SYSTEM DESCRIPTION AND ADMINISTRATION
COMPUTER SYSTEM FOR MAIN FRAME OPERATIONS (COSMOS)
OPERATIONS SUPPORT SYSTEMS

CONTENTS PAGE

CONTENTS PAGE

Printed in U.S.A.

CONTENTS PAGE

CONTENTS PAGE

CONTENTS PAGE

CONTENTS PAGE

Figures

Tables

1. SYSTEM OVERVIEW

INTRODUCTION

1.01 This section gives an overview of the Computer System for Main Frame Operations (COSMOS) and describes COSMOS application in the Assignment Office, in the Network Administration Office, at the Subscriber Main Distributing Frame, in the Repair Service Bureau, and in Outside Plant Engineering. Also discussed are other functions of COSMOS and the conduct of an operational review.

1.02 Whenever this section is reissued, this paragraph will contain the reason for reissue.

1.03 The title for each figure includes a number(s) in parentheses which identifies the paragraph(s) in which the figure is referenced.

1.04 COSMOS is a real-time computer system designed to assist the operating telephone companies in effectively managing, controlling and utilizing main distributing frame (MDF) facilities and circuits. COSMOS controls processing of service and work orders by keeping track of pending versus completed status. The system is implemented through a minicomputer with application programs that provide a variety of services to the users who access it via a terminal network. It is addressed by transaction codes initiated at the remote terminals.

1.05 Programs have been incorporated into COSMOS to mechanize plant and central office network operations associated with switch replacements and similar dial projects. They provide assistance for a COSMOS administered wire center in generating line translations, MDF cross-connection lists, board-to-board test lists, and bulletin updates for new and changed lines.

1.06 This function, known as dial transfer, utilizes standard COSMOS capabilities and features for assigning line equipment and tie cable pairs on a short MDF cross-connection (short jumper) basis within the constraints of objective traffic load balance. Additional capabilities are provided to extract customer service data from an existing COSMOS data base, maintain old circuit/new circuit facility associations, generate jumper running lists and number-number lists in near real time, and effect a "flash" conversion of data base circuit configurations at the time of cutover.

1.07 The dial transfer feature enables efficient management of large scale dial projects within a COSMOS environment. Transfer operations will coexist with normal service and work order activity, generally on a time-shared basis.

1.08 The COSMOS-ANALIT (analysis of automatic line insulation tests) module analyzes ALIT data obtained from LIT frames of No. 5 Crossbar (XB), No. 1XB, and step-by-step (SXS) switching machines; and the ALIT program in the No. 1 Electronic Switching System (ESS). The COSMOS-ANALIT programs are quite distinct from the traditional ANALIT programs that are currently available through several commercial time-sharing computer vendors. ALIT data analysis reports provided by the commercial ANALIT contain either line equipment or telephone numbers of the subscriber lines. The Repair Service Bureau (RSB) manually translates this subscriber line data to subscriber cable pairs. However, the COSMOS-ANALIT generates to various ALIT data analysis reports with subscriber cable pair data.

SYSTEM FUNCTIONS

1.09 The principal functions of the COSMOS system are as follows.

- Automatic assignment of telephone numbers, line equipment, bridge lifters, and tie cable pairs to service orders.

  Note: The system does ***not*** assign subscriber cable pairs.

- Maintenance of accurate records of telephone numbers, feeder cable pairs, line equipment and miscellaneous auxiliary equipment.

- Processing of service and work orders and keeping track of pending versus completed status.

- Providing preferential assignment of line equipment to cable pairs to achieve short jumpers on the MDF while following load balancing parameters.

- Permitting efficient reuse of left-in jumpers on the MDF. This feature is also known as Dedicated Inside Plant (DIP).

- Issuing reports for all departments involved.

- Provides for line assignments in bulk, MDF running lists, number-number lists and cutover bulletins for dial transfer.

- Maintains cable failure histories and provides ALIT data analysis reports with subscriber cable pairs.

IMPACT ON OPERATIONS IN THE VARIOUS DEPARTMENTS

1.10 COSMOS will have varying effects on many departments of the operating telephone companies (OTCs). Most departments will realize a reduction in the personnel requirements. A brief summary of departmental involvement follows.

A. Assignment Office (AO)

1.11 The AO is the prime manipulator of the COSMOS data base through the constant processing of service orders and work orders. The interface between COSMOS and the assigners will require a change in both their work environment and procedures. In lieu of the present manual equipment layout maps and available facility tables, they will have the readily accessible COSMOS data base as a reliable information source. The assigner will have a new method of communication in the keyboard terminal with cathode-ray tube (CRT) display unit (plus hard copy if desired) for the interchange of information, and they will use a computer-oriented language compatible to COSMOS. This is the most significant interface between the COSMOS system and the various departments which work with it. Additionally, the requirement posts the assigned line equipment and telephone number, and the exchange customer cable record (ECCR) is eliminated with COSMOS. This information is available in the COSMOS data base.

1.12 It is anticipated that the assignment job will initially take more time than the present manual operation. But this extra effort will be compensated for through the improved quality of assignments because of the reliability of the COSMOS data base, and the reduction in interdepartmental telephone calls because of the accessibility of the data base.

1.13 The basic service order flow in the AO will remain the same; COSMOS will only enhance the procedures. The operational effect on the AO will be as follows.

- The blocking desk analysis and left-in station file check will remain the same.

- The assignment desk operation will change. The assigner will have assistance from COSMOS in the automatic assignment of line equipment, telephone numbers, bridge lifters and tie pairs for plain old telephone service (POTS) customers. COSMOS will also provide validation checks and task sequencing for work orders.

- The installation desk will have the capability of verifying COSMOS data base information against paper copies of the completed service orders if desired.

1.14 For dial transfers and area transfers in which the "from" wire center has a COSMOS data base, preparation of cutover sheets can be dispensed with completely. Assignment program input is generated automatically from data base circuit associations.

1.15 It will still be incumbent upon the AO to review the COSMOS generated input files and to determine whether AO related circuit modifications are required. Assignment editing may also be required to arrange facility configurations for the proper assignment of tie pairs in a multiframe environment.

1.16 The AO will be the focal point for the management of service order and work related changes. The AO will initiate transfer withdrawals to process orders in the old office and reestablish the lines upon order completion. This circuit modification procedure essentially parallels operations in a manual environment with the exception that more stringent monitoring of circuit changes is possible.

B. Main Distributing Frame Force

1.17 COSMOS provides assistance to the MDF force in these broad areas.

- COSMOS guides the facility assignment process such that short jumpers are achieved (resulting in decreased MDF congestion), and a minimum of record accuracy errors are encountered.

- COSMOS is also involved in the operations of the MDF forces through service order/work order scheduling assistance and through real time access to the COSMOS data base. This is accomplished via a specialized frame order produced by a COSMOS terminal located at the MDF.

- COSMOS monitors MDF jumper pileup and congestion on modular frames, identifying undesirable trends before they can result in unmanageable frames.

- COSMOS provides MDF location information by providing the Location Oriented Identification System (LOIS) MDF appearance location on the specialized frame order.

1.18 Service order/work order scheduling assistance is achieved through due date sorting and cross-notification of multiple frame activities that might be scheduled to take place on individual circuits or equipments (eg, both a cable throw work order and a new connect service order might be scheduled such that they both affect the same cable pair within the next few days). In the case of some work orders, COSMOS does more than due date sorting and cross-notification in the sense that the work order is broken down by COSMOS into specific steps for more orderly control. For example, a cable throw may be broken down into the following five steps.

- Place back taps

- Validate back taps

- Place coils on ***to*** pairs

- Remove coils on ***from*** pairs

- Remove original jumpers

The key point to note here is that COSMOS can, at the option of local supervision, keep track of this process (which could span weeks) and cross-check the data base for conflicts whenever the throw status is changed on each affected circuit.

1.19 Real time access to the COSMOS data base reduces telephone calls to other departments and provides such things as circuit configurations (in response to TN, OE, TP [tie pair], CP, etc, input), equipment locations, and work lists of service orders for future dates (this allows jumper running for future work during slack periods).

1.20 Regarding MDF operations as a whole, the procedural ***changes*** occasioned by COSMOS are minor, with the net effect being increased efficiency and tighter organization and control of the overall process. The service orders themselves are available by due date from COSMOS in the open-of-day report requested by the MDF foreman (this report contains an audit of the work due on the specific day and two following work days). Service orders given due dates for the current and following workday (as well as 'HOT' orders), however, are transmitted directly to the MDF following AO assignment. Service order closeout (required from both the frame ***and*** installation control groups) automatically retains completed orders for two working days. This allows duplication of lost or mislaid orders, and allows retrieval of completed orders for trouble diagnosis if such an event occurs within the two following days.

1.21 All communications between COSMOS and the MDF forces takes place using hardcopy terminals. In the case of service orders, for example, the service order copy that COSMOS transmits to the frame will take the place of the standard order that is received there today; the difference is that the COSMOS order will be customized for MDF use and will be easier to read and interpret than the regular orders. (One exception to this practice involves SSWOs [special service work orders]; in these cases the COSMOS order will be attached to a copy of the SSWO prior to MDF processing.)

1.22 In addition, COSMOS constantly monitors the cross-connection situation and can provide reports (on demand) of the jumper pileup. If the wire congestion level exceeds an acceptable design level for the present number of working line equipment and cable pairs in the lineup, the frame force is alerted to the condition. Remedial action may then be initiated by requesting COSMOS (with the approval of the network administrator) to provide a specific number of line equipment transfers to replace long jumpers with short jumpers. A worklist is then generated for this purpose by COSMOS.

1.23 The primary impact of the COSMOS dial transfer module in the central office is the reduction of craft person effort in running

cross-connections, continuity testing, and circuit modifications.

1.24 Preferential assignment of short jumpers and automated tie pair assignment significantly improve the productivity of cross-connection work. In addition, in the case of modular COSMIC MDFs, facilities are listed with Location Oriented Information System (LOIS) positions, reducing the time required for terminal location.

1.25 Continuity tests through the old and new switching machines are usually performed in large scale dial transfers. The COSMOS dial transfer module aids in this process by providing mechanized purification of circuit data and preventing dual assignments. When discrepancies are discovered, the COSMOS number-number list provides a complete reference for determining the proper circuit facilities.

1.26 Ordinarily there is a considerable time lag between the time assignments or assignment changes are made, and the time cross-connections are run. This lack of synchronism leads to unnecessary rewiring of circuits which undergo service and work order activity. The COSMOS dial transfer module enables frame lists to be drawn in real time in shift-size portions with completely current circuit information. Rewiring is thus reduced to a minimum.

C. Network Administration

1.27 COSMOS will change some of the network administrator's work methods but the basic network responsibilities will remain the same. The network administrator is still responsible for managing the assignment of line equipment and telephone numbers so as to provide good customer service.

1.28 Network interfaces with COSMOS primarily in four ways.

(1) Establishing, reviewing, and updating office parameters and selecting options that are used to manage the COSMOS line assignment algorithm. The parameters and options will enable the network administrator to ensure that COSMOS operates in a manner consistent with their responsibilities and objectives for the specific entity and/or wire center(s).

(2) Determining the status of the telephone numbers maintained in the COSMOS inventory. COSMOS will associate a status with each telephone number in the office. COSMOS only assigns spare numbers. It is the network administrator's responsibility to release telephone numbers which have been properly aged and to determine which telephone numbers are to be held for administrative purposes. On the other hand, COSMOS automatically changes a telephone number's status to disconnect or change when such action is required. To assist the network administrator, COSMOS will provide dates of disconnect and previous customer class of service so that aging can be performed.

(3) Generation and input of data required for the line assignment algorithm. The Network Administration group will input load unit hundred call seconds (CCS) usage measurement data into the COSMOS data base.

(4) The COSMOS data base will provide information required by the network administrator to develop reports and summaries.

1.29 COSMOS automatically assigns line equipment for POTS service (ie, for single and two-party service requiring only one cable pair, one telephone number and one line equipment). COSMOS utilizes a line equipment algorithm that is designed to minimize jumper length while meeting the following objectives: dynamic load unit load balance, class of service balance, and an entity main station-fill objective.

1.30 COSMOS automatically selects line equipment for complex services such as multiline hunt groups, PBXs, and centrex groups. This procedure employs the basic assignment algorithm that uses "rules of spread" for such customers.

1.31 The dial area transfer module eliminates clerical involvement in the task of line assignment. COSMOS automatically assigns line equipment for both POTS and complex services, and provides for data base updating. A small effort is still required to review the COSMOS generated input files and edit any changes required by service regrades; eg, conversion of rotary hunting groups to multiline hunt groups.

1.32 Network administration management of the assignment process to achieve load balance

objectives is not eliminated with the dial area transfer module. Although COSMOS provides extensive visibility over the loading conditions as assignments progress, it is still incumbent upon the network administrator to analyze these reports and set the assignment parameters accordingly.

1.33 Some deviation from standard COSMOS operating procedure will be necessary while processing a dial area transfer. For example, if the assigned-to entity has a nonzero main station fill, the input of measured CCS values must be temporarily suspended. This is to avoid corrupting the estimated contribution of the transfer to the total machine load with current usage values.

1.34 During the postcutover period, it will be the responsibility of the network administrator to release or retire disconnected line equipment in the data base. Methods are provided to restatus the old equipment on an individual or range basis.

D. Commercial Department

1.35 Under COSMOS, the commercial department's assignment of telephone numbers should be minimized to the maximum extent possible. Number assignment prior to selection of a serving cable commits the assigner to a particular switching system without concern for a preferential assignment. On a conventional MDF where like switching system equipment is located in contiguous blocks, this might force the assigner to select a long jumper. Thus, except for special applications (eg, multiline hunt groups, PBX and centrex service), it is preferrable that the telephone number assignment be a COSMOS choice within the parameters specified by the service order. However, preassignment of telephone numbers is of no major consequence if only one switching entity is available for assignment.

PhoneCenters

1.36 It is recognized that with the introduction of PhoneCenters and the requirement to preassign telephone numbers for PhoneCenter customers that difficulties are likely to arise. Other operational support systems are being developed to assist PhoneCenter representatives in customer negotiations and telephone number delivery and administration. In the interim, telephone number lists will be required by the commercial department for PhoneCenter administration. These lists will be provided by network administration to ***one*** specified commercial department location for distribution to PhoneCenters. Local interdepartmental procedures must be established to ensure that telephone numbers are supplied on a regular basis as required, that they are not lost, and that duplicate assignments of telephone numbers are not made to different customers.

E. Marketing/Sales

1.37 Marketing/Sales responsibilities under COSMOS continue as in the past, but with increased emphasis on providing timely, complete and accurate information to network administration on complex orders for establishment of input files. Any changes to these orders, once the input file is established, requires close interdepartmental coordination.

F. Repair Service Bureau (RSB)

1.38 The Repair Service Bureau (RSB) will use COSMOS primarily to obtain circuit and pending order information. Access to the COSMOS data base will be provided by a set of inquiries which, when a given facility is specified, will list all known information about the facility as well as all other facilities associated in a circuit or pending order with the specified facility. Similarly, if an order number is specified, all known information about the order and its facilities will be listed.

1.39 The RSB has active responsibility for the establishment of maintenance change tickets within COSMOS. COSMOS assumes that maintenance change tickets reflect work that ***has been*** accomplished and minimal error checking is made at the time of establishment. Completion of the maintenance change tickets within COSMOS is the responsibility of the AO. (Such completion will be denied by COSMOS if discrepancies are found between the change ticket and COSMOS data base at this time.)

1.40 A set of feeder cable pair reports are available to the RSB which list defective cable pairs for retest, the number of defective pairs tested OK in a month, the number of pairs identified as defective in a month, and a summary of cable usage. In addition, COSMOS will list all the working circuits in a known damaged cable and all affected customers can quickly be identified.

1.41 COSMOS-ANALIT will have an effect on the RSB operations only. Since COSMOS-ANALIT provides ALIT data analysis reports with subscriber cable pairs, the RSB will realize a reduction in the man-hour requirements for processing ALIT data. Also, the RSB can either eliminate or simplify manual records of cable failure summaries that are being maintained for analysis purposes.

G. Data Base Manager

1.42 ***Data Base Manager:*** The function of data base management is performed by the Network Supervisor—COSMOS. The position is responsible for the integrity of the system data bases and for its ongoing utility to all operational users. The data base manager is the interdepartmental COSMOS coordinator and will interface and coordinate with Network Central Office, Network Administration, Plant Repair, Plant Installation, Data Conversion Coordinator, and Equipment and Outside Plant Engineers. Through continuous monitoring of system performance, periodic verification of data base accuracy levels, scheduling of system operations, etc, this position will provide overall system management and optimization of performance for COSMOS operations. The data base manager is completely responsible for maintaining the COSMOS data base in both conversion and operational phases and has the expertise to use the diagnostic and corrective programs that have been designed to monitor the general integrity of the data base. The data base manager will use the diagnostic programs regularly to isolate hardware malfunctions or user errors as soon as they occur, thus facilitating rapid correction and minimizing data base degradation.

1.43 As with all software systems the COSMOS data base may occasionally develop anomalies due to user error or hardware malfunction. When these anomalies occur, some system capabilities or user transactions may become nonfunctional.

1.44 COSMOS contains a battery of diagnostic programs for the purpose of monitoring the general integrity of the data base on three levels: (1) data base structure, (2) circuit logicality, and (3) data base accuracy. It is important to monitor the data base on a regular basis so that anomalies can be found and corrected before they become a problem to the user. Regular use of diagnostic programs has the additional advantage of isolating hardware malfunctions or user errors soon after they occur and thereby enabling rapid correction and minimal damage. Complementing the diagnostic programs are a set of transactions for correcting data base anomalies. These corrective programs operate in both manual and automatic modes and are designed to be used within the local operating company by an individual with careful training in this area.

1.45 It is strongly recommended that the responsibility for maintaining data base integrity on all three levels be vested in one or more persons who would be identified as data base managers. Such individuals would receive specialized training in the COSMOS data base structure and in the use of diagnostic and corrective programs. The data base manager would have ultimate responsibility for the usefulness of the data base to all user areas. Data base management would not be a full-time job for one wire center, and it is feasible to expect a capably trained person to manage at least two computers. Alternately a supervisory level person associated with a single wire center could assume data base management responsibilities on a part-time basis. Given the level of expertise required, however, it is recommended that specially trained personnel provide this function on a full time basis.

1.46 The extensive interaction of a dial or area transfer with the COSMOS data base will place additional demands upon the data base manager. Typical project related responsibilities will include the generation of input files, internal setting of assignment parameters, coordination of the report printouts, and execution of the cutover completion. These activities are relegated to the data base manager because of the level of technical training and sophistication required.

1.47 The data base manager will serve the traditional role in assuring structural integrity of the data base during the transfer interval. The impact of the transfer programs results in no additional stress or disturbance to the data base; however, the volume of activity will require more diligent attention to maintenance routines.

