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MILITARY SPECIFICATION

MANUALS, TECHNICAL: OVERHAUL ELECTRONIC AND INTERIOR

COMMUNICATION EQUIPMENT: CONTENT REQUIREMENTS FOR

This specification has been approved and is mandatory for use by all commands of the
Department of the Navy.

1. SCOPE

1.1 This specification sets forth the content and production requirements for technical manuals
required for depot level overhaul (see 6.1 and 6.2) of electronic and interior communication
equipment or an item of the equipment.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or requests for
proposal, form a part of the specification to the extent specified herein:

SPECIFICATIONS

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- MIL-M-9868/1 - Microfilming of Engineering Documents, 35MM, for Naval Ship
Systems.
- MIL-M-15071 - Manuals, Technical: Equipments and Systems Content Requirements
for.
- MIL-L-17192 - Lubrication Design, Lubricants and Lubrication Information for
ELECTRONIC Equipment: General Specification for.
- MIL-B-21741 - Book, Technical: Maintenance Standards.
- MIL-M-24100 - Manuals, Orders and Other Technical Instructions for Equipment and
Systems.
- MIL-R-24358 - Restoration, Shipboard Electronic Equipment F, 1N and 2N Cognizance.
- MIL-M-24365 - Maintenance Engineering Analysis; Establishment of, and Procedures
and Formats for Associated Documentation: General Specification for.
- MIL-M-38784 - Manuals, Technical: General Requirements for the Preparation of.
- MIL-P-38790 - Printing Production of Technical Manuals: General Requirements for.

PUBLICATIONS

MILITARY

- DOD 5220.22M - Industrial Security Manual for Safeguarding Classified Information.
- NAVEXOS P-35 - Department of the Navy Publications and Printing Regulations.

(Copies of specifications, standards, drawings and publications required by suppliers in
connection with specific procurement functions should be obtained from the procuring activity or as
directed by the contracting officer.)

FSC TMSS

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2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply:

UNIFORM CLASSIFICATION COMMITTEE
Uniform Freight Classification Rules

(Applications for copies should be addressed to the Uniform Classification Committee, 202 Union Station, 516 West Jackson Boulevard, Chicago, Illinois 60606.)

3. REQUIREMENTS

3.1 Precedence. In the preparation of technical manuals, when conflict exists between the requirements of this specification and its referenced documents, this specification shall take precedence. When conflict exists between the requirements of the contract and this specification or its referenced documents, the contract shall take precedence.

3.2 Security classification. Unless otherwise specified (see 6.2), the overhaul manual shall not contain classified information. When classified information is included, security classification shall be assigned by the command or agency concerned in accordance with the DOD 5220.22M Industrial Security Manual for Safeguarding Classified Information (see 3.9.1.8).

3.3 Deliverable data items. The deliverable data items of the overhaul manual shall be specified in the contract data requirements of the contract or order (see 6.2), and shall conform with the requirements specified herein. Data items shall include the following, as applicable:

- (a) Manual outline.
- (b) Manuscript for review.
- (c) Preliminary manual.
- (d) Basic (final) manual.
- (e) Supplements.
- (f) Changes.
- (g) Revisions.
- (h) Reproducible (camera-ready) copy.
- (i) Photolithographic negatives.
- (j) Replenishment material.
- (k) Status reports.

3.3.1 Manual outline. A manual outline shall be prepared for review and acceptance prior to development of the review manuscript. The manual outline shall conform to the following:

- (a) An outline of the planned manual coverage by chapter, section and paragraph shall be in accordance with the content requirements of this specification. Each chapter, section, and paragraph title or notation listed shall be followed by a short statement outlining the data to be presented. An index in tabular form, listing each illustration and table by number and title, shall be included. Each illustration by type (exploded view, schematic, line drawing, etc.), information content, and approximated use shall be described. All nomenclature shall be consistent between text and illustrations.
- (b) A sample of each type of illustration to be included in the manual.
- (c) When MIL-M-24365 (or any other procurement document/specification providing the same data) is invoked in the contract, the outline of content requirements shall be based on the plan for use and maintenance engineering analysis as

approved by the Government. The outline shall indicate coverage on a comprehensive and systematic basis and the most effective and efficient method of performing overhaul. The outline shall be correlated to the maintenance engineering analysis report.

3.3.2 Manuscript for review. A review manuscript shall be prepared for review and approval prior to the preparation of reproducible copy. Review manuscript shall contain all front matter, text, tables, and illustrations necessary to meet the content requirements of this specification and MIL-M-38784. The manuscript shall be proofread and edited prior to submission. Unless otherwise specified (see 6.2), the manuscript shall be validated.

