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AUGUST

1949

BUSHIPS

Electron

NavShips 900,100

In This Issue

ELECTRONIC SUPPLY OFFICE

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BUSHIPS Electron

A MONTHLY MAGAZINE FOR ELECTRONICS TECHNICIANS

AUGUST · VOLUME 5 · NUMBER 2

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Bureau of Ships (Code 993-b)
The Editor BuShips Electron
Navy Department
Washington 25, D. C.

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BUREAU OF SHIPS — NAVY DEPARTMENT

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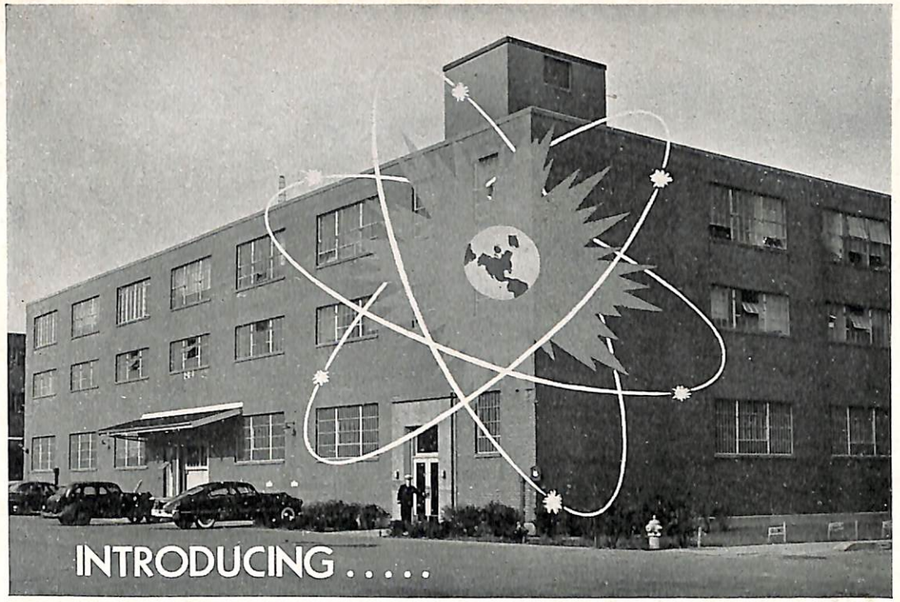

ELECTRONIC SUPPLY OFFICE

by

Cdr. T. J. Montgomery, SC, USN
Electronics Supply Officer, ESO

The Electronic Supply Office, operating under the technical control of the Bureau of Ships and the management control of the Bureau of Supplies and Accounts, is charged with the inventory control of electronic maintenance repair parts for Bureau of Ships equipments. Fundamentally, this merely means the providing of parts required for the maintenance of equipments when and where demand arises. It is merely a matter of knowing what parts comprise each equipment, how many equipments there are in use, the location of those equipments, and the rate at which the several parts are consumed or will be required.

Only within the last few months have there been adequate parts lists of equipments and equipment inventories that could be applied to this problem. In addition, many parts that were provided in the spare parts boxes with equipments at the time of acquisition were not properly identified or stock numbered; and many parts were never provided. These conditions then meant that the acquisition and distribution of electronic maintenance repair parts, of necessity, to a very large degree was dependent upon estimates only rather than upon necessary adequate information which was in fact almost wholly lacking. The development of adequate parts lists is going forward, the proper identification of all parts progresses, the introduction into the system of parts in the spare parts boxes continues, the application of failure data to the equipment application and population is coming into being with the end result that over the months to come the Electronic Supply System will be able to have available to the maintenance personnel a much more intelligent span of parts than at present. It will be able to provide an adequate electronic parts catalogue. It will be able to make purchases in quantities that are realistic, and at the same time, will refrain from unwise expenditure of funds for material which otherwise might have remained in parts boxes and therefore not available to the system itself. There follows in this issue of Electron a series of articles explaining these operations and how they all point toward a common goal.

Maintenance is completely ineffective without proper supply. Proper supply is dependent upon the factors indicated above, plus information from those involved in maintenance, operation, equipment development and procurement. As supply is vital to maintenance, so is information from all sources vital to supply.

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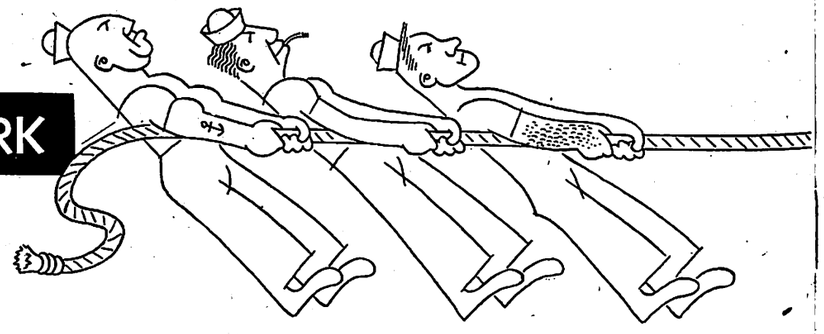
TEAMWORK



by
LT. CDR. P. F. COSGROVE, SC, USN
Stock Control Division Officer, ESO

Anyone familiar with the major American sports, football, basketball and baseball, can well appreciate the value of teamwork. In fact, the word teamwork has been so closely associated with these sports that its use has been almost exclusively confined to them. However, irrespective of the words used to describe any successful organization, one basic fact is revealed: The degree of success of an organization can be accurately measured by the degree of teamwork existing within it.

The electronics branch of the Navy is an organization composed of technical and supply personnel. Although the duties of this personnel are clearly defined, it is impossible to separate them as each is dependent upon the other for successful operation. It is true that the Electronics Officer is primarily concerned with the actual repair and overhaul of electronic equipment, and he is not required to be completely familiar with the detailed procedures of running a Supply Department. The Supply Officer, on the other hand, is primarily concerned with providing the materials required by the Electronics Officer, and it is not necessary that he have the technical "know how" to accomplish repair work on equipments.

The amount of technical ability the Electronics Officer possesses, however, will be of no value to him without the tools and parts he requires. By the same token, regardless of the efficiency of the Supply Officer, he cannot hope to have the necessary materials on hand when needed if he has not kept himself informed of the Electronics Officer's requirements. It follows, then, that these two officers must correlate their work in order that the proper support of both supply and maintenance may be rendered to the Fleet.

World War II brought out the fact that it is absolutely essential that the supply and maintenance officers be completely responsive to their Force Commander. There is no reason to believe that this same responsiveness will not be just as essential in any future emergency. The only way to ascertain that this condition will exist is through the daily practice of teamwork between the Supply Officer for Electronics and the Electronics Officer.

The Supply Officer and the Electronics Officer have a common meeting ground in that both exist for the sole purpose of providing service to the operating Navy. This should facilitate a mutual understanding of each other's problems. Once this mutual understanding exists, teamwork between the two will be a natural development.

How then can this mutual understanding be obtained? The answer is that each officer must have a knowledge of the work being performed by the other. It will be virtually impossible to gain such knowledge without also learning the problems which exist. The Electronics Officer should recognize that the Supply Officer must have advance knowledge of the types of equipment for which he is expected to provide spare parts. Further, the Supply Officer must know, as nearly as possible, the rate of failure of the parts used in the particular equipments being maintained or repaired. Once this information has been given to the Supply Officer it is his responsibility to utilize it as quickly as possible in obtaining the necessary parts. After the parts have been acquired by the Supply Officer, it remains his responsibility to make them readily available to the Electronics Officer with an absolute minimum of paper work and "red tape."

The concept of teamwork between the Electronics Officer and the Supply Officer is then reduced to the functions of, (1) the Electronics Officer providing the Supply Officer with the necessary technical information on the equipment and parts to be supported; (2) the Supply Officer expeditiously obtaining the material and making the issue of same as simple as possible. If each carries out his function, the work of these two officers will be automatically coordinated, with the end result of satisfactory service to the Fleet.

OPERATION REQUEST

by
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Ass't to Stock Control Division Officer, ESO

The ship, the shore station, the industrial yard, all are first line "end users" of electronic equipments, components and maintenance repair parts. Certain equipments and components controlled directly by the Bureau of Ships cannot be requisitioned except in accordance with Bureau instructions. The Electronics Supply Officer does not enter the picture until a maintenance repair part is required, those items of the resistor, capacitor, vacuum tube and dry battery categories for which BuShips and BuSandA have given us the ball to carry as the Supply Demand Control Point.

The problems of having enough of what you need when and where you need it have not all been completely resolved. However, the day is just around the corner when you will get the resistor or tube for that Model RBO or RCU immediately, and you'll miss just an inning or two of the ball-game broadcast while the ET makes the installation. It is for you, the end users, that the Electronic Supply System exists and is making all effort and haste to get all gears meshed. However, the System cannot do the job alone. You can't clean up the house and then hope to keep it clean if the kids continue to come in with dirty feet. What then must we have from you, the last man up to bat, to keep the rally going? You must know what you want, how many and how fast.

The sun will really shine when all ships, stations and yards have a "Standard Stock Catalogue" or allowance list of electronic maintenance repair parts actually aboard one and all requisitioning activities. However, until that day arrives, the Electronic Supply System must depend entirely upon you for full and complete data on the items required when your request is submitted to our first supply echelon. Sure, we know, there are technicians at the supply activities, but they're not crystal gazers, and they need a few hints from the user before they can identify the material for issue from existing stocks or for proper procurement.

The Requisition Must Be Right!

What then does the supply activity need? Basically, correctly prepared requisitions. (Your supply officers and storekeepers take over that department.) In addition, we need accurate accounting data; delivery conditions and, based on factors of overhaul schedules, failure data, departure dates, proper priority indicator and justification. Abuse of priority indicators has a deterring effect on the ultimate quality of service rendered by the supplier. Planning based on the above factors will eliminate most instances of supply inadequacies.

All effort must be made by the requisitioning activity to assure that only one class of material appears on the requisition. Classes 15, 17 and other General Stores classes are often included in error on requisitions for Class 16 material submitted to the electronic supply activities; consequently, unnecessary delay is experienced by the requestor as such items are processed to other classes. Do not "cram" items on one request, for the supplier must make certain notes related to stock numbering and identification for procurement.

The Requisition Reflects Your Need

For expeditious issue, the most important phase of submitting a properly prepared requisition is the recording of technical and reference data provided by the user to enable the supplier to readily identify the item. Very few instances occur when the end user will not know the specific use of the item to be replaced in allowance stock or in what equipment the part is to be installed. The ET has such reference data as instruction books, allowance lists, nameplate data and other markings available. With these tools at hand the requisition should show:

1—Full description of the electrical and physical characteristics of the item.
2—Equipment application.
3—Circuit symbol number of the item.
4—Manufacturer's reference numbers.
5—Contractor's part or drawing number.
6—Navy type number.
7—Army Signal Corps stock numbers, if available.

In certain instances and when convenient, the part to be replaced by requisition could be submitted to the first echelon of supply to be used by the technical staff for identification.

When an ESO or Standard Navy Stock Number is available, it will be necessary to show only the stock number and noun name of the item requisitioned.

In the event a requisitioning activity ascertains that an item not yet received is no longer required or a possible substitution could be made for an item previously requisitioned and on which supply difficulties are being experienced, notice of cancellation of such items should be expeditiously made to the supply echelon.

The purpose of the existence of all echelons in the Electronic Supply System is to be of service to the end user. They can only be as effective as the man making the item request for the purpose of installation or repair—a goodly portion of the responsibility for getting the right item is his.

INVENTORY CONTROL PROGRAM
OF THE ELECTRONIC SUPPLY SYSTEM

by
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Ass't to Control Division Officer, ESO

In the Navy's new integrated supply system, stock levels are determined, supply is compared with demand, and requirements are computed with electrons. Electric accounting machines using punched cards provide the faster, more accurate methods of accumulating and manipulating data on inventories and demand required by modern logistics.

As described in the article on the Tabulating Machine Division, holes punched in cards permit the opening and closing of electrical circuits; actuating sorting, collating, computing, printing, and duplicating mechanisms at rates many times faster than equivalent hand operations. The necessity for speed in inventory control becomes more and more pressing as the tempo of warfare accelerates and hundreds of thousands of items are added with complex technical innovations. In the Electronic Supply System demand is recorded and inventory balances are adjusted both by hand and machine. However, within a year, it is expected that stock record-keeping at all major stock points will be mechanized.

Authorized Stock Levels

Whether by hand or machine, the process of matching supply with demand is carried out most conveniently when both are expressed in units of time. Demand of a repetitive nature recorded for a specific number of months determines the authorized stock level at a stock point in terms of months' supply. Major electronic stock points are authorized to maintain a minimum of three months' supply and a maximum of six months' supply of all maintenance parts except dry batteries. These "on hand" levels are related to the interval between periodic replenishments. Replenishment is scheduled quarterly for maintenance parts, which establishes the six months' maximum—three months' minimum plus supply for the number of months in the reporting period. For dry batteries, replenishment is monthly—a two months' supply is the on hand minimum; a three months' supply is the on hand maximum.

Stock levels differ only in the "on order" quantities authorized, as expressed in terms of months' supply. In quantity, these "on order" levels are based on replenishable (repetitive) demand; and, in time, on the average period from the date material is ordered until it is received. For example, the maximum on hand and on order level at NSD Bayonne is fifteen months' supply—six months' supply on hand plus nine months' on order. Bayonne is replenished primarily with material purchased from manufacturers, for which the average procurement lead (on order) time is nine months. The maximum on hand and on order level at NSY Boston is nine months' supply—six months' supply on hand plus three months' on order. Boston is replenished by Bayonne, the average procurement lead period being three months.

In the discussion of stock levels, a variance in the functions of major stock points must be considered. Essentially, except for dry batteries, the distributive organization of the Electronic Supply System is typical: manufacturer to wholesaler to retailer to consumer. (See figure 1.) In addition to their wholesale functions, NSD Bayonne, SSD, NSC Oakland and ESB, SSD, NSC Norfolk supply certain consumers directly. To expedite action on high priority demands for parts that are often unique, research activities have been designated as dependents of Bayonne and Oakland. When no electronic supply point is located in the vicinity or stocks are inadequate, overseas consumers including ships in the Atlantic, Mediterranean and Caribbean areas, are authorized to submit requisitions to NSC Norfolk. Oakland and Norfolk also issue material to ships in the San Francisco Bay and Hampton Roads areas.

Retailers (Working Stock and Secondary Distribution Points) include shipyards, air stations, operating bases, submarine bases, Marine Corps activities, and overseas supply depots and centers. In the case of dry batteries, wholesalers have been eliminated to reduce the shelf-time in distribution of these items subject to rapid deterioration.

