/zetaliner, and earcups into helmet assembly per ASSEMBLY, WP00800.

k. Position HDU over universal connector and engage HDU latch.

l. Test helmet mounted display with HMD Test Set per WP00400.

m. Document OPNAVINST 4790.2 series. (QA)

5. REPLACEMENT.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
HRC/IRC Remate Pin	189-0494	99747
Needle Nose Pliers	9-45172	53800
QDC Removal/ Insertion Tool	189-0431	99747
Magnifying Glass	GP200	17866
Scissors	3452	70574
Tweezers	9-45335	53800

Materials Required

Nomenclature	Specification or Part Number
Brush, Soft	A-A-2076 TYPE 1
Canned Air	MS-222
Cloth, Lint-free	MIL-C-85043 TYPE 1
Cotton Tip Swab	GG-A-616
Isopropyl Alcohol	TT-I-735, or MIL-I-10428, NIIN 00-855-1158, NIIN 00-855-6160, NIIN 01-190-2538, NIIN 01-220-9907
Primer, Sealing Compound	MIL-S-22473, GRADE T, FORM R, AEROSOL CAN, NIIN 00-181-8372
Seal (QDC), Highvolt	189-0638
Seal (UC), Highvolt	008-017-03
Sealing Compound	MIL-S-46163, TYPE 2, GRADE N, COLOR BLUE, NIIN 01-014-5869, NIIN 01-025-1692, NIIN 01-104-5392
String, Lacing	MIL-T-43435
Tape, Silicone Rubber	MIL-I-23594

6. HVI QDC HIGH VOLTAGE SEAL REPLACEMENT.



Replacement of seals will be done on a 90 day interval to prevent damage to equipment.

Do not try to reuse seals if loose or if seal pops out.

a. Insert the QDC Removal/Insertion tool in the seal (4, sheet 2) until it bottoms out. Disengage seal (4, sheet 2) from cavity by working the seal easily up the seal cavity. Using needle nose pliers, remove the seals (4, sheet 2) being careful not to nick or scratch the contacts and/or receptacle insulator cavities that enclose the interfacial seals. Dispose of old seals.



ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 1001

b. Visually inspect the receptacle insulator cavities using a magnifying glass. Remove any dirt particles, lint, or cloth fibers by brushing with isopropyl alcohol. Blow out cavity using canned air. Allow connector to air dry for 10 minutes minimum before assembling rubber interfacial seals.

c. Visually inspect seals (4, sheet 2) using a magnifying glass.

d. If seals (4, sheet 2) require cleaning, clean using a cotton tip swab dipped in isopropyl alcohol for inside the seal, and wipe the outside with a lint-free cloth dipped in isopropyl alcohol. Inspect seals (4, sheet 2) to make sure the cloth fibers from the cotton tip swab or lint-free cloth do not exist. Allow seals to air dry for approximately 10 minutes.

e. Install seals (4, sheet 2) with the large end up in cavity and push with fingers until flush with the mating face. Push seals (4, sheet 2) the remaining distance using QDC Removal/Insertion tool being careful not to damage pin. The seal should be recessed below face of insulator and inside diameter of the seal should not be distorted.

f. Do TESTING per WP00400.

g. Document per OPNAVINST 4790.2 series. (QA)

7. HVI UC SEAL REPLACEMENT.



Replacement of seals will be done on a 90 day interval to prevent damage to equipment.

Do not try to reuse seals if loose or if seal pops out.

a. Using a small pair of tweezers or needle nose pliers, remove three rubber seals (2, sheet 2) being careful not to nick or scratch the pin contacts and/or receptacle insulator cavities that enclose the interfacial seals. Dispose of old seals.



ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 1001

b. Visually inspect the receptacle insulator cavities using a magnifying glass. Remove any dirt particles, lint, or cloth fibers by brushing with isopropyl alcohol. Allow connector to air dry for 10 minutes minimum before assembling rubber interfacial seals.

c. Visually inspect seals (2, sheet 2) using a magnifying glass.

d. If the seals (2, sheet 2) require cleaning, clean using cotton tip swab dipped in isopropyl alcohol for inside the seal and wipe the outside with a lint-free tissue dipped in isopropyl alcohol. Inspect seals (2, sheet 2) to make sure cloth fibers from the cotton tip swab or tissue do not exist. Allow seals to air dry for approximately 10 minutes.

e. Install seals (2, sheet 2) with large end up in cavity and push with fingers until flush with the mating face. Push seals (2, sheet 2) the remaining distance using a plastic tool taking care not to damage pin. The seal should be recessed below face of insulator and inside diameter of the seal should not be distorted.

f. Do TESTING per WP00400.

g. Document per OPNAVINST 4790.2 series. (QA)

8. HVI BRAIDING REPAIR PROCEDURE.

a. Inspect nomex braiding for tears, holes, or fraying. If more than 3 strands of underlying wire braiding (under material overbraid) is damaged return HVI for repair. If nomex braiding is no longer attached to strain relief or is worn 360 degrees in any area allowing nomex braiding to move up and down on metal braiding freely, return HVI for repair.

b. Wooling is acceptable but fiber strains greater than 1/4 inch should be removed using scissors or by searing using a heat source. If braiding is frayed more than a 1/2 inch, complete the below repair to damaged area:

(1) Remove excess braid material from damaged area using scissors.

(2) Using self-bonding silicone rubber tape (boot tape), start tape wrap approximately 1 inch above the damaged area. Use 50% overlap following guideline on tape while wrapping. Tape wrapping guideline should not be visible. Extend wrap 1 inch below damaged area. Taping on connectors is acceptable, but do not tape over HRC/IRC connector.

(3) Tie off using lacing string at both ends of the repair. Tying off over the boot is acceptable.

c. Document per OPNAVINST 4790.2 series. (QA)

9. HRC/IRC REMATE PROCEDURE.

a. Inspect connectors for bent pins or foreign objects.

NOTE

Audible click verifies correct mating of HRC/IRC pin.

b. Firmly grasping both connectors, make sure they are correctly aligned and remate using enough force to press the remate pin into latching clip within the connector. Listen for audible click to verify correct mating.

c. If connector continues to disconnect, complete HRC/IRC Pin Replacement Procedure.

10. HRC/IRC PIN REPLACEMENT PROCEDURE.

a. Unscrew HRC/IRC remate pin (5, sheet 2) using pliers.



PRIMER, SEALING COMP, MIL-S-22473, GRADE T, FORM R, AEROSOL CAN

696



SEALING COMPOUND, MIL-S-46163, TYPE 2, GRADE N, COLOR BLUE

223

b. Apply a small amount of sealing compound primer and sealing compound to new HRC/IRC remate pin (5, sheet 2) threads.

c. Insert HRC/IRC remate pin (5, sheet 2) in cavity and finger tighten.

d. Inspect connectors for bent pins or foreign objects.

NOTE

Audible click verifies correct mating of HRC/IRC pin.

e. Firmly grasping both connectors, make sure they are correctly aligned and remate using enough force to press the HRC/IRC remate pin (5, sheet 2) in latching clip within the connector. Listen for audible click to verify correct mating.

f. If connector continues to disconnect, return to depot for repair.

g. Document per OPNAVINST 4790.2 series. (QA)

11. ILLUSTRATED PARTS BREAKDOWN.

a. For illustrated parts breakdown of the upper helmet-vehicle interface, refer to figure 1

b. Refer to INTRODUCTION TO THE ILLUSTRATED PARTS BREAKDOWN, WP00200.

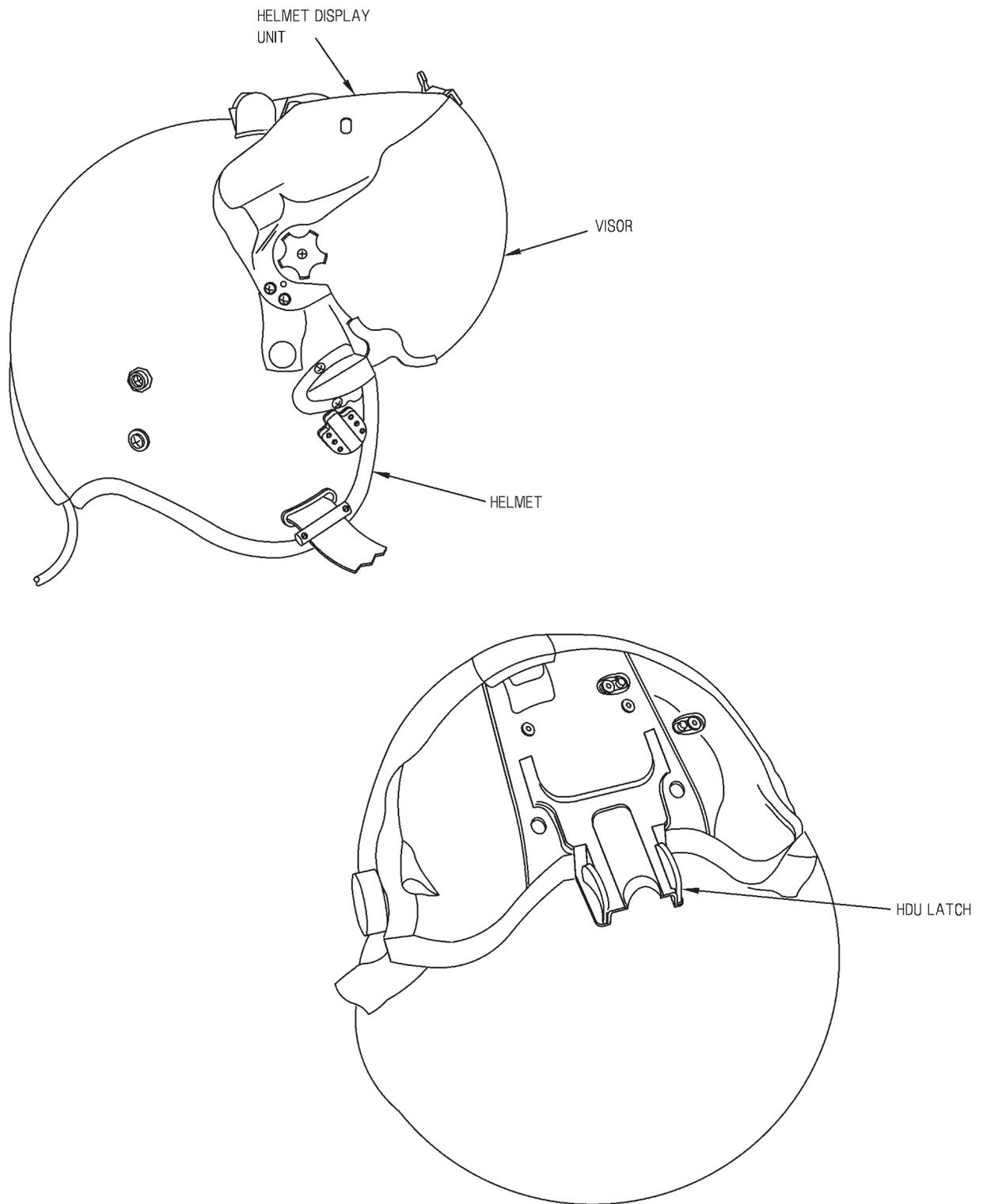


Figure 1. Upper Helmet Vehicle Interface, Part Numbers 620410-04-02, 620410-05-02, 620410-06-02, 620410-07-02, 620410-08-02 and 620410-09-02 (Sheet 1 of 3)