3.3.3 Preliminary manual. The preliminary manual shall include all data required for the basic (final) manual, but may deviate from production requirements for a basic (final) manual. Where equipment or facility availability does not permit validation of the review manuscript, a preliminary manual shall be issued. The preliminary manual shall reflect the review manuscript with all Government review comments incorporated and shall be superseded by a final manual. When required, the preliminary manual shall be prepared in accordance with the following requirements:

- (a) Text shall be typewritten single-spaced copy.
- (b) Any method of duplication, as defined in NAVEXOS P-35, which will provide the necessary quantity of black and white legible copies will be acceptable. When the method of duplication permits, the manual shall be produced on both sides of the paper.
- (c) Binding shall conform the requirements for basic (final) manuals (see MIL-M-38790). Covers need not include printed matter (other than the security classification) when suitable cut-out windows and backup pages, with identifying data, are provided.

3.3.4 Basic (final) manual. The basic (final) manual shall be prepared in full conformance to this specification and the requirements of the applicable contract. The printing production requirements for the final manual shall be in accordance with MIL-P-38790 and the applicable contract.

3.3.5 Supplements. Supplements to the manual shall be as specified in MIL-M-38784.

3.3.6 Changes. Changes shall be prepared in accordance with the requirements of MIL-M-38784, MIL-M-15071, or MIL-M-24100.

3.3.7 Revisions. Revisions shall be prepared in accordance with the requirements of MIL-M-38784, MIL-M-15071, or MIL-M-24100.

3.3.8 Reproducible (camera-ready) copy. Final reproducible (camera-ready) copy including illustrations shall be prepared in accordance with MIL-M-38784 for a double column page format and shall be suitable for 35 mm microfilming in accordance with MIL-M-9868/1.

3.3.9 Photolithographic negatives. When required by the applicable contract or order, photolithographic negatives shall be prepared in accordance with MIL-M-38790.

3.3.10 Replenishment material. Replenishment material consisting of one copy of the final manual and the photolithographic negatives used for the printing of the manual, shall be required to provide for economical quality reprinting of technical manuals (see 5.1.7).

3.3.11 Status reports. When a status reporting system applies to any material aspect of the contract, the report shall be made to indicate the degree of progress, any problems encountered, and any delays that occur which may effect the development of the deliverable data items. Only when a

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material status reporting system is not otherwise provided, the contractor shall prepare and deliver to the procuring activity a separate status report, with the above information, each month starting 60 days after award of contract and continuing until all deliverable data items have been approved and delivered. The reports shall be typewritten and prepared in a narrative format.

3.4 Arrangement. Manuals shall contain the following data, as applicable, to provide instructions for overhaul and shall be arranged as follows:

- Front matter (see 3.4.1)
- Technical content (see 3.4.2).
- Appendices (see 3.6).
- Index (see 3.7).
- User activity comment sheet (see 3.8).

3.4.1 Front matter. Front matter shall be prepared in accordance with MIL-M-38784 and the requirements specified herein. The front matter shall be arranged as follows:

- Cover.
- Title page.
- List of effective pages
- Content assurance page.
- Change record.
- Table of contents.
- List of illustrations.
- List of tables.

3.4.1.1 Content assurance pages. Content assurance pages shall conform to figure 1. Completed content assurance pages with all required data shall be included for the review manuscript and for each separate volume of the manual.

3.4.2 Technical content. The technical content of the overhaul manual shall be based on the plan for use and maintenance concept of the equipment as established by the command or agency concerned and shall provide on a systematic and comprehensive basis, the detailed instruction, procedures, and supporting illustrations necessary for an effective and efficient method of performing the depot level overhaul of the item(s) covered in the manual.

3.5 Chapters. The overhaul manual shall be developed in chapters and shall consist of two or more chapters as follows:

- Chapter 1 - General information (see 3.5.1).
- Chapter 2 (and subsequent chapters) - Overhaul procedures (see 3.5.2).

3.5.1 Chapter 1 - General information. This chapter shall inform the user of the purpose, intended use, and the planning data necessary for overhauling the items covered in the manual.

3.5.1.1 Introduction. The introduction shall provide a brief explanation of the purpose and organization of the manual including appendices and supplements. A pictorial presentation of the item(s) covered in the manual shall be included as a frontispiece (see figure 2). When more than one item is covered, the illustration shall show the relative size of each item, how they physically fit together, and their interconnecting elements. Each item shall be identified by its assigned name and nomenclature/reference designation.

3.5.1.2 Planning data. Planning data, essential to the user of the manual shall be provided in accordance with 3.5.1.3 through 3.5.1.10.

3.5.1.3 Reference data. Reference to the associated technical manual shall be made for reference data classified higher than the classification assigned the manual. Reference data, equivalent to the following, shall be included in tabular format.

- (a) Descriptive data (identification plate) which identifies manufacturer, type, model and component identification number (CID), as applicable.
- (b) Function characteristics, such as power requirements, modes of operation, frequency, pulse characteristics, sensitivity, selectivity, including tolerances, where applicable.
- (c) Capabilities and limitations, such as turning radius, minimum and maximum ranges, degree of coverage, resolution, and accuracy.
- (d) Rated outputs, such as wattages, voltages, horsepower, gallons per minute.
- (e) Environmental characteristics, such as ambient temperatures, heat dissipation per unit, humidity limits.