Maintenance parts are distributed from wholesaler to retailer largely on the basis of punched cards submitted to the Electronic Supply Office quarterly by Distribution and Reporting Working Stock Points. These cards are a report of the replenishable demand recorded by each point during the preceding quarter, obligations (quantities required by dependents that are not in stock or that are earmarked for issue in the future), quantities on hand and expected receipts. Electric accounting machines at the Electronic Supply Office multiply replenishable demand by a factor, add obligations and subtract on hand and expected receipts to compute quantities required or excess with respect to the authorized stock level of each point. It follows from the discussion of stock levels that the factor used in a given stock point's replenishment formula depends on the authorized maximum number of month's supply on hand and on order. Since a three months' replenishable demand is reported on the cards and stock levels are always multiples of a three months' supply, the factor is determined by dividing the maximum on hand and on order level by 3. The replenishment factor for SSD, NSC Oakland with a maximum on hand and on order level of fifteen months' supply is 5.

For dry batteries, the use of a factor has been avoided by having stock points report replenishable demand for a period equal to the maximum on hand and on order level. Reports on demand that cover periods longer than three months provide an advantage apart from simplifying formula calculations. A longer Supply-Demand Review period tends to smooth out short-term fluctuations that result in stock status reports that do not represent the stock points' true requirements and excesses. However, it has not been practicable to lengthen the review period for parts other than dry batteries during the Standard Navy Stock Number Conversion Program because of the complications it would introduce into mechanized stock record keeping at stock points. Collecting stock status data punched in cards for items under two stock numbers would consume more machine time than can be made available for the preparation of Quarterly Stock Status Reports.

ESO's machines not only determine quantities to be distributed within the system but also compute quantities to be purchased for the maintenance of the system stock level. Procurement quantities calculated by formula are reviewed by technicians to take into account such factors as deterioration rate and estimated failure.

Currently, material is purchased each quarter on the basis of these calculations. While annual procurement is clearly superior—cutting unit material costs with larger quantity awards, reducing overhead by decreasing the number of contracts negotiated and lowering shipping costs by consolidating shipments—it will not be feasible until the end of the Breakdown Program, when more complete data on inventory will be available.

The mechanized stock status reporting system described in the foregoing paragraphs is designed to serve as a basis for filling the bulk of the requirements at stock points. Demands for items not carried at Working Stock Points and sudden increases in demand result in the submission of interim requisitions to Primary Distribution Points when requirements are urgent or the cut-off date for the next QSSR is too far in the future. Replenishment for items to which no standard stock numbers apply is based entirely on requisitions until stock numbers are assigned.

Urgent requisitions and requisitions for non-stock numbered material not in stock at Primary Distribution Points are passed to the Electronic Supply Office to be filled by redistribution or procurement.

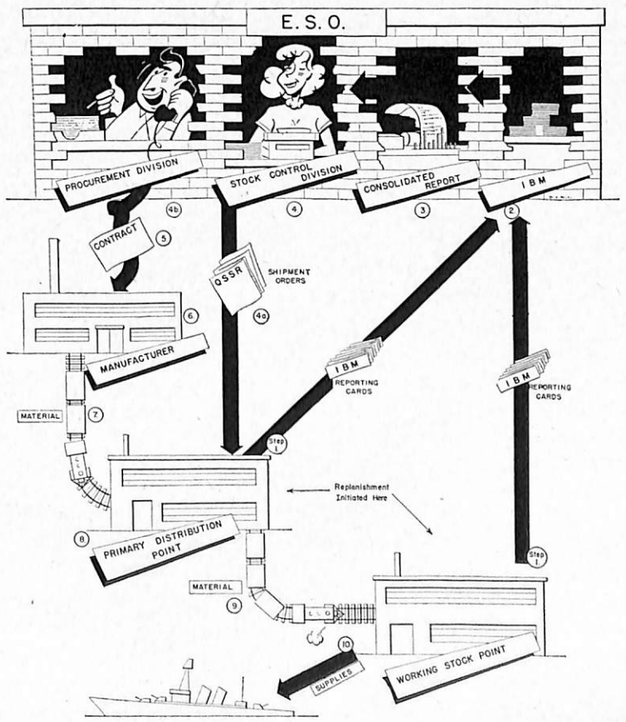

FIGURE 1.

REDESCRIPTION PROGRAM

by
MR. M. D. COHEN,
Supervisor, Identification Branch, Technical Division, ESO

A stock numbering system is only as good as the descriptions associated with its stock numbers. The worth of the descriptions is measured by several factors. Prime among these, is the way they delineate the variables for a particular kind of item.

ESO stock number descriptions were originally designed purely for purposes of material identification. The variables expressed in these descriptions were those that could be determined by visual inspection. These included physical dimensions, and electrical data that could be taken from the material by virtue of the nameplate data contained thereon, color codes, or simple electrical tests.

However, while there is a recognized need in the Navy Department for decentralization of certain supply functions, as performed by the various Supply Demand Control Points, there is also a definite requirement for a standard description and standard stock number for every item in the Naval Supply System. As a consequence, the Standard Navy Stock Number program, which was based on descriptions patterned in accordance with the Joint Army-Navy-Air Force publication "Manual of Standard Descriptions for Electronic Equipment and Material" (short title "JANAP–109"), made it necessary for the Electronic Supply Office to go into a redescription program. Every item binned under an ESO stock number had to be redescribed in accordance with the more rigid requirements of JANAP–109 and application made to the Navy Material Catalog Office for a Standard Navy Stock Number.

The description pattern requirement of JANAP–109, the basic document for all electronic description writing today, calls for many electrical values that cannot be obtained from visual inspection. A review of all the sources of supply for ESO-described items became necessary, in order to determine what was in the bin for each specific stock number.

Classification Groups

JANAP–109 classifies every item into one of three groups; different types of descriptions are required for each group. The JANAP–109 definitions for each classification group are given below:

Group 1 Items

This group covers simple, general purpose items of standard commercial design which are generally interchangeable, even though made by different manufacturers. Usually these items neither have nor require maintenance parts and are replaced as a unit when they become unserviceable. Since each item may have several manufacturers' numbers, these numbers cannot be relied upon to establish positive identification. Instead, complete reliance must be placed on descriptive information. For this reason, the description requirements for items in this group must necessarily be *detailed*. Typical examples of items in this group are:

fixed capacitors
fuses
cable clamps
screws
bolts
nuts
washers
rivets
conduits
pipes
pipe fittings
variable resistors
lamps
fixed resistors
dry batteries
wet batteries

Although such data as manufacturers' and contractors' names, part numbers, and drawing numbers are not relied upon to establish identification, they are required for procurement purposes and for cataloging records.

Group 2 Items

This group contains items of a complex nature and, though as units these items may be used interchangeably when made by different manufacturers, their component parts may not be interchangeable. Generally, when these items become unserviceable, they may be returned to use by replacement or repair of component parts. For these complex items, general descriptive information and manufacturer's part and drawing numbers are required. In the final analysis, positive identification can normally be made only by reference to manufacturer's parts catalogues and drawings. However, general or overall information is required for cataloging purposes, and for the purpose of enabling stock numbering personnel to associate similar items and to conduct further research, when necessary, before establishing a stock number.

Typical examples of items in this group are:

amplifiers
cameras
electrical converters
engines
generators
microphones
electric motors
oscilloscopes
test instruments
radio receivers
radio transmitters
telephones
switchboards
projectors

Group 3 Items

This group contains "special purpose" items, i.e., items especially designed for particular equipment and not normally used in any other equipment. Generally, these items are not interchangeable. For items in this group complete reliance for positive identification is placed upon manufacturer's and contractor's part, drawing, and specification numbers. All other required data are limited in quantity and are of a very general character. Generally, these consist of material, application, and overall physical dimensions.

Typical examples of items in this group are:

armatures
brush holders
camshafts
engine valves
wrist pins
gaskets
connecting rods
motor frames
pistons
rotors
slip rings
most assemblies
valve guides
push rods

Elements of Description Pattern

Description Patterns are so constructed that the variables expressed in each description will meet the needs of the most critical user of the part described. Tolerances for stock numbers are also dictated by the most critical user. Compactly designed sets, for example, allow for very little variation in the size of the parts used within them. A high-frequency oscillator circuit requires stability for its resistors and capacitors to a degree not required in common radio circuits. Thus, descriptions carried for these items will contain strict dimensional characteristics, as well as temperature coefficient, capacity, drift, and resistance and capacity tolerances, specifically for the use of the most critical user.

Redescription Problems

At the beginning of the Redescription Program, a physical inventory of all ESO stock numbered items was conducted at major stocking points in the U. S. and overseas.

Group 1 items, which showed a large number of contractors and suppliers, presented the biggest problem. It was determined that the material in the bins, in many instances, was an assortment that included all of the newly added variables. These items could not be segregated without extensive electrical testing equipment. However, all the variations were usually of such nature,

CROSS REFERENCE MATERIAL is checked to provide COMPLETE descriptive data for redescriptions.

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MICROFILM DRAWINGS being checked by electronics technicians to obtain description data.

that the broadest possible tolerance item in the bin could be, and was, used for the basis of the redescription. If it was known, for instance, that there were resistors binned under an ESO stock number that had tolerances of 5, 10, and 20%, the redescription would standardize the tolerance at plus or minus 20%.

Actually, the problem of resistance tolerance is a hypothetical one, since resistance tolerance can be obtained by color code reading. However, it serves to illustrate the problems encountered. Resistance tolerance should be measured by precision meters. As a rule such equipment is not available at the stocking points. There could conceivably be as many as 100,000 resistors under one stock number. Each would have to be tested. Finally, a technician's requirement for a resistor with a tolerance of plus or minus 20%, can be fulfilled by anything of lesser tolerance. The converse of this is, of course, untrue.

Sequential Preference System

The review of the references associated with ESO Group 1 stock numbers could, and often did, reveal several different kinds of numbers. Amongst these were manufacturers' and government type numbers, contractors' part numbers, and other service stock numbers. Each of these had to be checked against the basic reference, which was the part being described. The information developed from this check was often conflicting. As a result, a sequential preference system for reference numbers was developed.

The system of preferences was based upon existing procurement and identification procedures. JAN and AN specifications were used as often as possible. The validation of any of these against a stock number usually precluded the need for further check of references for descriptive purposes, since there is sufficient information within the majority of these specifications to prepare a JANAP–109 description.

If a JAN or AN type number was not available, a manufacturer's part number was used. These, too, were usually an authentic basis for redescription.

Contractors' part numbers and instruction book information required a much more thorough review. Each often expressed unstandardized electrical values, which reflected the need of peculiar circuit requirements. If a particular set needed a resistor whose power rating was twenty-three watts, for instance, the contractors and instruction book would carry that rating. Further research often proved that the actual part used was a manufacturer's standard of twenty-five watts. The new description would be based on what was supplied to meet the contractor's needs.

Group 2 Items presented much less of a redescription problem. There was usually sufficient information on the nameplates of those items to develop a new description.

Group 3 Item redescriptions could usually be developed on the basis of a contractor's drawing for a specific part. They, too, presented a comparatively simple redescription problem.

Ultimate Goal

The major result of this redescription program is the standardization of electrical-electronic parts within the Naval Supply System. This standardization will result in simplification of the supply system.

The number of people available who can fulfill a technician's request for an electronic part that differs from all other similar electronic parts by one or more variables is limited. However, the number of people available who can fulflll a technician's request for an item associated with a specific stock number is limitless. Yet the two requests may be for the same item!

STOCK NUMBERS CONVERSION PROGRAM

by
MR. H. J. COHEN
Supervisor, Technical Division, ESO

In the past year, the Electronic Supply Office essentially has accomplished a complete transformation of its methods of material identification and stock numbering. Named the Stock Numbers Conversion Program, this transition to Standard Navy Stock Numbers effectuates a directive for utilizing stock numbers having Navy-wide recognition as a means of consummating supply operations for electronic maintenance repair parts. This Program is also of considerable importance to shipboard maintenance, because it has produced a means of supporting operational equipments as specified in the Electronic Repair Parts Program developed by the Bureau of Ships.

As one of the major supply demand control points, the Electronic Supply Office has the mission of controlling the stock levels of electronic items required for the maintenance of BuShips' electronic sets. In the present state of development of electronic supply functions, however, electronic items are also under the cognizance of a number of other control centers. It is quite evident that a common identification pattern utilizing uniform stock numbers is a prerequisite for the interchange of materials between supply systems, and for their eventual consolidation for the purpose of efficiency.

As early as February, 1946, the Office of Navy Material directed the standardization of description patterns throughout the Navy by use of the Joint Army-Navy-Air Force "Manual of Standard Descriptions for Electronic Equipment and Material, JANAP–109". This same directive established the Navy Material Catalog Office (NMCO) as the central activity for receiving applications to which stock numbers were to be assigned from submitted descriptions prepared in conformance with JANAP–109. Since that time, various Naval bureaus and supply demand control points have been active in preparing the descriptions required for assignment of basic Standard Navy Stock Numbers according to a plan now known as the Electronic/Electrical Identification Program. These basic stock numbers are constructed to consist of stock class numerals, the initial letter of the basic noun name, and primary and secondary suffix numerals derived from elements of description in the standard pattern of JANAP–109.

Basic Standard Navy Stock Numbers for electronic/electrical items are authorized for use in a supply system by the addition of the control prefix letter of the cognizant supply demand control point. For ESO, this prefix is the letter "N". The format of a typical Standard Navy Stock Number validated by ESO is N16–A–12345–1234. It is important to remember that the electronic/electrical Standard Navy Stock Number is not a General Stores Stock Number, although it lacks a control prefix at the time of assignment by NMCO. Since submitted descriptions for stock numbers prepared by one activity also can be utilized by another activity as part of a common identification program, it is the responsibility of each supply demand control point to validate its required Standard Navy Stock Numbers by application of the control letter prefix to the body of the stock number which conveys descriptions of material in the supply system, and to officially promulgate such validated stock numbers and descriptions.

Development of a Conversion Method

Having reviewed the fundamentals of the Electronic/Electrical Identification Program, let us now consider the status of the Electronic Supply Office in July, 1948. Some ten thousand of its items had been described and had received Standard Navy Stock Numbers, but these stock numbers were not in use pending the development of a conversion method. Another nine thousand items had been described according to JANAP–109, but had not yet received Standard Navy Stock Numbers. All these items, however, were included in the sixty-five thousand items carried under ESO stock numbers. Using Standard Navy Stock Numbers as the medium of identification, the Bureau of Ships was initiating its Electronic Repair Parts Program by

preparing ships' allowance lists and directing the installation of stock bins on shipboard. Ships were instructed to requisition materials by means of Standard Navy Stock Numbers. Electronic supply activities were requested to support the requirements of the Fleet on the basis of requisitions bearing Standard Navy Stock Numbers.

It is apparent that a quick and complete conversion from ESO Stock Numbers to Standard Navy Stock Numbers was required. Not only was there the long range viewpoint of the original directive to be met, but there was also an immediate need for a complete range of Standard Navy Stock Numbers to identify items which were to be supplied to the Fleet, whether those materials existed in stock, were obtained from the ESO Breakdown Program, or were to be directly procured.

It was evident also that the conversion could not be limited to a category-by-category process, but would have to take place simultaneously in all categories. Time was of the essence; it was necessary to transform the Electronic Supply System from ESO stock numbers to Standard Navy Stock Numbers while still carrying out the normal volume of supply operations under one stock number or the other.

Such was the nature of the problems which were considered at the Electronic Supply Conference of July, 1948. The Stock Numbers Conversion Program was evolved and put into operation.