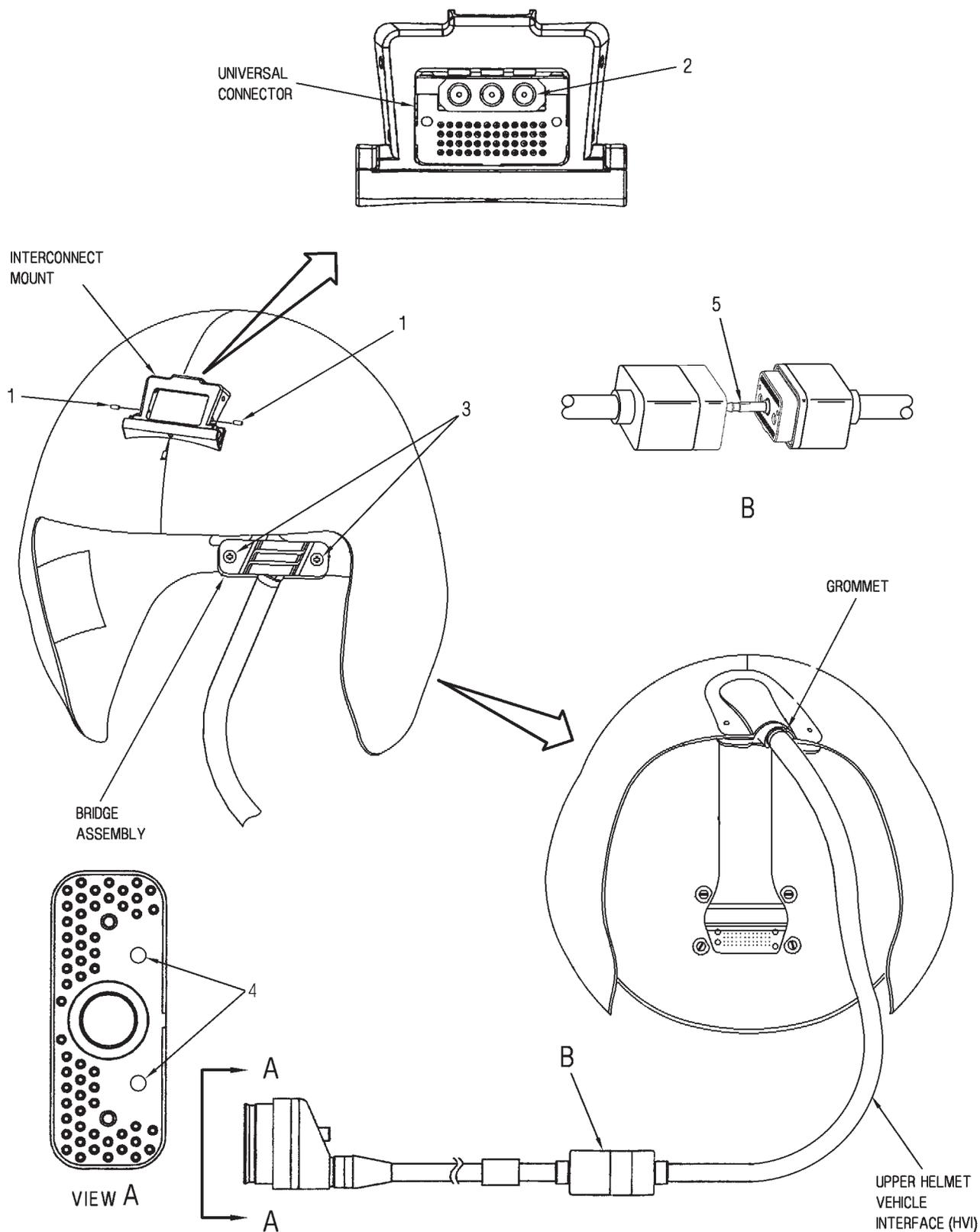


Figure 1. Upper Helmet Vehicle Interface (Sheet 2)

INDEX NO.	PART NUMBER	DESCRIPTION							UNITS PER ASSY	USE ON CODE	SM&R CODE
		1	2	3	4	5	6	7			
	620410-04-02	.	.	INTERFACE, UPPER HELMET					REF		PAOOK
				VEHICLE (EXTRA LARGE 98%)							
				/06VL3//NHA,WP008/							
	135421-8	.	.	INTERFACE, UPPER HELMET					REF	*	PAOOK
				VEHICLE (EXTRA LARGE 98%)							
				/09344//NHA,WP008/							
	620410-05-02	.	.	INTERFACE, UPPER HELMET					REF		PAOOK
				VEHICLE (EXTRA LARGE 3%)							
				/06VL3//NHA,WP008/							
	135421-11	.	.	INTERFACE, UPPER HELMET					REF	*	PAOOK
				VEHICLE (EXTRA LARGE 3%)							
				/09344//NHA,WP008/							
	620410-06-02	.	.	INTERFACE, UPPER HELMET					REF		PAOOK
				VEHICLE (LARGE 98%) /06VL3/							
				/NHA,WP008/							
	135421-5	.	.	INTERFACE, UPPER HELMET					REF	*	PAOOK
				VEHICLE (LARGE 98%) /09344/							
				/NHA,WP008/							
	620410-07-02	.	.	INTERFACE, UPPER HELMET					REF		PAOOK
				VEHICLE (LARGE 3%) /06VL3/							
				/NHA,WP008/							
	135421-6	.	.	INTERFACE, UPPER HELMET					REF	*	PAOOK
				VEHICLE (LARGE 3%) /09344/							
				/NHA,WP008/							
	620410-08-02	.	.	INTERFACE, UPPER HELMET					REF		PAOOK
				VEHICLE (MEDIUM 98%) /06VL3/							
				/NHA,WP008/							
	135421-2	.	.	INTERFACE, UPPER HELMET					REF	*	PAOOK
				VEHICLE (MEDIUM 98%) /09344/							
				/NHA,WP008/							
	620410-09-02	.	.	INTERFACE, UPPER HELMET					REF		PAOOK
				VEHICLE (MEDIUM 3%) /06VL3/							
				/NHA,WP008/							
	135421-3	.	.	INTERFACE, UPPER HELMET					REF	*	PAOOK
				VEHICLE (MEDIUM 3%) /09344/							
				/NHA,WP008/							
1	PC88037-1	.		SCREW, SET, CUP POINT /09344/					3		PAOZZ
2	008-017-03	.		SEAL (UC), HIGHVOLT /0LE36/					3		PAOZZ
	620490-01-00	.		SEAL (UC), HIGHVOLT					3	*	PAOZZ
3	MS51957-28B	.		SCREW, MACHINE /96906/					2		PAOZZ
4	189-0638	.		SEAL (QDC), HIGHVOLT /99747/					2		PAOZZ
	620480-01-00	.		SEAL (QDC), HIGHVOLT					2	*	PAOZZ
5	189-0494	.		HRC/IRC REMATE PIN /99747/					1		PAOZZ

* ALTERNATE OR EQUIVALENT PARTS. WP002/INTRO)

Figure 1. Upper Helmet Vehicle Interface (Sheet 3)

**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN**

**HELMET DISPLAY UNIT (HDU)
PART NUMBER 620520-01-05**

Reference Material

Introduction	WP002 00
Testing and Troubleshooting	WP004 00
Cleaning and Inspection	WP005 00
Visor Assembly	WP011 00

Alphabetical Index

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Disassembly	2
Helmet Display Unit (HDU), Figure 2	11
Illustrated Parts Breakdown	9
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Squadron JHMCS Helmet Display Unit (HDU) Usage Log, Figure 1	10

Record of Applicable Technical Directives

None

1. REMOVAL.

Support Equipment Required

None

Materials Required

None



Be careful not to scratch or damage helmet visor when removing from HDU.

a. Remove visor from helmet display unit (HDU), [figure 2](#), per [substeps](#) below.

- (1) Gently rotate both visor knobs backward.
- (2) Pull visor knobs away from HDU.
- (3) Lift visor away from HDU.



Be sure correct maintenance practices are followed when working with electrostatic sensitive devices (ESD) ([WPO 200](#)).

b. **ESD** Remove Helmet Display Unit (HDU) from helmet assembly by releasing visor snaps and unlatching universal connector with HDU latch.

2. **ESD** DISASSEMBLY.

Support Equipment Required

None

Materials Required

None

a. Remove two hex screws (3, [figure 2](#), sheet 2) and washers (4, sheet 2) from the characterization CCA.

NOTE

CRT characterization CCA is attached to the microcontroller CCA board. Some

jiggling may be required to separate the two boards.

b. Remove characterization CCA from microcontroller CCA.

c. Remove two screws (7, sheet 1).