3.5.1.4 Special overhaul facility requirements. A detailed description shall be provided for special overhaul facility requirements which are unique to the item(s) covered in the manual. The following represents the specific information required: however, it is not to be construed as preventing the addition of such information necessary to properly identify the peculiar facility requirements. The description shall include the following:

- (a) Access requirements.
- (b) Vibration/shock/acoustic level that will influence the facility or equipment environment.
- (c) Temperature and humidity extremes (high and low) that must be provided for the equipment or facility.
- (d) Forced ventilation/air changes required from the facility.
- (e) Heat rejection rate requirements.
- (f) Contamination level imposed by the equipment.
- (g) Electro-magnetic interference/compatibility requirements.
- (h) Hazard/safety requirements.
- (i) Other special environment requirements such as clean rooms, shielded enclosures, etc.
- (j) Water and gas service in terms of pressures, flow rates, etc.
- (k) Electric power requirements.
- (l) Ground requirements.
- (m) Mounting provisions for location and controlling dimensions for support equipment and work bench space.
- (n) Special handling requirements necessary to handle or move equipment.

3.5.1.5 Test equipment. A tabular listing of all test equipment approved for use by the command or agency concerned that is required during overhaul of the item(s) shall be included. The table shall include the following:

- (a) Column 1, Quantity. This column shall contain the quantity of each test equipment required.
- (b) Column 2, Nomenclature. This column shall contain the assigned name and designation of each test equipment.
- (c) Column 3, Item parameters. This column shall contain the range of all item(s) parameters to be tested, including values and tolerances. Sufficient test parameters shall be included to permit planning personnel to select alternate test equipment.

3.5.1.6 Special tools, jigs, and fixtures. A tabular listing of all special tools, jigs, and fixtures, approved for use by the command or agency concerned required during overhaul of the item(s) shall be included. The table shall include the following:

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- (a) Column 1, Description. This column shall contain the noun name and designation of each tool, jig, or fixture.
- (b) Column 2, Part number. This column shall contain manufacturer's part/ drawing number.
- (c) Column 3, Reference. This column shall contain a reference to fabrication instructions included in the manual.

3.5.1.7 List of major items. A tabular listing of all major items covered in the manual shall be included. The table shall include the following:

- (a) Column 1, Description. This column shall contain the assigned name and designation of each item. (FSN-CID-AN nomenclature, etc.)
- (b) Column 2, Overall dimensions. This column shall contain the uncrated height, width, and depth in inches of each item.
- (c) Column 3, Weight and volume. This column shall contain the uncrated weight and volume in cubic feet of each item.

3.5.1.8 List of publications. A tabular listing of all publications referenced in the manual shall be included as follows:

- (a) Column 1, Title. This column shall contain the title of each referenced publication.
- (b) Column 2, Publication number. This column shall contain the publication number.

3.5.1.9 List of overhaul time. A tabular listing of estimated time in man-hours required to overhaul each major item shall be included as follows:

- (a) Column 1, Description. This column shall contain the name and designation of each item.
- (b) Column 2, Time required. This column shall contain the estimated time in man-hours, to overhaul and test each item.

3.5.1.10 Difference data. A tabular listing of all field changes and modifications covered in the manual shall be included as follows:

- (a) Column 1, Change number. This column shall list the change number for each field change or modification included in the manual.
- (b) Column 2, Nomenclature. This column shall list the assigned nomenclature and serial number of the item effected.
- (c) Column 3, Description. This column shall contain a brief statement identifying the change or modification.

3.5.2 Chapter 2 (and subsequent chapters) Overhaul procedures. The overhaul procedures for each item level to be covered in the manual shall be arranged into individual chapters. The chapters shall be arranged in a top-down logical sequence of removal and disassembly for each item(s) to be overhauled. Each chapter shall contain the following sections, as applicable, in the sequence shown:

<u>Sections</u>	<u>Titles</u>
I	Introduction
II	Removal and disassembly
III	Cleaning and examination
IV	Repair and replacement
V	Reassembly
VI	Post-reassembly testing
VII	Parts List

3.5.2.1 Section I - Introduction. The introduction shall provide a brief explanation of the purpose of the chapter and its relationship to other chapters in the manual, a tabular listing of special tools, jigs, fixtures, and materials required to overhaul the item(s) covered by each chapter, and information describing any field change or modification effecting any item(s).

3.5.2.2 Section II - Removal and disassembly. This section shall include illustrations and the step-by-step procedures necessary for the removal and disassembly of the item(s). Disassembly instruction shall be limited to all items where the sequence of disassembly is not obvious or where special techniques are necessary for access to a part requiring overhaul (see figure 3).

3.5.2.2.1 Disassembly illustrations. Illustrations shall be utilized to show the sequence of disassembly and shall contain a listing of part identification data by item number, zone, noun name, quantity, and reference designatics (see figure 4). The sequence of disassembly described in the text shall identify the individual part(s) by the item number shown on the illustration. Illustrations shall also be provided for procedures requiring the use of any special tools, fixtures, or jigs during disassembly.