Relationship to Redescription Program

For the purpose of explanation, the Stock Numbers Conversion Program will be summarized into several phases. The first is the redescription of items.

Complete files of assignments of Standard Navy Stock Numbers to all Naval activities are maintained at ESO. All of these assignments (now numbering some 100,000) are checked against item descriptions under ESO Stock Numbers and description patterns, in order to discover identical or equivalent items in the Electronic Supply System. This determination utilizes the research of the other activities to eliminate duplication in preparing item descriptions.

If the assignment checking just described does not result in identification by an existing Standard Navy Stock Number, further research of the item identified by the ESO description must be performed in reference manuals and catalogues to satisfy the more extensive description requirements of JANAP–109. Such an expanded description is processed into an application for a Standard Navy Stock Number, which later is activated to become an element of the stock numbers conversion process.

Since there are materials of other stock classifications in the Electronic Supply System, assignment checking against non-electronic catalogues (such as that for General Stores materials) produces other types of Standard Navy Stock Numbers to which transfer of ESO stock numbers can be made as a preliminary to transfer of material and control.

Activation of SNSN's

Another phase of conversion to be considered is the method of activation of Standard Navy Stock Numbers in the Electronic Supply System by use of the control prefix letter "N". All Standard Navy Stock Numbers which result from the direct description process, or from assignment checking of records, represent descriptions of ESO controlled material and can be activated by transfer from the present ESO stock number. Because the BuShips Electronic Repair Parts Program is utilizing stock numbers which must be supported from materials in stock, originating from spare parts breakdown or obtained by direct procurement, it is assumed that those materials will enter the supply system to support the requirements of the Fleet. Consequently, all stock numbers which appear on shipboard allowance lists are activated if not already present in the records of ESO. Validation recognition of all such Standard Navy Stock Numbers having the ESO control letter prefix are accomplished by publication on Stock Numbered Description Cards, and later by inclusion in the Electronic Materials Cross Reference.

Synchronizing Conversion with Reporting Cycles

Another very important phase of operation is the relationship of the Stock Numbers Conversion Program to the reporting cycle of the Quarterly Stock Status Reports. In order to maintain levels of supply, it is necessary to preserve the means of reporting stock, and of consolidating data quarterly by stock number. The stock numbers conversion must be accomplished in such a manner that the continuity of stock status reporting is not interrupted. Prior to conversion, items of material are reported by ESO stock numbers. Next, a target date is set between two reporting cycles for the consummation of transfer action and adjustment of all records on a system-wide basis. At the occurrence of the second cycle, the item is reported under its Standard Navy Stock Number which had been activated on the target date. Since individual conversions of stock numbers are occurring at random times throughout all ranges of categories, rationalization of supply operations requires that stock number transfer actions be synchronized with stock status reporting.

The timing of individual stock number transfer actions which, grouped together, constitute the Conversion Program is accomplished by noting the effective target date of transfer on a Stock Numbered Description Card. This is distributed in a random time sequence determined by the receipt of information. For the purpose of effecting uniform conversion actions throughout the Electronic Supply System, Conversion Tabulated Lists are promulgated as summaries of transfer actions and activations which are to be effective on any one target date. Standard Navy Stock Numbers appearing on these lists are supported by catalogue data previously disseminated in the form of Stock Numbered Description Cards.

The Conversion Tabulated List is an authorization for stock number transfers to take place, systemwide, on the target date. Before that date, the ESO stock number is in effect. On and after the target date, the ESO stock number is deleted from the Electronic Supply System. Thenceforth, all supply and catalogue oerations are concerned with the Standard Navy Stock Number activated at that time. Since both the Stock Numbers Conversion Program and the Electronic/Electrical Identification Program have been in progress over an extended period of time, it has been necessary to establish a series of recurrent target dates for the various categories of material. Items have been segregated by their stock number ranges in order to accomplish systematic stock number conversions effected on recurrent target dates throughout the year of transition.

ESO Leads in New Supply Operations

The Stock Numbers Conversion Program is scheduled for completion towards the end of 1949. The Electronic Supply Office has become the first supply demand control point to revise its procedures for complete supply operations predicated upon the use of Standard Navy Stock Numbers for electronic items. As a result, the facilities for rendering better and more expeditious support to the Fleet are improved considerably.

RADIO AND TELETYPEWRITER COMMUNICATION TO THOSE "FAR-AWAY" PLACES

The *USS Huntington (CL–107)* of Cruiser Division Twelve recently sailed in company with the *USS D.H. Fox (DD–779)* on a goodwill tour of African and South American ports. The itinerary of the cruise, which lasted from 22 September to 8 December, 1948, began with Port Said, and extended in order to Massawa, Mombassa, Durban, and Capetown in Africa, and to Buenos Aires, Montevideo, Rio de Janeiro, and Trinidad in South America. Of interest to electronics personnel are several reports of performance of radio and radioteletypewriter equipment during the cruise.

Preparations for the cruise included putting the radio equipment to be used on the voyage into peak operating condition, especially the Model TCK–4 Radio Transmitting Equipments. The receivers were most carefully tuned to the exact frequencies to be used. Communications and electronics personnel were briefed in the problems of long-range communications and their solutions. The most favorable frequencies were chosen, and necessary measures were taken for maintaining communication security. As many arrangements as possible were made in advance by mail.

Ship-to-shore communication was carried out with most of the ports visited. Particularly noteworthy is the success of the duplex radioteletypewriter circuit with the Naval Communication Center at Washington (NSS), in which TCK–4 transmitters and FRA converters were employed. A special radioteletypewriter circuit of four hours duration per day was established between the Communication Center, Washington, and the *USS Huntington,* and was maintained until the vessels reached Buenos Aires, when it was discontinued. Except for two days when atmospheric conditions blocked radio transmission, communication on this circuit was reliable.

The Washington primary fleet broadcast was received at night time at Durban. Although some traffic was missed, the 0600Z general message schedule was intercepted "solid" by the vessels after their departure from Capetown. After they left Rio de Janeiro, they were able to receive the NSS primary fleet broadcast continuously.

For inter-vessel communication between the *Huntington* and the *D.H. Fox,* a u-h-f network was employed, using TDZ/RDZ equipment. This performed quite satisfactorily.

This cruise presented an unexcelled opportunity for training personnel in the operation and maintenance of long-range radio communication equipment, and especially in the operation of radio-teletypewriter apparatus. The cruiser started with five rated men, for example, and finished with nine.

It is reported that the *USS Albany (CA–123)* obtained almost perfect reception of the NSS primary fleet broadcast at Buenos Aires during a similar cruise in January, 1948. This performance occurred whenever automobile ignition noise did not create an excessive disturbance. A Boston trunk antenna system was employed. It is not reported whether the slightly better reception of the *Albany* was the result of a superior antenna system or more favorable radio-propagation conditions.

CATALOGING

by
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The Electronic Supply System has been trying to lick the numbers racket for five years. Navy type numbers, contractors' part and drawing numbers, manufacturers' part and drawing numbers, Joint Army Navy numbers, circuit symbol numbers, commercial catalogue numbers, all kinds of numbers are used to identify the same electronic item. What to do!

Because of the urgent need for equipments and materials during the last war, no time was permitted for effective identification of materials entering the Electronic Supply System. Thus, with materials entering the System from various sources, none of which used the same means of identification for electronic items, it was almost impossible to intelligently convey a desire for materials into a language that was understandable by all, and that would be useable by all activities, technical and supply, in the determination of requirements, issue, receipt, storage, and accountability of electronic materials.

To provide a common language to aid in supply operations, this office five years ago embarked upon a program of material identification, which has resulted in the establishment of a cross reference of all known equivalent reference numbers leading to a common stock number, and the establishment of equivalency and interchangeability of electronic materials. This program, soon to be completed, has permitted great savings through the elimination of duplication in various supply operations. For example: N16–R–4920 is the ESO stock number assigned to a relay of certain electrical and physical characteristics. This stock number has been determined as being applicable to all of the following equivalent reference numbers: Navy Type No. 29569, Dunco drawing #8AAX101 cl D, Dunco Part #CXB2854 cl 40, Submarine Signal Company Part and Drawing #746–145 and Circuit Symbol K–405 in the QCT equipment. The reference numbers to Stock Number N16–R–4920 are those numbers which are found in instruction books, parts lists, drawings, commercial catalogues, and the item itself.

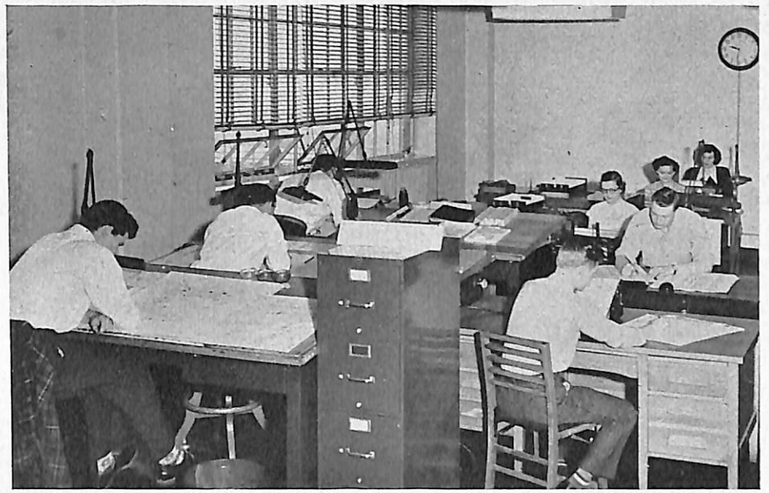
The EMCR

It is not necessary for supply activities to stock materials under each of the above reference numbers, since all cross reference information developed as a result of the electronic materials identification program is incorporated into a publication entitled the Electronic Materials Cross Reference (EMCR). This publication is a listing of all known identifying numbers leading to an authorized stock number, which when known, is to be used on all supply documents in the Electronic Supply System. At the present time, the EMCR contains approximately 70,000 such stock numbers which identify approximately 200,000 reference numbers. It also contains paragraphic descriptions for these stock numbers so that the user can definitely determine that the part which he has reference to is in fact the item actually identified by the stock number. Thus, the EMCR bridges the gap in the translation of the desire of a consumer to the supplier who is to furnish the material required.

However, the EMCR is not the final answer for all supply operations. Its main purpose, as stated above, is to serve as a cross reference and to identify material where a reference number is known. The present arrangement of the EMCR with its paragraphic descriptions listed in stock number sequence, rather than in sequence by electrical and physical characteristics, does not readily enable a stock number to be determined for an item if only electrical and physical characteristics are known. Another deficiency lies in the fact that, in accordance with a directive from the Chief of Naval Material, the Electronic Supply System has been directed to employ the Standard Navy Stock Number in lieu of any and all numbers, including the ESO stock number, presently being used in supply operations.

Redescription of Materials

To develop a fully effective catalogue which meets all supply and technical requirements in the Electronic Supply System and to comply with the directive issued by the Chief of Naval Material, the Electronic Supply Office, in conjunction with the Bureau of Ships and the Navy Material Catalogue Office, three years ago embarked on a large scale program to redescribe all electronic materials in accordance with a common description pattern authorized for use by all services and agencies of the federal government. This common description pattern used in the description of electronic materials is the Joint Army-Navy-Air Force Manual of Standard Descriptions (JANAP 109). The description of all materials in the same pattern permits the funneling through



THE ILLUSTRATION UNIT of the Catalogue Division of ESO compiles Part 2 of the Catalogue of Navy Material. (Bushps Section.)

the same channel of all like items, preventing the possibility of duplication of stock numbers for the same item, with attendant savings in supply operations.

Stock Numbers Conversion

To date, as a result of the redescription program, the Navy Material Catalogue Office has assigned approximately 70,000 Standard Navy Stock Numbers for use in the Electronic Supply System. These numbers, to be used in lieu of the present ESO stock numbers, are presently being introduced into the system by ESO and the Bureau of Ships in various methods. Through its Shipboard Allowance Program, the Bureau of Ships is furnishing these numbers to those vessels being converted to the allowance program. The Electronic Supply Office, through its Stock Numbered Description Cards, Spare Parts Breakdown Lists, Stock Number Conversion Lists and Supplements to the EMCR, is activating these numbers throughout the shore-based Electronic Supply System in accordance with a pre-determined schedule.

At the end of the redescription and stock number conversion program, the 10th edition of the EMCR will be published. This will in all probability be the last time that the EMCR will be published in its present format. The 10th edition will show the status of all stock numbers, both ESO and Standard Navy Stock Numbers, in the Electronic Supply System. It is estimated that approximately 80,000 Standard Navy Stock Numbers and 20,000 ESO stock numbers will be included therein with all appropriate cross reference information.

The New Catalogue

The Electronic Supply Office will commence publication of the Bureau of Ships Section, Part II (Electronics) of the Catalogue of Navy Material on 1 July 1949. This catalogue, which will cover all electronic maintenance repair parts, will be published in sectional form by commodity type; i.e., resistors, capacitors, transformers, relays, etc. Each commodity will be covered in a separate section of the overall catalogue. Each catalogue section will have at least three related sub-sections; i.e., one subsection will list all known reference numbers equivalent to a Standard Navy Stock Number; another subsection will show each Standard Navy Stock Number with all its equivalent reference numbers; and the third subsection will contain complete JANAP–109 descriptions of each supply item in the particular commodity, arranged in tabular form and listed in sequence by its electrical and physical characteristics. Illustrations will be employed throughout the catalogue as a further aid in identification. In addition, depending upon the commodity being catalogued, technical information tables, such as resistor and capacitor color codes, will be included therein.

This format has been determined to be the most effective for supply and technical operations. It will give the user who has only a reference number and a meager description, a means of finding the information desired in the catalogue. Similarly, it will also give the user who has a desire for an item of certain electrical and physical characteristics a means not presently available in the EMCR for determining the applicable stock number. Interchangeability and preferred values for certain items will also be indicated where such information has been determined.

The new catalogue is scheduled for completion by 30 June 1951. However, all efforts are being directed to complete it at an earlier date so that present information which is subject to rapid change may be disseminated while it is still effective. With the introduction of the new catalogue into the Electronic Supply System, the Standard Navy Stock Number will serve as the common language and the numbers racket will be under effective control.

ELECTRONIC SUPPLY SYSTEM PARTICIPATION

IN BUSHIPS ELECTRONICS REPAIR PARTS PROGRAM

by

CDR. C. R. EAGLE, JR., SC, USN

Executive Officer, ESO

The whys, wherefores, methods, aims, and objectives of the Bureau of Ships Electronic Repair Parts Program were ably expounded in the May 1947 issue of ELECTRON. Befitting the fact that one of the major objectives of the program concerns the saving of space aboard ship, that important phase was highlighted. From all reports, actual results thus far achieved fulfill even the highest expectations. Space savings, and reduction in the number of items carried, have been substantial.