H. Cutover Bureau

1.48 The dial transfer module significantly reduces the work traditionally attended to by the cutover bureau. Record preparation and transcription

is for the most part automated by the dial transfer module interacting with the COSMOS data base.

1.49 Manual generation of ESS 1101 and 1105 forms is eliminated with the exception of custom calling features and centrex information.

1.50 Purification of subscriber records should be completely unnecessary where COSMOS is in operation prior to the cutover. The degree of consistency demanded by the data base structure provides a natural environment for performing code and area transfers with a minimum of record conflicts.

COSMOS BENEFITS

1.51 The major economic benefits associated with COSMOS are due to the personnel reduction and through extensions of the service life of the MDF itself. Personnel savings are generated in two major areas.

- ***Fifty Percent of the Network Administration Work Force:*** (Involved in the line and number administration.) This is the estimated amount of time that COSMOS is expected to recover through the elimination of assignment lists, generation of line equipment transfers, generation of management reports, and reduction in discrepancies.

- ***Thirty Percent of the MDF Work Force:*** This figure is based on a Bell Telephone Laboratories (BTL) measured savings in three typical large wire centers (greater than 50K lines). These savings occur through the COSMOS sorting and cross-referencing of service orders and work lists, reduced record error rates, reduced telephone calls to other groups for circuit associations, and shorter jumpers. The use of a COSMIC frame gives MDF work force savings due to the frame type. However, in COSMIC frame sizes greater than 25K lines, COSMOS is recommended to ensure proper short jumper assignments. Additionally, the high data base accuracy maintained by COSMOS eliminates the requirement for periodic frame checks.

1.52 Additional savings can be expected in the RSB, installation force, and construction forces due to COSMOS report generation capabilities and the improved record accuracy maintained by COSMOS.

1.53 While it is evident that the economic benefits accruable from service life extension of an MDF can be very large, the approximate amounts depend strongly on local conditions. It will be noted here, however, that in the event that existing switching systems are to be transferred from a conventional MDF or ESS MDF to a COSMIC MDF, COSMOS will provide a most effective means of converting the existing records and can automatically provide short jumper reassignments coincident with the transition.

1.54 The COSMOS data conversion will disclose errors in the existing cable pair, line equipment, and telephone number records of the NAO, AO, and RSB which when reconciled will result in recovered plant. In addition, the ongoing COSMOS operation provides error checks on input and by providing the assigned facilities, can be expected to further reduce the error rate of the central office facility records.

1.55 Additional advantages gained through the use of COSMOS include:

- Reduction or prevention of MDF wire congestion through optimum use of short jumper assignments
- Dynamic traffic load balance and class of service spreading
- Reduced assignment errors and attendant trouble tickets
- Real time visibility of COSMOS data base
- Readily accessible management reports
- Validation of inputs in the processing of service orders and work orders
- Tie pair, bridge lifter and message register management and automatic assignment.

1.56 There is a final advantage in that the work required to implement COSMOS (eg, data conversion and record purification) is compatible with any future plans for Business Information Systems Customer Service/Facilities Assignment and Control System (BISCUS/FACS), Loop Maintenance

Operations System (LMOS) or Loop Cable Record Inventory System (LCRIS).

IMPLEMENTATION PLANNING

1.57 Installation of and data conversion for an initial COSMOS system may take from three months for small wire centers to as long as a year for large metropolitan centers. In addition, for the initial system there will be a variable period between the time a computer is ordered until it is delivered and installation can begin. During this manufacturing interval, computer site preparation and personnel organization are usually accomplished. Factors affecting this interval are computer delivery time, wire center size and complexity, accuracy of manual records, and personnel available.

1.58 A single COSMOS system will involve about one person-year of planning on the part of the operating company. Some of this planning must take place before the computer is ordered, but most of the planning and coordination effort is applied throughout the entire implementation process. Illustrating this, a project evaluation and review technique (PERT) chart is shown in Fig. 1 with the implementation broken down into three logical phases: (1) preliminary planning and system definition, (2) site preparation, and (3) data base generation. Data base generation in turn consists primarily of the data conversion process along with discrete steps of data base initialization and preoperational system configuration. The following paragraphs describe in some detail the activities which will occur in bringing a COSMOS system to life.

A. Preliminary Planning and System Definition

1.59 Prior to ordering the computer, the project leader and his staff must access how COSMOS will interact with local central office, plant service, and network administration operations. Some areas to be investigated are:

- Number of working lines to be managed
- Type and quantity of service order activity
- Extent of engineering work order activity
- MDF configuration and assignment practices
- Multiwire center considerations
- Location of work groups and administrative boundaries
- Interaction with special service design group
- Inclusion of trunks and miscellaneous equipment
- Types and number of terminals required
- Computer location and operation
- Future growth and dial projects.

The object of preliminary planning is primarily to determine how much computer and terminal hardware is needed so that an estimate case and purchase order can be written.

1.60 A second objective is to anticipate the impact COSMOS will have on existing practices and determine what procedural changes may be required. For example, in the area of special services, COSMOS has the capability of recording circuit information and automatically assigning tie pairs in a multiframe environment. In order to take advantage of this capability it may be necessary for the AO to enter special service circuits into COSMOS in addition to their regular service orders; or as an alternative, the special service design group may need an access terminal to enter and maintain this information.

1.61 Similarly, the extent to which special services are managed in COSMOS will affect the extent of the facility inventory and possibly the computer size itself. It is important for the project leader to consult with assignment, network, and central office supervisors during the preliminary planning phase to gain their assistance in determining how COSMOS will fit into normal operations. While decisions made here are not irrevocable, considerable time and expense may be required to retrofit the system later on.

B. Facility Inventory and Data Base Initialization

1.62 Telephone numbers, line equipment, cable pairs, etc, are represented in the COSMOS data base by permanent records. Each record contains information on a single facility, with all records of a given type constituting a facility file.

1.63 At about the same time site preparation is begun for the computer, a detailed inventory

of central office facilities should be compiled. This inventory should reflect planned facility additions for at least ***one year*** beyond the anticipated cutover date, plus growth estimates for the next five years. An accurate inventory and growth projection will allow simple and inexpensive expansion of the facility files to match future equipment and plant additions. The following information is required.

- Telephone numbers, X-numbers: Number range for each exchange code
- Line equipment: Equipment ranges for each entity
- Subscriber, trunk, and tie pairs: Pair ranges for each cable
- Bridge lifters, concentrator identifiers, message registers: number ranges
- Relays, noninventoried miscellaneous equipment: Approximate count
- Special service circuits: Approximate count.

1.64 As a local option, central office facilities such as pairs may be fully inventoried, as subscriber pairs are, or simply allocated an amount of file space matching their approximate count. In addition to the facility inventory, a table of USOC codes used by the local AO must be compiled with the dial class of service each maps into.

1.65 This information must be sent via the E-8113 COSMIC/COSMOS questionnaire to Western Electric (WE) at least two months prior to computer shipment to allow engineering and generation of a data base initialization file, file sizing, and allocation.

1.66 Upon installation and turnover of the computer itself, WE will load the operating system and application software. At this point, the data base initialization file, created from the E-8113 questionnaire, is read into the computer.

1.67 The questionnaire input drives programs which automatically generate the facility files and initialize the individual records. The complete system is then tested for reliability, and backup copies of the programs and initialized data base are created for the site.

C. Data Conversion

1.68 Data conversion is essentially the linking of individual facilities in the data base to form working circuits. Some of these circuits are then linked to form associations such as party lines and hunting sequences. Also during the data conversion phase, facilities which can not be assigned, such as defective cable pairs and intercept telephone numbers, must be given a status.

1.69 The COSMOS data base will, in general, contain more information on each subscriber line than is found in any single manual record. Consequently, partial information must be extracted from several manual records and combined in COSMOS to form complete circuits. The COSMOS data conversation system has three principle transactions for inputting circuit data directly from manual records. They are designed to be used in conjunction with repair service line cards, network administration directory number records, and plant assignment cable charts. A combination of some or all of these transactions may be employed to provide the primary input of working line associations and to serve an equally important cross-checking function on critical facility associations. Local conditions relating to record accuracy and circuit configurations will dictate which records comprise the most efficient and accurate data source.

1.70 Once lines have been entered to the data base they may be modified for purposes of correction and update. A complete set of transactions is available to alter any circuit item consistent with certain rules of logic.

1.71 COSMOS has the capability of accepting data conversion inputs in either an on-line interactive mode or in a batch processing mode. The on-line mode is preferred when unpurified manual records are the only source of circuit information available. When circuit information is available from a mechanized source, COSMOS will accept magnetic or paper tape input in a specified format. Machine throughput for the input of working lines is 600 (PDP 11/45*) or 1200 (PDP 11/70*) circuits per hour in the single user mode. These throughput figures may be applied directly to the reading of input from magnetic tape. Where paper tape is used as the input medium, allowance must be made for the operator's time in mounting and restarting new tapes.

*Registered trademark of the Digital Equipment Corporation

1.72 The cost of on-line data conversion will be a function of the number of lines, relative complexity of the office, and purity of the manual records. Due to the data base file structure used by COSMOS, a high degree of flexibility is allowed with respect to circuit configuration; however conflicts involving inventoried facilities are strictly prohibited. As a consequence, COSMOS data conversion will usually demand significant record purification as well as tracing of commonly neglected facilities such as tie pairs and bridge lifters.

1.73 In estimating the cost of on-line data conversion for a particular office, the following productivity figures are provided.

INPUT	NUMBER PER MAN-DAY
• **DIAL TONE LINES**	
Plant input from line cards	160
Plant input from prepared forms	310
Traffic input from dial administration books	250
• **SPECIAL SERVICE LINES**	
Plant input from CLR cards	30
Plant input from prepared forms	65
• **STATUS OF NONASSIGNABLE FACILITIES**	
Defective cable pairs	280
Intercept telephone numbers	1000
Resolution of discrepancies and reinput	20
Service order updates	75

1.74 The above figures include time to train personnel and interpret manual records. As an example, consider a wire center having 40,000 working dial-tone lines, 2000 special service lines, 4000 defective pairs, 10,000 nonworking numbers, a 20 percent overall error rate, and 75 service orders per day. Assuming no prior purification work, the man-day requirements for input are as follows.

INPUT	NUMBER MAN-DAYS
Dial tone lines (Line cards and traffic books)	410
Special service lines (Line cards only)	66
Individual statusing	24
Discrepancy resolution	420
Total man-days	920

1.75 The above total represents the one-time manpower investment required to build the data base. It is important to note that in addition to the one-time investment a continuing manpower expenditure during data conversion is required to interpret and input daily service order and work order activity. This task is proportional to the number of lines currently in the data base and hence is small at the beginning of data conversion and grows to a maximum when all lines have been

input. Service and work order updates are then required on an ongoing basis until the system becomes fully operational.

1.76 If ten clerks are available for the above tasks, plus one additional clerk for service order updates, data conversion for this office will take about 4-1/2 months. Doubling the manpower will not necessarily halve the time required since computer response time will be slower with the increased number of users and reduce individual productivity. In addition, two first line supervisors are required—usually one from plant assignment and one from traffic. The data conversion supervisors are responsible not only for personnel management and training but also for management of data base integrity during data conversion. The data base management function must, of course, continue throughout the operational phase.

1.77 Using an average loaded salary of $10.50 per hour for the clerks, the cost of data conversion for this office is $85,000 or $2.02 per line.

1.78 The dollar per line cost is quite sensitive to the discrepancy rate. A ten percent error rate would bring the per line cost down to $1.56. When time and funds permit, purification of line cards and cable records prior to the start of data conversion is highly recommended. Another source of overhead is the time it takes a clerk to interpret manual records. Condensing line cards and service order data onto prepared forms of input will boost efficiency and reduce interpretation errors.

1.79 Obviously the use of batch input will reduce the overall costs even further by reducing the primary plant and traffic input time; however, the cost of interfacing with another mechanized record system must also be considered.

Data Conversion in a Multiwire Center Environment

1.80 Data conversion in itself is the same for both single and multiwire center environments; the transactions are the same and the tasks which must be carried out are the same. Significant changes must be implemented, however, in the manner in which the machine is utilized. Data conversion contributes heavily to the overall system utilization and is capable of degrading system response time for operational wire centers sharing the same computer to unacceptable levels. Consequently, in multiwire center applications some form of work hour staggering or out-of-hours input will usually be necessary for wire centers in the data conversion mode.

1.81 ***Techniques:*** The most straightforward way to reduce the data conversion load on a multiwire center computer is to schedule some of the work outside normal working hours. For example, off-line preparation of input may be done during the prime hours for batch input during idle hours. Off-line preparation may take the form of mark-sense cards, keypunched cards, or direct punching of paper tape. With the exception of directly punched paper tape, off-line preparation will involve an intermediate step by an outside vendor or the TELCO data processing group to convert the manually marked or punched forms to paper or magnetic tape in the proper COSMOS format. It is also possible using the text editor within COSMOS to prepare input files during normal working hours with little processing overhead. These files may then be executed outside of the busy hours for the actual input to the data base.

Personnel Organization

1.82 Probably the most important consideration toward a successful data conversion effort is the manner in which personnel for the task are to be organized and managed. Proper personnel organization affects how smoothly data conversion proceeds.

1.83 It is essential that a Data Conversion (DC) Bureau be created consisting of personnel employed full time solely on data conversion, and under the direction of a full time data conversion coordinator. This bureau will execute all phases of data conversion—inputting records, resolving discrepancies, correcting plant and traffic manual records, and preparing for cutover. It will work from AO, RSB, and Network Administration (NA) records; however, the DC Bureau must work entirely unencumbered by routine central office activities. Similarly, the bureaus engaged in providing everyday service cannot be expected to engage any responsibilities of the DC Bureau.

1.84 Ideally the DC Bureau will consist of representatives from each of the areas being affected by COSMOS: AO, RSB, NA, and MDF. These should be local wire center personnel who

are familiar with the central office records and have a vested interest in maintaining their accuracy.

1.85 The DC Bureau should have a three-tier structure or hierarchy.

Level 0: Clerks and frame person—Inputs to computer and physical checks

Level 1: Analysts—Input supervision and discrepancy analysis

Level 2: Coordinator—General coordination and decision making

The levels listed should correspond roughly to standard management levels within the company. The coordinator must have the greatest understanding of the nature and requirements of data conversion. The analysts require the greatest knowledge of local plant and central office practices. The clerks, if need be, may be new hires or transferees with low experience.

1.86 The DC coordinator must have authority not only to direct his or her own people, but also to effect minor changes in the normal service activity of the operations bureaus. For example, the coordinator may find it necessary to alter the disposition of completed service order copies, or to require markers to be placed when line cards are pulled out of file.

1.87 Essentially the DC Bureau provides a service to the operations bureaus in that it purifies their records and inputs them to COSMOS. Hence, the DC Bureau should not be considered an intruder to the operations bureaus, but an extension of them—part of their own personnel temporarily dedicated to the task of installing COSMOS.

Personnel Requirements

1.88 The first member of the DC Bureau will be the coordinator. Together with the COSMOS project leader, the coordinator recruits the rest of the team and makes arrangements for their training. Using the supplied training package, the coordinator is instrumental in providing the actual training. The coordinator will also be engaged well in advance of the start date in setting up the physical environment needed by the DC Bureau.

Predata Conversion

1.89 Due to the importance of this data conversion phase, it is recommended that the coordinator fill out the office parameter forms. Completed forms should be submitted to Outside Plant Engineering, Central Office Engineering, and the network administrator for concurrence as to their completeness and accuracy. Since these parameters do not change on a frequent basis, they should be gathered as soon as the forms are available to allow adequate time for double checking.

1.90 Actual input of the information is a simple keyboard operation. This can be handled by a clerk provided the coordinator double checks the files created.

1.91 The DC Bureau must be fully staffed upon completion of predata conversion.

Bulk Data Input

1.92 In addition to the coordinator, a team of about eleven people will be needed to input working lines at an average rate of 750 to 1000 lines per day and resolve associated discrepancies. Experience indicates that eleven people can complete inputting an NNX code in about two or at most three weeks time. Table A shows the organization of this eleven person team.

1.93 The various sections of PA-6P020, Data Conversion Position Practice, explain in detail how these people go about their jobs. In general all keyboard work at the terminals is done by clerks. The analyzers supply the clerks with records for inputting, and troubleshoot difficulties the clerks may have with non-POTS circuits. Rejected input due to format errors or typographical mistakes can be solved by the keyboard operators themselves. Rejected input due to conflicts between records will require the analyzer to consult other books, or request help from the frame person or a desk person. After conflict resolution, the analyzer should correct the manual records and refer changes to be made in COSMOS to the update clerk.

1.94 The coordinator makes any adjustments that are necessary to keep the input from the various sources in the proper time sequence. Also, adjustments may be made in the input rate or the distribution of personnel to prevent accumulation of discrepancies. The coordinator should determine

which completed orders affect the data base and route these to the update clerk.

Nonworking Facilities

1.95 During this phase of data conversion the update operation and conflict resolution functions remain the same but the other functions change.

1.96 Two plant clerks should be assigned to check the cable pair—telephone number listing from COSMOS against the cable assignment books. Conflicts between the listing and the cable book should be referred to the plant analyzer for resolution. The analyzer will resolve these conflicts with the aid of the frame person and will make any necessary corrections in the plant records and COSMOS.

1.97 The third plant clerk should verify each listing of nonworking plant facilities against the cable book, tie pair records, bridge lifter records, etc. Defective, reserved, or spare status should be marked next to the pair number on the listing.

1.98 The fourth plant clerk will be required to attach the appropriate status to the nonworking facilities in COSMOS. Default statuses need not be entered.

1.99 One network administration clerk should be assigned to check the line equipment—telephone number list from COSMOS against the equipment records. Conflicts should be referred to the traffic analyzer.

1.100 COSMOS will supply a list of nonworking line equipment and telephone numbers. The second network administration clerk verifies each listing against the appropriate records. When this is completed, the network administrator must be consulted to designate which line equipments are reserved or excluded, and which telephone numbers are not available for assignment.

1.101 The third network administration clerk will be required to input data on nonworking facilities into COSMOS. Default statuses need not be entered.

1.102 It may become necessary to add another update clerk as most of the working lines are input into COSMOS.

Preoperation and Cutover

1.103 The data conversion coordinator is responsible for collecting information required for preoperation system configuration. Much of this data involves telephone number management and load balance, and must be concurred with by the network administrator. If possible, parameters which change infrequently, such as MDF terminal locations, should be acquired before data conversion begins. The input clerks, with double checking by the coordinator, can input preoperation data to COSMOS before cutover.

1.104 All of the clerks employed during data conversion will probably be needed to initiate pending orders in COSMOS prior to cutover, or to attach a nonspare status to the appropriate facilities. Update activity will continue up to the day of cutover.