3.5.2.2.2 Fabrication procedures for special tools. Instructions and illustrations shall be provided for the fabrication of special tools, fixtures, or jigs (see figure 5). The fabrication procedures shall include all parameters necessary to ensure that the item fabricated will meet its intended use.

3.5.2.3 Section III - Cleaning and examination. This section shall describe the process and methods of cleaning and examination to be performed on each disassembled item.

3.5.2.3.1 Cleaning. Cleaning instructions shall include the following.

- (a) The cleaning process to be used for each item requiring cleaning.
- (b) Step-by-step procedures for accomplishing the process.
- (c) Specific identification of cleaning materials to be used in the process by their commonly known name and specification number.
- (d) Quantitative instructions for the variables associated with the cleaning process, for example, air pressure, moisture content, solvent temperature, soak time, ultrasonic frequency, drying time, and temperature.
- (e) Procedures for use of any special tools, jigs, or fixtures required during cleaning.
- (f) Post cleaning preservation and handling instructions.
- (g) Cautions or warnings to be observed to protect personnel and equipment.

3.5.2.3.2 Examination. Instructions shall be included for examination of the item for damage, unbalance, alignment, wear, deterioration, and defect. Tolerances for allowable service limits, wear, clearances, alignment, and play, backlash or length and depth of scoring, etc., shall be listed in tabular form (see figure 6).

3.5.2.4 Section IV - Repair and replacement. This section shall include instructions necessary for the repair and replacement of damaged or deteriorated items. The instructions shall identify the action to be accomplished, safety precautions to be observed, special tools, jigs, fixtures, parts, and material required, and step-by-step instructions with supporting illustrations to accomplish the task. When overhaul procedures involve restoration, procedures and parts employed shall be in conformance with MIL-R-24358. For critical procedures the instructions shall indicate in tabular form, the following types of information:

- (a) Spring tensions, measured in grass or ounces, as appropriate.
- (b) Pressure between contacts when closed, measured in grams or ounces, as appropriate.
- (c) Clearance between contacts in open position.
- (d) Correct method of installing brushes in rotating machinery, including brush pressure.

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- (e) Limits to which commutators may be turned on a lathe, including pertinent dimension after cut has been taken.
- (f) Specify whether insulating material between commutator segments should be undercut (specify limits) or remain flush with the segments.
- (g) List of mandatory replacement items (gaskets, seals washers, etc.).
- (h) Dimensional information with tolerances, clearances, maximum bolt-down torques, and in-place balancing levels of mechanical items.
- (i) Caution or warnings which must be observed to protect personnel and equipment.

3.5.2.5 Section V - Reassembly. This section shall include instructions and supporting illustrations necessary for the reassembly of the overhauled item. The use of any special tools, jigs, fixtures, or test equipment shall be specified. (If reassembly is the reverse of disassembly, a statement to that effect will satisfy this requirement.) Specifically, the procedures shall indicate the following:

- (a) The use of corrosion-preventive compounds, paints or other materials and the use of gaskets, or sealing compound materials shall be specified by both colloquial name and specification number.
- (b) Identification of all points requiring lubrication, the kind of lubricants required, and the method of application. Lubricants to be used shall be those specified in MIL-M-17192 or as approved by the command or agency.
- (c) The correct manner of installing all fasteners, safety wiring, cottor pins, and other locking devices.
- (d) The method of measuring tolerances, clearances, end-play backlash, and tolerances between any two gears.
- (e) Gearing and linkage alignment data.
- (f) Reference to tables and illustrations.

3.5.2.6 Section VI - Post-reassembly testing. This section shall include instructions for testing the overhauled item to determine that it is functioning within design limits. Tests on subassemblies, assemblies, or other items which can be performed prior to complete assembly shall be included. Extensive testing procedures of the overhauled item when covered in other technical manuals shall be included in this section. In the case of electronic units or assemblies, test set-ups together with precise step-by-step test procedures and required measurement parameters shall be included to ensure that the overhauled equipment will meet design specifications and can serve as an exact replacement.

3.5.2.6.1 Performance standards and tolerances. Performance standards and tolerances shall provide the tests and indications (in tabular form), which will assure overhaul personnel that the overhaul item(s) meets the standards of performance required. For electronic equipment or systems, the performance standards under MIL-B-21741 Performance Operational and Maintenance Standards for Electronic Equipment (POMSEE Program) previously established for the specific equipment shall be met.

3.5.2.7 Section VII - Parts list. This section shall contain a tabular list of parts of the overhauled items which are not included in the list of parts in the associated technical manual. The list of parts shall include all data which completely identifies the item for replacement and ordering purposes, including its physical, electrical, mechanical, and dimensional characteristics and the index and figure numbers of the illustration on which part appears.

3.6 Appendices. If special techniques for shipping, packing, and handling are not included in the associated technical manual for the equipment, the required data shall be included in an appendix. Other appendices may be used when authorized by the command or agency concerned and shall conform to MIL-M-38784.