Obliquely, but nonetheless deeply, the Electronic Supply System, and ESO not the least, has quite a stake in the successful completion of the BuShips Electronic Repair Parts Program. One of the gravest obstacles in the path of extending to the forces afloat some measure of the progress already obtained in the Electronic Supply System will be overcome, and effective electronic supply processes will at last become possible beyond the shore line. The grave obstacle we have in mind is that absence of a common language between those afloat faced with the necessity of ordering electronic material and those ashore bearing the responsibility of supplying it. That golden medium of exchange, that common language, is the Standard Navy Stock Number that will spring into life to vitalize ship-to-shore relations through the BuShips allowance lists which have or will be placed aboard each vessel of the active fleet.

Identifying Data Ashore

Although very much yet remains to be accomplished, great strides have been made during the past two or three years in the identification and cataloging of electronic spare parts. Many thousands of items were described and stock numbered by the Electronic Supply Office. These ESO stock numbers, their descriptions, together with pertinent reference numbers, were promulgated to shipyards, depots, and major stations through the Electronic Materials Cross Reference (EMCR), and parts became stock recorded, stored, issued and procured under ESO stock numbers. More recently, the Bureau of Ships and ESO have been engaged in redescribing electronic maintenance parts in accordance with patterns prescribed by JANAP–109, and submitting the results of their work to the Navy Material Catalogue Office for assignment of Standard Navy Stock Numbers (SNSN).

As SNSN assignments were returned, various sorts of publications have been disseminated to the shipyards, depots, and major stations which incorporated valuable identification media in terms of Standard Navy Stock Numbers. Some of these, although invaluable, are of an interim nature developed for specific purposes, and will later become part of permanent publications now being compiled. For example, Spare Parts Breakdown Lists (SPBL's) were developed to facilitate the Breakdown Program—the segregation, identification, and binning of spare parts sets. Substitutions of Materials Lists—cross reference between SNSN and ESO stock numbers—were developed to assist in the Standard Navy Stock Number Conversion Program. Extensive lists cross referencing reference numbers to SNSN's have been promulgated, as well as many other types of identification data.

Identifying Data Afloat

So, while the shore establishment has been becoming progressively more versed in and enjoying the benefits of electronic parts stock numbers—a common language—such was not the case afloat. Identifying data on requisitions still had to be derived largely from instruction books, and this sometimes was more voluminous than the electronic technician and/or storekeeper who had to requisition material cares to think about. But the trouble doesn't stop there. Before the supply department ashore can honor the requisition, translation becomes essential—translation between the identifying data given on the requisition and the stock number under which the item is stock recorded, stored and issued. Not always, but too often, this job of translation, or an attempt at it, had to be done not only by the shipyard supply organization, but also by the next two echelons of supply—the depot and ESO. Research for stock numbers associated with reference numbers is a delaying, not to mention costly, process in the supply chain.

As the BuShips Electronic Repair Parts Program is implemented and conversions are effected the barriers of language will be removed, all will speak the same tongue, requisition processing will be expedited and dispatch traffic (requests for additional necessary identifying data) reduced. Oh, happy day! That is why ESO is immensely interested in the early implementation throughout the fleet of the BuShips Electronic Repair Parts Program. Indeed, the Electronic Supply Office allows itself to hope that placement of key sheets and allowance lists aboard active vessels will not have to be delayed pending actual conversion of each vessel. The new type of class allowance lists now being developed by the Bureau of Ships may well make it possible to place key sheets and allowance lists aboard prior to conversion. To do so would enable ships to identify required parts by SNSN and to requisition them accordingly. Many of the benefits of the program—particularly as applying to supply processing—would be realized immediately, and shipboard personnel, being thus preliminarily exposed to the new system, would have a better understanding of it when conversion of the vessel was actually undertaken.

Success of Conversion Depends upon Availability of Parts Required

What has the Electronic Supply System done, and what more can it do in the future to further assist the Bureau of Ships in the acceleration of the Electronic Repair Parts Program? On receipt of off-loaded spare parts sets from submarines designated for conversion, shipyard supply departments have been segregating the spare boxes by items and identifying them by Standard Navy Stock Number through the use of Spare Parts Breakdown Lists. As soon as the vessel's allowance list arrived from BuShips, assembly of the allowance began, using the off-loaded and stock numbered parts as the prime source of material. Deficiencies were supplied from the shipyard's electronic stocks if available. If not, requisitions were submitted to the shipyard's primary distribution point, either SSD, Oakland or NSD, Bayonne for action.

It will be noted that the assemblage method described relies, first, upon material from off-loaded spares as the prime source, and secondly, upon material in the Electronic Supply System as a secondary source. It also requires a segregation and identification program for the off-loaded spares which must be accomplished prior to initiation of the assemblage. Assemblage itself cannot begin until receipt of the vessel's allowance list. Filling of deficiencies, then, from the Electronic Supply System generally must be undertaken towards the end of the vessel's availability when time is a factor—with the resultant priority A or B requisitions to plague the supply activities, and some allowance list shortages unfilled at the vessel's departure.

Filling the supply pipelines has been and will continue to be one of ESO's contributions to the Electronic Repair Parts Program. SPBL's for the approximately 100 submarine equipment types have been consolidated by electronic accounting machine (EAM) methods and 5200 line items obtained and tabulated. By comparing the tabulated list of 5200 submarine type items with shipyard stocks on hand or due, deficiencies were revealed and diversion action taken to supply the missing items.

Class Type Allowance Lists Speed Conversion

Through development of class type allowance lists now under study by the Bureau of Ships, it may be feasible to alter the assemblage methods now practiced to the end that ship conversions may be improved and accelerated. Being more flexible, and thereby facilitating compilation for individual vessels, the class type allowance list may permit an assemblage to be initiated shortly after a vessel's availability period begins. In fact, it may be feasible to schedule vessels for conversion during upkeep periods, the assemblage being initiated well in advance of the ship's arrival.

The assemblage method contemplated, and made more practical of application by the class type allowance, would depend for its prime source of parts upon material in stock at the activity designated to perform the job; secondly, upon material in the Electronic Supply System as a whole (diverted to the assembly point by ESO); thirdly, upon material in the off-loaded spares; and fourthly, upon procurement. It would rely upon assembly directly from material already in regular bin storage and eliminate the segregation and identification problems now confronting supply activities engaging in conversion. Problems facing the implementation of this assemblage method are now under study jointly by ESO and the Bureau of Ships with every expectation of their early application.

BREAKDOWN PROGRAM

by

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The Breakdown Program in operation in the Electronic Supply System during the fiscal year 1948 has proven a sound and economical investment for the Navy. This can best be illustrated by pointing out that after 38 weeks of operation 22,026,626 pieces of electronic maintenance repair parts were identified, binned, placed under inventory control in a reporting status, and made ready for issue at a cost of but $.036 per piece.

What was the Breakdown Program? Breakdown can be defined as the identification by stock numbers and the binning of the various electronic maintenance repair parts contained in boxes comprising sets of spare parts. This program, which was vastly larger than any previous operation, was developed as a result of agreements reached at the Electronic Supply Conference held at Great Lakes in July 1948. At this time, the Bureau of Ships agreed to furnish necessary technical data which would permit breakdown by the use of Standard Navy Stock Numbers, and the Bureau of Supplies and Accounts accepted sponsorship of the undertaking. In addition, the Bureau of Ships released nearly all shore based stock, tender, and extra equipment spare parts sets for processing in the project. The Naval Supply Depot, Bayonne, and the Ships Supply Depot, Naval Supply Center, Oakland, were selected as the sites for the breakdown operation.

The Breakdown Program became an actuality in September 1948 when processing of spare parts boxes commenced on a large-scale basis at the two points. Based on predetermined inventory, large shipments of sets of spares were moved to Bayonne and Oakland for mass production processing. An understanding of the tremendous output of this breakdown operation can best be conveyed by pointing out that at but one of the two breakdown points 4,975 boxes were processed, 22,602 line items and 840,397 pieces were identified and sorted during the period of one week.

Advantages of the Program

What are the advantages of the Breakdown Program? This can best be illustrated by depicting some of the supply procedures of the Electronic Supply System. A large portion of electronic supply activities report the stock status of all electronic maintenance repair parts on hand at weekly intervals during each calendar quarter. These stock status indications show replenishable demands, obligations, materials due, and the balance on hand at the time of the report. By consolidation of these reports and noting requirements versus availability of materials, the Electronic Supply Office can immediately redistribute material required to satisfy needs indicated at the various activities. Further, where stocks are no longer available or where low levels have been reached, this office can institute procurement to insure that the pipe line will constantly be filled.

Since, prior to the Breakdown Program, materials contained in spare parts boxes were not segregated and identified by stock numbers, and, as a result, could not be included in stock status reports, no positive redistribution action could be undertaken with these materials. In addition, the likelihood of procurements being initiated for material which actually were located in spare parts boxes existed, since this office had no specific and immediate knowledge of their location and quantities. As can be seen, the Breakdown Program eliminated to a large degree these two undesirable conditions, for all materials generated were immediately placed under inventory control and their stock status reported to ESO. The result is a greater ability to provide rapid and efficient fulfillment of fleet and shore based requirements.

The availability and readiness for issue of materials processed through the Breakdown Program constitute desirable features which should be highlighted. These advantages were brought about by the positive identification and subsequent binning by stock numbers of each maintenance repair part, with a resultant stowage condition well adapted to rapid issue of the right materials. Eliminated by the Breakdown Program were the time-consuming inaccessibility and research problems which previously existed when issues were made from spare parts boxes.

Medium for Accomplishment

Breakdown was accomplished through the medium of Spare Parts Breakdown Lists. These lists were prepared by ESO upon receipt of equipment parts data developed by the Bureau of Ships. SPBL's contain circuit symbols, Navy Type Numbers, and Standard Navy Stock Numbers for each equipment, and, in addition, each item covered by a Standard Navy Stock Number is fully described. Items processed through the Breakdown Program were checked against descriptions to insure that materials were associated with applicable stock numbers, so that the materials which would be supplied were, in fact, the materials required.

The Breakdown Program has assisted substantially in providing the tools which enable the day by day accomplishment of the prime purpose of ESO and the Electronic Supply System—the supply of electronic materials in required quantities where and when they are needed.

THE PREFERRED ITEM PROGRAM

by

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During its infancy, the Electronic Supply System procured, issued, and stored maintenance items as the demand became evident. A minimum amount of time was allotted to the important phase of standardization, which resulted in recurring failure of maintenance items. The use of non-standard components that were manufactured and procured either under inadequate specifications or under no specifications at all proved to be costly, both from the standpoint of repeated replenishment of maintenance repair parts and the storage of numerous items when one actually was superior and could have been used in the place of others.

For purposes of economy and efficiency, the Specification Development Section of the Technical Division at ESO was assigned the mission of standardization. This is being accomplished by reviewing each category of material in the Electronic Supply System and publishing lists of preferred items that will service all equipments in use. Since the armed forces have become more and more dependent on electronic equipment for operational duty, it is important that each activity have on hand items and components which will service the majority of their equipments, rather than just a few selected items which may be difficult to obtain in time to place the equipments in operation. It is obvious, therefore, that everyone along the line, from the consumer to the Procurement Division, will benefit from this program of standardization.

The personnel assigned to this project are engaged in the research of actual applications of the parts concerned, as well as pertinent trade, research and engineering publications, from which will be obtained standardization data. Some of the facts considered before an item is adopted as a standard item for the entire Electronic Supply System are listed below:

1—Will it meet all the equipment applications?
2—Is it superior electrically and mechanically to the item or items replaced?
3—Reference numbers and related descriptive data required to establish identity of item or items.
4—Standard item names.
5—Was the item specially designed for a particular equipment?
6—If applicable, temperature cycling, humidity cycling, etc.
7—Maximum production abilities of manufacturers.

The use of preferred item listings will have many advantages for the Electronic Supply System. The reduction of items which must be stocked to satisfy all requirements is of great benefit to both the Procurement and Stock Control Divisions of the Electronic Supply Office. Warehousing, inventory, maintenance and distribution operations are simplified. The reduction in monies spent, due to procurement in larger quantities, is largely a result of standardization. The ultimate user will receive a better item for maintenance because the items will be manufactured under Joint Army-Navy Specifications, which require the items to undergo a series of rigid tests to insure that the quality of the component is in accordance with the specifications under which it was manufactured. The preferred item listing is made up of stock numbers, which are to be used for all procurement action in the given category of material, with the exception of special cases.

The Specification Development Section has recently compiled a preferred item listing on the composition resistor category. This list was presented in a form which consists of three tables. The Standard Navy Stock Number is listed with the resistance value in ohms and the Joint Army-Navy (JAN) type designation, where applicable. The narrowest resistance tolerance of PM 5%, and the broadest resistance tolerance of PM 20% were considered and incorporated in the list for different purposes. If narrowest tolerances are available, procurement for shipboard use is restricted to the resistance tolerance of PM 5%, providing delivery of material is not delayed. Procurement of tolerances of PM 10% is given consideration in cases of emergencies when a broader tolerance will not impair efficient operation of equipments. Issue from storage is to be made starting with the broadest tolerance of 20% for cases wherein such resistors can be used.

The composition resistors represented are all of the type "BF" characteristic, as defined by the Joint Army-Navy specifiication JAN–R–11 and outlined by the Bureau of Ships Specification 16C39(RE). Exclusive use of an insulated type was adopted under JAN–R–11 styles RC10, RC20, RC30 and RC40.

The tolerance of PM 5% would be the only listing necessary were it not for complications in the procurement of these narrow tolerances. While this narrowest tolerance is available, it will be used to replace any broader tolerances; but these narrowest tolerances may not under certain conditions be obtainable. In time of national emergency broader tolerance items will in all likelihood have to be procured and used. For example, resistors are manufactured in such a manner that resistance values of the narrowest tolerances must be obtained by selection. In other words, a tolerance of

PM 5% represents only a part of the total production capabilities. When the total production of resistors is required for military use, the broader tolerance items must be utilized in case of national emergency.

The Specification Development Section is in contact daily with the fabricating field to determine if any of the Navy's standardization projects would hamper the flow of materials into the Electronic Supply System. It does not duplicate the work of ASESA. It is not the intention of the standardization program to sidetrack any products which the advances of science can produce expeditiously and with minimum cost to the government. The program does not and will not set up specifications of a hypothetical standard, but is endeavoring to achieve the most effective practical standardization of all electronic maintenance repair parts.

VALUE OF FAILURE DATA TO THE ELECTRONIC SUPPLY SYSTEM

by

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Stock Control Division Officer, ESO

The probable reaction of anyone reading the title of this article is, "Not again!" However, this time we have a new twist on an old subject. Past issues of ELECTRON have emphasized the importance of failure data reports to the Bureau of Ships for purposes of design, engineering and maintenance. The purpose of this article is to explain still another use of these reports—the collection of usage data for purposes of forecasting requirements for maintenance repair parts.

Prior to discussing the details of the application of information obtained from failure data reports, it might be well to outline the problems confronting Supply Officers connected with any phase of technical supply. All branches of technical supply such as aviation, ships parts, automotive parts, ordnance and electronics have certain peculiarities which preclude the use of standardized formulas in determining and computing parts requirements. These peculiarities revolve around types of equipments being operated; consequently, it is essential that each Supply Demand Control Point base its support upon the type, quantity and distribution of these equipments. It is therefore necessary that all of the various factors which affect the range and quantity of the parts requisite to the support of particular equipments be recognized and compensated for by the Supply Demand Control Point responsible for the support of these equipments. Over a period of years, experience has dictated that the only solution to the accurate determination of requirements lies in the application of actual usage or consumption data. Further, it has been ascertained that the only reliable source of usage data is the end consumer of the parts required; in other words, we must "ask the man who owns one." We must follow this one step further and ask him to provide information as to the type of equipment on which the part is used.