Training

1.105 Formal training for the clerks involves instruction in computer terminal operation and proper transaction usage for inputting data. If required, additional instruction will be given to the clerks in the reading and interpreting of manual records. The analyzers and coordinator should already have good familiarity with telephone records and practices so that the only training required is in computer terminal operation and data conversion methods.

1.106 A course of instruction in data conversion practices will be conducted for the data conversion coordinator and analyzers by WE. A training package will also be provided for the management levels to use in training clerks.

1.107 Prior to starting data conversion it is important to have several general meetings in order to inform everyone as to the nature of the task and how each person's task contributes. It is also wise to inform everyone else concerned with normal central office activities as to what will be happening so that no one feels left out or imposed upon. Be aware that data conversion will inevitably interfere somewhat with everyday service activity in the wire center; and unless the operations personnel are in sympathy with COSMOS goals and kept informed as to what is happening, they will not supply the cooperation which is needed. The general meeting should be held in advance of

computer and terminal installation. Training the input clerks in the proper formats to use should occur close to their actual utilization (during computer installation). The frame person is already familiar with any tasks he or she will be called upon to perform.

Computer Interface

1.108 Data may be input to COSMOS by either of three means.

- Paper tape
- Magnetic tape
- On-line terminal

When batch input is desired, the following requirements must be met.

Paper Tape

1.109 Oiled or nonoiled opaque paper tape is permitted, with nonoiled preferable. Each tape must be written in American Standard Code for Information Interchange (ASCII) characters set with a header and trailer of 100 null characters each. The first character of information on each tape must be the ASCII character STX, Octal 002. The last character of information on each tape must be the ASCII character ETX, Octal 003. Do not include parity information on the tape. It is also recommended that no more than 5000 characters of information be put on a tape.

1.110 If the paper tape is created from mark sense cards, insert the ASCII line feed character (Octal 12) between the data on the tape representing one mark sense card. A mark sense card cannot contain more than one circuit of information but more than one mark sense card, with a line feed character inserted between cards, can be used to represent an entire circuit.

1.111 If the paper tape is created directly from a terminal, the line feed character should appear at the end of each line.

Magnetic Tape

1.112 Magnetic tape input differs from paper tape input. Magnetic tape format for COSMOS requires the logical record length and block size to be fixed and the same size—512 lower case ASCII characters per record (one 512 byte per record). When the data for a circuit is less than 512 characters, all circuit information including the beginning and ending slashes must be left-adjusted in the record. Use blanks to pad out the unused portion of the record in order to maintain 512 characters per record. Each record must contain one and ***only*** one circuit.

1.113 Only nine track nonlabeled tapes written at 800 or 1600 bits per inch (BPI) are permitted. There is no restriction on the number of records on any one tape assuming an end-of-file follows the last record.

1.114 A typical DCB specification for creation of the tape on an IBM computer under OS is as follows:

```
DCB=(RECFM=F,LRECL=512,BLKSIZE=512,DEN=2,OPTCD=Q)
When DEN=2 is 800 BPI.
```

Terminal Selection

1.115 Terminals for on-line data input should be installed about one month before data conversion begins. If this input method is desired, the purchase orders for the terminals (teletype or otherwise) should be issued early enough to meet this time requirement.

1.116 The number of terminals needed for data conversion depends entirely on the rate of input being planned. Approximately one terminal is required for each 100 lines to be input on a daily basis. (This estimate assumes a concurrent PASS1 and PASS2 or PASS2 and PASS3 operation.)

1.117 The terminals should be of the keyboard plus hard copy variety. This provides a record of all transactions performed at that terminal and eliminates transcribing discrepancy notices output at the terminal. The same terminals used for inputting circuit records may also be used for making data base updates and changes since these activities are generally performed overnight or between production shifts. A few additional terminals with hard copy or CRT display should be made available to the data conversion coordinator

and other persons responsible for resolving discrepancies. These terminals are used primarily to provide ports for inquiry without using a clerk's terminal and thereby interrupting production.

1.118 The same terminals to be used for normal operation may also be used for data conversion, although not necessarily in the same location. Some offices (eg, RSB) have large data conversion terminal requirements relative to their operational needs. Others (eg, AO) require more terminals for operation than for data conversion. To fully utilize the terminals at hand, and eliminate the leasing of extras solely for data conversion, a certain amount of interoffice terminal borrowing may be necessary. Terminals borrowed will be relocated before cutover.

D. Computer System Hardware

General

1.119 COSMOS System is implemented on a Digital Equipment Corporation (DEC*) PDP 11/70 "minicomputer". (Some earlier systems were implemented on a PDP 11/45 minicomputer.) This computer is physically housed in the wire center or an associated location and is in communication with various operation departments of an OTC via terminals. This system has application programs which provide a variety of service to the users, and which may be addressed by specifying transaction codes. Terminals are located in a number of OTC departments such as the AO, Traffic Network Administration, and the MDF. These and other offices may communicate with COSMOS in order to request facility assignment, to inquire about data base items, to change data base entries, and to request off-line reports. COSMOS manipulates its data base, returns information to the user, or produces reports, in response to the transaction entered.

*Registered Trademark of the Digital Equipment Corporation.

1.120 The PDP 11/70 computer system, as configured for COSMOS, includes the following hardware.

- Central processor (CPU)
- Memory (up to 128K words) core or MOS
- Multiplexers
- Moving head disk drives (up to eight) RP04 or RP06
- Magnetic tape drives (two) TU25 or TE16
- High-speed printer
- High-speed paper tape reader
- Computer operator's TTY (TT00)
- User terminals (up to 48 named TTY01 up to and including TT48)

1.121 The majority of the equipment (other than the moving head disk drives and the terminals) is contained in five cabinets, each 21 inches wide and 72 inches high.

1.122 The CPU, an RH70 controller for the moving head disk drives, and the high-speed paper tape reader occupy one cabinet. The CPU includes, on one panel, the operators console.

1.123 The core memory occupies a second cabinet. No displays or controls are provided. New systems use 128K word Metal Oxide Semiconductor (MOS) memory which has the advantage of single bit error correction and higher reliability than core memory.

1.124 The multiplexer occupies a third cabinet. It provides the interface between the CPU and the user terminals. No controls or displays are provided. There is no RP04 status panel as in the case of the RP11C. Instead, the RP04 controller and drive register values are obtained by using the display switch and the data lights on the CPU console. RP06 disk drives with twice the capacity of the RP04s are also available.

1.125 The magnetic tape drives occupy cabinets four and five.

1.126 The mechanical drive, together with the tape reels, is mounted in the upper half of its cabinet, while the control electronics for both drives are mounted in the lower half of one of the cabinets. The drives provided may be one of four different types, but all are described below.

1.127 The moving head disk drives are each contained in a low cabinet arranged for top loading of the disk packs. Either RP04 or RP06 units may be furnished.

1.128 The high-speed printer enables the generation only of hard copy, as the output of transactions entered by the operator. It is contained in its own special purpose console.

1.129 The computer operators TTY (designated within the system as TT00) provides the operator's interface with the PDP 11/70. Some installations include a paper tape reader-puncher.

1.130 The moving head disks are used for storage of the data base (primarily cable pairs, line equipments, telephone numbers, tie pairs, and the COSMOS transations), and for program swapping.

1.131 Each of the 48 terminals which access COSMOS requires a hardware interface: either one DM11 or up to three DJ11 multiplexers. These items are integral parts of the COSMOS hardware.

1.132 Two magnetic tape units are used primarily for system backup and for data base recovery. The data base (on the moving head disks) is copied onto tape or a spare disk pack each week at system shutdown so that a backup copy is available. During the intervening days, all data base disk-writes are also written on daily log tapes. An up-to-date disk may be created at any time by adding the entries of the data base log tapes to the previous disk copy.

1.133 The high-speed paper tape reader is used for certain OTC inputs, and for loading DEC diagnostic programs.

1.134 The paper tape reader-puncher is used in some locations, in conjunction with certain ESS functions.

Terminal Requirements

1.135 The required terminal characteristics are given below.

(a) An ASCII character set (full ASCII is helpful, but upper case only terminals are acceptable).

(b) 300 or 1200 baud (bits/sec.) asynchronous transmission.

(c) Ten bit code (1 stop bit).

(d) Full duplex character-at-a-time transmission (echoplex).

(e) Even or no parity sent by terminal to the computer.

(f) No parity checking on output (from the computer).

(g) Null characters are ignored except for delay on output (from the computer).

(h) An all-caps switch must be provided if terminals have upper/lower case input (to the computer).

(i) All terminals should have a line width of at least 80 printable characters.

(j) No editing features are supported or required.

(k) No tab setting features are required; a limited form of tabbing is simulated in software.

(l) No protected format, dual intensity (highlighting) features are supported.

(m) Printing is better done on-line; but if it is done in a local mode, the screen should scroll up. (Wrap-around results in out-of-order hard copy.)

(n) No receive-only (RO) terminals are supported.

(o) Control characters should not be displayed on output (from the computer).

(p) No special function keys are supported.

(q) No multidrop lines are supported.

(r) Control characters transmitted to the terminal should not disable it (ie, should not turn off line, lock keyboard, etc).

(s) Electronic Industry Associate (EIA) RS232-C interface.

DATAPHONE® Requirements

1.136 A simple full-duplex line protocol is used with the COSMOS system. For lines using 300 baud, no conditioning is required, and inexpensive data sets may be used. If a 1200 baud terminal is being used, the private line circuit must be conditioned for 1200 baud.

1.137 It is expected that most COSMOS systems will be mainly private lines. Any mixture of dial-up lines may be used with the private lines. However,the low-numbered port of the first data multiplexer must be a dial-up line for purposes of remote access by WE or BTL. Since the line number is used to determine transaction availability, dial-up lines should ***not*** be connected in a hunt sequence.

1.138 In the event that a terminal is located within 50 cable-feet of the data multiplex distribution panel, a null modulator-demodulator (MODEM) may be used in place of the pair of DATAPHONES and communication line usually required. Wiring of these null MODEMS should produce signals consistent with those of the data sets.

1.139 The required DATAPHONE information is given in Table B. WE model numbers are given. Wiring options are also shown. Information in Table B is listed by type of circuit (computer or terminal) to which the data set is attached and by type of service (dial-up or private line). Model 113 and 102 DATAPHONES may be paired.

Storage of Magnetic Material

1.140 Magnetic recording media (disks and tapes) should be stored in the same environment as the system on which it is to be used. When disks or tapes are brought in from another environment, at least two hours in the system environment are required for stabilization before mounting onto the drive or transport.

EVALUATION OF COSMOS PERFORMANCE

1.141 Periodic analysis of the performance statistics will enable COSMOS results managers to quantify the success of an office in using COSMOS capabilities, and to identify areas in need of improvement. Objective performance statistics will also help determine the ability of a computer to absorb growth in processing demand or to service additional wire centers.

1.142 The COSMOS system collects and stores real-time statistics related to line assignment, system utilization, and DIPs. Specific items which are tallied are as follows.

(a) ***Line Assignments***

- Number of line equipment assigned on each frame
- Average assignment time
- Breakdown of assignments by jumper length and load factor
- Tie pairs assigned

(b) ***System Utilization***

- Number of service order inquiries
- Number of circuit inquiries
- Total transactions processed
- Total service orders completed
- Total pairs entered in cable throws

(c) ***DIPs***

- Number of DIPs created
- Number of DIPs reused
- Total inward circuits established
- Number of DIPs broken by service orders
- Number of DIPs broken by work orders

(d) ***Data Base Integrity***

- VER on user requests, a random sampling of the data base which is physically verified to determine data base accuracy
- Sample review of completed service orders.

2. INTERDEPARTMENTAL RELATIONS

2.01 To perform the functions described in paragraph 1.09, the COSMOS system is utilized by the assignment office, network administration, MDF administration (frame), RSB, and outside plant engineering. Each can access the system through a remote terminal at each location.

A. Assignment Office

2.02 The assignment office initiates POTS service order flow for inward telephone movement by selection and input of the required cable pairs to the system. Telephone number, line equipment and tie pair assignments are made automatically by the system and transcribed manually to the service order by the assignment office. Further processing and distribution of the order and final data base update are also the responsibility of the assignment office. Because of these important activities, the assignment office has the primary responsibility for COSMOS data base integrity. Inputs must therefore be complete and accurate, and COSMOS completions executed within 24 hours of the service order completion. The assignment office also establishes complex service orders in the system after the required telephone numbers and associated assignments such as relays have been made by network administration. Similar procedures are required for disconnect and change type service orders.

2.03 For use of the area/dial transfer feature, the assignment supervisor participates in dial transfers and cutovers. The assignment supervisor, as a member of the committee established to administer the transfer, is responsible for:

(a) Providing data to the network administrator pertaining to the facilities (cable pairs and associated line equipment and telephone numbers) that are to be transferred.

(b) Carrying out checks of printouts of input files stored in the COSMOS service order directory.

(c) In conjunction with network administration, the preparation of input files for circuits that do not have line equipment.

B. Network Administration

2.04 Network administration is responsible for:

(a) Establishment and update of the parameters used by the COSMOS algorithm in making line and number assignments to service orders.

(b) The management and control of all telephone numbers, whether they are available for automatic assignment by the system or require manual assignment; eg, for complex service orders, official telephone service, etc.

(c) The release of telephone numbers from intercepting.

(d) The administration and input of measured usage for line equipment load balance to the system.

(e) The monitoring of automatic line assignments made to complex service orders and implementing of required corrections and/or changes.

(f) Assignment of auxiliary equipment to complex service orders; eg, relays in No. 5XB offices.

(g) Control of class-of-service allocation to line equipment.

(h) Input and control of line equipment transfer orders for network administration frame related purposes, and monitoring of line equipment transfer orders for frame related purposes.

(i) Police of data base accuracy.

(j) Overall system management and optimization of performance for COSMOS operation as a member of an interdepartmental committee of COSMOS coordinators. The data base manager chairs the committee which consists of operational area supervisors from Network Central Office, Network Administration, Plant Installation and Repair, and the Data Conversion Coordinator.

(k) Daily recomputation of load factors for load groups.

2.05 For offices which utilize the reuse of left-in MDF jumper (DIP) feature, the network administrator, after consultation with the assignment

office and MDF administration (frame), will establish the following parameters in COSMOS for DIP administration:

(a) Entities and frames which will utilize this feature

(b) Classes of service for which line equipment will be DIPed

(c) Load factor parameters for DIP creation and DIP reuse.

2.06 In addition, the network administrator is responsible for monitoring DIP results, and, in conjunction with the assignment office and MDF administration (frame), to administer DIP removal, in order to ensure adequate spare line equipment for new non-DIP assignments.

2.07 For COSMOS installations equipped with the area/dial transfer feature, the network administrator is responsible for providing the data for the following types of information and parameters that will be used to govern assignments made by COSMOS for the transfer:

(a) NXXs to be transferred and their new entities.

(b) Where applicable, details regarding new equipment to be installed coincident with the transfer; eg, new line groups, directory number groups, entities, loading divisions, etc.

(c) Revised load factor values to be used for revising existing line group load factors.

(d) Equipment classes of service for which tallies of spare line equipment are to be obtained.

(e) Revised data for entity summary table, such as minimum and maximum fills, engineered capacity, etc.

(f) Line equipment to be embargoed, test lines, maximum fill for line groups, directory number ranges for centrex customers and large PBXs for which line assignments should be provided using "rules of spread."

2.08 The network administrator is also responsible, in conjunction with the office assignment supervisor, for carrying out a variety of verification checks of printouts of the transactions related to the dial area transfer and for identifying discrepancies and determining any changes that may be required.

2.09 The network administrator's contact with the data base manager will generally be in relation to error messages received on transaction printouts that do not refer to input and format errors when accessing the data base and to the items listed as the responsibilities of the computer operator.

2.10 With use of the area/dial transfer feature, the data base manager is responsible for key activities that include generation of input files for the cutover or transfer, such as old number—new lists; lists for removal of disconnected jumpers; updating of tables in the program, ie, the entity summary table; and modification of load factor records for loading divisions in the entities into which customer lines are to be transferred. The network administrator will work in close cooperation with the data base manager, providing data required for input to the files and tables, and receiving printouts of various lists for verification.

C. MDF Administration (Frame)

2.11 The responsibility of the frame with COSMOS is to enter completion of service orders and line equipment transfer orders into the system within 24 hours of completion of the physical activity. The frame also shares responsibility for data base validity, and is responsible for reporting any data base errors or descrepancy to the originator of the order, and performing periodic sample verifications of data base accuracy. The frame must also ensure that no facility work is done unless the appropriate changes have been entered into the data base.

2.12 In offices which utilize the reuse of left-in MDF jumper (DIP) feature, the frame force is responsible for establishing the COSMOS parameter which specifies maximum MDF cross-connection length for DIP establishment. This parameter is specified in MDF frame zones.

2.13 For COSMOS installations that are equipped with the area/dial transfer, the central office supervisor, as a member of the transfer committee, participates in such activities as the establishment of parameters and schedules for the issuance of cutover bulletins, for the generation of a variety of cross-connection lists (such as those required

for office-to-office testing), and for miscellaneous lists (such as those for dead jumpers).

D. Repair Service Bureau

2.14 The RSB has the responsibility for the input of the maintenance change ticket completions established by the RSB, especially during the hours the AO is closed. The RSB can request a wide variety of cable information from the data base. The RSB also shares responsibility for data base validity, and is responsible for reporting any data base errors to the appropriate department.

2.15 The RSB is also responsible for the COSMOS-ANALIT program in analyzing automatic line insulation tests.

E. Outside Plant Engineering

2.16 Engineering does not have the primary responsibility for input into the COSMOS data base as does the AO, MDF, network administrator, or the RSB. Engineering concern will be with benefits derived from the data base, inquiries and up-to-date information for various reports, which will represent a substantial time and money saver.

F. Computer Operator

2.17 Appointment of a computer operator is made on an interdepartmental basis as part of the planning procedures for COSMOS. The operator is required to perform miscellaneous duties associated with the COSMOS computer as follows.

- Start and stop the system operation
- Mount magnetic tapes
- Load paper tapes
- Supply paper to the printer and the console
- Run, separate, and distribute off-line reports
- Maintain the tape library
- Perform system back-up and recovery procedures
- Perform routine maintenance
- Monitoring system performance
- Changing disk packs
- Maintaining equipment error information

2.18 The network administrator's contacts with the computer operator will be generally in connection with the following:

(a) Input of a network administration related message-of-the-day.

(b) Running of lengthy reports during off-normal hours to avoid monopolizing the network administration terminal for long periods during business hours, or degrading the response time to other users.

(c) Input of No. 1 ESS load balance data to the system.

(d) Daily recomputation of load factors for load groups.