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3.7 Index. An alphabetical index, prepared in accordance with MIL-M-38784, shall be included for all manuals.

3.8 User activity comment sheet. The manual shall include three user activity comment sheets in each separately bound volume. These sheets shall be located immediately following the last page. Figures 7 and 8 shall be used as a guide for production of these sheets.

3.9 Production.

3.9.1 General. The style and format of the deliverable items (see 3.3) shall conform to MIL-M-38784 and the requirements specified herein.

3.9.1.1 Distribution statement. A distribution statement shall be furnished by the procuring activity to be used in marking the document denoting the conditions of its availability for distribution, release, or disclosure. The applicable distribution statement shall be included on the cover and title page as specified in MIL-M-15071 (see 6.2.1).

3.9.1.2 Volumes. A single volume manual shall not exceed a 3 inch thickness. When the contents of the manual exceeds 3 inches, it shall be physically divided into volumes. The material contained in each volume shall be governed by chapter breakdown of the manual. Whenever an individual chapter content exceeds 3 inches, the division shall be governed by the section breakdown of that chapter.

3.9.1.3 Development of text. The development of text shall be in accordance with MIL-M-38784.

3.9.1.4 Level of writing. The level of writing shall be readily understandable by depot maintenance level personnel having previous experience with similar or related equipment.

3.9.1.5 Accessibility and referencing of data. Cross referencing techniques used in text and illustrations shall provide rapid access to all data in such a manner that the user can proceed through the required action without interruption. Referencing to other publications shall be kept to a minimum.

3.9.1.6 Illustration and artwork requirements. Illustrations shall be provided to convey essential information and to support the instructions in the manual. Text and illustrations shall complement each other to communicate the required information. Illustrations and artwork shall be prepared in accordance with this specification, MIL-M-38784, MIL-M-15071, and MIL-M-24100, as applicable.

3.9.1.7 Illustration types. Types of illustrations include, but are not limited, to the following:

- (a) Exploded views
- (b) Sectional views
- (c) Test setup diagrams
- (d) Assembly or fabrication drawings
- (e) Hydraulic, electrical, and electronic schematic diagrams
- (f) Wiring diagram
- (g) Item location illustrations
- (h) Engineering drawings
- (i) Gearing and linkage diagrams
- (j) Piping diagrams

3.9.1.8 Security marking. When classified information is included in the overhaul manual,

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marking, handling, and production of all classified material shall be in accordance with MIL-M-38784. On foldout pages of classified overhaul manuals, the security classification shall be so placed as to be visible when the printed page is folded or open (see 3.2).

3.9.1.9 Publication or change number. The contractor shall request a publication or change number from the Government approving activity when the review manuscript is submitted for approval.

3.9.1.10 Quantity and distribution. The quantity and distribution of all deliverable items shall be as specified on the DD Form 1423. The contractor shall be responsible for delivery of all items procured on the contract or order.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier shall perform all inspection requirements specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Quality program. The quality assurance provisions including quality program requirements as applicable to the overhaul manual shall be in accordance with MIL-M-15071.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging of manuals shall be sufficient to afford adequate protection against deterioration and physical damage during shipment from the supply source to the first receiving activity for immediate use. Unless otherwise specified, the material furnished in accordance with this specification shall be packaged as specified in 5.1.1 through 5.1.7.

5.1.1 Classified material. Classified material shall be packaged and marked in accordance with the requirements of the DOD Industrial Security Manual DOD 5220.22M.

5.1.2 Manuals for shipment. Manuals for shipment shall be packaged in transparent waterproof plastic bags, minimum four mils thick. Closure shall be by heat sealing. The shipping container housing the manual shall be marked "MANUALS ENCLOSED". The invoice, packing list, or bill of lading shall indicate the publication number and quantity of manuals.

5.1.3 Packing lists. A copy of the letter of transmittal or the packing list shall be placed inside of the carton or container. When a shipment consists of several containers, the letter of transmittal or packing list shall be enclosed in the first container and shall identify the material that is packed in each container.

5.1.4 Manuscript copy for review. Manuscript copy shall be packaged flat in the most appropriate containers. The artwork and text material may be packaged in one container or separate containers. Copies of large artwork (for review purposes only) may be folded.

5.1.5 Reproducible copy and artwork. Reproducible copy and artwork shall be packaged flat and double packaged. Artwork shall not be folded or rolled. Interior packaging material shall be waterproof and free of any chemical substance that would discolor or otherwise render the reproducible copy useless. Large size inked-linen or vellum illustrations may be rolled and packed in mailing tubes.

5.1.6 Photolithographic negatives. When required by the applicable contract or order, negatives required for delivery to the printer shall be packaged in accordance with MIL-M-38790.