The collection of usage data can impose a very heavy burden upon the individuals submitting this information. For this reason the Electronic Supply Office is now attempting to secure this usage data from a report already being submitted to the Bureau of Ships. The failure data report will thus serve a dual purpose, in that it will bring to the attention of the Bureau of Ships the unsatisfactory performance of certain parts and to the Electronic Supply Office the actual consumption of these parts. Also, if these reports are submitted as the failure occurs, the necessity for other additional reports to the Electronic Supply Office will be eliminated.

If the reader is now convinced of the necessity of usage data to the supply system he should be interested to know the Electronic Supply Office plans to utilize this data. If the reader is not convinced of the necessity of this data to the supply system he may be converted after reading further.

Failure data reports will be collected, stock numbered and the information contained on these reports will be punched into already existing electric accounting machine cards which include equipment application, circuit symbol number and total equipments for the parts concerned. The above will enable the Tabulating Machine Division of the Electronic Supply Office to prepare a listing showing part number, circuit symbol number, equipment model, equipment population and number of failures reported. This run-off can be compared with an existing list showing the stock number and rate of issue of the part for the same period of time. It will then be possible to establish the relationship between issue rate and failure rate which, after a period of time, will result in an actual usage factor. By applying this usage factor as a multiple, the Electronic Supply Office can project requirements into the future. It follows that if requirements are accurately forecast the parts will be on hand in the system where and when needed. Of course, the success of a supply system based on usage data is entirely dependent upon the reliability of this data, which rests squarely in the hands of the electronics technicians repairing and maintaining the equipments. If the reports are properly filled out and frequently submitted, there is every reason to believe that the Electronic Supply System will be a highly efficient as well as an economical one.

TABULATING MACHINE DIVISION

ELECTRIC ACCOUNTING MACHINES interpret, sort, merge and list information from EAM cards.

by

LT. (jg) N. T. HAWKINS, SC, USN
Tabulating Machine Division Officer, ESO

The Tabulating Machine Division was established in October 1945 for the twofold purpose of expediting the identification of all electronic material obtained through the breakdown of spares and compiling the Quarterly Stock Status Report. At that time, the Naval Supply Center, Oakland, California and the Naval Supply Depot, Bayonne, New Jersey were the only activities reporting stock status to ESO. A complement of twelve persons, operating ten machines, comprised the original staff.

As the Electronic Supply Office expanded, the Tabulating Machine Division was given more projects, machines and increased personnel complement. With the acceleration of the conversion program, machine requirements doubled, the personnel complement was increased and more operating space obtained. Today the Tabulating Machine Division has fifty-one machines and fifty-two persons processing a total of fifteen routine projects weekly as well as various special projects.

Mechanized Processing of QSSR

The Quarterly Stock Status Report remains one of the most important operations of this Division. Nineteen activities report directly to the Electronic Supply Office on general maintenance repair parts, and twenty-seven activities report on tubes.

To permit even distribution of stock status reporting workloads, both at reporting activities and at ESO, stock number ranges are divided into thirteen groups, with one group being reported each week. Consequently, each item will be reported approximately every ninety days. Reporting activities provide stock status information on pre-punched electric accounting

machine cards. Through consolidation of this submitted data, individual activity requirements or excesses, area requirements or excesses, and system requirements or excesses are determined for each item reported. From this consolidation the Stock Contol Division is able to compare total supply with total demand throughout the Electronic Supply System, and take appropriate action to maintain or re-establish the desired balance between supply and demand.

The report of dry batteries is similarly processed, varying in that it is a monthly report, and, in addition to stock status information, shows date of manufacture.

Reports to BuShips

Two quarterly reports are processed for the Bureau of Ships; (1) Equipment Inventory Report (NavShips 2573), and (2) Electronic Component Inventory Report (NavShips 2605).

The NavShips Form 2573, "Radio, Radar and Sonar Major Equipment Inventory Report," is a preprinted form listing all equipments and sets of spares under Bureau of Ships cognizance. By consolidating these reports, submitted by thirty activities, the Bureau is informed of on hand quantities, desired stock level and incomplete equipments. From these data, the Bureau of Ships is aware of the available equipment, thereby permitting them to re-distribute or procure as necessary.

Thirty-one activities submit stock status information on NavShips Form 2605 "Electronic Components Inventory Report—Radio, Sonar and Radar." By consolidation, system obligations, issues and on hand quantities are determined. From this information the Bureau of Ships and ComServPac trans-ship material between stocking activities to effect an equitable distribution of stocks.

Lists, Cards, and Miscellaneous Projects

A monthly report is submitted to cognizant Inspectors of Naval Material showing contract number, item number, manufacturer, quantity requested, quantity shipped and outstanding balance. From the returned annotated copies a report of contract status is developed and submitted to requisitioning activities.

Weekly conversion lists (transfer of ESO numbers to Standard Navy Stock Numbers) are developed for system-wide publication.

Approximately twenty Spare Parts Breakdown Lists showing key stock number, circuit symbol, equipment model code and Navy type number are developed weekly as an aid to various activities in the breakdown stock identification program.

Substitutions of Materials Lists showing key stock number cross-referenced to ESO number are processed periodically as a further guide in item identification.

Stock Records Inserts (S&A Form 769) are furnished twenty-five activities.

In addition to the above conversion items approximately fifty thousand cards are furnished the Technical Division of ESO weekly to assist in identification of electronic items. Among these are the reference numbers to ESO and Standard Navy Stock Numbers file, which establishes a cross-reference of manufacturers, contractors, Army, Navy, and Army-Navy part and type numbers to ESO and SNS numbers. The cards generated for this file are reproduced in the Electronic Materials Cross Reference and Spare Parts Breakdown List.

The microfilm cross reference file establishes a cross reference between reference numbers and their applicable specification drawings. These drawings, which are used for description writing and procurement purposes, appear on microfilm reels.

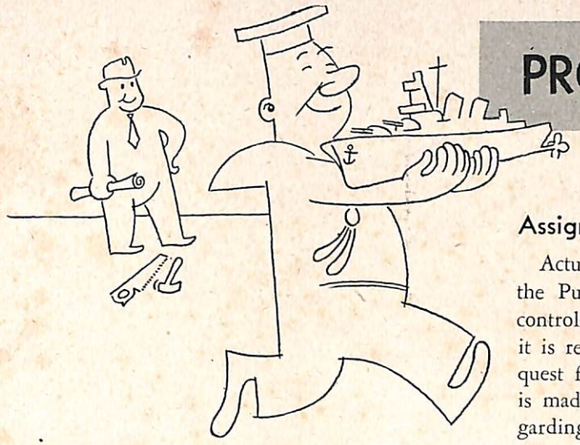
The flexibility of the electric accounting machines makes possible many varied types of listings, tabulations and statistical reports based on punched card information. An example is a recent analysis involving 542 equipments, which shows frequency of items in each equipment and total application of each item for all equipments.

Mechanized Stock Control

Definite trends toward further mechanization in accounting and record keeping is apparent. As of this writing two of the Electronic Supply System activities—the Electronic Supply Branch, Ships Supply Depot, Naval Supply Center, Norfolk and Puget Sound Naval Shiyard, Bremerton, have converted from manual stock record keeping to punch card procedures. Mechanical operations make possible greater speed, accuracy, economy and expansion in time of emergency.

Mechanized processing of requisitions and maintenance of statistical and accounting information have recently been placed into effect by ESO. The procedures are basically designed to provide adequate operating statistics, accounting information and operative controls of requisitions in process. In addition, a card file of source information is available for many analytic purposes—procurement lead time studies, analysis of interim requests by types of materials, and standard price data. Maintenance of this information on punched cards is eliminating the necessity of manual record-keeping and manual accumulation of source data.

As a by-product of this operation, processing of the Quarterly Stock Status Reports is being reduced to an almost completely mechanical operation. Shipment orders and purchase requests necessitated by requirements appearing on the reports can be made as listings on reproduced cards, eliminating the typing of many documents. Further mechanization of routine operations is planned in order that processing time and cost can be reduced to a minimum.



PROCUREMENT

by
LT. CDR. C. W. ESKEY, SC, USN
Procurement Division Officer, ESO

The Procurement Division of the Electronic Supply Office was established in February 1949 to develop and execute policies required to perform purchasing operations in order to assure delivery of material at the time and place specified by the requiring activity, in accordance with procedures outlined in the Armed Services Procurement Regulations, Navy Procurement Directives and other directives issued by competent authority. To perform this function, a complement of four officers and sixty-four civilian personnel were assigned to the new organization.

Prior to February 1949, a Purchase Section within the Stock Control Division was performing informal purchases (under $1,000.00) which accounted for approximately 85% of the line items procured for the system. Requests for the remaining 15% were forwarded to the Navy Purchasing Office, Chicago, Illinois for formal procurement action. As of 1 April 1949, the Bureau of Supplies and Accounts granted authority for this office to engage in both formal and informal procurements, which is presently being done. This enables technical problems involving procurements to be resolved within the organization without referrals from the Navy Purchasing Office to this office and return. It has been found that, due to the technical nature of the material and in some cases due to inadequate procurement descriptions, a large portion of the procurements initiated require technical evaluation before final procurement action is taken. By having the Technical and Procurement Divisions physically located side by side these evaluations can be expedited and as a result the procurements can be consummated much more expeditiously.

Assignment of Responsibility

Actual purchase is performed by the Buyers within the Purchase Section. Each Buyer is responsible for controlling each phase of procurement from the time it is received by him in the form of a procurement request from the Stock Control Division until the award is made. He is responsible for all correspondence regarding a particular procurement. Technical problems are referred to the proper technicians for answer, but the reply is forwarded to the Buyer for approval and dispatch.

Each Buyer is responsible for the procurement of a specified range of material, but he may be shifted to other categories from time to time depending upon the workload. By specialization within a range of electronic maintenance repair parts it is felt that procurement may be expedited.

At the present, there are ten Buyers in the Purchase Section under the supervision of the Purchase Officer. The two remaining sections within the Procurement Division, the Service Section and Operations Section, act in conjunction with the Purchase Section by supplying the services necessary to consummate a procurement.

Purchase Categories

In the Procurement Instructions issued by the Electronic Supply Officer, it is recognized that the maintenance repair parts for which the Electronic Supply Office is responsible under present circumstances fall into several categories, these being:

1—*Common parts covered by Navy and other government specifications.* These items are procured within the terms of the specification and after the widest possible competitive negotiations.

2—*Common parts not covered by specifications but which have been fully described using the JANAP–109 common pattern.* This description is used for wide competitive negotiations among recognized manufacturers, and is introduced as an acceptable commercial item into the system which is identical or equivalent to the item described. The interpretation of the word equivalent, as used by this office, is that the material required is in all respects "equal to electrically, equal to or smaller than physically and with identical mounting characteristics" of the described material.

3—*Common parts not covered by 1 and 2 above.* These are items which, it is felt, do not have the adequate descriptions required for procurement, but which do have one or more manufacturers' reference numbers. If sufficient reference numbers are available, competitive negotiations are possible by sending invitations to bid to all manufacturers whose reference numbers are shown. At the same time, information is requested from these manufacturers which will enable the Electronic Supply Office to fully describe the item, using the JANAP–109 pattern. In future procurements of this item, this full JANAP–109 description will be used to encourage competition.

4—*Parts apparently proprietary.* When time is an important element, items which are of the nature of parts peculiar, that is, apparently proprietary to a particular manufacturer, are ordered from that manufacturer on a proprietary basis. At the same time, information is sought as to the exact nature of this material so that in the future it can be recognized as either proprietary or non-proprietary. If it is proven that the item is a common one, competition will be sought on future procurements.

5—*Proprietary items.* These items are procured from the manufacturer concerned. In case the manufacturer of a proprietary item does not desire to furnish the item or submits a bid which is considered excessive, the entire matter shall be taken up with the manufacturer on the basis of negotiation.

Circumstances Causing Delays

Due to many factors, there are several problems encountered in the procurement of electronic maintenance repair parts which of a necessity delay delivery to the requisitioning activity. Most of these problems are due to the nature of the material itself, its high obsolescence rate, and the fact that in many instances there is not a commercial counterpart of the material required. This requires special production runs by the manufacturer, necessitating, in many instances, that his commercial production be set aside. In cases of this nature, most manufacturers are reluctant to bid on the small quantities sometimes required by the Navy.

Another common cause of procurement delay is the lack of adequate procurement descriptions which require research to determine the item desired. This will be eliminated by the redescription program now being carried on by the Technical Division, which will soon have the majority of ESO controlled materials completely described in accordance with the JANAP–109 pattern.

A large number of manufacturers who were engaged in the production of electronic material during the war have returned to peacetime production of commercial items and cannot supply the needs of the services. In many cases all tools and dies were scrapped and even the fabrication drawings destroyed. This is especially true of sub-contractors who made most of the parts we require today. In these cases the Electronic Supply Office is endeavoring to develop a substitute source of supply or, if drawings are available, have the material fabricated by another manufacturer.

In the case of proprietary items it is sometimes necessary to accept long delays in delivery because the proprietary manufacturer will fill his backlog of commercial items before retooling for the Navy's needs. If, however, the item is urgently required, the manufacturer will, in most cases, give the item the desired priority.

Approximately 85% of the procurements being made at this time are valued at less than $1,000.00. Large manufacturers are not interested in such small quantity business and often do not submit a bid. This creates a delay caused by the additional correspondence required and by the researching for another source of supply. This is being eliminated by combining orders and by getting material from local jobbers, if available. Along this line, it would be of great asssitance for the field activities to take advantage of local procurement authority whenever possible.

The above are only a few of the problems encountered in the procurement of electronic maintenance repair parts, but it is felt that, through experience and the redescription of materials in the system, our procurement problems will diminish and material will be delivered to the destination as required.

Type of Approach	Last Month	To Date
Practice Landings	10,212	221,510
Landings Under Instrument Conditions	291	9,388

ESO LIBRARY AND REPRODUCTION FACILITIES

by
LT. CDR. G. A. ERIKSEN, SET, USNR
Ass't Technical Division Officer, ESO

At the Electronic Supply Office, which is responsible for the identification of electronic items and for the procurement of electronic maintenance repair parts, the ESO Technical Library plays a vital and important part in providing the facilities by which these actions are to be accomplished. The Library has copies of instruction books for practically all equipment used in the fleet and is presently receiving copies of new instruction books as they become available. In addition to instruction books issued by the Bureau of Ships and through contractors, the Library also contains and endeavors to obtain all available commercial manufacturers' catalogues, both past and present, covering many items which are being identified or being purchased. This Library is similar to most technical libraries at other large activities.