Do not remove the puppers from the HDU when removing the CRT assembly. This will cause misalignment.

NOTE

CRT Assembly Screw/Washer Set 620592-01-00 is made up of a socket head set screw, hexagon socket button head cap screws, wave washers, and button head cap screws.

d. Move the CRT assembly (1, sheet 2) and relay optics assembly (11, sheet 2) to access set screw (2, sheet 2).

e. Remove two captive screws from high voltage connector.

f. Remove four screws (5, sheet 1) and four washers (6, sheet 1).

g. Loosen universal connector on HDU assembly.

h. Remove tie-wrap from high voltage connector wiring.

i. Remove high voltage connector.

j. Remove set screw (2, sheet 2).



Do not use CRT cable assembly to turn CRT.

k. Rotate the CRT assembly (1, sheet 2) ccw 1/4 turn and carefully remove the CRT assembly (1, sheet 2) from the relay optics assembly (11, sheet 2).

l. Remove left or right strap (8, sheet 1) by removing attaching hardware, as required.



Removing purge valves and preformed packings will cause moisture to enter relay optics assembly. Remove purge valves and preformed packings only if purging of relay optics assembly is required.

m. Remove purge valve screw (9) and preformed packing (10) from relay optics assembly (11) only if purging of relay optics assembly (11) is required. Refer to WP012000 for relay optics assembly purging.

3. CLEANING.

Support Equipment Required

None

Materials Required

None



CRT assembly is fragile and can be damaged easily. Be careful in handling CRT to prevent scratching. Do not use abrasive cleaners or polish on CRT assembly.

a. Refer to WP005000 for cleaning.

4. INSPECTION.

Support Equipment Required

None

Materials Required

None

a. Refer to WP005000 for inspection.

5. ESD ASSEMBLY.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
* Adapter	GTMB88A	55719
* Tip, Hex .035	.5H.035-.5	32652
* Tip, Hex .050	120003	32652
* Tip, Hex .050 (Tip Extended)	.75H050-.865	32652

Support Equipment Required (Continued)

Nomenclature	Type Designation/ Part Number	CAGE
* Tip, Hex 1/16	120116	32652
* Torque Screwdriver Preset 2 Inch- Ounce	020074	32652
* Torque Screwdriver 2 - 100 Inch- Ounce	6C486	25795
* Part of JHMCS Torque Tool Kit 3829AS110		

Materials Required

Nomenclature	Specification or Part Number
Primer, Sealing Compound	MIL-S-22473, GRADE T, FORM R, AEROSOL CAN, NIIN 00-181-8372
Sealing Compound	MIL-S-46163, TYPE 2, GRADE N, COLOR BLUE, NIIN 01-014-5869, NIIN 01-025-1692, NIIN 01-104-5392

a. Install right or left strap (8, figure 2) sheet 1) on HDU and secure with attaching hardware.



Be careful not to touch end of CRT assembly. Do not apply lubricant to CRT assembly.

b. Insert CRT assembly (1, sheet 2) in the relay optics assembly (11, sheet 2).

c. Rotate the CRT assembly (1, sheet 2) clockwise 1/4 turn.



Do not over tighten set screw (2, sheet 2).

NOTE

CRT Assembly Screw/Washer Set 620592-01-00 is made up of a socket head set screw, hexagon socket button head cap screws, wave washers, and button head cap screws.

d. Using hex .035 tip and 020074 torque screwdriver, torque set screw (2, sheet 2) on CRT assembly (1, sheet 2) to 1-3 inch-ounce. (QA)

e. Install high voltage connector using two captive screws.

f. Using hex .050 tip, adapter, and 6C486 torque screwdriver, torque two captive screws to 31 - 33 inch-ounce. (QA)

g. Apply sealing compound primer and sealing compound on top of captive screws.

h. Attach characterization CCA to microcontroller CCA using two washers (4, sheet 2) and two hex screws (3, sheet 2).



Do not over tighten hex screws (3, sheet 2).

i. Using hex .050 tip, adapter, and 6C486 torque screwdriver, torque hex screws (3, sheet 2) to 15 - 17 inch-ounce. (QA)

j. Install universal connector using four screws (5, sheet 1) and four washers (6, sheet 1).



PRIMER, SEALING COMP, MIL-S-22473, GRADE T, FORM R, AEROSOL CAN **696**



SEALING COMPOUND, MIL-S-46163, TYPE 2, GRADE N, COLOR BLUE **223**

k. Apply sealing compound primer and sealing compound to screws (5, sheet 1).

l. Using hex .050 (tip extended) tip, adapter, and 6C486 torque screwdriver, torque screws (5, sheet 1) to 47 - 49 inch-ounce. (QA)

m. Install two screws (7, sheet 1) securing relay optics assembly (11, sheet 2).

n. Using hex 1/16 tip, adapter, and 6C486 torque screwdriver, torque screws (7, sheet 1) to 31 - 33 inch-ounce. (QA)

o. Document per OPNAVINST 4790.2 series. (QA)

6. INSTALLATION.

Support Equipment Required

None

Materials Required

None

a. Inspect HDU for obstructions and pinched wires.

b. **ESD** Attach HDU to helmet with HDU latch and visor fastener snaps.

c. Install visor on HDU per substeps below.

(1) Pull visor knobs apart from each other by 1/2 inch.

(2) Position visor knobs over visor bushing receivers on HDU.

(3) Press visor knobs together until visor bushings are firmly seated.

(4) Gently rotate both visor knobs forward until visor knobs lock in position.

d. [Test using HMDTS per WP00400.](#)

7. CONTROLS OF THE HMDTS USED FOR CAMERA OFFSET ADJUSTMENT WINDOW.

Support Equipment Required

None

Materials Required

None

8. **ABORT.** The ABORT control button is available both on the main window used for HMD testing and on the main window used for Camera Offset Adjustments. The ABORT [Esc] control button is also part of the two warning windows. Selecting ABORT ends testing or camera alignment and shuts down the high voltages to the HMD. At completion

of the ABORT sequence, the PC monitor shows the desktop display under the Windows operating system.

9. SHOW LIMITS. Checking the box (clicking with the PC mouse) causes the maximum allowable camera offsets to appear as an overlay on the PICTORIAL REPRESENTATION OF OVERLAY OFFSET display of the main window. The allowable offsets range is displayed as a rectangular outline, or part thereof, red in color, on the display. Unchecking the box (clicking with the PC mouse to remove the check mark) causes the maximum allowable camera offsets to not be displayed.

10. RESET TO FACTORY. Selecting RESET TO FACTORY is the first step in a process that modifies the HMD's Display Unit microcontroller Electronically Erasable Programmable Read-Only Memory (EEPROM). At the completion of the RESET TO FACTORY sequence, the initial factory values for camera offset are stored in the HDU as the current camera offset values.

11. COMMIT. Selecting COMMIT is the first step in a process that stores new values for current azimuth and elevation offset in the HMD'S DU EEPROM. At the completion of the COMMIT initiated sequence, the offset values entered by the operator are stored in the HDU as the current camera offsets.

12. OK. The OK control button is used on multiple windows. Selecting the OK button using the mouse or typing RETURN closes the current window and takes the operator to the next step in the camera alignment sequence.

13. PROCEED. The PROCEED [F8] control button is used on two different warning windows. Selecting PROCEED or typing the F8 function key while either of these windows are displayed causes the software to go to the next step in the camera alignment process.

14. DIRECTION CONTROLS. Two direction control windows, one for cross offset in elevation and one for cross offset in azimuth, are part of the main window. By clicking on the direction window for "Cross Offset Azimuth" the operator can select between adjusting the offset in the LEFT or the RIGHT direction. By clicking on the direction window for CROSS OFFSET AZIMUTH the operator can select between adjusting the offset in

the UP or DOWN direction.

Also, the operator may position the current aiming cross by clicking on and dragging the aiming cross symbol. The direction control windows automatically updates, as required, as the aiming cross is moved.

15. MAGNITUDE CONTROLS. Two sets of magnitude controls, one for cross offset in elevation and one for cross offset in azimuth, are part of the main window. Clicking on the increment (top) arrow increases the value displayed in the magnitude window by one milliradian for each click. Each click will also change the position of the current aiming cross on the PICTORIAL REPRESENTATION OF OVERLAY OFFSET window by one milliradian in the direction indicated by the direction control

The cross offset values are constrained to zero and positive whole numbers. For that reason, the decrement (bottom) arrow will decrease the offset, by one milliradian for each click, provided a positive value is currently displayed. The decrement arrow has no effect if the relative offset magnitude displayed is zero.

The HMD EEPROM is not updated as the offset magnitude values are manipulated. Either the RESET TO FACTORY or the COMMIT control buttons must be selected to start an update to the EEPROM stored offset values.

The value in a magnitude window may be changed by clicking in the window using the PC mouse and typing in a new value using the keyboard.

The value in a magnitude window may be changed by clicking in the window using the PC mouse and using the main keyboard LEFT and RIGHT (for azimuth) or UP and DOWN (for elevation) arrows to increase and decrease the error values.

16. PICTORIAL REPRESENTATION OF OVERLAY OFFSET. The PICTORIAL REPRESENTATION OF OVERLAY OFFSET is located in the upper right side of the Camera Offset Adjustment Window. This window provides the operator with a graphic representation of offset, in milliradians, between an outside world reference (yellow) and the current aiming cross (green). When the Camera Offset Adjustment Window is first displayed, the Outside World Reference and the Current Aiming Cross are superimposed. When

superimposed the Outside World Reference is visible and the Current Aiming Cross is hidden from view.

The maximum valid offset range may be displayed as a red rectangular outline on the PICTORIAL REPRESENTATION OF OVERLAY OFFSET, by checking the SHOW LIMITS checkbox.

17. OFFSETS RELATIVE TO PREVIOUS SETTINGS WINDOW. The magnitude in milliradians and direction for the OFFSETS RELATIVE TO PREVIOUS SETTINGS are displayed in the upper left section of the Camera Offset Adjustment Window.