5.1.7 Replenishment material. Unless otherwise specified in the contract or order the contractor shall be responsible for obtaining one copy of the final manual and the photolithographic negatives used for printing of the manual, from the printer and packaging them in accordance with the requirements of this specification. The package shall be marked "FOR STORAGE" and forwarded to Naval Publications and Printing Service, Eastern Division, Building 4, Section D, 700 Robbins Avenue, Philadelphia, Pennsylvania 19111. This material when forwarded shall have a covering letter (with a copy to Naval Ship Engineering Center, Code 6181C01, Center Building, Hyattsville, Maryland 20782) advising that the material is for replenishment purposes.

5.2 Packing. Manuals packaged as specified in 5.1 shall be packaged in containers acceptable to the common carrier and which will insure safe delivery at destination in a satisfactory condition at the lowest applicable rate.

5.2.1 Multivolume manuals. Multivolume manuals shall be furnished as complete sets. Individual volumes of manuals, changes or revisions for stock shall be separated and shipped in common containers. When a contract or order requires technical manuals, revisions, or changes having different publication numbers, the stock copies of each multivolume manual, change or revision shall be packaged as separate items (see 5.3).

5.2.2 Bulk shipment. Manuals shipped for stock in bulk quantities shall not be individually wrapped.

5.3 Marking. Except for shipment of an individual copy or an individual set of manuals, packages and containers shall be marked as follows:

Box (number) of (number) (to be listed on multiple container shipments)
 Publication number
 Quantity (in package)
 Contract or order number

When applicable, the words "FOR STOCK" shall be marked on the shipping containers destined for stock. The publication number(s) shall be indicated on the shipping documents (see 5.2.1).

6. NOTES

6.1 Intended use. The intended use of this specification is for the procurement of overhaul manuals for electronic equipment only when mechanical aspects so justify and is limited to those items which can be overhauled at depot level maintenance by designated overhaul activities (see 6.5.3).

6.2 Ordering data. Procurement documents (including Contract Data Requirement List, DD Form 1423) should specify the following:

- (a) Title, Number, and date of this specification.
- (b) Designation of equipment or item(s) to be covered in the manual (see 1.1).
- (c) Security classification (see 3.2).
- (d) Status reporting information required under 3.3.11 shall be included under a single status reporting system for the contract.
- (e) Deliverable items and delivery schedule (see 3.3).
- (f) Deletion of validation requirements (see 3.3.2).

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- (g) The number of copies and distribution requirements for each deliverable item (see 3.9.1.10).

6.3 Quantity and distribution. The quantity and distribution of overhaul manuals are normally limited and are not supplied with the equipment (see 3.9.1.10). The following quantities of the deliverable items which are normally required by the procuring activities are:

- (a) Manual outline, five copies.
- (b) Review manuscript, five copies.
- (c) Preliminary manual, quantities shall be based on the number of designated overhaul activities and interested commands.
- (d) Reproducible copy, one set.
- (e) Status reports, three copies.

6.4 Planning, inspection, and verification.

6.4.1 Planning. Planning for overhaul manuals must begin during the early design phase of the related item(s) to assure the quality of the manual.

6.4.2 Inspections. In-process inspections conducted by the Government are held primarily to provide guidance to the supplier and to assure that deliverable items are being prepared in accordance with the contract and specification requirements. These inspections may be conducted at the supplier's facility or his source facility at any time during the development of the items.

6.4.3 Verification. Verification may be simultaneously performed with validation where:

- (a) Equipment or facility availability does not permit separate verification.
- (b) When advantageous to the Government.

6.5 Definitions. For the purpose of this specification, the definitions specified in 6.5.1 through 6.5.10 are applicable.

6.5.1 Depot maintenance. Depot maintenance is that maintenance which is the responsibility of and performed by designated activities which have shop facilities, equipment, and personnel of higher technical skill than are available at the lower levels of maintenance. It normally consists of repair, modification, alteration, modernization, overhaul, reclamation, or rebuild of parts, assemblies, sub-assemblies, components, and end items; the emergency manufacture of non-available parts; and provides technical assistance to using activities. Depot maintenance is normally that maintenance performed by contractor rework activities, naval or commercial shipyards and may also include ship and shore activities designated as "Ship Repair Facilities" having the capabilities of the overhaul of the item(s) covered in the manual.

6.5.2 Equipment. One or more assemblies capable of performing a complete function.

6.5.3 Final manual. A final manual complies with all requirements, including production requirements of this specification and has been validated, verified, and approved to be complete and accurate.

6.5.4 Function. A group of circuits or other devices which operate together to accomplish a portion of an equipment or system objective (e.g., transmit, receive, display, hoist, control, etc.).

6.5.5 Interior communications equipment. Equipment normally used for shipboard interior communication. These include navigation or related equipment designated Interior Communications (IC) equipment such as the following:

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- (a) Plotting tables.
- (b) Dead reckoning indicators.
- (c) Gyros and gyro amplifiers.

6.5.6 Item. A non-specific term used to denote set, group, unit, assembly, sub-assembly, and part as defined in MIL-STD-280.

6.5.7 Overhaul. The act of disassembly, inspection, cleaning, replacing defective parts, modifying, and restoring an item to place it in a condition to ensure that the item will meet design performance standards and technical specifications.