However, due to the urgent project which ESO is now undertaking, that of accelerating and completing its present program of identifying electronic maintenance parts, it has been necessary to acquire large quantities of manufacturers' and contractors' drawings which are received both in blueprint and microfilm form. The maintenance and filing of these drawings and microfilms is one of the fastest growing of the many projects at ESO today.

In order to make research information readily available to technicians employed by ESO, it is necessary to simplify the methods of locating any drawing in order to obtain it in the shortest time possible. This is accomplished by compiling and arranging all available index data through the use of electric accounting machine cards. These cards are arranged in reference number sequence, which results in leading to either of the following: Model, Manufacturer's or BuShips Navy Type number drawing, either filed in blueprint form or on microfilm, whichever is available.

Approximately twenty to twenty-five thousand new reference number cards are being produced through this indexing process every week. At present, ESO has a temporary force utilizing Recordak readers in screening all microfilms received for the purpose of posting each individual frame or reference number within any specific reel in order to create reference indexes to be put on electric accounting machine cards. Physical blueprints and drawings are also recorded by this method.

A battery of 15 Recordak Type "C" Readers are utilized by various units of ESO technicians in order to analyze the drawings for technical requirements necessary in assignment of stock numbers and for procurements.

The demand for certain drawings necessary to accompany procurement documents has increased constantly. As most of the procurement actions submitted to various bidders require from 5 to 30 copies of accompanying drawings with procurement papers, it is obviously necessary for this office, which handles many hundreds of procurement requests a day, to be able to reproduce various drawings either from microfilm by enlargement methods or, in the case of physical drawings and blueprints, by photostatic process.

In view of the foregoing, the Chief of Naval Operations has authorized ESO to establish a photostatic and micro-photographic reproduction facility for this purpose. The reproduction facilities at ESO consist of various types of equipment, such as photostat cameras, enlarging projectors, ozalid print machine and portograph equipment. Besides this, the facility is also equipped with a Type CX camera for use in reproducing blueprints in the form of microfilm records.

New drawings which are accumulated and not existing on microfilms will be microfilmed by ESO periodically so as to reduce cumbersome filing problems of physical drawings. At present, the Electronic Supply Office has so far indexed and recorded approximately 500,000 drawing reference numbers on EAM cards and it is estimated at the completion of the present project that there will be well over a million reference numbers of this type at ESO, not counting future new drawings of new equipment, which will arrive from time to time under new contracts.

THE ELECTRONIC SUPPLY SYSTEM
AS IT LOOKS TO AN ELECTRONICS OFFICER

by
CDR. A. B. CHACE, ED, USN
Technical Division Officer, ESO

Briefly, the Electronic Supply Office is charged with the support of the fleet and shore electronics establishments with electronic maintenance parts. It is a supply demand control point operating under the joint cognizance of the Bureau of Supplies and Accounts and the Bureau of Ships. No material is stored at this supply activity; it is strictly a paper operation, the work of which is concerned largely with identification, cataloging, inventory control and procurement.

The Bureau of Supplies and Accounts supplies the funds required for the salaries of personnel and operating expenses of the Electronic Supply Office, and establishes the personnel ceilings. They also issue certain broad directives; so that the operation of this activity will conform to the fundamentals of supply demand control points. However, considerable freedom is given in our methods of operation. Electronics is recognized as a special type of material; therefore stock control formulas are developed to satisfy the peculiar requirements of this type of service.

It is desired at this point to include a quotation from the speech made by Rear Admiral E. D .Foster, SC, USN, Chief of the Bureau of Supplies and Accounts, at the Electronic Supply Office Conference of 1948:

> ". . . the principles of supply, and I presume the principles of maintenance or of any other field of endeavor, are fundamentally the same; they do not change—but the implementation of these principles must vary. In our case, they vary in accordance with the differences in the types of organization, and in accordance with the differences in the characteristics of the material with which we deal. And, secondly, they must vary in accordance with the degree of development of each supply system."

This activity is under the technical cognizance of the Bureau of Ships. It is realized that the electronic supply program must be carefully coordinated to satisfy the maintenance policies of this Bureau. Many special problems arise that can be solved only with the closest cooperation between these two organizations. Many maintenance parts that are required for the upkeep of active electronic equipments are not presently in the system and some of them never have been in the system. During the past war, many substitutions were made for parts that should have been supplied in parts boxes. Some of this substitute material was the technical equivalent of that which was specified. Other substitutions were made of definitely inferior material. Every effort must be made to eliminate the inferior material and to buy only the best that can be obtained under existing specifications for future replenishment. As discussed in the previous article on "The Preferred Item Program," the extremely wide range of material in the system calls for every effort to be made toward standardization. It should be the policy throughout the Navy that standard items should be used wherever possible in research and development, as well as in design of new equipments. It is only through standardization in the beginning, that any large degree of reduction of items can be accomplished. There has been a continuing improvment in the coordination between the Bureau of Ships and the Electronic Supply Office. This has come about through a desire to cooperate; through better handling of correspondence, and through a number of very enlightening exchange visits of personnel.

There are many other organizations whose cooperation is greatly appreciated by the Electronic Supply Office. Among these is the Armed Services Electro Standards Agency (ASESA). The work of ASESA in standardization is being followed very closely by our Technical Division and an exchange of information along this line is being accomplished. Considerable help has also been received in the modification of JAN specifications to assist the Electronic Supply Office in making procurements. It has been realized that a specification is of little value if the article cannot be made. Expediting of type approval tests has also assisted in the delivery of material to field activities.

The Parts Committee of the Radio Manufacturers Association, as well as a number of individual manufacturers, have cooperated with the Electronic Supply Office in making studies of production methods and accumulating other information required for making intelligent purchases. Visits of key personnel to manufacturing plants have proved of great value in developing an understanding of manufacturing problems as related to the electronics requirements of the Navy.

It is desirable to emphasize that the outermost point in the Electronic Supply System is the consumer; and the consumer, in most cases, is represented by the Electronics Officer or Electronics Technicians Mate. It is of very great value and essential to the success of the system that a close coordination be maintained all along the line. A free exchange of information must be maintained with the consumer so that the full effectiveness of an efficient system can be realized. A system can be improved only through a complete knowldege of all deficiencies and corrections as soon as these deficiencies are known. The consumer is usually the first to know of a deficiency and can usually supply the details that are necessary for investigation and correction. "The customer is always right."

A recent modification to the system of procuring material has been the development of the procurement team concept. This system is being established to simplify and accelerate the procurement program. This procurement team will include stock upkeep employees, technical consultants, purchasing employees and an officer. The ultimate aim will be to group these people together to handle all of the transactions for one or more categories of material. It will then be possible to determine the stock requirements on the basis of Quarterly Stock Status Reports, to screen them for reasonableness from a technical standpoint, to provide the purchasing specifications, and to purchase the article, all by one group of employees. Any question arising regarding this particular category can then be referred to the group concerned and prompt and specific action can be taken.

As a whole, the Electronic Supply System is predicated upon the application of knowledge of the material to an inventory control plan that centers around information of equipment population, location and parts application thereto.

CONFERENCES between personnel of BuShips and ESO have aided materially in solving mutual problems. Pictured above during a mid-winter meeting at ESO are: LCDR S. M. Ball, SC, USN, ESO; CDR C. R. Eagle, Jr., SC, USN, Executive Officer, ESO; CAPT A. L. Becker, USN, Assistant Chief of BuShips for Electronics; CDR T. J. Montgomery, SC, USN, Electronics Supply Officer; CAPT W. L. Turney, USN, Materiel Officer for BuShips; Mr. C. C. Heatlie, ESO; CDR. A. B. Chace, USN, ESO; LCDR C. W. Eskey, SC, USN, ESO; and Mr. J. M. Stewart, BuShips.

REPLACING RADIO SET AN/ARC–1

Heavy current flowing in power plugs will melt down and destroy connector pins when poor or intermittent contacts are permitted. This fact, true for any equipment, has been reported as occurring at receptacle J–401 located at the rear of the mounting rack of Radio Set AN/ARC–1. The failures are considered to be due to improper installation practice with the following factors contributing:

1—In several instances the transmitter-receiver has been removed from or installed in the mounting base with the switch inside the front panel cover in the ON position while power is still applied to the mounting base.

2—Investigation of bent male terminals on the transmitter-receiver reveals that the terminals were engaged by receptacle J–401 before the untapered sides of the alignment dowels fully engaged the transmitter-receiver. If the transmitter-receiver is not in proper alignment with the mounting base when installation is made, the male terminal will not be engaged properly by receptacle J–401, and a bent terminal will result.

3—When installing the transmitter-receiver, the wingnuts on the mounting base had been tightened manually in accordance with the instruction book, but had not been safety-wired. Normal vibration had loosened these nuts allowing the transmitter-receiver to slide back in the mounting base far enough to loose positive contact with receptacle J–401.

All maintenance personnel are cautioned to remove the power before replacing the transmitter-receiver, to carefully align it with the base before installation, and to secure the wingnuts on the mounting base properly.

RESTRICTED

HARRISON . . .

Sirs:

Commander Harrison's article in the May ELECTRON was great! It is a pleasure to read an article which reaches sound conclusions based on complete data and facts rather than generalities. The listening test is always the last word.

I wonder if Commander Harrison has opened up his 757A to see if the KS–12027 can be moved relative to the 728B to check phasing for the acoustic conditions of the room. If so, I may try an experiment with an audio oscillator to check my phasing in my own living room, and to check the balance between high and low frequency units. I find it necessary to use 4.5–db treble attenuation for proper balance based on "ear test."

Keep up the good work and give us more like the December 1948 and May 1949 articles.

CAPTAIN D. C. REDGRAVE, JR., USN,
Director Material Laboratory,
New York Naval Shipyard

Sirs:

I have been enjoying Commander Harrison's articles in ELECTRON very much, especially the one in the May issue. I really enjoy his literary style. I can detect a substrata of humor that probably isn't apparent to anyone who wasn't around during his experimentation (and I was). The articles have been good—and for the most part of a very informational nature.

LIEUT. RUTH C. WHITE, USNR,
O-in-C, NTS, Electronics,
Philadelphia Naval Shipyard

REPAIR SPACES . . .

Sirs:

Just as many other units in the fleet, we technicians of the *USS Eldorado (AGC–11)* were faced in the past with lugging bulky and heavy test equipment about from one compartment to the next when it was necessary for servicing or to effect repairs. The problem of stowage was also ever present. Equipment either had to be left adrift or kept in storerooms for issue.

To meet this problem and make for greater efficiency, not to mention the sense of frustration at having to go to the storeroom dozens of times a day for equipment, we have created "repair spaces" at strategic locations such as: radio repair shop, radio I, II, III, and flag communication. These repair spaces are all similar to that of the radio repair shop, as shown in the accompanying photograph.

We realize that our scheme is not perfect, but we have a start. This letter is submitted in hope that other units will also submit suggestions along this line or perhaps ELECTRON will run an article and thereby enable fleet units to profit therefrom.

RICHARD L. WARREN,
USS Eldorado (AC–11),
FPO, San Francisco, Calif.

Bureau comment: The electronics personnel of the Eldorado are to be congratulated on their ingenuity and zeal in this matter. In the case of most ships, however, because of space limitations, and moment and weight considerations, it is felt that the main electronics repair shop should prove adequate. Further repair spaces should be set up only after prior approval has been obtained. Work benches should be made in accordance with BuShips Dwg. S–9102–960545.

ASESA PREFERRED PARTS LIST

by
LT. COMDR. CHARLES A. RIDGWAY
Exec. Officer, Navy Electro-Standards Agency, Fort Monmouth, N. J.

Prior to World War II, the military services used relatively small quantities of electronic components and equipment and had few service specifications covering those in use. As a result, when action to enlarge the military establishments of the United States was initiated, in order to prepare for possible hostilities, it became necessary to call on industry to supply large quantities of communication equipment. Due to the time element involved and the fact that specifications delineating military characteristic requirements were not available, a large portion of the equipment furnished to the Armed Forces was produced under commercial specifications and design. Much of this equipment functioned admirably under the conditions of commercial use for which it was intended, but when used under adverse battle and climatic conditions without special outside protection or shelter, component parts began to fail. This necessitated the stocking of replacement parts in large quantities at points where they could be quickly obtained. Stocking became a major problem, since there were few standards established by industry to aid in the identification and binning of these parts. The ratings were not uniform because of individual manufacturer's test procedures and limits; the conditions under which the parts would operate were not uniform; and, in many instances, there was a lack of data showing operating characteristics. Moreover, slight changes in physical dimensions and/or construction increased the number of parts to be stocked and seriously retarded interchangeability.

In addition to these conditions and because of the emergency, the individual military services started writing specifications to meet their own specific military requirements, independently of the requirements of the other services. This procedure worked a definite hardship on industry as a whole, inasmuch as many manufacturers had contracts with all three services; and the component parts which were manufactured in accordance with the specifications of one service were, in many instances, unacceptable to the other two services, even though apparently intended for the same purpose.

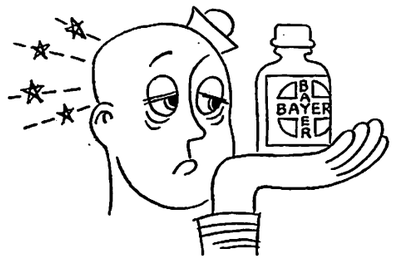
As a result of these situations, it became apparent soon after the beginning of the war that immediate steps should be instituted to standardize on general service requirements where possible, and to write specifications covering electronic parts. When this was done, it was still apparent that the values furnished, if not controlled, would remain too numerous and that it would be extremely difficult to maintain adequate component stocks having these values and physical dimensions. Therefore, the service laboratories came to the conclusion that if selected values meeting military conditions could be reduced to the minimum needed to meet design requirements, a sufficient quantity of parts could be stocked; and this would, in turn, assist industry in reducing the number of types and sizes required to produce military equipment.

To assist further in promoting the electronic component standardization program, the Armed Services Electro Standards Agency has prepared a "Preferred Parts List" for use as a guide in selecting components commonly used in the development and maintenance of electronic equipment. This list contains the electronic components for which preferred form factors, values, and tolerances have been selected. Consideration has been given to cost and production factors; these are reflected in the list by the fact that components included have been screened for the most reasonable tolerances used in the maximum of engineering applications, and for those which will not appreciably increase the cost of purchase when bought in large quantities.

Frequently, components used in design and development equipment models find their way into production of military equipment. However, values and tolerances used in the original design often differ from standard requirements listed in National Military Establishment specifications. For example, a circuit which could originally have been designed around JAN parts, is made up of a large percentage of parts which are undesirable from a military standpoint. To eliminate this unsatisfactory condition, the service laboratories are using the Preferred Parts List as a guide for stocking, and adequate stocks are maintained to permit the utilization of JAN approved parts in original design. The usage of these parts in production runs and in a maintenance and supply system will eliminate a large percentage of similar non-JAN parts performing the same function.

Implementation of these recommendations will reduce the quantities of non-standard parts and varying styles now maintained and used in military equipment. Moreover, the increasing demand for preferred parts will result in the establishment of additional production sources which will be available in the event of emergency and will make it possible for the parts in question to be furnished more economically, thus fulfilling a two-fold requirement.