3. APPLICATION IN THE ASSIGNMENT OFFICE (AO)

GENERAL

3.01 This part provides general information to be used in the AO. It provides background information necessary to implement COSMOS. It should be used in conjunction with the COSMOS User Manual, PA-6P031; Plant Reference Manual, PA-6P033; Outside Plant Operations Training Manual, PA-6P036; and the Plant Transaction Code Book, PA-6P037. The Plant Transaction Code Book is intended for use by assignment and exchange layout personnel during training and in actual COSMOS work operations. Other manuals are intended for use by COSMOS trainers and AO supervision. The COSMOS User Manual is a reference guide to ***all*** COSMOS transactions; the Plant Training Manual describes COSMOS capabilities with respect to assignment operations in service orders, related work orders and maintenance change tickets; and the Outside Plant Operations Training Manual describes COSMOS use in exchange layout operations involving cable pair transfers.

3.02 COSMOS has the ability to process service orders in such a manner that it:

(1) Facilitates assignments

(2) Provides frame work output

(3) Maintains a central record of pending orders subject to rapid inquiry

(4) Eliminates assignment errors

(5) Facilitates assignment changes

(6) Handles replacements, cancellations, and withdrawals

(7) Ensures proper completion via completion or jeopardy notifications

(8) Provides various service order, facility, and managerial reports.

3.03 ***Functions of the AO:*** Most changes in the COSMOS data base are effected by the AO. The AO creates new circuits, breaks old circuit associations, and rearranges existing circuits. The AO uses manual transactions, service order and work order processing, and cable pair transfers to accomplish the above. Because of these important activities, the AO is the hub of the COSMOS wheel; therefore, the AO has the primary responsibility for COSMOS data base integrity.

3.04 At the start of each day, a COSMOS terminal is logged into the computer and various report transactions are run by the assignment supervisor. The printer at the terminal produces a hard copy printout. These reports are as follows.

(1) Summarize Service Orders (SSO)

(2) List Pending Orders (LPO)

(3) Orders in jeopardy (OIJ)

(4) Service Order Inquiry (optional) (SOI)

(5) List Completed Service Orders (SOU)

3.05 ***Summarize Service Order:*** SSO provides a tally of processed service orders sequenced by order type. By performing transaction SSO at the beginning and end of each day, a measure of service order activity is obtained.

3.06 ***List Pending Orders:*** LPO lists all service orders which have not received a final completion notice.

3.07 ***Order in Jeopardy:*** OIJ lists all orders that the frame could not complete and were placed in jeopardy. These orders will require reassignment of facilities by the AO.

3.08 ***Service Order Inquiry:*** SOI will print a pending or completed service order and related order. If the service order number is the input to SOI, then COSMOS will print the service order in its entirety. When a due date is the input, all orders having the same due date will be printed. A maximum of 400 orders will be printed and sorted by order type.

3.09 ***List Completed Service Order:*** SOU lists all service orders completed on a specified date. The output is in telephone number order.

3.10 Another transaction that should be performed at the start of the day is maintenance change ticket completion (MCC), established by the RSB during the hours the AO was closed and MCL to list maintenance change tickets in need of completion.

SERVICE ORDER TYPES

3.11 Transaction service order establishment (SOE) can be used to establish any one of eight types of service orders in COSMOS. These eight order types (OTs) are defined as follows.

(1) ***New Connect (NC):*** The NC order is used to establish a new circuit in COSMOS.

(2) ***Complete Disconnect (CD):*** The CD order disconnects a working circuit in COSMOS.

(3) ***Change (CH):*** The CH order is used either to change an existing circuit, or to connect a new circuit, or to disconnect a working circuit. (The Telephone Company will normally use a CH order to connect and disconnect auxiliary lines.)

(4) ***From (F):*** The F order establishes the FROM portion of a move order. The FROM portion of a FROM and TO order may disconnect only a portion of the circuit (eg, cable pair) if the TO portion is in the same district. The FROM portion may disconnect the entire circuit when the TO portion goes to another district.

(5) ***To (T):*** The T order establishes the TO portion of a move order. The TO portion

may add facilities to a circuit (eg, add a cable pair) when the FROM portion is in the same district, or it may connect a new circuit when the FROM portion is in another district.

(6) ***Suspend Service (SS):*** The SS order suspends service for either incoming or outgoing calls or both.

(7) ***Restore Service (RS):*** The RS order restores service for a circuit previously suspended in COSMOS.

(8) ***Remark Order (R):*** The R order allows the sending of a message to the frame under an order number. No facilities are changed on the R order.

3.12 Service order types NC, CH, and T can be associated with related work orders. These work orders include line or station transfers (LSTs) and reassociations (REAs).

GENERAL INPUT REQUIREMENTS

3.13 The inputs for the various types of service orders to transaction ***SOE*** exhibit differences as well as similarities. The first input is always the transaction code ***SOE.*** This can then be followed by H, O, I, and R type input lines. The last input line consists of a period (.) which is used to indicate that all inputs are completed. All four input lines may be used in a single ***SOE*** transaction, with the H, O, and I lines repeated when required. The O and I lines can be entered in any sequence. The definition and use of these input lines is as follows.

(1) ***H Line:*** This is a header line used for general service order information.

(2) ***O Line:*** The O line specifies all outgoing (OUT) facilities.

(3) ***I Line:*** The I line specifies all incoming (IN) facilities.

(4) ***R Line:*** The R line is used to enter remarks or comments on the service order.

3.14 Each application of transaction ***SOE*** requires a minimum of two input lines. The H line is always required; the second line may be an O or I line. The R line is optional in all cases.

RECOMMENDED PROCEDURES

A. Plain Old Telephone Service (POTS)

3.15 The AO initiates the POTS service order flow through a request for service from a customer contact location. For inward telephone movement, the AO selects the cable and pair from the exchange customer cable record (ECCR) or dedicated plant assignment card (DPAC) and inputs the cable and pair, along with the order number, due date, class of service, features, and order type into COSMOS. The telephone number, line equipment, bridge lifter, tie pairs, and message register assignments are made automatically by the system, if so desired. The output from COSMOS must be transcribed manually to the service order by assignment personnel. Further processing and distribution of the order and final data base completion are also the responsibility of the AO. The line equipment and telephone number assigned by COSMOS need not be posted in the ECCR because this information is available in the COSMOS data base. A check (✓) or some other indicator should be used to show that the cable pair is no longer spare.

3.16 When a service order is established with transaction ***SOE,*** COSMOS creates a pending file for that order. This file can be found and printed on command ***(SOI)*** by the computer. Also, the service order number and due date of the pending service order are placed in the files of all facilities affected by the order. Thus, any inquiry (***ISH*** or ***INQ)*** on an associated facility will also show the presence of the service order number.

3.17 At the time the service order is established, COSMOS also checks the validity of the manually entered assignments and performs the required automatic assignments. All incoming facilities are given a pending connect status (PC) and all outgoing facilities are given a pending disconnect status (PD) or a left-in status (LI) in the case of line equipment or cable and pair.

3.18 A special frame order file is generated simultaneous with service order establishment. The MDF may obtain all orders for a given due date with transaction frame order report (FOR) code.

B. Complex Service Orders

3.19 Complex service orders are used to provide the customer with multiline service such as hunt groups, PBX services, etc. For these orders, the business office will contact the network administrator for dial facilities to be assigned to the order. In the COSMOS environment, network administration will not provide line equipment assignments for a complex service order except in special cases. However, other dial facilities such as telephone numbers, auxiliary relays, etc, are provided to the business office on a verbal assignment basis.

3.20 The network administrator will obtain from the business office the service order number, the USOC for each line, the service features of each line, etc. This data together with facilities manually selected for assignment (telephone numbers, auxiliary relays, etc) are entered into an input file by the network administrator. The input file created for the complex service order is identified by the service order number. The AO obtains a printout of the input file, assigns cable pairs, and enters these assignments in the input file. The AO then establishes the complex order in COSMOS which automatically assigns line equipment and if the number of subscriber lines in the complex service order is less than or equal to the limit specified by the network administrator the service order is released to the frame force. If the number of subscriber lines is greater than the limit, the service order is maintained in a held status pending network approval of the COSMOS assignments. The network administrator reviews the COSMOS assignments and, if satisifed, releases the service order from the held status. If not satisfied, the network administrator will replace the COSMOS assignments with manual assignments and then release the service orders. Some complex orders requiring only cable pair changes may be handled directly by the AO.

3.21 The responsibility for processing a complex order in COSMOS is shared by the AO and network administration. Because of this shared responsibility a special file has been created in COSMOS which is used to store the input for these orders. COSMOS has a feature, called the "text editor" (TED), which enables changes, additions to, or deletions from a line in the service order input before it is entered into the active file. There also exists a special transaction which scans the input text for errors allowing for corrections before the order is processed. The ability to ***save, edit,*** and ***check*** the input of an order is a time and effort saving feature of COSMOS.

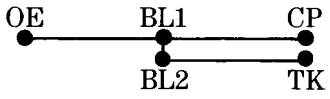
C. Special Service Orders

3.22 COSMOS has two special features for special service orders: (1) branch points, and (2) target frame notation. These features can be used when establishing circuits which are more complex than single cable pair to line equipment connections.

Service Orders on Circuits With Branch Points

3.23 When a service order is established in COSMOS, the circuit should be input in the logical schematic order. This is necessary to assure that the pairs are properly assigned when required and that the frame output is generated in the proper sequence.

3.24 A special "branch point" notation is required for some special service circuits to enable the computer to follow the schematic order of the circuit. For example, the circuit diagrammed below is a business line with an off premise extension. Bridge lifters are added to the circuit for line isolation.



3.25 Without a diagram the schematic order of the circuit cannot be followed from a list of the facilities in a single string. However, the facilities could be listed and define the circuit without ambiquity in the following manner.

OE/BL1/CP
BL1*/BL2/TK

Observe that the bridge lifter, BL1, is repeated in the second leg of the circuit. This facility is called a branch point and is a common element in both legs of the circuit.

3.26 This method of listing a circuit with several legs is used in COSMOS. However, in COSMOS the duplicated facility (the branch point of the circuit) is always followed by an asterisk (*) when repeated. This ensures that the duplicated facility is a branch point and not entered twice by accident.

Simplified Procedures for Special and Complex Orders

3.27 ***Assemble and Run a Given Master File (ARG):*** Transaction ARG is used to create flexible capabilities for frequently used COSMOS transactions, to pass variable input to command files, and to generate command files for bulk input. ARG can automatically execute a command file after the variable input has been passed to it. ARG can be used whenever the user is faced with the task of executing the same transaction many times, and when much of the input is repetitive. ARG receives its instruction from a "master file" which is unchanged by the execution of the program. Various options are listed below.

- To pass a single list of arguments from a master file to a temporary file.
- Allows user to program prompt response inputs.
- Permits simplified input for frequently run transactions.
- Enables user to run multiple transaction with a single input.
- Gives the user the ability to write ARG files for special conditions; ie, dormitory service connects/disconnects, wire center recentering projects, etc.
- Batch new-connect orders with common USOC, due-date, and NXX code.
- Command file to improve the reuse of DIPs.

Target Frame Notation for Special Equipment

3.28 Transaction ***SOE*** will automatically assign tie pairs provided the circuits are entered in logical schematic order using branch point notation when required and the frame location of the equipment is known.

3.29 COSMOS has two types of facility records: (1) inventoried, and (2) noninventoried facilities. Line equipment, cable pairs, and tie pairs are always inventoried facilites. Other facilities, such as trunk pairs and bridge lifters, may or may not be inventoried depending upon the office. Noninventoried facilities do not have frame locations. Special equipment, such as E6 repeaters, Dial Long Lines, etc, are noninventoried.

3.30 A noninventoried facility can be given a frame location by use of "target frame" notation. The frame and zone of the equipment is appended to the facility ID and enclosed in parenthesis. A frame is designated by two characters (M1, M2, ...) and a zone is designated by a three-digit number. The location M1006 is on frame M1, in zone 6.

3.31 Target frame notation usage is very important to supply target frame and zone for a noninventoried facility if there is a possibility that tie pairs may be needed to construct the circuit. If a noninventoried facility is entered without a frame location, the check in transaction ***SOE*** which determines if tie pairs are needed will be bypassed.

The Preferred Frame for Facility Assignments

3.32 When a facility appears on more than one frame, the computer must determine which frame the facility should be working on. When there is an OE in the circuit, the working frame is determined by the "preferred frame" for the entity. If cable pairs in the circuit have an appearance on the "preferred frame", they are assigned to it; if not, tie pairs are assigned. When there is no OE in the circuit, the working frame is determined by the ***first*** frame appearance in the cable and pair (CP) file.

3.33 If CPs appear on two frames, the frame on which special service circuits are to be run should appear first in the CP file. If special circuit assignments for CP-to-CP or CP-to-TK are going to the wrong working frame, the frame appearances in the CP file should be interchanged. This job can be done by your WE regional support center.

D. Work Order Processing

3.34 The following paragraphs describe the procedures used for processing work orders which may be used to provide assignable facilities

or for service maintenance. The following work orders are discussed.

(1) Line or station transfers (LST)

(2) Reassociations (REA)

(3) Maintenance change tickets (MCT).

3.35 Other work orders, such as cable pair transfers, and line equipment transfers are discussed elsewhere.

3.36 An LST order is used to provide an assignable cable pair on a subscriber's terminal. REA orders can be established only on party line circuits and may be used to increase party line fill or to provide assignable cable pairs (CP) or line equipment (OE) for service orders. The MCT order is only used to replace defective facilities in working circuits.

3.37 All three work orders (LST, REA, and MCT) can be established in COSMOS; at the time of establishment a record is created within the work order file.

3.38 When an LST or REA order is established, COSMOS will perform an error check to ensure that the OUT facilities are working and the IN facilities are assignable. These error checks are ***not*** made on MCT order establishment for reasons given later. The facilities affected by an LST or an REA order are given pending connect and/or pending disconnect statuses. No pending statuses are created at the time of MCT order establishment.

3.39 While the LST, REA, and MCT orders are in the work order file they are available for inquiry by work order (WO) number. The LST and REA orders remain in the WO file even after completion. They will remain until the computer operator purges them using transaction ***CCO.*** The LST and REA orders become candidates for purging by ***CCO*** two days after they receive completion status. MCT orders are removed from the WO file immediately after completion and become unavailable for inquiry. Until a work order is purged, the WO number cannot be duplicated in another work order of the same type.

3.40 All three types of work orders can be withdrawn if they require changes or are no longer required. A change requires reestablishment of the work order and the same work order number can be used. A withdrawal removes all information with respect to the work order from COSMOS. Completed work orders cannot be withdrawn.

3.41 The three work orders can be completed manually with the appropriate completion transaction. When an LST or REA order is related to a service order it is completed automatically upon final service order completion; therefore, it does not require manual completion. However, the option for manual completion is still available.

3.42 Status checks on the IN and OUT facilities of MCT orders are performed at the time of order completion rather than order establishment. This allows the RSB to establish MCT orders when the AO is closed without infringing on the control responsibility of the AOs for data base changes. COSMOS will accept an MCT order with IN and OUT facilities as physically worked on the frame, even if it clashes with the COSMOS data base. The AO will later be responsible for completing the MCT order. If a clash occurs with the data base, the AO will receive an error message and the completion will be aborted. If this occurs, the AO will correct the data base after which the MCT order can be successfully completed.

Work Order Capabilities

3.43 Work orders have the ability to add, delete, or change facilities in existing circuits or in pending service orders. In addition, some work orders can perform automatic tie pair assignments when required.

3.44 LST, REA, and MCT orders are used to change facilities in working circuits. REA orders can be established only on party line circuits. In addition to changing facilities, the REA order can add or delete bridge lifters.

3.45 Work orders also have the capability of adding information to CP, OE, and TN files. This information would include remarks, special statuses, or party position. This information is retained in the facility files after work order completion and is available through the facility inquiry transaction (***ISH***).

3.46 Work order may be given work order remarks at the time of establishment by using an R line input. These remarks are transmitted to

the frame and are output in any work order inquiry. All work remarks are purged at the same time as the work order record.

3.47 The capability to "change" a facility implies that the IN and OUT facilities are of the ***same*** type; for example, a CP is replaced by another CP and ***not*** by an OE.

3.48 ***Summary of Work Order Capabilities:*** An LST order can only change cable pairs (CPs) in a working circuit and performs automatic tie pair (TP) assignments when required. The REA order can change CP, OE, BL, or PTY position and can add or delete a BL in a working party line circuit. The REA order also performs automatic TP assignment. The MCT order can change CP, OE, TP, TK, SE, BL, and MR in a working circuit.

Work Order and Service Order Relationships

3.49 The function of the MCT order is to replace defective facilities for maintenance purposes. MCT orders are processed independent of service orders.

3.50 LST and REA orders can be processed independent of, or in conjunction with, service orders. The LST and REA orders ***must*** be completed manually (transaction ***LSC*** and ***RAC***, respectively) when processed independent of a service order. An example of processing an LST order that is independent of a service order would be as follows. Assume no cable pair is available for an MCT order. The cable pair may be provided by establishing and completing an LST order. Independent REA processing is normally performed to increase party line fill (2FR and 4FR).

3.51 When processed with service orders, the LST and REA orders are used to create assignable facilities for the service orders. The LST or REA order must be established in COSMOS ***before*** the freed facility can be used in a service order. Both LST and REA orders may be used to create assignable CPs. In addition, the REA order may be used to create open-sided OE for party line assignment in a service order. Manual completion of the LST or REA work order is not required when the facility provided by the work order is later used in a service order. Final service order completion automatically completes the work order.

3.52 REA orders can be used to provide a CP needed to perform an LST order. In this case, the REA order gives the working CP a pending connect (PC) status to it. The CP made assignable by the LST order, in turn, can be used in a service order. The following chain of pending orders has been formed.

REA ⟶ LST ⟶ SO

3.53 In the above chain, the REA order must be manually completed (transaction ***RAC***) before the service order can be completed (transaction SCM and SCP or SCA). The LST order is completed automatically when the service order receives final completion.

3.54 The following chains of pending orders have been discussed.

(1) LST ⟶ SO
(2) REA ⟶ SO
(3) REA ⟶ LST ⟶ SO

Each succeeding order (to the right of arrowhead) uses a facility made available by the preceding order (to the left of arrowhead).

3.55 COSMOS does not allow assignment conflicts, therefore only the last link of any of the above chains can be withdrawn. For example, in the third chain the REA order ***cannot*** be withdrawn until the SO and LST orders are withdrawn, in that sequence.

3.56 The output of a service order inquiry (transaction ***SOI***) on a service order linked to a work order (LST or REA) will indicate the existence of a related work order. Whenever an ACT order breaks the linkage between an SO and an LST or REA order, this indication disappears.