6.5.8 System. A system includes two or more equipments (sets) or components each having its own identity and nomenclature, arranged and interconnected to perform a specific operation.

- (a) An electronic system can be identified as an IFF system, ECM system, AEW system, ASW system, NTDS system, etc.
- (b) An electromechanical system can be identified as a propulsion system, underway replenishment system, degaussing system, etc.

6.5.9 Validation. The process by which the contractor assures the technical accuracy, adequacy, and that the manual represents the latest configuration of the equipment by actual test against the hardware.

6.5.10 Verification. The process by which the Government assures the accuracy of the manual(s) by actual comparison with hardware. This includes Government action to assure proper execution of validation by the contractor.

Navy interest:

EC - Review
OS - Review
YD - User
MC - User

Preparing activity:

Navy - SH
(Project TMSS-N028)

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VALIDATION PERFORMANCE					
Title of Publication:				NAVSHIPS Number or NAVELEX Number	
Contractor:				Sub-Contractor (if performing validation):	
Contract No(s) and Purchase Orders, If applicable					
Chapter	Section	Paragraph	Date Validation Completed		Check here if not validated
Name & Authority of Contractor's Authorized Quality Representative			Signature of Contractor's Authorized Auality Representative		
Signature & Activity of Government Agent Witnessing Validation					<u>Para. 3.4.1.1</u>

Figure 1 - Example of content assurance page.

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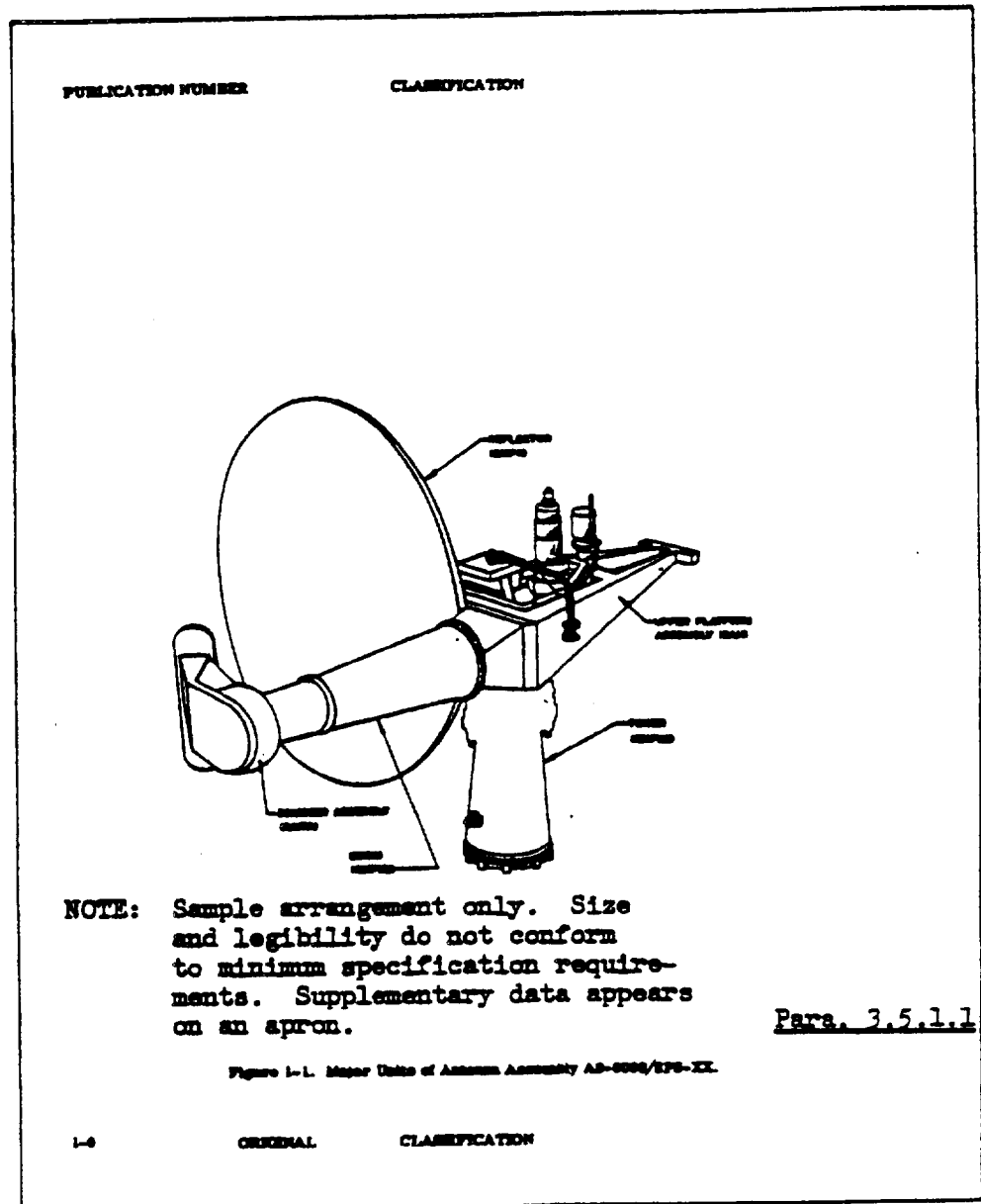


Figure 2 - Sample of a typical frontispiece required for an Overhaul Technical Manual.