In view of the above, it is the intention of ASESA to make every possible effort to enlist the cooperation of industry in adapting the Preferred Parts List in common with the Armed Services.



PROJECT MIGRAINE

Toward the end of World War II, Kamikaze attacks upon picket destroyers led to the development of picket submarines. The first picket submarines did not see action in the Pacific because the war ended before they were called upon. They possibly would have proved to be limited in value because they had no height-finding radar and only limited air control facilities.

Development of the radar picket continued in Project Migraine. The *USS Spinax (SS–489)* and *USS Requin (SS–481)* were converted into Migraine ships at Portsmouth Naval Shipyard. They were completed late in 1946 and early 1947 respectively.

In the conversion they were equipped with a CIC, an SR–2 long-range air search radar, an SV–2 height-finding radar, and additional radio equipment.

The CIC was located in the after torpedo room. Changes in the ship were kept to a minimum since the CIC was a trial installation.

The SR–2 equipment, except for the antenna and pedestal, was installed in CIC. The pedestal was installed in the after engine room and the antenna was mounted just above the deck. This antenna had to be completely rebuilt in order to withstand submergence pressure, wave slap, and the drag of being moved under water. All these mechanical changes had to leave the electrical characteristics unchanged.

The SV–2 equipment was also installed in CIC. The SV–2 consists of an SV–1 radar with a special antenna and the accessories necessary to permit height finding. The SV–2 antenna has a three-by-eight-foot vertical parabolic reflector which can be trained and elevated and is stabilized in level. A modified VF remote indicator gives slant range and position angle and an SM height computer furnishes altitude. The ships also had the standard submarine radar installation SV–1, SS and ST.

Although the air control capabilities of these ships were limited by a less-than-ideal radar installation their performance was good enough to warrant further development. During 1948 the *Spinax* and *Requin* returned to Portsmouth for additional changes, and work was started on the first of the Migraine II's, the *USS Tigrone (SSR–419)*.

Snorkel was installed on the *Spinax* and *Requin*, the after torpedo tubes were removed and a new electronic equipment room was put in the forward end of the after battery compartment, occupying space that was originally part of the meat and cool room. The SR–2 transmitter-receiver and antenna pedestal were moved to the electronic equipment room. The SR–2 antenna was moved forward and raised to improve its performance. This greater antenna height also produced a problem. It made it necessary to manufacture a 40-foot length of special coaxial transmission line so that both radar and IFF energy could be carried up through the rotating joint and torque tube to the antenna itself.

A YE series homing transmitter was also installed in the electronic equipment space. The YE antenna was mounted above the after engine room. Like the SR–2 antenna, the YE antenna system had to be completely redesigned. Since the new antenna was much heavier and had to be rotated by a packed shaft, a new antenna drive system had to be manufactured. Even this was not the end of the problem because the original control system was a make-break contact follow up designed for a 1/20 hp motor which was not considered suitable for the new drive system. It was decided therefore to install amplidyne control.

A new sector scan elevation control manufactured by the New York Naval Shipyard was installed on the SV–2, and the SS antenna was removed. The CIC (now the air control center) was rearranged to take advantage of additional space made available by relocation of some of the electronic equipment in the electronic equipment room.

A new plotting and radio control console was added providing an indirectly lighted horizontal plotting board with fingertip controls for all essential radio and telephone circuits. Two VF repeaters for display of the SR–2, SV–1 or SV–2 radar were mounted one on either side of this console with accessory units grouped in a convenient place on the fiddleboard. Space was also reserved for future installation of Model AN/SRR–4 AEW equipment.

In the Migraine II program two additional submarines, the *USS Tigrone (SSR–419)* and the *USS Burrfish (SSR–312)* have been converted to radar pickets.

The air control center in Migraine II submarines is located above the forward end of the after battery compartment, and the electronic equipment room is located directly below. This allows the electronics installation to be quite well centralized.

Before final plans were drawn for the Migraine II air control center, a complete mock-up was built and a conference was held to settle on a final arrangement. Bureau of Ships, forces afloat and Portsmouth Naval Shipyard were represented. A final arrangement was agreed upon and work proceeded on plans for the actual installation.

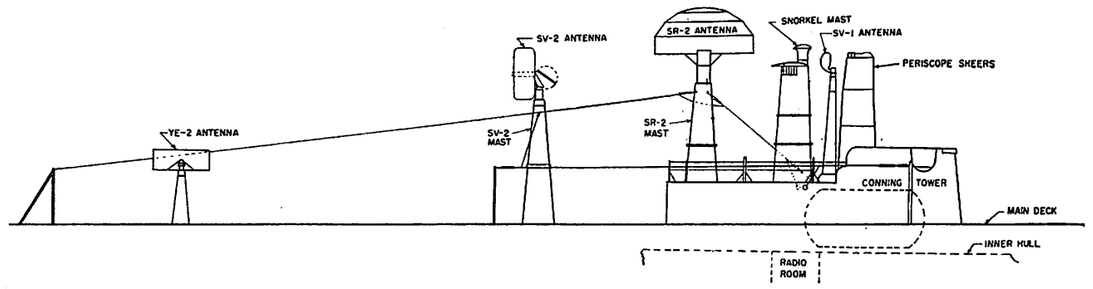
The list of radar equipment is essentially the same as for Migraine I but the locations and arrangements are somewhat different. One of the more important differences is the increased height of the SV–2 antenna so that both the SR–2 and the SV–2 can be operated without fully surfacing the ship.

The radio installation in the *Tigrone* and *Burrfish* has been considerably enlarged. It now includes, in addition to the standard Models TBL, RAK, RAL, and RBS equipments, two TDQ/RCK's, one TDZ/RDZ, two Model 15 teletypewriters, one TCZ, two AN/ARC–1's, the new Type SB–82/SRR and SB–83/SRT radio transfer switchboards, an antenna transfer panel, and additional RBS receivers, with antennas and associated equipment.

The sonar installation in the *Tigrone* is quite different from the other Migraines. It consists of a QHB–1 scanning sonar with the transducer mounted bottomside, a WFA–1 with a topside-mounted transducer, a standard JT, an AN/SQN–1 zenith scanning sonar, and a QXB–1 sonaramic receiver. The QHB–1 indicator console and the WFA–1 remote stack are located in a sound room which is adjacent to the electronic equipment room. The AN/SQN–1 indicator, QHB–1 remote indicator and the QXB–1 sonaramic receiver are located in the conning tower.

In the *USS Burrfish* the AN/SQN–1 equipment will be replaced with an AN/BQN–1 shallow fathometer having two topside transducers (one mounted forward and one aft). In addition an AN/UQC–1 underwater telephone and three AN/BQC–1 emergency underwater telephones will be installed.

CIC magazine for March 1948 gives information on the operational characteristics of the original Migraine installations. As yet Portsmouth Naval Shipyard has not received any operational information on the modified Migraine ships. We feel certain, however, that the electronic facilities of the ships were considerably improved by the second modification.



TYPICAL ARRANGEMENT of a Migraine installation.

NEW MODEL TDZ TUNING PROCEDURE

One of the prime difficulties experienced with the Model TDZ Radio Transmitting Equipment is the failure of the 2C39 third tripler and output tubes. The inherent design of these tubes makes them prone to grid-cathode shorting when subjected to the slightest overload. The fault which allows the present tubes to be overloaded has been traced directly to the grid and cathode current limitations found in the Model TDZ instruction book.

The Bureau of Ships has spent considerable time and effort in checking the tuning procedure given in the instruction book, and several others submitted by field activities. The best features of all methods studied have been combined, resulting in a system which, after repeated trials, has been found to be satisfactory. In fact, it is so complete and straightforward that a person who has never tuned a transmitter before would experience little difficulty. Details of this tuning procedure appear in Supplement No. 27 of the C.E.M.B. (July 1949), and supersede the procedure given in the TDZ instruction book.

This approved tuning procedure is considered to be so important to the u-h-f program that a training film on the subject is being prepared for the benefit of all u-h-f technicians and operators. The film should be available for distribution approximately 1 September.

THE CONTRACT FIELD-SERVICE ENGINEER

by
LT. CDR. J. COOLIKOFF, USN
Electronics Ship and Amphibious Division
Bureau of Ships

Probably at this very moment there is an electronics technician somewhere who is making an unprintable remark about an item of electronic equipment that defies all his efforts to keep it running in good order. Read this story to learn about one of the efforts being made by the Bureau of Ships to relieve such technicians of a few of their headaches through expert corrective maintenance of equipment and further training of personnel.

It is of great importance that all of the Navy's electronic equipment be placed in an efficient operating condition and kept in that condition at all times. For that reason the Bureau of Ships has been deeply concerned with the existing poor condition of shipboard electronic equipment and the shortage of qualified enlisted technicians and officer engineers needed to remedy the condition.

Recognizing the gravity of the situation, in the fall of 1948 the Navy Electronics Advisory Board with the assistance of the Bureau prepared and presented to the Chief of Naval Operations and the Navy General Board a thorough study of the reasons for the deteriorated condition of electronic equipment installed in Naval vessels. As a partial remedy for this condition, one recommendation was to contract for qualified civilian electronics engineers whose services and skills would be used to restore shipboard electronic equipment to peak operating condition and at the same time to instruct ships' personnel on how to maintain the peak operating condition when restored. The Chief of Naval Operations approved the recommendation and directed the Bureau of Ships to implement the program.

The matter was turned over to Code 992 of the Electronics Ship and Amphibious Division of the Bureau. Under the attentive guidance of this section contracts were let, and engineers were procured and assigned.

As a result, after six months the Bureau has available more than two hundred highly-trained civilian engineers. These men operate from numerous strategically-important points under the detailed orders of Navy commands. They represent several large industrial concerns: the Philco Corporation; Western Electric Company; General Electric; Westinghouse; Radio Corporation of America; and the Submarine Signal Company. With such a background they are in a position to give the Navy a great deal of technical assistance.

The assistance these men can give the Navy takes many forms. The first and most obvious is by testing, maintaining and repairing the electronic equipment on individual ships and stations. In addition, they provide expert instruction to Navy shipyard personnel and to uniformed personnel as well, on board ships and stations, at the shipyards, and also at special schools established for the purpose. Also they contribute substantially to the Bureau's data on equipments and components through the job-reporting system in use.

Assistance can be requested by any ship or station having difficulty with its electronic equipment if the difficulty is beyond solution by the ship's force. This may be interpreted to mean that any ship with unsolved difficulties may ask for and receive help regardless of the experience level of its own personnel or the nature of the difficulties encountered.

An engineer may be called on to assist with equipments out of his normal specialty or built by a company other than his own. The Bureau has not let any contracts restricting field engineers to any one specific equipment or kind of equipment. This applies in every case regardless of the company under contract or the specialty of the engineer. The only limitation is that of the experience of the individual engineer. Radar, sonar, countermeasures, or communication equipment, it's all the same. Cases are on record where contract engineers have serviced interior-communications equipment. The company represented, and the specialty of the engineer, serve only as a guide.

The Naval Reserve also shares in the benefits of this program, for it, too, is receiving a share of technical assistance. For the past year the Bureau has employed forty engineers under contract with the Philco Corporation for planning, installing and maintaining the electronic equipment in all Naval Reserve armories and training centers.

Training of personnel is of utmost importance. The present poor state of maintenance of electronic equipment is due in the main to the shortage of trained personnel on board our ships and at our shore stations. The shortage can be relieved somewhat by giving our present personnel a higher level of training.

The contract engineers enter the picture here by instructing local personnel wherever they are called on to do a job. At the shipyards they are training and instructing the shipyard personnel in the test, maintenance, repair, and installation of equipment, to better enable the shop personnel to carry on their own detailed duties. Shop men are given detailed information pertaining to the fine points of the equipment, maintenance shortcuts, and improved techniques. On board ship the engineers take time out from their assigned jobs to give enlisted technicians and officers on-the-spot instruction on their equipment. This better enables the local personnel to carry on their work after the civilian engineers have departed. Wherever they go, the technical know-how of the local personnel is improved through the assistance and guidance of the contract engineers.

Training of Navy personnel by these engineers is being conducted continuously on the integrated ASW attack system, fire control radar and associated equipment, and all other complicated electronic equipment in use by the Navy. This training is taking place at regularly-established schools at certain key points.

Nor do their duties end here. It is not enough that the contract engineers repair the equipment and retrain the personnel. They must also report to the Bureau the conditions they find on every job and the steps they take to remedy the defects. The reports are complete, stating the nature of the services performed, symptoms of failure, condition of equipment, reason for failure, training level of assigned personnel, actions taken, and anything else known to be of value to the Bureau. Through these reports the Bureau can gain a good deal of vital information on each equipment and a cross-section of equipment performance in general. Compiling the data, the Bureau can determine whether an item of equipment is of poor design, or has been improperly installed or maintained.

These reports tie in closely with the Navy electronic equipment failure report system and add measurably to the data on which depends much of the design of new equipment, the modification of old, or changes in installation or maintenance procedures.

All of the engineers are highly trained. They have been chosen because they have a high degree of training in electronics, either broad and general or highly specialized. The actual degree of specialization or training depends a good deal on the individual engineer. Some men, those who have many years of practical experience of a general nature, are qualified to work on almost any kind of electronic equipment. Some others are highly specialized, having concentrated all their efforts and experience on one branch of electronics.

In general, a man with a broad background and all-round experience will be found in locations employing but few contract engineers, for it is there that his versatility can best be utilized. Highly specialized personnel will in general be found where men of other specialties are also available.

These men are placed geographically where they can do the most good. Engineers representing each company are stationed at each shipyard and industrial manager's office, and also at certain other shore activities. In addition, both Service Force, Atlantic, and Service Force, Pacific have engineers under their supervision. These engineers are stationed at the fleet maintenance offices at Pearl Harbor and Norfolk.

The fleet maintenance office at Pearl Harbor provides this assistance to ships in the Hawaiian Area. F.M.O., Norfolk does the same for ships on the Atlantic Coast. Commander Service Squadron One, a part of ServPac, is located at Long Beach, California, and ships and type commanders on the West Coast are provided field engineer service from this point.

There are two Western Electric Company engineers in the Mediterranean with the Sixth Task Fleet. These were sent overseas primarily for benefit of the Mark 25 program, but may be employed on any other electronic equipment designated by the commanding officer or group commander.

How do you obtain the services of a contract engineer? Vessels under shipyard availability should ask the ship-

yard Electronics Officer for assistance by these engineers. Vessels not under shipyard availability should request services from their service force commanders. Shore stations make their needs known to their cognizant Electronics Officers.

Contract engineers must indeed be properly detailed and effectively utilized, for this is an expensive program. Contracts are let on the Bureau of Ships maintenance appropriation, which is the same appropriation used in the design and purchase of the equipment itself. If this program were not necessary—if more enlisted and officer personnel were available to maintain their equipment in proper order—the money spent on the program would instead be spent on research for or procurement of more or better equipment. As the situation now stands, it is necessary to use this money to better maintain the equipment now available.

Every advantage should be taken of the presence of field engineers on a job. In order to do this, vessels and shore stations alike should insure that their local personnel are on hand to assist the civilian engineer and gain from him the maximum instruction. By proper placement of engineers and obtaining the utmost benefit from their services, their relative cost will be reduced.