E. Cable Transfers

3.57 Procedures for establishing cable pair transfers in COSMOS are independent of the reason

for the transfer. Routine orders are issued to add, remove, or rearrange the outside plant of a given wire center. The execution of routine orders usually involves cable throws and reconcentrations. In COSMOS both are called cable pair transfers. Because only underground cables are inventoried in COSMOS, aerial cable pairs may not be included in a COSMOS cable pair transfer.

3.58 The AO prepares cable transfers and distributes them to the RSB, construction, and the plant central office. Cable throws are initiated to "free-up" cable pairs for later use. Generally the FROM pair is working and the TO pair is spare.

3.59 A single transaction is used to establish a transfer. Five other transactions are used to process cable pair transfers. The six cable pair transfer transactions are as follows.

- ***Cable Transfer Establishment (CTE):*** This is used to define a new cable pair transfer, add cable pairs to an established one, or change the due date of an established transfer.

- ***Cable Transfer Completion (CTC):*** Used to complete an entire established cable pair transfer or part of a transfer.

- ***Cable Transfer Withdrawal (CTW):*** This is used to withdraw an established transfer or to remove cable pairs from an existing transfer. Cable pairs may be withdrawn until they are completed with transaction CTC.

- ***Cable Transfer Summary (CTS):*** Used to print a summary list of FROM and TO cable pairs in an established cable pair transfer, or to list all cable pair transfer orders. Pairs withdrawn from a transfer are listed if they have been printed at the frame with CTP. When the frame again prints these withdrawn pairs they are removed from the summary list.

- ***Cable Transfer Frame Work Print (CTP):*** The frame uses this transaction to obtain a frame work list in MDF format.

- ***Cable Transfer Tie Pair Correction (CTT)*** Used to manually change tie pairs in a circuit involved in a cable transfer. Only used if upon establishment the following message is received: TIE PAIRS MAY NEED TO BE MANUALLY ASSIGNED OR DISCONNECTED.

3.60 Other transactions are available to facilitate cable pair transfers. One or both of the following data base checking transactions should be used before establishing a cable pair transfer.

- List Cable Pair (LCP)

- Check Cable Pairs (CKC)

3.61 To obtain more detailed information about a particular circuit or service order, the following two transactions can be used.

- Inquire About a Facility (INQ)

- Service Order Inquiry by Order Number (SOI)

3.62 If discrepancies are found in the data base, manual transactions can be used to modify, that is, correct the data base. These transactions cannot be used on any circuit which has a service or work order pending against it.

- Add a Facility to a Working Circuit (AWC)

- Change a Working Circuit (CWC)

- Change Facility Status (CFS)

- Delete a Facility from a Working Circuit (DWC)

- Manually Establish a Working Circuit (MEC)

Types of Transfers

3.63 There are two types of cable pair transfers.

- LST (Line or Station Type Transfers *): This type of transfer is used to transfer working cable pairs to spare cable pairs. Step throws, both within an order and between orders, are allowed. The FROM pairs in this type of transfer always become spare.

- SW (Swaps): This type of transfer is used to interchange two working cable pairs.

Note: *This is different than LSTs that are generally used to free a cable pair for a service order. See the Plant Training Manual (PA-6P034) for LST transactions.

Line or Station Type Transfers

3.64 The LST type transfer is an interchange of a working cable pair and a spare cable pair. The following matrix summarizes the allowed transfers (ie, transfers not considered in conflict). An asterisk (*) indicates that the DIP associated with the TO pair will be broken automatically. The DIP is broken on establishment of the transfer. Immediately, a message is sent to the frame stating that the DIP must be removed.

TO Cable Pair	FROM Cable Pair					
	WK	PC	PD	SF	D	LI
WK			✓	✓		✓
PC			✓	✓		✓
PD	✓	✓	✓	✓	✓	✓
SF	✓	✓	✓	✓	✓	✓
D			✓	✓	✓	✓
LI	✓*	✓*	✓	✓	✓*	✓

Legend:
WK Working PD Pending Disconnect
PC Pending Connect SF Spare
LI Left-in (DIP) D Defective

3.65 A description of the order interaction allowed between cable transfers and service orders is given in the Plant Training Manual (PA-6P034), Section 4.

Swap Transfers

3.66 A swap transfer is an exchange of two working cable pairs. Pairs pending connect are considered working if the pending connect has a due date prior to the cable pair transfer, and conversely for pairs pending disconnect.

What Occurs When a Transfer is Established

3.67 When a cable transfer is established the following occurs.

(1) The specified transfers are examined for conflicts. However, COSMOS does not keep track of aerial cable pairs, binding posts, or terminals; and COSMOS does not check to see if the requested transfer is physically possible. Therefore, ECCRs are still the proper source for this information.

(2) Tie pairs are assigned automatically, when required, or if COSMOS cannot assign tie pairs this message is printed: TIE PAIRS MAY NEED TO BE MANUALLY ASSIGNED OR DISCONNECTED FOR THIS CIRCUIT. Examine the circuit to determine what action is required with transaction CTT.

(3) Cable transfer form E-4675 is placed in the ECCR. If a service order, a related work order or another cable transfer order (step throws) is established on one of the cable pairs, COSMOS automatically manages the order interaction.

(4) Pending statuses are assigned to the cable pairs.

(5) A status is assigned to each set of cables.

(6) The Open of Day report will summarize all cable transfer orders and will print a count of such orders.

(7) When a cable pair that is involved in a transfer appears in an inquiry (such as INQ or SOI) the order type, order number, and due date of the transfer are given.

Preparation of a Cable Pair Transfer

3.68 The following six basic steps are usually required in the preparation of a cable pair transfer. Sometimes Steps 3 and 4 are not required.

(1) Check and when necessary correct the data base.

(2) Establish the cable pair transfer.

(3) Withdraw any pairs that are in conflict.

(4) Rearrange the pairs in conflict and reenter them in the established transfer, or if necessary use other TO pairs.

(5) Print summary of the transfer.

(6) Complete the transfer.

F. Orders in Jeopardy (OIJ)

3.69 OIJ lists all orders that the central office frame could not complete and were placed in jeopardy. These orders will require an investigation and/or a reassignment of facilities by the AO. Orders in jeopardy have a transaction code OIJ. Transaction code OIJ has two options. All orders in jeopardy can be listed in sequential order or by specified due date.

3.70 The MDF receives the frame output from COSMOS. If there are no discrepancies (eg, defective or working facilities assigned because of errors in the COSMOS data base) the order goes through the normal MDF and AO completion procedures. If a discrepancy is encountered, the MDF places the order in jeopardy preventing automatic AO completion of the order by due date. Information is appended to the frame order, as a remark, to indicate what was actually encountered in order to assist in resolution of the discrepancy.

3.71 On a periodic basis, the AO obtains lists from COSMOS of all orders in the jeopardy status. If the order is urgent the MDF may verbally request the AO to correct it.

3.72 Orders in jeopardy can be corrected either by means of an assignment change ticket or by establishing a modification. The assignment change ticket order has the ability to replace a facility of one type (eg, cable pair) with another facility of the same type, or it can add or delete a facility from the service order. The future status, such as defective, can be indicated on the outgoing facility. When establishing a modification (SOM), all facilities, class of service, and features, as in the original order, must be specified. Previously assigned facilities on the same order can be reused by manually inputting the facilities. COSMOS will assign new tie pairs when required.

3.73 Following the correction by the AO, the MDF receives from COSMOS either the assignment change ticket or the new order. If the new assignment has no discrepancies, the order goes through the normal completion stages.

3.74 When an order has been modified, a modification number suffix (-M1, -M2, ..., -M9) is appended to the original order number. COSMOS will only accept completion of the modified order and the suffix must be included when the order number is specified.

3.75 When discrepancies are encountered more than once, the order goes through the same correction procedure each time. Whenever the AO corrects an order, a modification number suffix is added and incremented each time the order is corrected. The suffix used for the first correction is "-M1", the second correction is "-M2", etc, up to a total of nine corrections. Only nine corrections are possible on the same order.

G. Service Order Completions

3.76 The following paragraphs describe COSMOS capabilities in manual and automatic completions. Remember that all service orders receive a pending status at the time of establishment. COSMOS creates a pending file for the order and enters the appropriate pending connect or disconnect. Any inquiry on the order or affected facilities will show service order activity.

3.77 When the service order receives final completion, the pending facility statuses are changed to final working or spare statuses and the completion status is entered in the service order file. The final completion frees the facilities for use in other orders or in manual update transactions and must be accomplished within 24 hours of the completion of the required physical activities.

3.78 Normally service orders have two stages of completion:

(1) MDF completion

(2) AO completion.

MDF completion provides a verification that the frame work was actually performed on that order. AO completion retains the control of final service

order disposition within the AO. If the order needs changes or modifications after MDF completion, the AO has the option to do so.

3.79 If the service order does not require frame work (eg, change TN in an ESS entity), the AO enters FW N (frame work - no) at the time of order establishment. This order will generate no frame output and only requires the AO completion.

3.80 MDF service order completions are entered with transaction ***SCM.*** The AO may enter either manual completions (***SCP***) or automatic completions (***SCA***). Transaction ***SCP*** completes one service order at a time and may be used by the AO when individual order verification is desired. Transaction ***SCA*** completes pending orders by a given due date which have received MDF completion and are not in either the jeopardy or withheld status. Transaction ***SCA*** will also complete cancellation orders.

3.81 AO and MDF completions can be entered in either sequence. The second completion is the final completion at which time pending statuses are removed. Normally MDF completion comes first, followed by AO completion.

3.82 When the service order receives final completion, COSMOS automatically completes any related work orders, such as LST or REA. Related work orders are withdrawn only upon completion of a cancellation order.

3.83 Orders with final completion maintain their record in the SO file until the record is purged by transaction ***CCO*** at the computer master terminal. Before the order is purged, it can be inquired upon with transaction ***SOI.*** The output of transaction ***SOI*** will include the entire circuit if it was not disconnected by the order. For disconnected circuits transaction ***SOI*** will output only one facility. Transaction ***SOU*** can be used to obtain a report on completed orders. Until a completed order is purged by transaction ***CCO,*** its service order number cannot be used in another service order.

H. Backup Procedures

3.84 Nothing is forever, and this includes the operation of COSMOS. So an alternative manual backup assignment procedure must be available when a failure occurs. The method described below is designed to keep the AO functional for approximately five days, a period of time that should be more than adequate for correcting computer troubles.

3.85 It is strongly recommended that the manual assignment procedure be tried prior to COSMOS failure. Such a trial run will point up deficiencies in the procedure and allow time for correction without the added pressure of a nonworking system.

COSMOS Failure Indications

3.86 There are two general indications of system failure.

(1) The user is not able to log-in

(2) The response to transaction codes is abnormal or nonexistent.

Local procedures will be followed to determine the extent and possible cause of the trouble. If the trouble analysis indicates that COSMOS will be "down" for an indeterminate period, manual assignment procedures must be used.

Manual Assignment Criteria

3.87 When manual assignments are being made in the AO, two criteria must be met.

(1) Short jumpers should be assigned whenever possible. The assigner, knowing the MDF location of the selected exchange feeder cable pair from the marked manual ECCRs, will look for the nearest suitable line equipment from a printout of line equipment and associated telephone numbers available for manual assignment.

(2) All manual assignments made during the system down time must be entered into the COSMOS data base. If all manual assignments are not entered into COSMOS prior to restoration of automatic assignment procedures, COSMOS may select a facility that had already been chosen. The end result will be confusion and wasted time in resolving the conflict.

Manual Assignment Facility Printouts

3.88 To maintain continuity of assignment operations two facility printouts will be employed.

(1) A printout which is a short-term source of ***reserved*** facilities for processing POTS SOs only. The contents of the printout will be controlled by the network administrator after consultation with the AO supervisor. The printout will be obtained from network prior to the beginning of each work week and will be sufficient in size to handle the quantity of POTS service orders that the AO normally encounters during any two-hour work period, unless local arrangements call for less frequent updating. Since the facilities on the printout are reserved, ie, not available for mechanized assignment by COSMOS, the printout can be used immediately. When some or all of the reserved facilities have been used for manual assignments, the network administrator will be requested to provide a new printout as soon as the computer has been repaired and service has been restored. Upon receipt of the new list, the old one must be returned to network.

(2) A printout which is a long-term source of ***spare*** facilities for processing all types of service orders. The printout is the AO manual assignment list and should be produced at the end of each working day for the following day. The size of the printout will be controlled by the AO supervisor. The manual assignment list will be sized to provide assignment facilities for a five-day period. The magnitude of the printout is strictly the AO supervisor's decision based on experience. It need not be approved by the network administrator. In locations with multiple or back-up computers, a two day list is sufficient. Since the facilities on this printout are spare, COSMOS may select some of the facilities during the work day after the printout is compiled. Therefore, the printout must be reviewed and corrected to reflect any prior assignments made by COSMOS before being used as a source of facilities for manual assignments. Paper copies of service orders processed during the part of the work day prior to COSMOS failure can be used to update the printout.

3.89 The two printouts, the first a short-term printout made up of reserved facilities, the second a long-term printout of spare facilities, are provided to make the transition to emergency manual assignment procedures as smooth as possible. The reserved facility printout is used immediately after a COSMOS failure. It allows the AO to continue making POTS assignments on a limited basis until the larger spare printout is updated.

3.90 Both printouts should be readily accessible to the assigning force.

Manual Assignment Procedure

3.91 Both printouts will be used in conjunction with marked exchange feeder cable records to assign the shortest possible line equipment-exchange feeder cable pair jumper.

3.92 The key to manually assigning a short jumper involves the user of the Location Oriented Identification System which indicates the module number (COSMIC MDF), right or left side of a vertical (ESS MDF), or a zone composed of either 30 verticals or 1/5 the total number of MDF verticals, whichever is smaller (conventional MDF).

3.93 The manual service order assignment procedure is a simple process. The exchange feeder cable pair is selected from the manual records in the usual manner. However, the assigner, after selecting the pair, must note the physical location of that pair on the MDF. When cables have been bridged to appear on two frames simultaneously, both identifying locations must be shown.

3.94 Having determined the cable pair MDF location, the assigner must now scan the manual assignment printouts for suitable line equipment on adjacent modules. If the cable pair is bridged, and thus appears on two MDFs, the assigner must also consider the possibility of assigning a short jumper on either MDF if suitable line equipment exists on both frames.

3.95 When the COSMOS system has been returned to service, all service order assignments made during the manual mode ***must*** be input to COSMOS before automated procedures can commence.

Work Load Impact

3.96 Data conversion is the process whereby the manual records of network, assignment and the RSB are simultaneously purged and input to

COSMOS. Record purification and purging must be an integral part of the conversion process since COSMOS can only accept that data which are internally consistent. In addition, the advantages of a "pure" data base are numerous and cost effective.

3.97 Personnel for data conversion to COSMOS should be borrowed from other assignment offices within the company, well in advance of their utilization. It is important that these personnel be acquired on a full-time basis. The job is simply too large to be accomplished by employees during so called "slack time" on their regular jobs. The success of data conversion is highly sensitive to the sequence in which individual functions are performed; hence, an organized, dedicated staff is essential.

3.98 Once the conversion process is completed and COSMOS is on-line, the assignment office may need an additional assignment clerk until everyone has been properly trained and the normal time interval for processing orders has been achieved. The AO can expect a reduction in errors, service order discrepancies, intra- and interdepartmental phone calls, etc.

Training

3.99 It is suggested that all management and craft personnel involved in COSMOS attend Plant Training Course 50 (PTC-50) prior to COSMOS conversion.

4. APPLICATION IN THE NETWORK OFFICE

GENERAL

4.01 The application of COSMOS to network administration tasks and the benefits that can be derived require the active participation of the network administrator. Although COSMOS documentation details applications, the system is sufficiently flexible to allow the network administrator to tailor certain transactions to the requirements of individual wire centers or offices. The following items are the general activities that have been integrated into the COSMOS system to be used by the network administrator and the network administration clerks for the daily activities involved in line/number administration and assignment.

Administration

(a) Implementation of a line assignment loading plan by inputting and manipulating entity loading parameters.

(b) Processing of load balance CCS data to the system and monitoring of the effect of automatic assigning on the load balance.

(c) Class of service balance in each switching entity (this includes concentrator design in an ESS office).

(d) Telephone number management, implementing embargoes, changes in entity loading and in cross-loading, changes in main station capacities, etc.

Clerical

(a) Review of completed service orders when overall data base accuracy warrants.

(b) Verbal assignment of telephone numbers and other dial facilities.

(c) Verbal assignment of line equipment.

(d) Complex service order processing.

(e) Preparation of back-up lists of telephone numbers and line equipment for use during system outages.

(f) Preparation and input of line equipment transfers for network administration purposes.

(g) Preparation of periodic telephone number and line equipment reports.

(h) Verification and release of outstanding assignments and reservations.

(i) Release of telephone numbers from intercepting status so that these numbers are available for reassignment in the COSMOS data base (telephone number aging).

4.02 Some of the more important applications of COSMOS are detailed in the following paragraphs.

DATA BASE MANAGEMENT

A. General

4.03 One of the main functions of the network administrator is the maintenance of up-to-date accurate records of working and nonworking telephone numbers, line equipment, and miscellaneous related equipment in each wire center. These records, previously maintained manually in books, are transferred to the COSMOS data base at the time of conversion and their maintenance and accuracy remain the responsibility of the network administrator. COSMOS will automatically update files and permit ready access to required listings and statistical records to facilitate monitoring accuracy of the data.

4.04 Data base management consists of the procedures required to carry out this responsibility. These procedures may be classified into the following categories.

- Ongoing verification of the contents of the data base in relation to source documents, physical features and arrangements in the switching equipment, and records maintained in other departments.
- Action to eliminate discrepancies and out-dated information in the data base.
- Maintenance of manual records to supplement the data contained in the data base and provide a means for administrative control and for the preparation of reports.

4.05 The COSMOS program provides transaction codes which are designed to facilitate the implementation of these procedures.

B. Procedures for Verification in Relation to Source Documents

Service Orders

4.06 The chief source of input to the data base are service orders (SOs) which install new customer service, change service already installed or disconnect service completely. These service orders pertain to both POTS, individual residence or business service, and to complex service such as PBXs and centrex which serve large businesses.

4.07 The network administrator is responsible to ensure that the daily input of data from service orders is accurate. For this purpose transaction SOU is used daily to obtain a list of all service orders completed on the previous day for a periodic sample comparison with the COSMOS data base.

4.08 The COSMOS algorithm search for completed SOs is limited to 2 days; ie, if the SOU transaction is input on day 5, SOs complete on day 3 and day 4 can be requested; but, although SOs for days 1 and 2 are still in the data base, they cannot be obtained with this transaction. These SOs must be accessed via the ISH transaction.

4.09 Comparisons are to be made between the data in the SOU printout and the related completed SO received by the NA to determine whether there are discrepancies. Such items as customer features in relation to equipment features and USOCs in relation to customer class of service are verified to determine whether the input agrees with the SO information and with the features and options actually provided in the switching equipment and associated with the equipment assigned to each customer.