The magnitude windows, one for CROSS OFFSET AZIMUTH and one for CROSS OFFSET ELEVATION display the value, in milliradians, of the offset error entered by the operator.

One direction window indicates whether the current aiming cross offset for Azimuth is in the RIGHT or the LEFT direction. One direction window indicates whether the current aiming cross offset for Elevation is in the UP or the DOWN direction.

18. SOFTWARE CONTROL/VERSION NUMBER. The HMDTS software version for the camera alignment capability is shown at the top of the Camera Offset Adjustment Window. The operator should refer to this number in any reports issued.

19. OPERATION FOR CAMERA ALIGNMENT. This section gives the step-by-step instructions to adjust camera alignment offsets using the HMDTS.

Support Equipment Required

Nomenclature	Part Number or Type Designation	CAGE
Computer	COMMERCIAL	N/A
Helmet Display Unit	620992-01-00	06VL3
Test Set Cable		
Helmet Mounted	620900-02-01	06VL3
Display Test Set		
QMB	178-5936	99747

Materials Required

None

NOTE

The HMDTS is operated in either helmet mounted display test or camera alignment mode. The HMDTS is not designed to do both functions simultaneously. Before launching the helmet test software, close the camera alignment software on the PC. Before launching the camera alignment software, close the helmet test software on the PC.

This procedure assumes that the HMDTS and HMD have been connected and started as described in WP004 00 before the beginning of this sequence.

To produce and use new camera offset values, the operator must complete two tasks. One before and one after using the camera alignment procedure away from the HMDTS. Before entering the offset error (in milliradians), this error must be determined using the camera video playback capability. This is not a HMDTS function. After entering new camera offset values, the operator must force the system to read and use the new values by rotating a different HMD through the system.

- a. Connect HMD to HMDTS. (WP004 00)
- b. Select the JHMCS Camera Alignment icon for the desktop window of the PC.
- c. The JHMCS Camera Alignment Program Window will be displayed. Select OK to continue.
- d. A warning Window automatically appears. Select the PROCEED [F8] control button to continue. If the operator does not have the values desired for updated camera offsets, select the ABORT control button or ESC key to exit the camera alignment software and remove power from the HMD.
- e. A window automatically appears and then closes on the PC monitor asking the operator to "Please Wait While DU Memory is Being Read...".
- f. The Camera Offset Adjustment Screen appears on the PC monitor.
- g. The operator may take one of three actions:

(1) Enter new camera offset values and program them into the HDU.

(2) Restore the camera offset values to the initial factory settings.

(3) Terminate the camera alignment software without updating the HDU memory.

20. ENTERING NEW CAMERA OFFSET VALUES.

NOTE

The operator should enter the camera offset error as it appeared in the debrief camera video. For example, if the camera

registration (symbology) appeared up and left of the outside world reference, the aiming cross (green) in the PICTORIAL REPRESENTATION OF OVERLAY OFFSET should be placed in the upper left quadrant.

a. Refer to [table 1](#) to determine the offset direction required (upper left) to move the current aiming cross into the desired quadrant.

Table 1. Quadrant Desired Versus Offset Direction

Quadrant Desired	Cross Offset Azimuth Direction	Cross Offset Elevation Direction
Upper Right	RIGHT	UP
Lower Right	RIGHT	DOWN
Lower Left	LEFT	DOWN
Upper Left	LEFT	UP

b. Click on the CROSS OFFSET AZIMUTH DIRECTION window to toggle between RIGHT and LEFT directions.

c. Click on the CROSS OFFSET ELEVATION DIRECTION window to toggle between UP and DOWN.

d. Enter the Azimuth and Elevation Cross Offset Values. There are four ways to do this:

(1) The first method is to click on the increment (top) arrow to the left of the azimuth magnitude window or the elevation magnitude window. Each click increases the offset magnitude value by one and moves the aiming cross by one milliradian on the PICTORIAL REPRESENTATION OF OVERLAY OFFSET. If too large a number is entered, use the decrement (bottom) arrow to decrease the magnitude by one milliradian per click.

(2) The second method is to drag the current aiming cross to a new location on the PICTORIAL REPRESENTATION OF OVERLAY OFFSET. This method updates both Azimuth and Elevation offset values simultaneously.

(3) The third method is to double click in a magnitude window (azimuth or elevation) and type a value on the keyboard followed by the enter key.

(4) The fourth method is to select the contents a magnitude window and use the main keyboard arrow keys (left and right arrows for azimuth; up and down arrows for elevation) to increase and decrease the error value.

NOTE

The cross offset values are constrained to zero and positive whole numbers. The decrement (bottom) arrow will decrease the magnitude value as long as a positive

value is displayed. The decrement arrow has no effect if the magnitude displayed is zero.

e. Verify that the correct offset values are entered and that the offsets are in the desired direction.

f. If the offset adjustment limits are not shown, inspect the SHOW LIMITS box on the Camera Offset Adjustment Window. The offset limits are displayed as a red rectangular outline. Verify that the entered offset values are within the limits (inside the rectangle).

g. Select the COMMIT control button. If "Error - Cannot Proceed: New Offset Location Resides Outside Limit Region!" appears, the HDU memory has not been updated. Select OK [Return]. Go to [paragraph 19, step e](#).

NOTE

Select ABORT [Esc] key on the keyboard to terminate camera alignment without modifying the contents of the HDU memory.

h. The "Warning: Display Unit Settings WILL be Modified!" window automatically appears. Select PROCEED [F8] function key on the keyboard to program new camera offset values into the HMD.

i. The "Camera Offset Location Modified Successfully" window automatically appears on the PC monitor. Select OK [Return] to continue.

j. A "Program will now terminate, Goodbye." message window will automatically appear. Select OK.

k. The message window will automatically close. The camera alignment software automatically removes power to the HMD and exits.

l. The PC Windows desktop is displayed on the PC monitor.

m. If HDU memory has been updated go to the next step. If HDU memory has not been modified, remove the HMD from the test set-up and restore to normal system use or update camera offset values. ([paragraph 20](#))

NOTE

The EU (Electronic Unit) holds in non-volatile memory characterization data, including camera offsets, for the last HMD used. The EU will read characterization data only when a different HMD is put in the system, or it uses the previously stored data. The HMD has no way to tell the EU that characterization data. For that reason, to make sure of update, a second HMD must be rotated through the aircraft system.

On the aircraft, the technician/pilot must wait approximately one minute for the EU to complete reading and updating the characterization data from the second HMD. The system should then be powered down and the second HMD removed. When the first HMD is installed, the system will read the updated characterization data.

n. Disconnect the HMD from the test cable. The HMDTS may be left in the powered on state if more HMDs are to be cycled through the camera alignment procedure or it is to be used for helmet functional testing; otherwise the HMDTS should be powered off.

21. RESTORING THE CAMERA OFFSET VALUES TO THE ORIGINAL FACTORY SETTINGS.

a. To program or restore the initial factory offset values, select the RESET TO FACTORY control button on the Camera Offset Adjustment Screen.

b. The "Warning: Display Unit Settings WILL be modified!" window automatically appears on the PC monitor.

NOTE

Select ABORT [Esc] key on the keyboard to terminate camera alignment without modifying the contents of the HDU memory.

c. Select PROCEED [F8] function key on the keyboard to set current offset values to the initial factory settings.

d. The “Camera Offset Location Modified Successfully!” window automatically appears on the PC monitor. Select OK [Return] to continue.

e. A “Program will now terminate, Goodbye.” message window will automatically appear. Select OK.

f. The message window will automatically close. The camera alignment software automatically removes power to the HMD and exits.

g. The PC Windows desktop is displayed on the PC monitor.

h. If HDU memory has been updated go to the next step. If HDU memory has not been modified, remove the HMD from the test set-up and restore to normal system use or update camera offset values (paragraph 20).

NOTE

The EU (Electronic Unit) holds in non-volatile memory characterization data, including camera offsets, for the last HMD used. The EU will read characterization data only when a different HMD is placed in the system, otherwise it uses the previously stored data. The HMD has no way to tell the EU that characterization data. For that reason, to make sure update, a second HMD must be rotated through the system.

On the aircraft, the technician/pilot must wait approximately one minute for the EU to complete reading and updating the characterization data from the second HMD. The system should then be powered down and the second HMD removed. When the first HMD is installed, the system will read the updated characterization data.

i. Disconnect the HMD from the test cable. The HMDTS may be left in the powered on state if

more HMD's are to be cycled through the camera alignment procedure or it is to be used for helmet functional testing; if not, the HMDTS should be powered off.

22. TERMINATING THE CAMERA ALIGNMENT SOFTWARE WITHOUT UPDATING THE DU MEMORY.

a. To terminate the camera alignment software and remove power for the HDU, select the ABORT button in the lower left-hand corner of the Camera Offset Adjustment Screen. A “Program will now terminate, Goodbye,” message window will automatically appear. Select OK.

b. The message window will automatically close. The camera alignment software automatically removes power to the HMD and exits.

c. The PC Windows desktop is displayed on the PC monitor.

d. Disconnect the HMD from the test cable. The HMDTS may be left in the powered on state if more HMD's are to be cycled through the camera alignment procedure or it is to be used for helmet functional testing; otherwise the HMDTS should be powered off.

22A. SQUADRON JHMCS HELMET DISPLAY UNIT (HDU) USAGE LOG.

a. The Helmet Display Unit (HDU) Usage Log (refer to figure 1) should be utilized by each squadron to record monthly and yearly HDU information.

b. Make a copy of the log to record HDU information or go to the <https://pma202.navair.navy.mil/> website to download a digital copy. Login capability is required to access this website. The file is located under the Research Development Team Section, Joint Helmet Mounted Cueing System, documents, folder JHMCS HDU Log, and download disc JHMCS HDU.xls. If problems occur, please e-mail craig_1@crane.navy.mil.

23. ILLUSTRATED PARTS BREAKDOWN.

a. For illustrated parts breakdown of the cathode ray tube assembly, refer to figure 2.

b. Refer to INTRODUCTION TO THE ILLUSTRATED PARTS BREAKDOWN, WP00200.