There is little doubt that these same services could be provided by the Navy's own personnel if enough of them, properly qualified, were available. There is little if anything wrong with the Navy's basic-training program in electronics. The Navy has a number of very fine schools engaged in turning out qualified technicians. The difficulty lies in the number of qualified men available, rather than the degree of training for each man. Until more qualified Naval technicians are available, the contract field-service engineer will continue to serve admirably in providing the Navy with high quality electronic equipment maintenance, a high level of technical know-how, and an increased amount of technical data on its electronic equipment. To enable him to do this we must cooperate with him, and help him to help us. The Bureau of Ships has started the ball rolling. Let us help it to roll by giving it a little boost whenever, wherever, and however we can.

In general, electronics contract field engineers are normally treated as commissioned officers. Policies and directives pertaining to the relationship between contract engineers and the Navy are contained in a pamphlet entitled "Navy Department Regulations Governing Technicians," OpNav 30 S–A dated December 4, 1943.

MODEL VF FIELD CHANGE NO. 2

George C. Shively of the Puget Sound Naval Shipyard has submitted a beneficial suggestion concerning an improved procedure for operation No. 31 of Field Change No. 2 for the Model VF Radar Indicating Equipment. The detailed procedure states (Refer to F.C. No. 2 – VF Bulletin NavShips F C 3 – 45):

1—Delete Operation 31 (page 5) which calls for removal of cover, coupling and taper pin.

2—Substitute instead "Remove the spring-back mechanism and large gear from its hub by removing 4 screws, and mark gear and hub with a pencil for proper re-assembly later."

3—Delete the note on Figure 4 which states "coupling removed by drilling out taper pin;"

The suggestion states that "by removing the 4 screws and removing the gear from its hub it is no longer necessary to remove and replace the taper pin and coupling. The new procedure eliminates the risk of damage to parts when drilling out the small taper pin. It also eliminates any chance of bending the shaft, if the taper pin is driven out. The time saved by not removing the coupling would probably run from ½ to 1½ hours, especially if the mechanic had to obtain a drill motor from the dock tool room when working aboard ship."

The Bureau of Ships has been informed of another method used by several shipyards, in connection with this field change. Instead of drilling out the pin, they drive it out with a drift-punch, being careful, of course, not to bend the shaft. This is probably the best method, in that it eliminates the possibility of replacing the gear in the wrong position. If the pin does not drive out readily, however, then Mr. Shively's method could be resorted to. The importance of marking the gear before removal, however, must be kept in mind by personnel using Mr. Shively's method.

OPERATION OF TYPE–23497 SELECTOR CONTROL UNIT ON 400 CYCLES

It has been found that the Type –23497 Selector Control Unit, employed for remote channel-selection on Models RDZ, AN/URR–9, MAR, and RDR radio equipments, work well with *either* 60-cycle or 400-cycle line voltages. No modification is required for operation from a 400-cycle source.

NEW ALIGNMENT PROCEDURE FOR MODEL VK

The Model VK Radar Repeater Equipment alignment procedure as given originally in the instruction book is difficult to follow and some of the adjustments are interactive. A new procedure developed by GE engineers has proven much more satisfactory. This new procedure follows below in detail.

An up-to-date schematic of the VK repeater incorporating all the latest changes has been prepared. For those who desire or have use for a print of this schematic, write to the nearest Naval shipyard or look for the first revision of the VK instruction book which is currently being prepared for issue.

Preliminary Discussion

Range marks are used as the basis for this alignment. Therefore, in a preliminary adjustment, the linearity control is adjusted first to give equal spacing between range marks.

Then the speed of the 4-mile sweep at the input to the N-S sweep amplifier is adjusted to match the fixed voltage (south) side of the N-S o-c (off-center) pot (i.e., so that 40 miles of sweep voltage = 40 miles of o-c voltage.) The 4-mile sweep at the input to the E-W sweep amplifier is adjusted to match the fixed voltage (west) side of the E-W o-c pot.

Next the adjustable sides (north and east) of both the N-S and E-W o-c controls are matched to the 4-mile sweeps at the inputs of the N-S and E-W sweep amplifiers.

Then the 10-mile, 20-mile, 40-mile, 80-mile, and 200-mile sweep speed controls are adjusted to match these sweeps to the south o-c control.

Zero and gain of both sweep amplifiers are then adjusted on the 10-mile centered range to give the desired centered and balanced appearance to the display.

Detailed Alignment Procedure

1—With unit operating on 20-mile range, adjust linearity control R–360, to obtain equal spacing on all range markers.

2—Remove cap from slewing motor shaft. Rotate shaft of slewing motor to obtain 360° bearing of sweep. On 10-mile centered presentation, adjust N-S and E-W zero controls (R–400 and R–456) to give approximate centering of start of trace. With wax pencil, pen, or what-have-you, accurately mark position of sweep origin. Make as small a mark as possible and be careful of parallax.

3—Switch to 4-mile o-c presentation. Make sure the centered range selector is not on 4-mile position. (When both centered and off-centered range selectors are on the same range, a slight inaccuracy develops due to added distributed capacity. Therefore, in this alignment, the range selectors should always be kept on different ranges.)

4—Off-center 40 miles south as carefully read on N-S o-c dial. Check 40th mile marker and identify it with the range ring marker.

5—Adjust the 4-mile sweep speed control, R–372, to place the 40th marker under the mark made for the origin. Be careful of parallax. Recheck origin or center mark by switching back to 10-mile centered presentation. If center has drifted from under the center mark, bring it back using N-S and E-W zero controls (R–400 and R–456). Recheck 40th marker.

6—Using slewing motor shaft, change trace bearing to 90°. Using N-S and E-W centering (zero) controls, make sure that origin falls directly under the center mark on 10-mile centered presentation.

7—On 4-mile o-c presentation, off-center 40 miles west. Adjust balance control R–449. Check for drift as in (5) above.

8—Repeat (6) using a bearing of 180°.

9—On 4-mile o-c presentation, off-center 40 miles north. Adjust N-S o-c adjustment, R–434, to place 40th mile marker under mark.

10—Repeat (6) with a bearing of 270°.

11—On 4-mile o-c presentation, off-center 40 miles east. Adjust E-W o-c adjustment, R–490, to place 40th mile marker under the center mark.

12—On 10-mile o-c presentation (with trace bearing at 360° and centered range selector on some range other than 10 miles), off-center 80 miles south and, with 10-mile sweep speed control, R–385, bring the 32nd 2½-mile marker directly under the center mark. Center drift should be checked as in (5) above.

13—Repeat (12) for 20-, 40-, 80-, and 200-mile ranges to adjust R–387, R–389, R–390, and R–391, the 20-, 40-, 80-, and 200-mile sweep speed controls. Off-center 80 miles for 20-, 40-, and 80-mile ranges to correspond to the 16th 5-mile marker, 8th 10-mile marker, and 4th 20-mile marker respectively.

14—On centered 10-mile position, 360° bearing of trace, adjust N-S gain control, R–419, and N-S zero (centering) control, R–400, so that the 4th marker is about ¼" from edge of engraved bearing and the origin is accurately centered.

15—At 90° bearing, repeat above adjustment using E-W gain, R–475, and E-W zero, R–456.

LACK OF U-H-F PERFORMANCE AND OPERATION REPORTS

The request for Performance and Operation Reports on u-h-f equipment in the October 1948 Supplement of CEMB resulted in only a small percentage of ships (actually 28 percent) sending in reports. A few additional reports were received during December and January, bringing the number of ships submitting reports to approximately 30 percent of the total number of active ships having u-h-f equipment. These few reports are not sufficient to satisfactorily judge u-h-f performance.

This summary of reports in conjunction with the monthly u-h-f installation charts should provide useful information on the shipyard u-h-f program badly needed by the Bureau of Ships and other planning activities.

In spite of the relatively small quantity of reports received, a summary was made for November. It is believed a few of the findings will be of interest. Among these are:

1—Reports were received on 352 equipments or 20 percent of the total of 1740 u-h-f equipments installed in active ships as of 1 November 1948.

2—The reported equipment was used an average 112 hours during November or 15.5 percent of the time.

3—The average time lost for each equipment was 2.6 hours or 2.24 percent of the operating time.

4—The average performance of the u-h-f equipment was *fair*.

5—The overall average of the maximum reliable ranges was 7.9 miles while various types of ships ranged from 1.5 to 17 miles.

6—The average number of Electronics Technicians is 41 percent of the latest approved allowance.

Forms for reporting the monthly performance and operation of communication and countermeasures equipment, NavShips 3642(3–49), have been distributed to all active vessels in the Fleet. Additional forms may be obtained by application to District Publication and Printing Offices. This is described in detail in the June 1949 BuShips Electron.

RMB SUPPLEMENT NO. 3

Recently the supply of Supplement No. 3 to the Radar Maintenance Bulletin became exhausted. Accordingly requests received for Supplement No. 3 could not be filled. This supplement has now been reprinted in limited quantity. Activities needing copies of this supplement can obtain them from the Chief of the Bureau of Ships, Code 993B, Washington 25, D. C.

NAVY TYPE–49992 ADAPTER KITS

Navy Type 49992 adapter kits have been procured and are on the allowance lists of many ships. These adapters enable a technician to make connections to electron tube pins from above the chassis and should find extensive application in servicing chassis whose tube sockets are not conveniently located below the chassis or which cannot be rotated to a convenient servicing position. Although the instruction pamphlet issued with the kits states that they were designed to be put into Navy Model OE radio receiver analyzing equipments, the Bureau of Ships does not desire that they be so mounted. Instead the adapters should be kept separate and a box fabricated locally to hold them. This adapter kit will be a valuable adjunct to Test-Tool Set AN/USM–3 in making emergency tests and repairs.

BATHYTHERMOGRAPH SUMMARY CARDS

NavShips 900,111, "Sonar Prediction with the Bathythermograph," was furnished with two summary cards. For identification purposes these cards have been assigned NavShips numbers as follows:

NavShips 900,111–1 for the card entitled "Rules for Predicting Maximum Echo Ranges" and NavShips 900,111–2 for the card entitled "Rules for Making Temperature Corrections for QDA/OKA Depth Determining Equipment."

A limited supply of extra cards is available for activities holding copies of the basic publication in the event that the originals were not received or were lost. Any request for NavShips 900,111–1 or NavShips 900,111–2 should be submitted to the Chief of the Bureau of Ships, (Code 993B) Navy Department, Washington 25, D. C.

BOX SCORE — BuShips Electronics Repair Parts Program

Allowances	Type Vessels	Percentage Completed
ELECTRON TUBES	Submarines	100%
	Surface	90%
REPAIR PARTS	Submarines	38%
	Surface	0.1%

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RCM:

Shore Facilities:

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Electronics Supply Branch, SSD, Naval Supply Center, Norfolk

Long Beach Naval Shipyard

Mare Island Naval Shipyard

Navy Electronics Laboratory

New York Naval Shipyard

Norfolk Naval Shipyard

Pearl Harbor Naval Shipyard

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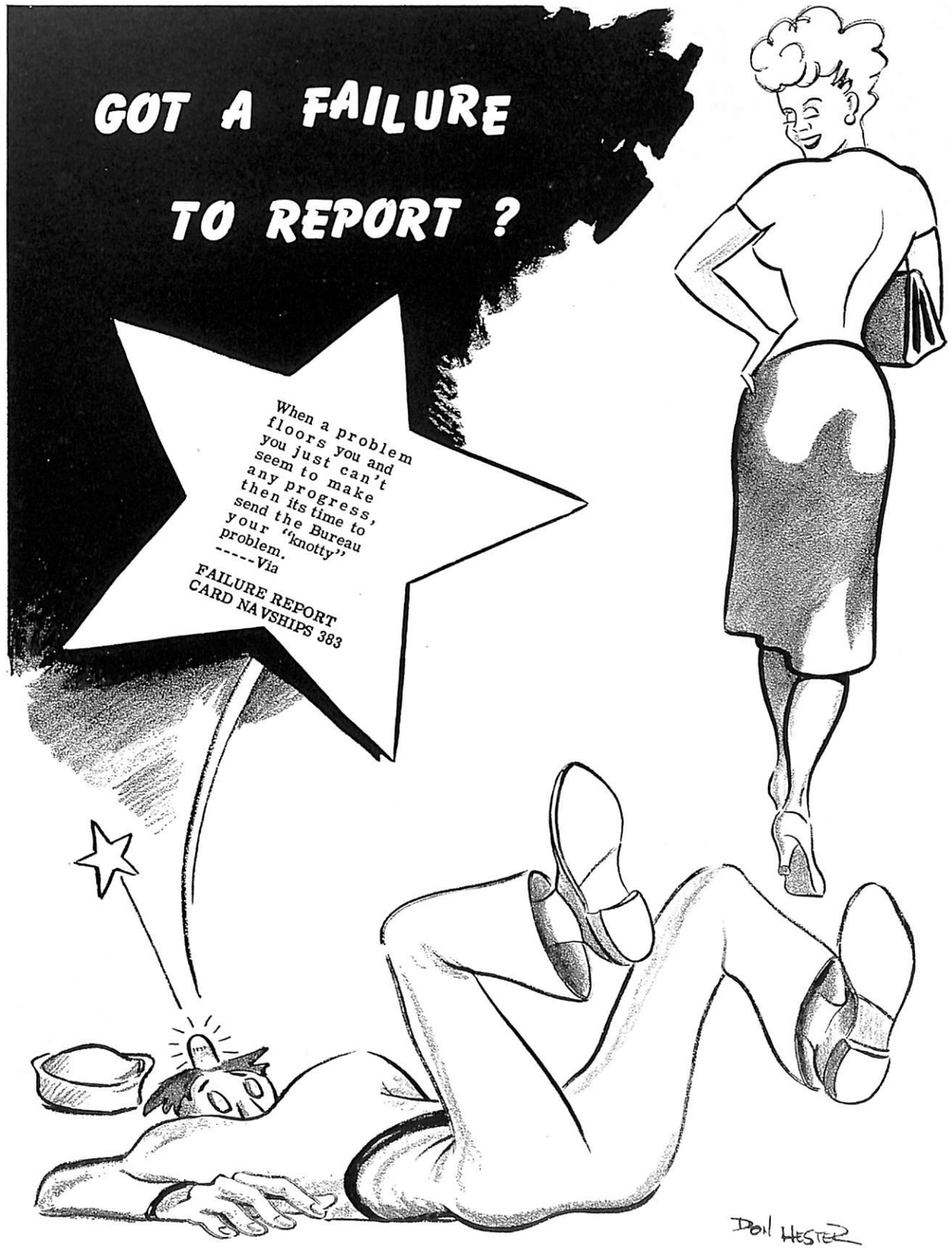

RESTRICTED

Electronics

THERE is no phase of modern warfare in which Electronic Equipment does not play a vital role.

There are certain Electronic Equipments without which fighting ships do not sail, aircraft do not fly and tanks do not roll in battle. They are not permitted to do so. The odds against them would be too great.

Joint Communication Boards Statement
Joint Chiefs of Staff

Symbol of Tomorrow