4.10 For a period of two months after conversion of the wire center to COSMOS, a complete check of all SOs is usually conducted. Depending on the volume of discrepancies found, this procedure can be reduced to a sample check for POTS SOs. However, a complete check of complex SOs is recommended until the NA is satisified that a sample check is adequate.

4.11 Examples of discrepancies that may be identified from the comparison check between completed SOs and the SOU printout are as follows.

- Incorrect status
- Incorrect TN Type
- Billing TN not shown
- Bridged night number not shown
- Incorrect auxiliary relay assignments
- Incorrect hunt sequence
- Incorrect line equipment

- Incorrect line equipment class of service

When discrepancies are encountered, a copy of the COSMOS output and associated service order should be returned to the AO for resolution. Any additional information which might be useful in resolving the discrepancy should be included on these copies.

4.12 To facilitate verification procedures, transactions have been provided which inquire into the contents of the COSMOS files to provide data pertaining to a specific item of equipment. Transactions are also available which provide lists of SOs sorted in accordance with several different criteria.

Records of Other Departments

4.13 In the event that significant discrepancies are detected in the data base, comparison checks with accounting department billing records may be required. To implement such checks, printouts from the data base may be requested by the NA from the computer center.

4.14 Transactions SAR and RSAR will be used by the computer center to produce the required printouts which are needed to carry out the record check.

4.15 A prerequisite to carrying out this type of record check is an agreement with the accounting department and with the plant department for the implementation of physical equipment checks that may be considered necessary to clear discrepancies.

C. Procedures to Correct Data Base

Elimination of Discrepancies

4.16 Transactions have been designed to change, add, or delete data pertaining to working line equipment, telephone numbers or other auxiliary equipment and to establish associations among those items of equipment; ie, to build a circuit. These transactions make in-depth changes in the data base and therefore should be used with care as they by-pass many of the built-in safeguards which are provided for use when facility associations are established or deleted by plant assigning during normal SO processing.

4.17 Application Position for Data Base Management provides detailed information pertaining to the input and output of these transactions.

Removal of Out-dated Information

4.18 Remarks fields are provided in both telephone number and line equipment (LE) data files. A variety of notations may be entered into these fields within the following limitations.

- The remarks field for both the TN and LE files may contain only 12 characters.

- Characters may be either alphabetical or numerical, periods (dots) and dashes with no blank spaces between them.

In order to keep the remarks for nonworking TNs and LE free of out-dated information left over from previous assignments, it is recommended that their contents be reviewed at least annually to determine whether an overall clearance is required.

4.19 Transaction code PRP is provided for this purpose. Procedures for processing this transaction are provided in Application Position for Data Base Management.

Monitoring of Intercepting Option

4.20 The network administrator may be required to monitor the type of intercept service given to customers when "D" or "F" SOs are processed. The status code identifying this service appears on the ISH printout. If the status code is to be changed, the CFS transaction is processed.

D. Maintenance of Manual Records

4.21 Maintenance of certain manual records are needed to supplement the information that is in the COSMOS inventory. These records are required for network administrative control and for the preparation of reports.

4.22 The manual records required are listed in former Dial Facilities Management Practice (DFMP), Div. D, Section 7e. Additional manual records not included in this list may be considered necessary by the network administrator on the basis of specific requirements. Also, local forms may already exist which may serve the same purpose as those provided.

4.23 Brief descriptions of the purpose of each of the manual records are provided in the following paragraphs.

Installed Equipment and Features

4.24 One form has been provided in the C101 series for each type of equipment (SXS, No. 1 and No. 5XB, and No. 1 ESS) for recording data regarding basic equipment quantities and features installed in each switching entity that is on COSMOS.

4.25 These forms are to be prepared for each loading division and filed in a reference book to be provided to the clerical personnel responsible for assigning. With the elimination of the manual records, this form will be a source of quick reference to verify equipment features and quantities for each loading division without necessitating reference to a traffic order.

4.26 Entries on these forms will require revision each time an extension which changes equipment quantities is completed in a loading division and also must reflect ongoing updates such as revised TOUCH-TONE® patterns and similar changes in features.

Temporary Non-Listed Telephone Numbers

4.27 A manual record of temporary nonlisted (TNL) telephone numbers is required in order to ensure that the telephone numbers allotted for that purpose are handled correctly and also that the permanent telephone numbers for the customers receiving temporary intercepting are not released for reassignment.

4.28 When the wire center is converted to COSMOS sufficient telephone numbers are allocated to type good (G) for use as TNL TNs. The quantity allocated will be decided on by the network administrator based on previous normal demand for TNL service. An entry "For TNL" in the remarks field of the TN data file will identify these TNs. These TNs will also be recorded on forms C101.

4.29 Application Position—Miscellaneous Telephone Number Assignments (Verbal Assignments) provides details of the procedures for handling the assignment of TNL telephone numbers and for the use of this record.

Completed Service Orders Received Daily

4.30 A manual record of completed service orders received is maintained for statistical and reporting purposes. This is an optional record and its use is to be decided on by the network administrator.

Discrepancies Identified in Data Base

4.31 A record is required of discrepancies identified when completed SOs are verified with the SOU Printout. Form C104 was designed for this purpose.

4.32 This record is required for the following purposes.

- Determination of the quantity of discrepancies in relation to the volume of completed SOs
- Determination of the types of discrepancies and their causes
- Follow-up on the correction of discrepancies
- Determination of action required to prevent discrepancies
- Determination of the clerical effort required to process discrepancies

Telephone Numbers Held for Administrative Reasons

4.33 Requirements will arise for withholding telephone numbers from normal processing either manually or automatically by the COSMOS algorithm. Examples are as follows.

- TNs requiring intercepting for periods longer than the established standard
- Unassignable TNs to be given excluded status; eg, numbers which have resulted in long standing complaints of annoyance calls
- TNs to be reserved for periods longer than normal for specific customers, etc

4.34 Form C105 has been designed for recording such numbers either for a thousand-group or a hundred-group, depending on the volume. Provision has been made for entering the TN type and status and the reason for which the TN is

being held out of service. TNs to be listed on this form are normally those in the Excluded, Unknown, and Reserved Status.

Line Equipment Transfer Orders

4.35 The network administrator is responsible for issuing all line equipment transfer (LET) orders for both plant and network administrative purposes. Each LET is numbered and the number is input to COSMOS at the time the LET is processed. However, a control record of serial numbers assigned to LETs in each loading division is required and Form C106 has been designed for this purpose. LET order numbers can contain up to eight digits and can be either alpha, numeric or a combination of both. Separate series of numbers are allocated to each loading division in order to facilitate follow up on completion dates.

4.36 In order to facilitate identification, serial numbers may include the loading division designation and NXX (eg, MG172002, CG046010), the last two digits being used to indicate the actual number of the LET. As LETs issued for plant reasons are also numbered by the NA staff, the numbering system is established jointly by the plant supervisor and network administrator. It may be found convenient to establish a separate numbering system for plant LETs. Application Position—Line Equipment Transfers provides procedures for issuing LETs and for the use of this form.

Record of Terminal or System Outage Time

4.37 It is to be anticipated that either the computer containing the COSMOS data base or the terminal used to access it will go out of order and require down time for repairs. A manual record of such outages is required for administrative use to determine corrective or preventive action that might be indicated.

4.38 Form C107 has been designed as a record of such outages. A separate form may be maintained for terminal outages and system outages or both may be recorded on the same form.

Miscellaneous Existing Forms

4.39 In addition to the forms discussed above, two standard forms now in use are to be retained with the introduction of COSMOS. They are as follows:

(a) Form 1105: Multiline Hunting Group Record—No. 1 ESS

(b) Form 1107: Supplementary Information Record—No. 1 ESS.

Use of these forms is to be continued in accordance with instructions contained in the No. 1 ESS Translation Guide (TG-1A).

E. Record of Custom Calling Features

4.40 Custom calling features provided in No. 1 ESS offices are not included in the COSMOS inventory. However, a record of these services may be maintained by the NA for statistical reporting purposes by the entry of codes in the remarks field provided for each directory number in the data base. The entries are to be input to the remarks field of the TN associated with each custom calling service, utilizing the following standard codes.

CUSTOM CALLING SERVICE	CODE
Call Waiting	CW
Three-way Calling	3CW
Call Forwarding	CFW
Speed Calling—Short List	SC1
Speed Calling—Long List	SC2

4.41 Data regarding inward and outward movement of custom calling services are obtained by the NA from the paper copy of the related completed SO and the CRM transaction used to input the required code in the remarks field. The codes will appear in the remarks column of all TN reports that are obtained from the data base. To prepare statistical reports on custom calling services the NA will process one or both of the following transactions as required.

- SIR: Sorting inquiry by range
- STR: Sorted totals by range

4.42 The ***remarks*** entries are to be used as the sorting parameter for these reports. If

it is expected that these reports are to be lengthy they should be requested for processing by the computer center during off-hours.

4.43 Further details of these transactions are provided in paragraphs 4.44 through 4.46 and in the Application Position for Data Base Management.

F. Miscellaneous Sorting Transactions

4.44 Two transactions have been provided which can be used in data base management procedures to obtain itemized lists and statistical summaries (counts) of inventoried facilities sorted by Status, USOC, Class of Service, Features or Remarks. These transactions are as stated in paragraph 4.41.

4.45 The SIR transaction provides an itemized list of the facilities required in accordance with the specifications shown in the input data with regard to type of facility and sorting parameters.

4.46 The STR transaction provides only the total quantity of facilities which meet the input specifications, sorted in the same manner as is followed by the SIR transaction.

4.47 Procedures for processing these transactions and detailed descriptions of their function are provided in Application Position for Data Base Management.

ASSIGNMENT ALGORITHMS

A. Line Assignment and Entity Loading Plan

4.48 The COSMOS line assignment system provides a number of parameters that are the responsibility of the network administrator. These parameters can be monitored and changed by the network administrator in order to control entity balance, party service assignments and crossloading, the reuse of left-in MDF jumpers (DIPs), to specify automatic assignment of message registers and to change rate zones. To control entity balance the network administrator specifies the entity status (stable or growth), the upper and lower limits of main station fill, and the entity priority. The network administrator also controls the party line fill ratio by designating which of three party service assignment procedures COSMOS is to follow. The network administrator determines whether crossloading should be allowed or disallowed in each entity and sets the crossload permit parameter accordingly. The network administrator also determines which entities and line equipment classes of service will be DIPed, the load factor parameters for DIP creation and reuse, and administers DIP removal.

B. Entity Balance

4.49 Balance between entities in a wire center is in accordance with the main station fill requirement and the priority number assigned to each entity by the network administrator. During the initialization procedure, each entity will be assigned a priority number from one to nine. The lower the number, the more attractive that entity will be to COSMOS for assignment. More than one entity may have the same priority number. It should be understood that, during the assignment process, COSMOS will assign line equipment from the lowest priority numbered entity(ies) first unless it is over main station capacity, even if it means assigning into an LF 9 load group and running a jumper from one end of the frame to the other. This can result in excessively long jumpers being run, as well as a possible degradation of load balance. In most instances, all of the entities in an office should have a priority of one. It should be considered unusual for entities to have different priorities. However, there are instances when a priority structure is needed; for example, when one of two entities in an office is being deloaded for a cutover, giving this entity a priority of two would be appropriate. In summary, it is to be emphasized that entities can be given priorities, but the primary COSMOS controls for entity balance are the categories G and S and the main station capacity requirements.

4.50 Every entity in a wire center is classified as either a stable (S) entity or a growth (G) entity. A growth entity may be changed to a stable entity by the network administrator. In addition, the network administrator has the ability to set and change the upper limit on main station fill for all entities and a lower limit for the stable entities. COSMOS will compute a band number for each entity depending on the actual main station fill, the entity type, and the specified upper and lower limits as shown in Table C.

4.51 Refer to example one of Table D. Since all entities have the same priority number, as a first choice, COSMOS will assign into entities

whose band numbers are zero. COSMOS will next assign into entities having a band number of one before assigning finally into entities with a designation of band number two. No assignments will be made into entities having band number three. As the number of main stations in an entity changes, the band number will be changed to reflect the fill of the entity. This procedure will ensure that an existing entity will remain at the desired main station fill when a new growth entity is added to the wire center. Example two of Table D shows order of assignment with a change of priority number.

C. Load Balance and Current Estimated Usage (CEU)

4.52 The COSMOS line equipment assignment algorithm is designed to maintain a proper load balance between the line groups in each loading division, and MDF jumper length. This is done by keeping a record of the current estimated usage (CEU) of each line group in the division and giving assignment preference to lightly loaded equipment. COSMOS uses estimates of usage (CCS) data for each USOC or LCC to automatically update the CEU when customers are added to or removed from a line group.

4.53 As part of the preoperational requirements, the network administrator is responsible for providing the CCS value for each USOC or LCC that will be listed in the USOC/LCC table in COSMOS. These CCS values are used to compute the CCS load for each line group by multiplying the CCS/USOC value by the number of customers in each USOC in the line group. The network administrator must periodically monitor and update the CCS values listed in the USOC table. Yearly subscriber line usage (SLU) studies should be conducted to validate these CCS values. SLU studies should also be initiated if the relationship between the CEU and actual load balance measurements becomes disproportionate through changes in characteristics of the wire center. After the initial CEU has been entered into the data base, the CEU is automatically updated by the system on the basis of inward/outward movement in each line group. The CEU is also updated when load balance data (empirical data) becomes available and is entered to the data base. This update with load balance data should be done weekly where practical; ie, from No. 1 ESS paper tape input, and less often where manual input of measured usage is required. In any case, updating should be done at least monthly, except when a dial transfer is in progress. COSMOS compares the existing CEU with the measured usage, computes two-thirds of the difference which is added to the lesser of the two values (existing CEU and measured usage). The result is the updated CEU for the line group. The use of the two-thirds rule provides a traffic conservative estimate of current true usage when the old CEU and the actual measurement are not equal and compensates for abrupt changes in usage due to seasonal variation in usage or change in busy hour.

4.54 When the CEU is updated for a line group, the associated load factor is updated. The load factor is a dynamic indicator that reflects the effect of inward and outward movement on the load in each line group. The load factor consists of a number in the range of one to ten and is allocated to each line group on the basis of the CEU. The load factor indicates the usage level in a specific line group in relation to the remaining line groups in the loading division. The lower LF numbers indicate lightly loaded line groups, and the higher numbers indicate those that are more heavily loaded. The COSMOS assignment algorithm is based on the load factor, assignments being made into the line groups with the low LFs first, and also giving consideration to MDF jumper length. Where the reuse of left-in MDF jumper (DIP) feature is in use, COSMOS will first determine if the load factors of the DIPed line equipment is less than the parameter established for DIP reuse. If it is, the line equipment will be reused; if not, the DIP will be broken and a new assignment made as described above.

4.55 When an assignment is made to or removed from a load group and the CEU of the group is updated, COSMOS will determine whether the resulting CEU change has moved this group to another load factor and will change it accordingly. However, the CEU values at which load factors change should be recomputed by the network administrator once a day or more often during periods of heavy assignment activity (eg, a large business customer). The network administrator should confirm that this procedure is being followed. The network administrator may recompute load factors at any time. A recomputation of load factors should be performed when new load group load balance usage data is made available to COSMOS.

4.56 The COSMOS program provides the network administrator with the ability to adjust the CEU of any line group through the use of transaction code CFU. Examples of conditions that would require such action are:

(a) Estimated usage of a specific USOC is considerably different (higher or lower) from the value originally input because of changes in characteristics of wire center.

(b) Estimated usage of a new customer is considerably different from the value stated on the USOC table.

4.57 Refer to former DFMP, Division D, Section 7d(2), Subsection III, for detailed information regarding CEUs and LFs, and also to Division D, Section 7c, App. A, Line Equipment Load Balance, which provides details pertaining to procedures referred to in paragraphs 4.52 through 4.56.

D. Class of Service Mix

4.58 A good class of service mix is essential to proper management of line equipment. In No. 1 and No. 5XB systems, the line equipment class of service is determined by the machine configuration with a particular class of service applicable to each vertical file. In SXS and panel systems, the percentage of each class of service to be assigned to a line finder group is determined by the network administrator, and assignments are made accordingly by COSMOS.

4.59 For No. 1 ESS machines, each terminal in a concentrator is assigned a nominal class of service and COSMOS will assign a customer to a concentrator that has terminals available for that customer's class of service. Concentrator to concentrator class-of-service balance is achieved by assigning the same class of service to the same terminal number in each concentrator.

4.60 In order to better reflect the actual class-of-service makeup of the ESS office, COSMOS is capable of redesigning this concentrator map of class-of-service configuration at the request of the network administrator. For example, when a large number of new customers are to be added to an office at one time, the concentrator map can be changed prior to the addition and held frozen until all new lines are in. Once the class-of-service configuration has been changed, a number of previously assigned customers will be connected to terminals now designated with a different class of service. These customers will not be changed to another terminal, as new customers will be assigned following the new class-of-service configuration. Care should be exercised in concentrator map redesign to avoid an upset in load balance or short jumpers. Redesign should be reviewed by the data base manager before being implemented.

E. Cross Loading

4.61 In some cases, customers may be assigned to line equipment offering features they do not require. There are three types of cross loadings available in the COSMOS: dial type, essential service, and sleeve lead service. The network administrator controls each type of cross loading by entity. COSMOS will make cross loading assignments only when permission has been entered into COSMOS by network administration, and only then when no comparable direct assignment is possible. In addition, there is an automatic cross loading of class of service in No. 1 ESS once certain levels of terminal and office fill are reached, if the cross loading option is in effect.

F. Searching Procedures

4.62 A frame is divided into several assignment zones with subscriber cable pairs and line equipment appearing within each zone. In a COSMIC frame, an assignment zone is made up of a cable pair module and two adjacent line equipment modules. In an ESS modular frame, the assignment zone is made up by the adjacent two half-verticals. In a conventional frame, the zone size is a variable and may be defined by the telephone company prior to COSMOS operation. Appropriate zone size for conventional frames is between 10 and 20 verticals.

4.63 With the appearance of the customer's exchange cable pair in a given assignment zone, the search for a suitable line equipment is governed by a set of rules programmed into COSMOS that selects a DIPed line equipment with a left-in MDF jumper to that cable pair, or uses the algorithms functionally depicted in the flowcharts shown in Fig. 2, 3, and 4 for the best possible choice of spare line equipment. The preferential assignment of line equipment for load balance and short cross-connection procedure for a modular type of frame is shown functionally in Fig. 5.

4.64 If the equipment is to serve multiline hunt groups, PBX, or centrex, additional considerations are followed by COSMOS to spread the customer over different line link frames, line finder groups, etc.