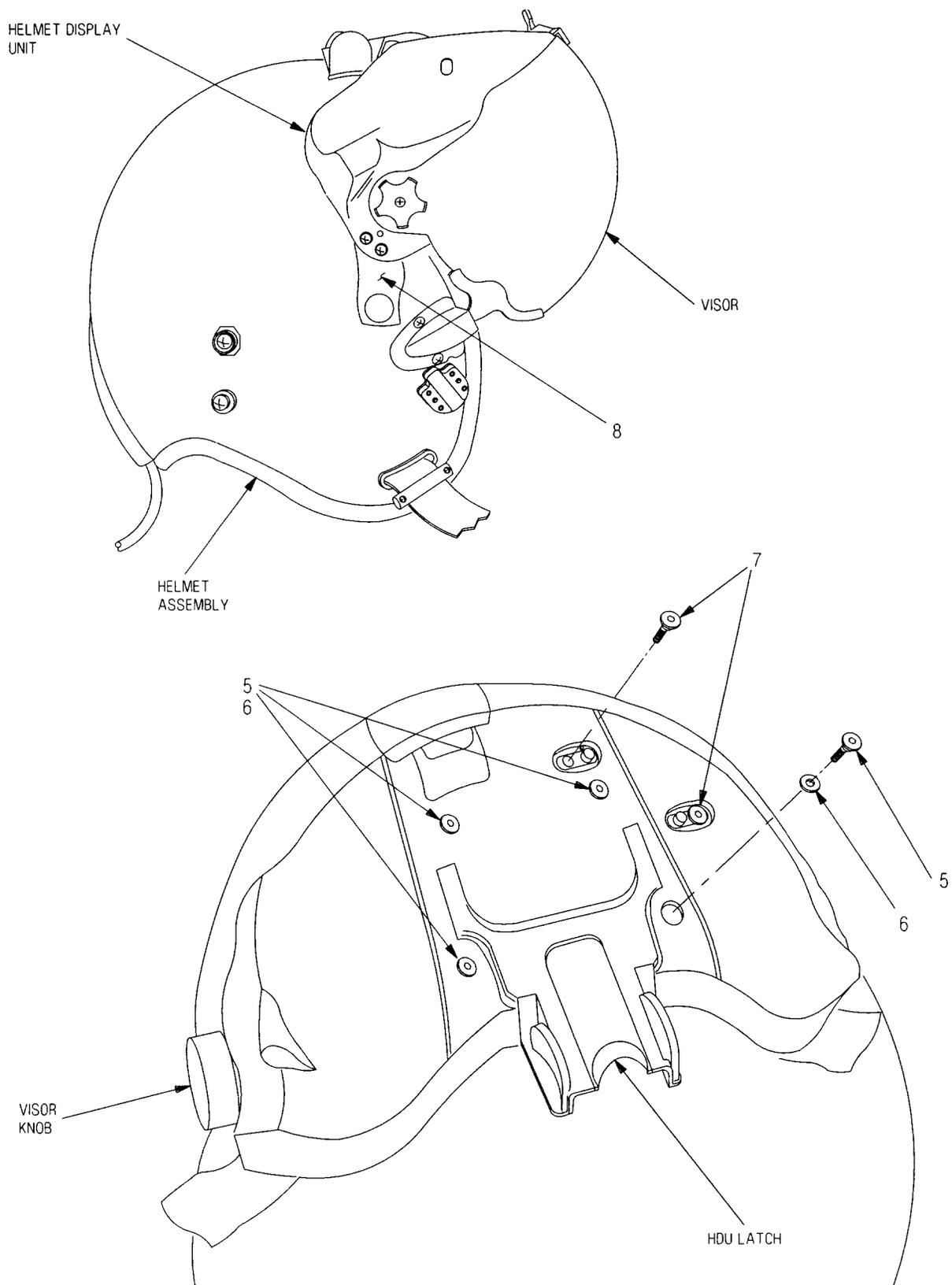


Figure 2. Helmet Display Unit (HDU), Part Number 620520-01-05 (Sheet 1 of 3)

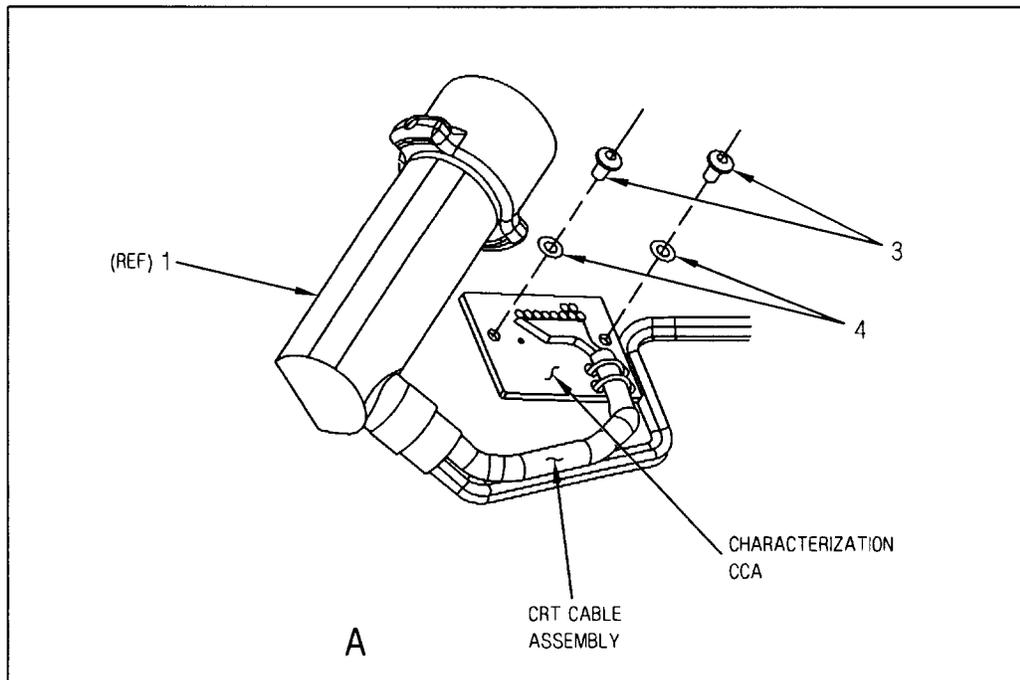
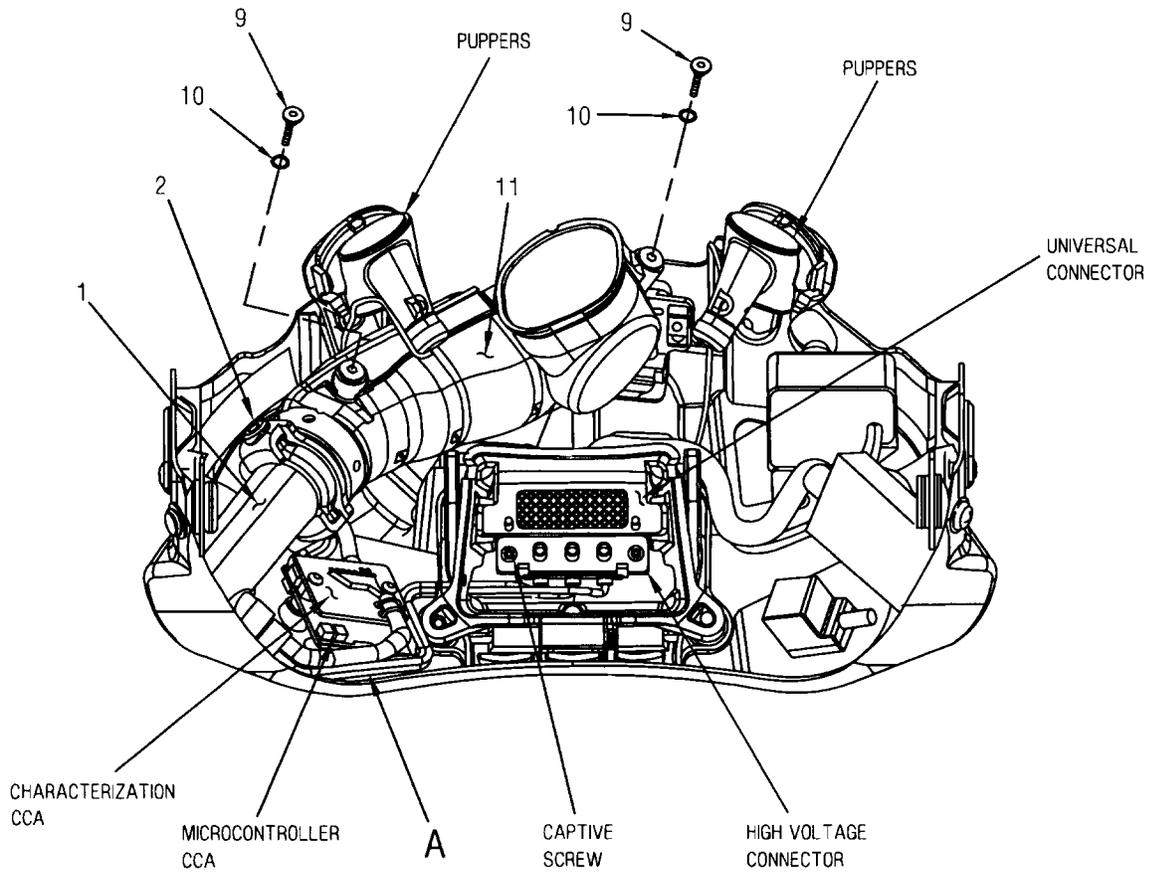


Figure 2. Helmet Display Unit (HDU), Part Number 620520-01-05 (Sheet 2)

INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USE ON CODE	SM&R CODE
	620520-01-05	[ESD]HELMET DISPLAY UNIT (HDU) /06VL3/[NHA,[WP008[0/	REF		PAOOK
	135015-59	[ESD]HELMET DISPLAY UNIT (HDU) /09344/[NHA,[WP008[0/	REF	*	PAOOK
1	620590-01-03	. CRT ASSEMBLY	1		PAOZZ
	135100-29	. CRT ASSEMBLY /09344/	1	*	PAOZZ
2	8B01012	. SET SCREW, SOCKET HEAD /09344/	1		PAOZZ
	CS-24	. SET SCREW, SOCKET HEAD /00141/	1	*	PAOZZ
3	PC91047-1	. SCREW, CAP, HEX HEAD /09344/	2		PAOZZ
	DK02C177BHB	. SCREW, CAP, HEX HEAD /56563/	2	*	PAOZZ
4	8B02041	. WASHER /09344/	2		PAOZZ
	24987-9A	. WASHER /51506/	2	*	PAOZZ
5	PC91047-3	. SCREW, CAP, SKT BUTTONHEAD /09344/	4		PAOZZ
6	8B02061	. WASHER, FLAT /09344/	4		PAOZZ
7	8B01101	. SCREW, CAP, BTNHD /09344/	2		PAOZZ
	X63728	. SCREW, CAP, BTNHD /09344/	2	*	PAOZZ
8	8B10173	. STRAP, RIGHT /09344/	1		PAOZZ
	8B10174	. STRAP, LEFT /09344/	1		PAOZZ
9	8B10131	. SCREW, PURGE VALVE /09344/	2		PAOZZ
	SM-C-806612	. SCREW, PURGE VALVE /13567/	2	*	PAOZZ
10	AS3578-002	. PACKING, PREFORMED /81349/	2		PAOZZ
11	135150-1	. RELAY OPTICS ASSEMBLY /09344/ /SEE[WP012[0[FOR[PURGING/	1		PADBZ
12	620592-01-00	CRT ASSEMBLY SCREW/WASHER SET	1		PAOZZ

Figure 2. Helmet Display Unit (HDU), Part Number 620520-01-05 (Sheet 3)

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**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN**

**VISOR ASSEMBLY
PART NUMBERS 620530-01-01, 620530-03-04 AND 620530-05-01**

Reference Material

Introduction	WP002 00
Cleaning and Inspection	WP005 00
Helmet Assembly Buildup	WP006 00
HDU Alignment/IPD Adjustment	WP007 00

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Illustration	5
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Installation	4
Removal	1
Visor Assembly, Figure 1	5

Record of Applicable Technical Directives

None

1. REMOVAL.



Support Equipment Required

None

Be careful not to scratch visor assembly.

Materials Required

None

b. Gently rotate both visor knobs (4, figure 1) backward.

c. Pull visor knobs (4) away from Helmet Display Unit (HDU).

d. Lift visor assembly away from HDU.

a. Remove visor cover, if installed.

e. Install visor cover, if available.

2. DISASSEMBLY.

Support Equipment Required

None

Materials Required

None

- a. Remove visor cover, if installed.



Be careful not to scratch visor assembly.

NOTE

Visor knob kit 620536-01-00 is made up of a turn shaft, washers, visor knob, and screws.

- b. Remove screws (5, [figure 1](#)) from visor knob (4).

- c. Gently remove visor knob (4).

- d. Remove turn shaft (2).

- e. Remove washers (3 and 6) from visor.

NOTE

Visor latch kit 620534-01-00 is made up of a pin, visor lock, pull latch, preload spring, and pull spring.

- f. Remove pins (8) from visor lock (9) per substeps below:



Be careful when removing pins (8). Pins are tapered and can only be removed from one direction and will cause damage to visor lock (9) if removed incorrectly. Damage to visor lock will destroy the visor.

- (1) Gently push pins (8) out enough to grasp with pliers. Refer to [figure 1](#) detail A for correct pin removal direction.

- (2) Grip pins (8) with pliers and remove from visor lock (9).

- g. Remove pull spring (12), pull latch (10) and preload spring (11).

- h. Remove visor tang kit (13), as required.

3. CLEANING.

Support Equipment Required

None

Materials Required

None

- a. Refer to [WP00500](#) for cleaning.

4. INSPECTION.

Support Equipment Required

None

Materials Required

None

- a. Refer to [WP00500](#) for inspection.

- b. If the visor fails inspection and requires replacement, follow the visor trimming procedures in [WP00600, step 35](#) for the replacement visor.

5. ASSEMBLY.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
* Adapter	GTMB88A	55719
* Tip, Hex Phillips	120108	32652
* Torque Screwdriver 2 - 100 Inch- Ounce	6C486	25795

* Part of JHMCS Torque Tool Kit 3829AS110

Materials Required

Nomenclature	Specification or Part Number
Primer, Sealing Compound	MIL-S-22473, GRADE T, FORM R, AEROSOL CAN, NIIN 00-181-8372
Sealing Compound	MIL-S-46163, TYPE 2, GRADE M, COLOR PURPLE, NIIN 01-054-3968, NIIN 01-055-6126, NIIN 01-069-3046

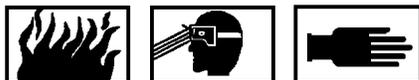
NOTE

Visor knob kit 620536-01-00 is made up of a turn shaft, washers, visor knob, and screws.

a. Align washers (3 and 6) on visor knob (4).



SEALING COMPOUND, MIL-S-46163, TYPE 2, GRADE M, COLOR PURPLE 1088



PRIMER, SEALING COMP, MIL-S-22473, GRADE T, FORM R, AEROSOL CAN 696

b. Apply sealing compound and sealing compound primer to threads of screw (5).

c. Insert screw (5) into visor knob (4).

d. Put turn shaft (2) through visor assembly.

e. Attach visor knob (4) and washers (3 and 6) with turn shaft (2).

NOTE

Be careful not to cross-thread attaching screw (5) when compressing spring washer (6) and aligning turn shaft.

f. Using hex phillips tip, adapter, and torque screwdriver, torque screw (5) 23 - 25 inch-ounces allowing visor knob (4) to turn freely. (QA)



Be careful when installing pin (8). Pin is tapered and can only be installed in one direction and will cause damage to visor lock (9) if installed wrong. Damage to visor lock will destroy the visor.

NOTE

Visor latch kit 620534-01-00 is made up of a pin, visor lock, pull latch, preload spring, and pull spring.

g. Install pull spring (12) and pull latch (10) on upper holes on visor lock (9) using one pin (8). Refer to figure 1 detail A for correct pin installation orientation.



Be careful when installing pin (8). Pin is tapered and can only be installed in one direction and will cause damage to visor lock (9) if installed incorrectly. Damage to visor lock will destroy the visor.

h. Install preload spring (11) on lower holes of visor lock (9) using the second pin (8). Refer to figure 1 detail A for correct pin installation orientation.

i. Install visor tang kit (13). Refer to INSTALLATION OF VISOR TANGS, WP00600.

j. Install visor cover if available.

k. Document per OPNAVINST 4790.2 series. (QA)

6. INSTALLATION.

Support Equipment Required

None

Materials Required

None

a. Pull visor knobs (4, [figure 1](#)) apart from each other by 1/2 inch.

b. Position visor knobs (4) over visor bushing receivers on display unit.

c. Press visor knobs (4) together until visor bushings are firmly seated.

d. Gently rotate both visor knobs (4) forward until visor knobs lock in position.

7. ILLUSTRATED PARTS BREAKDOWN.

a. For illustrated parts breakdown of the visor assembly, refer to [figure 1](#).

b. Refer to INTRODUCTION TO THE ILLUSTRATED PARTS BREAKDOWN, [WP002 00](#).

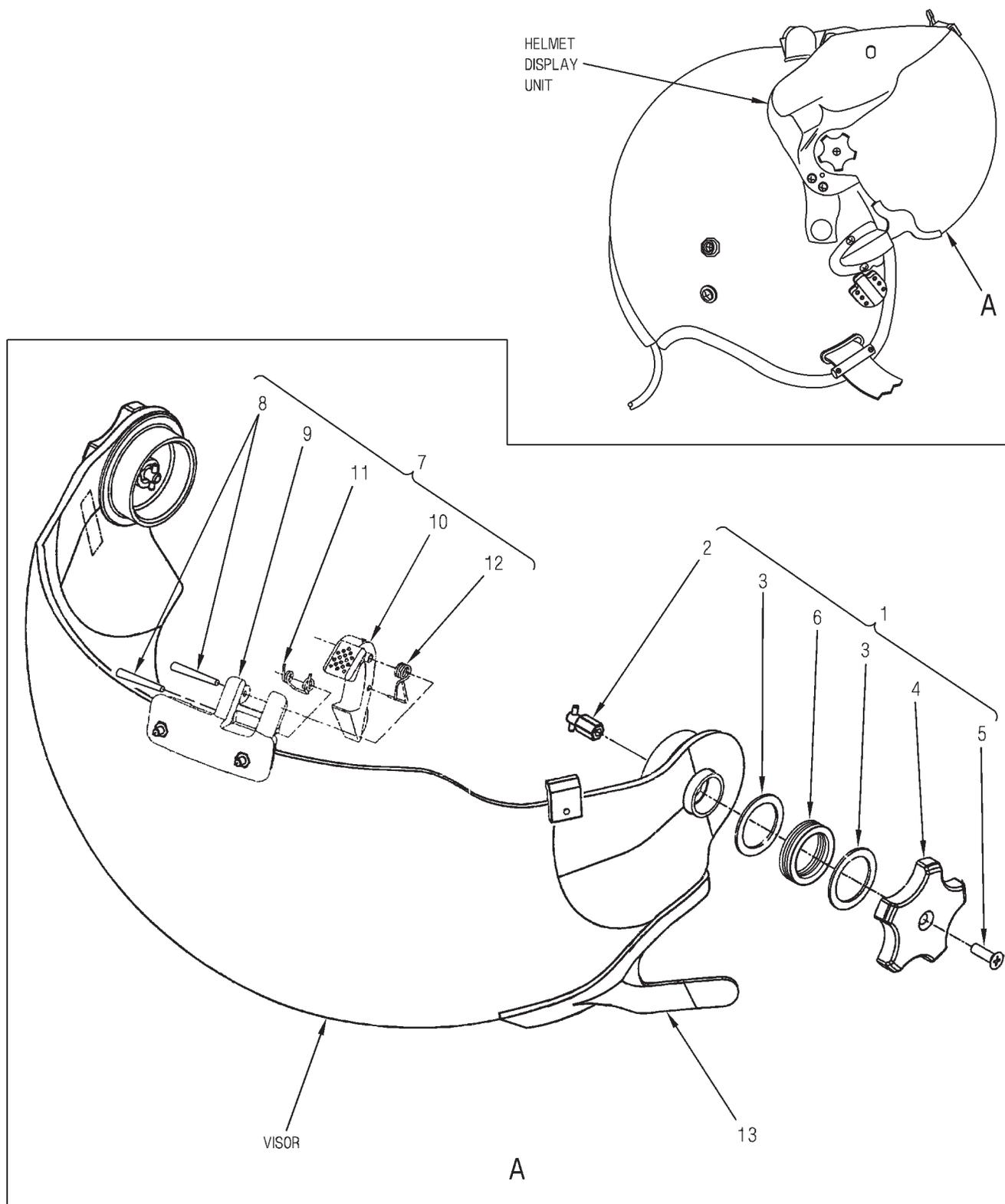


Figure 1. Visor Assembly, Part Numbers 620530-01-00, 620530-03-03 and 620530-01-05 (Sheet 1 of 2)

INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USE ON CODE	SM&R CODE
	620530-01-01	VISOR ASSEMBLY, CLEAR (PATCH)..... /06VL3/ /NHA, WP008 00/	REF		PA000
	620530-03-04	VISOR ASSEMBLY, 25%, (PATCH)..... /06VL3/ /NHA, WP008 00/	REF		PA000
	620530-05-01	VISOR ASSEMBLY, 25%, HIGH CONTRAST... (PATCH) /06VL3/ /NHA, WP008 00/	REF		PA000
1	620536-01-00	. VISOR KNOB KIT.....	1		PAOZZ
2	135286	. . SHAFT, 1/4 TURN.....	2		XAOZZ
3	8B02011	. . WASHER, TEFLON, FLAT.....	4		XAOZZ
4	135276-1	. . KNOB, VISOR.....	2		XAOZZ
5	MS24693-4B	. . SCREW, FLUSH.....	2		XAOZZ
6	8B02022	. . WASHER, FLAT WIRE COMPRESSION.... SPRING	2		XAOZZ
7	620534-01-00	. VISOR LATCH KIT.....	1		PAOZZ
8	MS16555-607	. . PIN, STRAIGHT, HEADLESS..... /06VL3/	2		XAOZZ
9	135407-1	. . VISOR LOCK, PULL /09344/.....	1		XAOZZ
10	135368-1	. . LATCH, PULL TYPE /06VL3/.....	1		XAOZZ
11	135318-1	. . SPRING, PRELOAD PUSH /06VL3/.....	1		XAOZZ
12	135400-1	. . SPRING, PULL /06VL3/.....	1		XAOZZ
13	620532-01-00	. VISOR TANG KIT.....	1		PAOZZ

Figure 1. Visor Assembly (Sheet 2)

**OFF AIRCRAFT MAINTENANCE
WITH ILLUSTRATED PARTS BREAKDOWN**

**PURGE RELAY OPTICS ASSEMBLY
PART NUMBER 135150-1**

Reference Material

Introduction	WP002 00
Testing and Troubleshooting	WP004 00
Cleaning and Inspection	WP005 00

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Inspection	3
Purging	2
Purging Relay Optics Assembly, Figure 1	4
Relay Optics Assembly, Figure 2	5

Record of Applicable Technical Directives

None

1. PURGING.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
* Adapter	GTMS8A	55719
Purge Kit (afloat)	268549	13567
Purge Kit (ashore)	SC4931-95CLJ54	19200
Purge Valve Adapter	269390-1	13567
* Tip, Hex Flat	120141	32652
* Torque Screwdriver	6C486	25795
2 - 100 Inch-Ounce		

* Part of JHMCS Torque Tool Kit 3829AS110

Materials Required

Nomenclature	Specification or Part Number
Cloth, Lint-free	MIL-C-85043 TYPE 1
Cotton Tip Swab	GG-A-616
Leak Test Compound	SNOOP 8 OZ

WARNING

Serious injury may result if the nitrogen tank valve breaks off. If the tank valve breaks, the tank can be propelled by the force of escaping gas and strike you or others. To prevent injury, always secure the tank to an upright support before removing the tank valve guard and attaching the regulator valve to the tank.

CAUTION

Do not try to remove relay optics assembly. The relay optics assembly is a matched set with the HDU.

NOTE

HDU and relay optics must remain together. If relay optics assembly is not repair-

able by purging, return HDU and relay optics assembly to depot.

a. Connect pressure regulator to nitrogen tank per applicable regulator technical publication. Refer to [figure 1](#).

b. Set pressure to zero by turning the regulator valve handle counterclockwise until there is no spring pressure on the control.

c. Slowly open nitrogen tank valve and back turn a quarter turn. The high pressure gauge should read at least 250 psi.

CAUTION

Do not hook up regulator to relay optics assembly until regulated down to 5 psi.

d. Adjust regulator pressure to 5 psi, purging line for at least 30 seconds.

e. Remove purge valve screws (1, [figure 2](#), sheet 2) and preformed packings (2, sheet 2) from purge valves of the relay optics assembly.

f. Set up the relay optics assembly so the purge valve holes are facing up. Refer to [figure 1](#).

CAUTION

Do not over torque connection between purge valve adapter and relay optics assembly purge valve.

g. Without the pressurized regulator hose attached to the purge valve adapter, screw the purge valve adapter on one of the purge valves of the relay optics assembly.

WARNING

With the pressurized purge valve adapter attached to one of the relay optics assembly purge valves, do not cover the remaining open purge valve. Over pressurization may occur resulting in seal leakage.

h. Gently press the pressurized regulator hose on the purge valve adapter. Allow 5 psi of nitrogen to run through the relay optics assembly for 5 minutes.



Leak test compound is a liquid and should be used moderately. Care should be taken not to get leak test compound on lenses or electrical components.

i. Using a cotton tip swab soaked in leak test compound, apply along seals and moldings looking for bubbles indicating a leak. If leaks are detected, return HDU to depot.

j. After 5 minutes, wipe any excess leak test compound off with a lint-free cloth.

k. Remove the pressurized regulator hose from the purge valve adapter.

l. Close the nitrogen tank valve and release the pressure on the regulator valve handle.

m. Remove the purge valve adapter from the relay optics assembly.



Be sure not to cross thread purge valve screws into purge valve.

n. Within 30 seconds of removing purge valve adapter from relay optics assembly, install preformed packings (2, sheet 2) and purge valve screws (1, sheet 2) in purge valves.



Do not overtighten purge valve screws.

o. Using hex flat tip, adapter, and torque screwdriver, tighten purge valve screws (1, sheet 2) until o-ring seal is closed. (QA)

- p. Make sure the regulator valve indicates zero.
- q. Disconnect pressure regulator from nitrogen tank. Refer to figure 1.
- r. Make sure HDU operates correctly. Do TESTING AND TROUBLESHOOTING per WP00400.

s. Document per OPNAVINST 4790.2 series. (QA)

2. CLEANING.

Support Equipment Required

None

Materials Required

None

- a. Refer to WP00500 for cleaning.

3. INSPECTION.

Support Equipment Required

None

Materials Required

None

- a. Refer to WP00500 for inspection.

4. ILLUSTRATED PARTS BREAKDOWN.

a. For illustrated parts breakdown of the relay optics assembly, refer to figure 2.

b. Refer to the Illustrated Parts Breakdown, WP00200.