Inches No.	Zone	Part Name	Qty	Reference Designation
1	3-B	Cover		12A17MP3
2*	3-B	Hex Head Capscrew	8	12MP37
3*	3-B	Nut	8	12MP38
4*	3-B	Washer	16	12MP39
5	3-A	Scanner Assembly		12A17A1
6	3-A	Shim		12MP40
7	2-B	Cover		12A17MP3
8*	2-B	Hex Head Capscrew	8	12MP41
9*	2-B	Nut	8	12MP42
10*	2-B	Washer	16	12MP43
11	2-B	Boom		12A17MP1
12*	2-C	Hex Head Capscrew	6	12MP44
13*	2-C	Lockwasher	6	12MP45
14	3-C	Reflector		12MP18
15*	1-A	Hex Head Capscrew	8	12MP46
16*	1-A	Washer	5	12MP47
17*	2-A	Socket Head Screw	4	12MP48
18*	2-A	Washer	4	12MP49
19*	2-A	Lockwasher	4	12MP50
20	2-A	Roll Drive Assembly	4	12MP50 12A3
61*	2-D	Lockwasher	8	12MP65
62	2-D	Train Motor Assembly		12B1
63	1-D	Preformed Packing	1	12A13MP37
64	2-D	Clamp		12A13MP13
65	2-D	Boot		12A13MP29
66*	1-D	Socket Head Capscrew	6	12MP69
67*	1-D	Nut	6	12MP70
68	1-D	Train Gear Box Assembly		12A13A2
69	3-D	Hex Head Capscrew	7	12MP71
70*	3-D	Eared Washer	7	12MP26
71*	3-C	Lockwasher	7	12MP72
72	2-D	Slip Ring Assembly		12A12
202	2-D	Pan Head Screw	6	12MP155
203	2-D	Lockwasher	6	12MP156

*Item to be segregated at disassembly for replacement at reassembly. Refer to Parts List for procurement information

NOTE. Sample arrangement only size and legibility do not conform to minimum specification requirements. Supplementary data appears on an apron

Para 3.5.2.2

Figure 2-2. Antenna AS-0000/SP5-XX, Unit 12, Exploded View

CLASSIFICATION

ORIGINAL

2-3/2-4

Figure 3 - Sample illustration to support assembly/disassembly procedures.

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TABLE 3-1. INSPECTION PROCEDURE			
Part	Inspection	Tolerance Range (Dumbie)	Remarks
Beam 12A17MP4 (11) Fig. 3-3	Inspect all welds per paragraph 3-... Inspect A for flatness. Inspect B for parallelism with A.	Must be flat within 0.002 inch. Must be parallel within 0.003 inch.	Repair defects in weld per paragraph 3-... Light machining is permissible. Light machining is permissible.
Elevation Structure 12MP4 (98) Fig. 3-3	Remove all paint to bare metal in a four inch band around beam rest periphery, and inspect weld for surface defects using dye penetrant process per NAVSHIPS 0000-000-0000. Inspect all other welds of elevation structure per paragraph 3-... Note: A line passing through the center of B and C establishes the axis D. Inspect concentricity of C with B. Inspect the flatness of reflector mounting pads A. Inspect the parallelism of pads A with axis D. Inspect flatness of flange E. Inspect angle between flange E and pads A.	Must be concentric within 0.004 inch. Pads must be flat and coplanar within 0.003 inch. Pads must be parallel with axis within 0.010 inch. Flange must be flat within 0.004 inch. 5 degrees \pm 40 seconds.	Repair defects in weld per paragraph 3-... Repair or replace sleeve in elevation structure. Light machining is permissible. Light machining of pads is permissible. Light machining of flange is permissible. Light machining of flange is permissible.
Jointing Box 12A1 (32) Fig. 3-3	Inspect all terminal boards for damage or evidence of over-heating.		Replace any defective terminal boards.

Para. 3.5.2.3.2

Figure 6 - Sample of a typical inspection procedure table.

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USER ACTIVITY TECHNICAL MANUAL COMMENT SHEET

TITLE _____

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VOLUME NO. _____

(Fold along dotted line on reverse side, staple, and mail to **NAVAL SHIP ENGINEERING CENTER OR**
NAVAL ELECTRONIC SYSTEMS COMMAND)

PROBL. QUESTION, SUGGESTION, COMMENT:

NOTE: Both sides of this form shall
 be reproduced locally to size
 of manual as required.

Para. 3.8

NAME _____

RANK/RATE/TITLE _____

MAILING ADDRESS _____

Figure 7 - Sample of a user activity comment sheet (comment side).

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Para. 3.8

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Figure 8 - Sample of a user activity comment sheet (address side).

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