TRAINING

A. Network Administration Training Documentation (Formerly DFMPs)

General

4.65 The NA training documentation was developed for the on-going application of COSMOS to network administration procedures; it does not cover conversion or preoperational procedures for the system. The DFMP designation has been removed, but ordering information provided in GL 76-10-205 remains unchanged.

4.66 The documentation consists of 13 Application Position Practices, 5 Application Manuals, the Administrative Guide, and a small volume of Transaction Performance Aids covering only the Transaction Codes used for Network Administrative purposes. See Fig. 6.

4.67 The Application Position Practices are for clerical personnel and provide detailed procedures for carrying out daily clerical dial assigning responsibilities.

4.68 The Application Manuals are for management personnel and cover administrative aspects of the functions for which detailed procedures are provided in the Position Practices.

4.69 The documentation covers six major network administration functions as follows.

- Telephone Number Administration
- Line Equipment Administration
- System Administration
- Data Base Management
- System Backup Procedures
- Area/Dial Transfer Procedures

A Trainee Workbook and Instructor Guide are provided with each Position Practice.

4.70 The Position Practice details, by task, each step required to perform an activity. Each Position Practice contains narratives, exhibits, and performance aids. A narrative page is divided into two columns with action statements on the left side of the page which provide directions for performing a specific activity, and supporting statements and references on the right side of the page.

4.71 Exhibits of actual transaction printouts are shown on the page opposite the action statements which contain reference to that particular transaction.

4.72 Each Performance Aid contained in the Position Practices specifies the three-letter transaction code, its function, clarifying comments, and examples of actual input and output formats, including any error messages that may be output. These Performance Aids are essential to the learning of the position and should be carefully studied during training.

4.73 During training the Position Practice and Performance Aids will be used in conjunction with a Trainee Workbook and certain lists of prefixes and codes contained in the Appendices to this guide. A Trainee Workbook is provided with each Position Practice and contains the direction for working through the position as well as exercises and a final test to provide practice in the activities learned. After training is completed the Position Practice is to be used for daily on-the-job reference.

4.74 Also provided with each Position Practice is an Instructor Guide which contains directions for administering the training and answers to the questions in the exercises and final test.

4.75 The exercises and final tests are designed to test the trainee's learning of transaction code input in a pencil and paper mode. However, if a training data base is available they can be easily converted for "hands-on" training by inserting entity parameters from the live data base; eg, NXX codes, equipment types, line groups, etc.

Application Position Practices

4.76 The Position Practices are designed for self-paced, self-instructional training in clerical procedures with limited supervisory participation.

4.77 The necessary step-by-step instructions for performing the network administration tasks that are applicable to COSMOS are provided in the Position Practices, which have been grouped in a job-related manner and may be referred to as work positions.

4.78 Each work position consists of a series of tasks that must be performed in order to accomplish the required work. In the same manner, a Position Practice is divided into a number of tasks which, in turn, consist of a series of steps.

4.79 The Position Practices that are designed for the application of COSMOS are as follows.

Telephone Number Administration

- Div. D, Sect. 7b, App. A—Telephone Number Aging
- Div. D, Sect. 7b, App. B—Telephone Number Type and Status Changes
- Div. D, Sect. 7b, App. C—Complex Service Orders
- Div. D, Sect. 7b, App. D—Miscellaneous Number Assignment

Line Equipment Administration

- Div. D, Sect. 7c, App. A—Line Equipment Load Balance
- Div. D, Sect. 7c, App. B—Entity Loading
- Div. D, Sect. 7c, App. C—Line Equipment Transfers
- Div. D, Sect. 7c, App. D—Complex Service Orders
- Div. D, Sect. 7c, App. E—Class of Service Allocation

System Administration

- Div. D, Sect. 7e, App. A—Data Base Management
- Div. D, Sect. 7d(2), App. A—Obtaining System Reports
- Div. D, Sect. 7f, App. A—System Backup Procedures
- Div. D, Sect. 7j, App. A—Area/Dial Transfer Procedures

4.80 Prior to the presentation of Position Practice training, it is recommended that the instructor and trainees work through the "Introduction to the Position Practice." This booklet may be ordered from WE. The ordering information is as follows.

(Qty) Introduction to the Position Practice (Developed by Personnel Subsystem Development Technology Group—Systems Training Department- June, 1973)—Select Code 450-652.

Application Manuals

4.81 The Application Manuals are designed for management personnel and are in narrative format with exhibits. They provide information regarding the following.

- Monitoring and administrative procedures required to control or change the system algorithm
- Implementation of network administration utilizing data contained in reports provided by the system
- Administrative background to the clerical procedures detailed in the Position Practices
- Administration of area/dial transfers, line regroupings and large SOs utilizing the area/dial transfer procedures

4.82 The Application Manuals are as follows.

- Div. D, Sect. 7d(1)—Telephone Number Management
- Div. D, Sect. 7d(2)—Line Equipment Management
- Div. D, Sect. 7e—Data Base Management

- Div. D, Sect. 7f—System Backup Procedures
- Div. D, Sect. 7j—Area/Dial Transfer Procedures

4.83 The Telephone Number and Line Equipment Management Manuals provide information regarding NA input to, and monitoring of, wire center parameters which change or control the COSMOS assigning algorithm. They also provide information regarding the use of data contained in the administrative and day-to-day management reports produced by the system as well as detailed explanations of the contents of the reports.

4.84 The Data Base Management Manual provides information regarding procedures to be followed to maintain the accuracy of the data base with regard to working and nonworking line equipment, telephone numbers, and auxiliary equipment.

4.85 The System Backup Procedures Manual covers the NAs responsibilities during outages of the system.

4.86 The Area/Dial Transfer Procedures Manual contains details of the area/dial transfer module, including a description of its functions and of the NAs responsibilities as a member of the team which administers area/dial transfers.

Transaction Code Performance Aid Book

4.87 This is a small conveniently-sized binder which is provided for use as an on the job reference guide. It contains the essential input formats required for all transaction codes used by the network administration personnel. In addition it contains Alphabetical and Functional Transaction Code Indices, cross-referenced to the Position Practices and Application Manuals, lists of prefixes and codes, definitions of various terms, and transaction input formats, all of which are used when processing transactions at the terminal. Each person who processes on-line transactions should have a copy of this book which is designed for use at the terminal.

Scope of the Training Material

4.88 The material covered in the COSMOS Manuals and Application Positions is not designed to replace or supplement existing practices which relate to the basic functions and objectives of line and number assigning, load balancing, and dial office management generally. It pertains exclusively to the application of COSMOS as a means of carrying out those functions and attaining those objectives. The personnel to whom this material is directed, therefore, are clerks and supervisors who have been previously trained in the areas of dial office management mentioned above.

B. Other

4.89 The Data Base Management Course is designed for managers responsible for maintaining the integrity of the COSMOS data base. See GL 76-11-224.

5. APPLICATION AT THE SUBSCRIBER MAIN DISTRIBUTING FRAME

GENERAL

5.01 The primary function of COSMOS is to help administer plant central office facilities. COSMOS performs this function by:

- Automatically selecting line equipment to provide the shortest cross-connects on the MDF consistent with traffic load balance criteria. When possible left-in jumpers (DIPs) are selected, this reduces wiring effort.
- Keeping accurate records of central office facilities such as line equipment, cable pairs, trunk pairs, bridge lifters, etc.
- Providing audits of data base accuracy via periodic random sampling.
- Providing location-oriented output on work orders and service orders.
- Assigning tie pairs automatically when required on work orders and service orders.
- Providing reports on pending order activity at the frame, on request.
- Producing summary reports on the state of the MDF.

5.02 Some of the benefits that frame personnel receive from COSMOS are:

- Jumper tracing will be reduced.
- Jumpers will be shorter; therefore, it will take less effort to run jumpers.
- Some jumpers are not removed on complete disconnect orders and are saved for possible reuse.
- The reports, such as Open of Day, will help to schedule work and thus more evenly balance the work load over all days of the month.

WORK ADMINISTRATION WITH COSMOS

5.03 COSMOS can be a very useful tool in administering the central office. It will increase productivity and give the frame supervisor much greater visibility of the work load ahead. However, COSMOS will not automatically create order out of chaos. If the system is simply overlayed on the existing manual administration scheme, the results will be disappointing. On the other hand, if the frame administration desk is reorganized to integrate the system into the order flow, the results will be well worth the initial effort required. Additional information can be obtained from PA-6P012, Frame Training Manual.

5.04 The frame supervisor should attempt to achieve the following goals after COSMOS cut-over.

A. Work All Orders Directly From the COSMOS Output

5.05 For a short period after cut-over, the COSMOS output for each order should be matched with the Network II (or MDF) copy of order. This period is used to correct areas where information is missing on the COSMOS order. If orders are missing from the FOR output, find out why. If telephone number intercept statuses are incorrect, consult with the AO supervisor. If orders are incorrectly entered, place them in jeopardy to force corrective action.

5.06 This process is important for the health of the whole system as well as for frame operations. Any order that the frame fails to receive through the computer or is received incorrectly represents an error in the data base. By demanding high accuracy on the orders receive from COSMOS, the MDF helps maintain good records.

5.07 Once high accuracy has been obtained on the COSMOS frame output, all orders can be worked directly from the COSMOS frame output. The Network II (or MDF) copies of the service orders can be filed for use in an emergency (for example, when the computer is "down").

B. Use the Computer to Communicate

5.08 The frame person should work from the COSMOS output whether the order is a service order, line or station transfer, or maintenance change. When a service order cannot be worked, the frame person should establish a jeopardy report in COSMOS. Enough information should be provided so that the assignment clerk can take corrective action without calling the frame.

5.09 Facility changes made on a verbal request should be prohibited. This will lead to inaccurate records and inefficient work practices. The frame person should receive a printout from COSMOS for every facility change.

C. Reorganize the Order Filing System at the Administration Desk

5.10 Because COSMOS will only print out orders due on the date requested, and because any pending order in COSMOS can be inquired on by order number, it is not necessary to file orders by due date or by order number. However, it is necessary to be able to find orders that have been modified, cancelled, or changed.

5.11 The filing system for COSMOS orders should be divided into two sections: (1) pending orders, and (2) MDF-completed orders. In each section, the orders will be filed by exchange code and thousands group. Refer to Fig. 7 for a schematic of the system. Circuits without a telephone number are filed in the private line bin.

5.12 The service orders in the pending section are those which for one reason or another cannot be worked at present. These include orders that have had their due dates advanced, orders requiring installer go-ahead, etc. A separate bin in the pending file should be kept for orders in jeopardy.

5.13 When an order is MDF-complete, it is placed in the completed order section. If a modification, assignment change ticket, or cancellation is received on the order, it can be traced quickly.

5.14 Work orders (cable pair transfers, LETs reassociations, etc) should be filed in the pending section grouped by order number. There should be enough bins in the pending section so that each work order can have a separate bin.

5.15 In the completed section, work orders should be filed by telephone exchange and thousands group along with service orders. In this way, recent activity on a customer's line can be traced if needed.

5.16 Orders in the completed section need only be retained for a few weeks. At the first of each month, a temporary separator can be placed on the top of the order pile in each bin. After two weeks, all orders below the separator should be removed and filed away.

5.17 The diagram in Fig. 7 is a suggested layout for a COSMOS filing system. The system can be adapted to suit local needs, and extra bins can be set aside for special purposes.

FRAME MANAGEMENT

5.18 For descriptive purposes, the typical day is divided into three segments: (1) beginning of day (2) operations during the day, and (3) end of day. Some regularly performed tasks which are not necessarily daily are included.

A. Beginning of Day

5.19 The first activity is to run the Open of Day report. This report will help the frame supervisor to manage the work of the frame personnel for the day and to schedule future work. The Open of Day report contains:

- The phase alert message regarding trough congestion for the COSMIC or ESS frame.
- An entity summary giving the percent fill, priority, and maximum and minimum fill for each line equipment entity in the office. The party service option, preferred MDF, M-number for tie pair assignment, and primary and secondary DIP options are listed. This section gives the frame the value of all important parameters in the office.
- A list of service orders due on the present day by order type.
- A list of service orders due on the following two days.
- An audit section listing service orders overdue, cancelled orders due today, orders with AO completion with no MDF completion, and orders outstanding due to jeopardy reports.
- A summary of cable pair transfer work with the due date of the transfer, the work order number, the number of pairs requiring back tap work, and a summary by stages of work completed.
- A summary of withdrawn or modified and unprinted cable pair transfers.
- Lists by order type all due and overdue work orders.

B. Operations During the Day

5.20 During the day the frame personnel will perform the necessary work operations to complete service orders, work orders, and cable transfers. Several times during the day the frame supervisor will request the work status list from COSMOS. The work status list is a list by order type of all service orders due and overdue today which have not received a frame completion notice. The work status list should decrease in size during the day. However, new orders established at the AO with today's due date will appear on the list. Transaction FOR is used to obtain these new orders.

Service Orders

5.21 COSMOS processing of service orders is basically a two step procedure — obtain an order, complete the work and notify COSMOS of its completion. After the Open of Day report is run, transaction FOR is used to obtain a work list of service orders and work orders with a specified due date. When the AO establishes an order with a "HOT" status (ie, one needing immediate attention or one with frame due date of today or tomorrow)

a bell rings at the frame and transaction FOR is then used to obtain this order. The FOR output contains all the information needed to complete the order. The order number, order type, and any related order numbers are given along with the facilities listed in schematic order. Each facility is labeled IN, OUT, or REU and its location is given. Occasionally a new connect service order will not be able to use the line equipment associated with a DIPed cable pair; in these cases a message is sent to the frame to break the DIP. A separate order is sent to connect the new circuit. If any special security protection is required, that is also listed.

5.22 A service order can also be changed, cancelled, withdrawn, or frame due date changed by the AO. In all cases, the frame will be notified of the change when the frame output is next requested. A service order is normally cancelled in COSMOS when it is the result of a customer request. A service order can be changed through an assignment change ticket, a service order modification, or a change-of-due-date. The order can also be withdrawn and reestablished.

5.23 When the information on the FOR output does not agree with the actual frame wiring, service order information can be obtained with transaction SOI (when the service order number is known) or ISH (when a facility is known). If a circuit is working, transaction ISH will give all of the facilities, their statuses, any work or service orders associated with any facility in the circuit, and the physical location of the facilities on the MDF. If a service order still cannot be completed, it should be placed in jeopardy with transaction IJR.

Work Orders

5.24 Line equipment transfers, and work orders related to service orders, such as line or station transfers, maintenance change tickets, and reassociated orders, are also obtained with transaction FOR. Transaction ISH, LEI, LSI, MCI, and RAI can be used to obtain additional information. When a work order is completed or it is determined that it cannot be completed, the order originator should be notified.

Cable Pair Transfers

5.25 All engineering orders that involve cable pair rearrangements, such as reconcentrations, cable throws, etc, are called cable pair transfers in COSMOS. Two transactions, CTS (Cable Transfer Summary) and CTP (Cable Transfer Printout), are used to obtain information on a transfer. Transaction CTS is used to obtain a list of the cable pairs and associated circuits that make up the transfer. Transaction CTP is used to obtain the work sheets for placing and removing back taps and heat coils.

5.26 The Open of Day report gives a summary of all pending cable transfer activity. All pending orders are listed by due date with the number of cable pairs in each work code. A work code is associated with each cable pair in a transfer, and it identifies the state to which that cable pair has advanced in the transfer.

5.27 The seven work codes are:

(1) Place Back Taps (PBT)

(2) Validate Back Taps (VBT)

(3) Place Coils on the TO Count (PCT)

(4) Remove Coils on the FROM Count (RCF)

(5) Remove Back Taps (RBT)

(6) Work Completed (COM)

(7) Optional Code (USR)

5.28 Transaction CTP is used to change the work codes as the transfer progresses. Cable pair transfers not requiring splicing work will normally have only three codes: PBT, RBT, and COM. Worksheet printouts may be obtained or supressed for each work step. Initially, the work code for each cable pair in the transfer requiring back tap work is set to PBT.

5.29 COSMOS will normally assign tie pairs automatically when required at the time the transfer is established. These tie pairs will appear on the worksheets generated by CTP. In some cases, the computer cannot assign tie pairs automatically. In this case, a message will appear on the CTP output stating that tie pairs must be assigned manually. If this occurs, the transfer

coordinator should be notified, so that transaction CTT can be used to assign the tie pairs.

5.30 When an item in a transfer is withdrawn or modified, a withdrawal or modification message will appear the next time CTP is run for that order. A withdrawal and modification summary also appears on the Open of Day report.

5.31 When there is a conflict in a cable pair transfer, it will still appear on the summary list generated by transaction CTS, but that particular transfer will not be printed on the worksheet generated by transaction CTP.

C. End of Day

5.32 At the end of the day the frame supervisor will run the work status to ensure that all required work has been completed. All service orders that were completed at the frame will be recorded in COSMOS, and the AO will be contacted concerning any orders which still have a jeopardy status. The exchange layout personnel will be informed of any cable pair transfer work that has been completed at the frame, so that they can record the completion in COSMOS. Finally, the frame supervisor will run the close of shift report (transaction COS) which gives a summary of the work completed, the orders overdue, and the orders still in jeopardy. The COS report contains a list of:

- Orders withdrawn today
- Orders for which COSMOS received a frame completion notification today
- Orders overdue at the MDF
- Orders cancelled during the day with today's due date or future due dates
- Orders that had their due dates changed today
- Orders outstanding due to jeopardy reports
- A summary of withdrawn or modified cable pair transfers
- A summary of unprinted cable pair transfers.

RECOMMENDED PROCEDURES

A. Processing of Service Orders

5.33 Service orders are obtained by use of transaction FOR. When a new connect order cannot use the line equipment associated with a DIPed cable pair, a message is sent to the frame to break the DIP. The order to break the DIP has today's due date. The order to wire the circuit will appear as a separate order; both orders are obtained by running transaction FOR.

5.34 Use of transaction FOR will also give line equipment transfers, line and station transfers, reassociation orders, and maintenance change tickets. These are covered in later paragraphs.

5.35 After the SOs have been obtained by use of transaction FOR, they should be sorted by type and handled in the same manner as the paper copy of an order sent by the AO. The COSMOS copy of the order should be filed along with the "back-up" paper copy of the order from the AO. After the frame work specified in the order is complete, the SO completion is recorded with transaction SCM.

5.36 If an order cannot be completed with the information provided by the FOR input, transactions SOI and/or INQ are used to obtain more information. If the order still cannot be completed, transaction IJR is used to place the order in jeopardy. Information is appended to the frame order, as a remark, to indicate what was actually encountered in order to assist in resolution of the discrepancy. The order originator should be notified of the problem.

Obtaining Service Orders

5.37 At the start of each day, transaction FOR is used to obtain service orders and work orders that are due during the next three work days. The first time FOR is run for the day, always include yesterday's date in the due date range. This will ensure that any orders entered yesterday with yesterday's due date will be output.