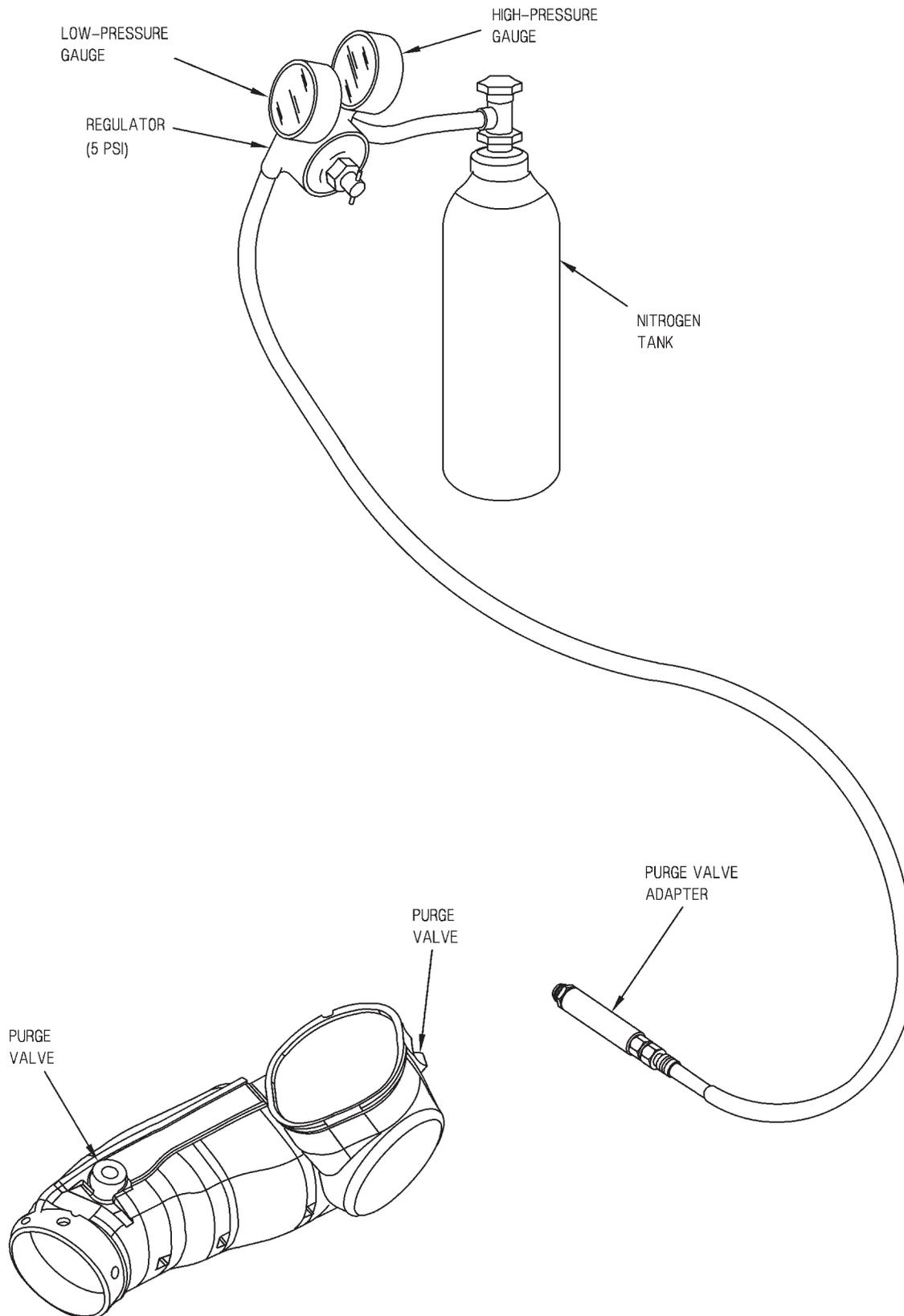


Figure 1. Purging Relay Optics Assembly

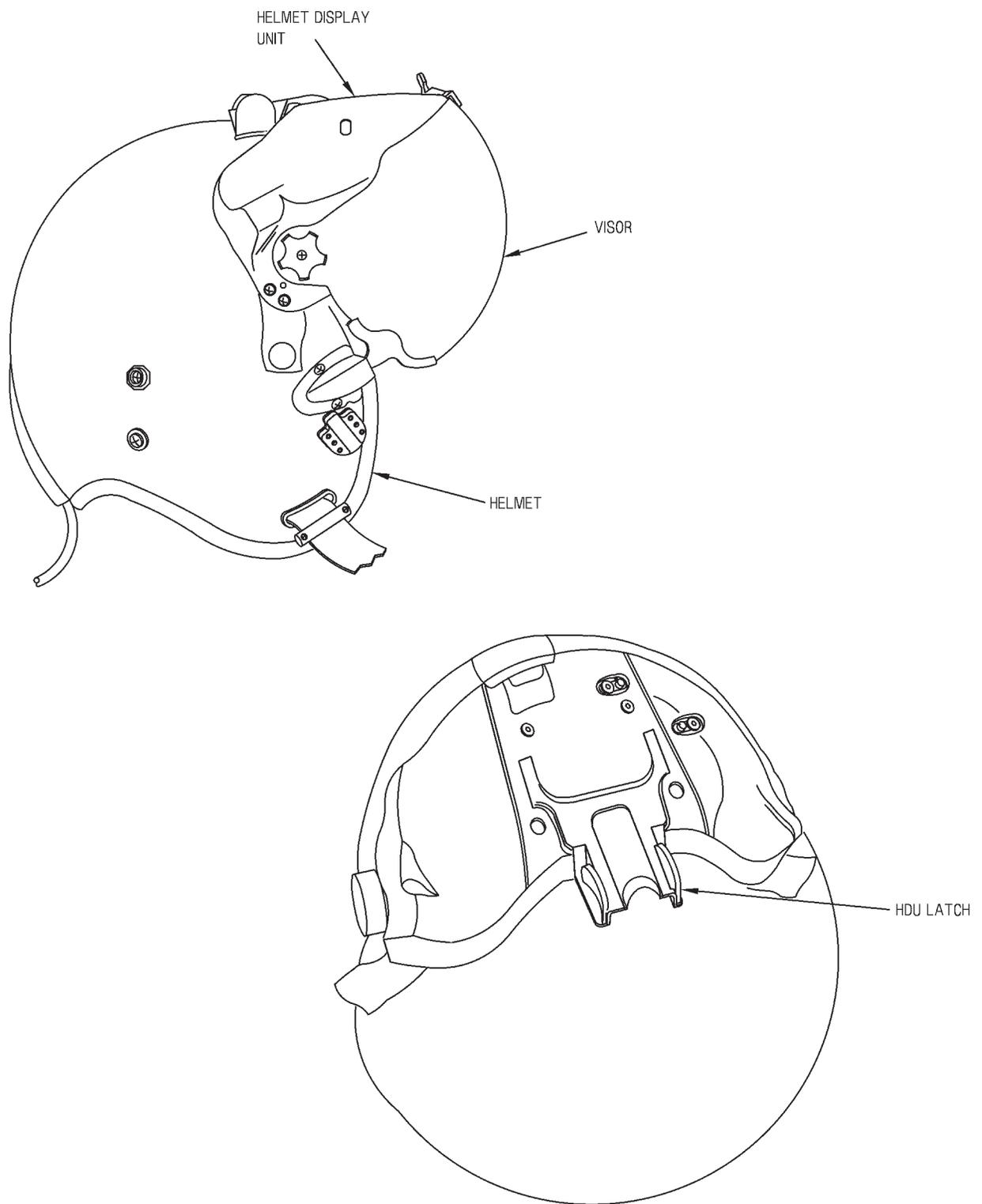


Figure 2. Relay Optics Assembly, Part Number 135150-1 (Sheet 1 of 3)

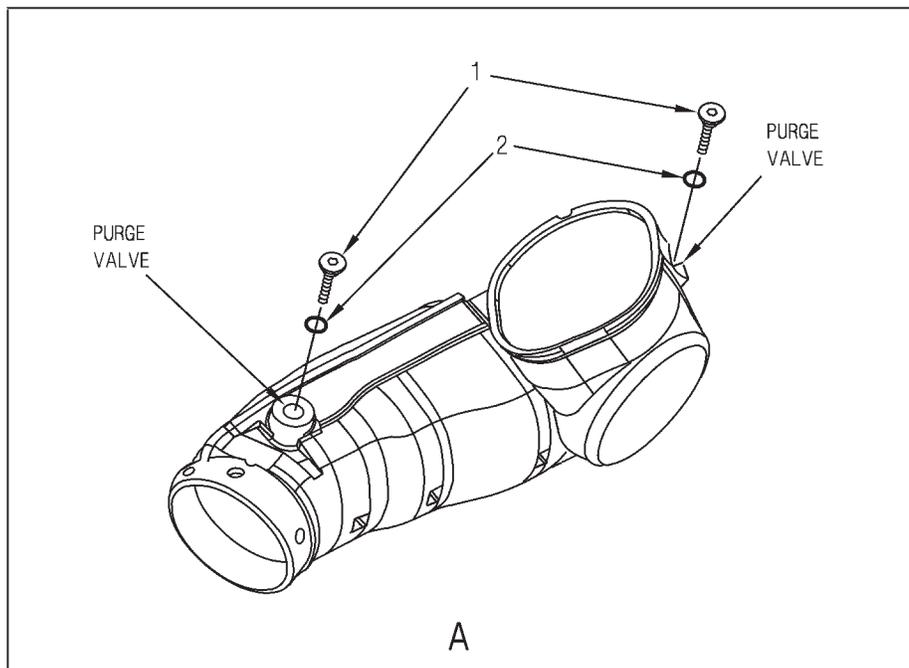
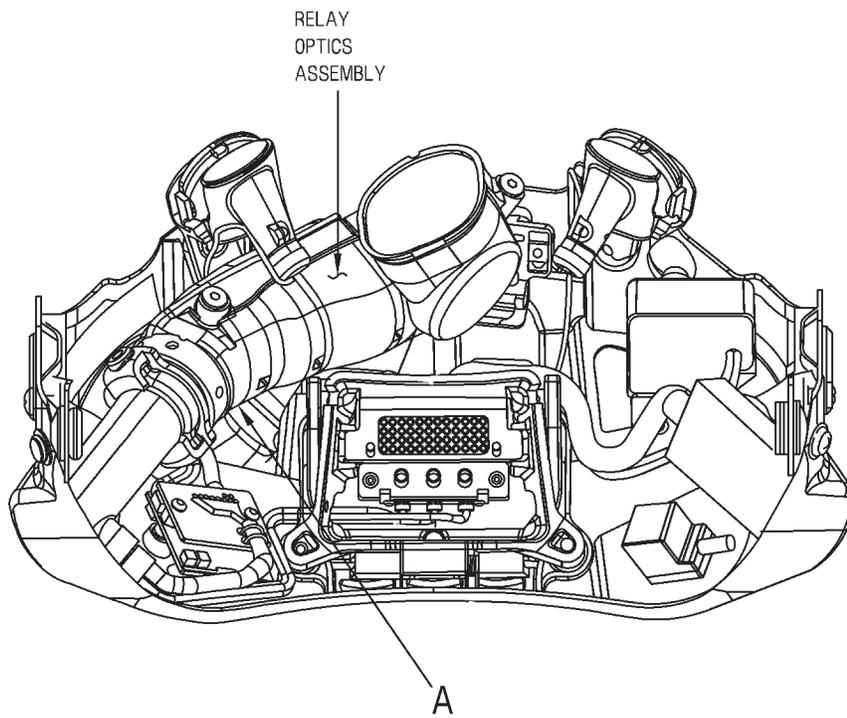


Figure 2. Relay Optics Assembly (Sheet 2)

INDEX NO.	PART NUMBER	DESCRIPTION							UNITS PER ASSY	USE ON CODE	SM&R CODE
		1	2	3	4	5	6	7			
	135150-1	RELAY OPTICS ASSEMBLY /09344/.....							REF		PADBZ
		/NHA, WP010 00/									
1	8B10131	. SCREW, PURGE VALVE.....							2		PAOZZ
	SM-C-806612	. SCREW, PURGE VALVE /13567/.....							2	*	PAOZZ
2	AS3578-002	. PACKING, PREFORMED /81349/.....							2		PAOZZ

Figure 2. Relay Optics Assembly (Sheet 3)

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