5.38 There are two basic ways to run transaction FOR:

(1) Request orders by frame due date or range of frame due dates

(2) Request orders by order number.

Orders can be restricted by order type and orders can be reprinted by specifying REP Y.

5.39 During the day transaction FOR is used with the same range of due dates to obtain all orders generated since FOR was previously used.

5.40 Anytime the bell rings indicating a "hot" order, transaction FOR is used to obtain the order. Transaction FOR is used to check for "hot" orders. Any order established by the AO which is due today or tomorrow will ring a bell at the frame terminal.

Recording Completion of a Service Order

5.41 After all of the required frame work has been completed, COSMOS must be notified that the service order is completed. Transaction SCM is used to do this. The frame completion notice is a validation by the frame personnel that the work directed by COSMOS was correct and has been completed. This simple, but important task helps to ensure the accuracy of the records in COSMOS. COSMOS is now able to provide up-to-the-minute reports of work completed (and not completed) and thus assist the day-to-day operations of the frame, AO, and RSBs.

5.42 Transaction SCM is used to complete single circuit orders and multiple circuit orders. Transaction SCF can be used to bulk complete orders.

5.43 ***Single Circuit Order:*** In this case the completion notice will contain the order number and the subscribers telephone number or cable pair number.

5.44 ***Multiple Circuit Order:*** If the order is a multicircuit order, the order number and telephone number (or cable pair) of each circuit must be entered for completion. The completion notice is accomplished using transaction code SCM. The entire order need not be physically worked before entering completion notices for individual lines. Each circuit can be completed separately in COSMOS when physically completed on the frame.

5.45 The frame may use CMR if required to enter closing reading of disconnected message registers.

The frame should not enter a completion notice for an order that is in jeopardy until the discrepancy has been resolved and a countermanding COSMOS order has been issued and completed. A premature SCM will erase the jeopardy report and may make COSMOS records inaccurate.

Bulk MDF Order Completion

5.46 Positive order completion by transaction SCM is the only means of properly tracking service orders and managing frame operations with COSMOS.

5.47 Bulk MDF completion of all orders having a given frame due date may be more efficient than completing each order separately. However, bulk completion would be permissible only when a separate accounting method is used to ensure that all orders which are being bulk completed have been worked. Transaction SCF is used to bulk complete all orders with a given frame due date or within a range of frame due dates.

5.48 The frame supervisor must verify that all orders due have been worked before running SCF. This is an essential step to ensure the accuracy of the COSMOS data base. To assist in this, transaction LPO can be run with a frame due date entered. The output will list all pending orders with the specified frame due date. These orders must be compared with the file of worked service orders. If all orders for the specified frame due date have been worked, then transaction SCF may be run to bulk complete these orders. If any order with the specified frame due date has not been worked, SCF should not be run until all orders are worked or placed in jeopardy. An order which is in jeopardy will not receive MDF completion when SCF is run. Another alternative is to use transaction SOH to give an order a withheld status; this prevents bulk completion by SCF.

Obtaining More Information

5.49 When the FOR output does not agree with the actual wiring on the frame, more information should be acquired on the circuit.

5.50 By using the SO number in transaction SOI, the latest circuit information can be verified.

5.51 By using an inventoried circuit element, such as the TN, CP, or OE in transaction ISH, the other circuit elements and their statuses can be determined.

Orders Pending Traffic Approval

5.52 When a multiline complex order is established in COSMOS, the frame output may be withheld pending traffic approval. This will occur if the number of lines in the order exceeds the threshold set by the network administrator.

5.53 An order which is withheld pending traffic approval will appear on the Open of Day Report and the Work Status List, and may be inquired on with SOI. Both the Open of Day Report and the Work Status List have a column which indicates whether traffic approval is required for the order.

5.54 In order to have the frame output released for the order, the frame must call the network administrator if that order has not already been approved. When this approval is recorded in COSMOS (transaction RTA) the frame can be printed with FOR.

Placing an Order in Jeopardy

5.55 When, for any reason, a service order cannot be completed, three things should be done:

- Transaction IJR is used to place the order in jeopardy
- Information is appended to the frame order
- The order originator is called.

5.56 The effect of the jeopardy report initiation will be to:

- Notify the AO that the frame cannot complete the work requested on the order because of data base discrepancies or an assignment error
- Provide a hold on final order completion until the discrepancy is resolved by the order originator
- Provide a list of assignment errors and data base discrepancies which can be used to alert management to unusual error rates. The list of orders in jeopardy is obtained by using transaction OIJ.

Removing An Order From Jeopardy

5.57 When an order is incorrectly placed in jeopardy, or the jeopardy is corrected, transaction RJR can be run to remove the jeopardy status.

B. Service Order Changes

5.58 An SO can be changed by the AO in a number of ways.

The Order Can Be Withdrawn and Reentered

5.59 When an SO is withdrawn, the computer checks to see if the order has already been printed at the frame. If the order has not been printed at the frame, it is erased. If the order has been printed, a withdrawal message will be output the next time FOR is run. Thus, if the order is withdrawn and reestablished, the frame will only see the latest version if the original order was not printed. If the original order was printed, the frame will receive the original order, a withdrawal message, and the new version of the order. The time-line on the bottom of the order should be checked to make sure the latest version of the order is retained. If an order which broke a DIP is withdrawn, the DIP remains broken. This is explained in paragraphs 5.114 through 5.116.

An Assignment Change Ticket (ACT) Can Be Issued Against The Order

5.60 In this case, a message will appear when FOR is run; it gives the order number and the out and in facilities. ACTs are usually issued when the assigned cable pair is defective or when tie pairs must be added to or removed from a service order. The ACT output will always appear in addition to the service order output. The ACT has the same due date as the service order. If the ACT is entered before the frame output for the service order is received, both the SO and ACT will be printed out together when FOR is run for that due date. If the frame output for the SO has already been received, only the ACT will be output with FOR. In this case, it is necessary to find the SO output and associate the ACT with it. If an ACT causes a DIP to be broken,

the order is received the next time transaction FOR is run.

The Order Can Be Modified

5.61 When an order is modified, a new version of the order is received at the frame. A modified order always has an "-M1", "-M2", etc, following the order number. For example, order NC1234-M2 would indicate the second modification of order NC1234. If the modification is entered after the original order has been printed with FOR, a withdrawal message will be received the next time FOR is run. The latest modification will be printed by FOR on the frame due date of the modified order.

5.62 If the modification is entered before the original order is printed, the original order will be erased from the file. Only the latest modification will be printed. The computer can always be queried for the latest modification with transaction SOI. When the original order number if entered, the latest modification will be printed.

The Due Date of the Order Can Be Changed

5.63 If the order has already been printed at the frame, a message will be placed in the frame output file, giving the order number, the old and new due dates, and frame due dates. The message will appear on the next FOR output. It is necessary to find the SO output and associate the due date change message with it.

5.64 If the order has not been printed, the due date will be changed in the file and no due date change message will be issued. The order will be output with FOR on the correct due date.

5.65 If any doubt exists on a service change, SOI is used to inquire on the order. SOI will always give the latest version.

Service Order Cancellations

5.66 When an order is cancelled by the customer, a cancellation order is initiated in COSMOS. The cancellation order always ends with "-CA". For example, the cancellation order for NC1234 would be NC1234-CA. When an order is cancelled, a notice is received the next time FOR is run. The notice gives the order, and circuit ID, and states that the order has been cancelled. This notice is received regardless of whether the original order has already been printed by FOR. The MDF must complete the cancellation order with SCM. Completing the cancellation order means that the frame has received the cancellation notice and has taken the required action. When the cancellation order receives both AO and MDF completion, the original order is automatically withdrawn.

Service Order Withdrawals

5.67 A service order withdrawal instantly removes the service order from the computer. Normally a withdrawal will be followed later by a corrected version of the order, since customer-requested cancellations should always be input as cancellation orders.

5.68 If the original order has not been printed by FOR, the withdrawal removes it from the file. It will not be printed. If the order has already been printed by FOR, a withdrawal notice will appear the next time FOR is run. The withdrawal notice gives the order number, frame due date, circuit ID, and states that the order has been withdrawn.

C. Line Equipment Transfers

5.69 Line equipment transfers are required for proper administration and utilization of switching equipment and for maintenance of the MDFs. The network administrator initiates line equipment transfers.

5.70 The frame may request that the network administrator issue line equipment transfers for proper administration of the MDFs in the serving office. These transfers will be requested to carry out any of the following tasks.

- To remove jumpers that span a prespecified number of verticals or more on the conventional MDF.
- To remove jumpers that span a prespecified number of modules or more on the COSMIC frame.
- To remove jumpers that span a prescribed number of verticals, or more, on the ESS modular frame.

- To remove jumpers between the COSMIC frame modules and tie pair distributing frame (TPDF) modules.

5.71 The network administrator is responsible for issuing and controlling all line equipment transfers. Details of pending line equipment transfer activity are listed in the Open of Day report. Transaction ETL can be used to obtain a list of pending line equipment transfers. Transaction FOR, with the frame due date of the desired line equipment transfer, is used to obtain the work order. Transaction LEI can be used to inquire about a particular line equipment transfer. If more information is needed, use transaction ISH.

5.72 Upon completion or if a conflict is found the order originator should be notified.

D. Reassociations

5.73 There are two reasons why the AO establishes reassociations.

- To provide facilities for party-line service
- To increase party-line fill.

5.74 When a reassociation is related to a service order it is used to provide open sided line equipment or to free a cable pair. In this case, when the service order is completed in COSMOS the reassociation is automatically completed. In all other cases completion is recorded by the AO after the frame calls.

5.75 Transaction FOR will print reassociation orders due on the date requested. Transaction RAI can be used to obtain information about a reassociation order if the order number is known. For more information use transaction ISH. A list of all pending reassociation orders can be obtained by running transaction RAI.

E. Line or Station Transfers

5.76 There are stand alone line or station transfers, and line or station transfers that are issued by the AO to provide assignable cable pairs for service orders. The line or station transfers that are issued to provide cable pairs for service orders are always associated with service orders.

5.77 Transaction FOR is used to obtain line or station transfers. Transaction LSI can be used to inquire about a particular line or station transfer. As before, transaction ISH can be used to obtain more information. Final plant completion of a related service order automatically completes the LST. If the line or station transfer cannot be completed, the related service order should be placed in jeopardy with transaction IJR.

F. Maintenance Change Tickets

5.78 The AO or the RSB establishes maintenance change tickets to change a single facility in a circuit.

5.79 Transaction MCL will provide a list of pending maintenance change tickets and is also used to obtain information about a particular maintenance change ticket. Transaction FOR with the frame due date of the maintenance change ticket will give the complete circuit if the change ticket was given a "HOT" status at the time of establishment.

G. Explanation of Transaction VER

5.80 Transaction VER provides all related circuit information for 150 randomly selected telephone numbers, line equipment, and cable pairs (50 of each).

DEDICATED INSIDE PLANT (DIP)

A. Philosophy of DIP Management

5.81 COSMOS has the capability to reuse left-in cross-connects, also referred to as DIPs. With this feature, COSMOS determines on a disconnect whether the cross-connect between the cable pair and line equipment should be left in, and keeps track of those jumpers which are left in place. The computer also determines whether a new customer reusing a cable pair with a DIP can also reuse the associated equipment.

5.82 When a jumper can be reused, the only frame work required is to pull the heat-coil on the cable pair at the time of disconnect—and perhaps replace it with a dummy protector—and restore it for the new customer. Considerable savings can be realized by implementing a DIP program.

5.83 Not all wire centers have the potential for high DIP reuse. The wire centers which will have the greatest probable success are those with:

- Flexible switching equipment (ESS)
- Predominantly residential service
- Dedicated or cut-through plant, or cooperation from the assignment office personnel to assign DIPed cable pairs whenever possible
- Low line equipment fill.

A wire center with high equipment fill, electromechanical equipment only partially equipped for TOUCH-TONE service, and with a mix of flat rate and measured service may, on the other hand, have relatively poor success with DIPs.

Cross-Connect Reuse Strategy

5.84 The COSMOS DIP management strategy will be described in the following paragraphs. The DIP strategy can be divided into three parts: (1) DIP creation, (2) DIP reuse, and (3) DIP protection. DIP protection refers to the rules used to keep the DIPed line equipment from being assigned to another cable pair.

DIP Creation

5.85 A DIP will be created (ie, left in) on a disconnect if the line equipment and circuit configuration satisfy certain conditions. Some of these conditions may be specified by the network administrator prior to cut-over. Specifically, the creation of a DIP depends on the following:

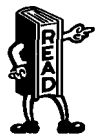
- ***The working frame of the line equipment:*** If the cross-connect appears on a frame for which the DIP feature has been excluded, the jumper will not be DIPed.
- ***The entity of the line equipment:*** DIPs may be enabled on an entity-by-entity basis. If DIPs are not enabled for a particular entity, the jumper will be removed on a disconnect order.
- ***The equipment class-of-service:*** Line equipment with certain specified classes of service may be excluded from the DIP program.
- ***The length of the cable-pair-to-line-equipment cross-connect:*** If the jumper exceeds the user-specified cross-connect length, the jumper will be removed. An upper bound may be specified for each frame.
- ***The load factor of the associated line equipment:*** If the load factor of the line equipment is greater than the upper bound set by the network administrator, the jumper will not be DIPed.
- ***The circuit configuration:*** Any circuit containing elements other than a telephone number, line equipment, and one cable pair will not be DIPed.
- ***Circuits with tie pairs and multiparty circuits will not be DIPed.***
- ***Pending order activity:*** Any circuit which has another pending order such as a cable throw or line-and-station transfer will not be DIPed.

DIP Reuse

5.86 A DIP will be reused on an inward order if the following conditions are met.

- Automatic line equipment assignment has been requested on the order.
- The input USOC and features are compatible with the line equipment associated with the DIP. If the equipment matches the specified USOC and features or can serve them through a permitted cross-load (rotary features on TOUCH-TONE equipment, for example) the equipment is considered compatible.
- The specified telephone number, exchange code, or rate zone can be served by the line equipment associated with the DIP. If the telephone number or exchange code is not specified, a number is chosen which can be served by the DIPed line equipment.
- The load factor of the DIPed line equipment is less than or equal to a specified upper bound determined by the network administrator.

This upper bound can be different from the load factor threshold used to determine whether a disconnect should be left in. For example, the parameters may be set so that a jumper is left in if the load factor of the equipment is less than or equal to eight, and reused if the load factor is less than or equal to five.



If any of the above conditions are violated, the DIP is broken and a new spare line equipment is selected.

DIP Protection and Management

5.87 In the COSMOS DIP strategy, a DIPed line equipment is never selected in a full sequential search. A DIP is only broken automatically when the equipment associated with an assigned cable pair cannot be reused on an order. This situation will appear on work orders (cable throws, line-and-station transfers, etc) as well as service orders. DIPs may also be broken on a bulk basis at the request of the frame personnel.

5.88 The periodic removal of DIPs will be necessary in most central offices because DIPs will tend to be created faster through disconnects than they are broken or reused. Because in most offices the number of spare cable pairs greatly exceeds the number of spare line equipment, a situation can occur in which all spare line equipment in the office become DIPed, unless DIPs are periodically removed from the frame on a bulk basis. Because a DIP can never be broken in a full sequential search, when all or nearly all of the spare line equipment becomes DIPed, the automatic equipment assignment capability is impeded.

5.89 The recommended COSMOS procedure is to remove, weekly or monthly basis, all DIPs which have been in the frame longer than a specified time. This DIP protection cut-off time may vary from one wire center to another, depending on the equipment fill, order volume, and outside plant utilization, but will normally be from one to six months.

5.90 The DIP removal transaction, DPR, will be the primary means of removing DIPs from the frame. This transaction will have two options: (1) list DIPs with specified input conditions (for example, frame zone, creation date, class of service), or (2) a list-and-remove option whereby the DIPs are broken in the facility files and made available for assignment. DPR can also be used to remove specific DIPs, by specifying the OE or CP.

5.91 The recommended procedure for the use of the DIP removal transaction will be to periodically remove all DIPs which were created before a given date (say 60 days in the past) using the DPR transaction. The DPR transaction is run first using the list option. The frame person then removes the DIPs on the list, and either completes each removal separately with DPR, or runs DPR on a range when the "remove" option is finished.

5.92 Whenever a DIP is broken, except manually with transaction DPR (DPR has its own output for jumper removal), the frame will receive frame output. An order to break a DIP will occur when:

- A DIPed cable pair is used on an inward assignment but the associated equipment cannot be used.
- A cable pair transfer occurs on a DIPed cable pair. This can occur in a cable throw or a line-and-station transfer.
- A DIPed line equipment is specified on a service order or an LET.

5.93 The order to break the DIP is generated immediately and the CP-OE association is broken in the facility files. If the order which causes the DIP to be broken is withdrawn, the DIP will not be reconstructed.

5.94 It is very important that the break-DIP messages from COSMOS be worked as soon as possible after they are received. Since these facilities become spare immediately, the line equipment associated with the broken DIP can be reassigned on another order.

Withdrawal and Modification of Orders Involving DIPs

5.95 On the withdrawal or modification of a service order, if the DIP has been broken by the service order, it is not reconstructed by the withdrawal. If a DIP is reused on a new connect order, it will go back to DIP status after the withdrawal of the order.

5.96 When a new connect order is cancelled, withdrawn, or modified, the frame person should locate the original order to see if the cross-connect was a reused DIP. If so, the jumper should not be pulled out. If the original order cannot be found, SOI can be used to inquire on the order.

Assignment Change Tickets

5.97 In the case where a DIP is being reused on a new connect order and the cable pair or line equipment is changed on an ACT order, the DIP status is removed from the cable pair and line equipment. A message is sent to the frame, and a new cable pair or line equipment is assigned. If the cable pair or line equipment which is assigned on the ACT is DIPed, the DIP will be broken immediately and a message to break the DIP will be sent to the frame. The change ticket will be established in the usual manner.

Maintenance Change Tickets

5.98 If a cable pair or line equipment which is DIPed is to be used in a maintenance change ticket order, the DIP will be broken automatically and an order with today's due date will be sent to the frame to break the DIP. The DIP will remain broken if the MCT order is withdrawn. The order type and order number on the frame output to break the DIP will be that for the MCT order.

Work Orders—Cable Throws, Reconcentration Orders, LSTs

5.99 When the FROM side is working or defective and the TO side is DIPed, the DIP must be broken. In all other cases, the DIP will be left in place, and no back tap work or data base changes are required.

Line Equipment Transfers

5.100 If a DIPed line equipment is assigned (on a forced assignment, for example) the DIP will be broken first automatically, and a message sent to the frame. The order will be established in the usual manner. If the order is withdrawn, the DIP will remain broken.

Frame Output

5.101 The frame output to break a DIP has the same format as the standard frame output. The order number and the order type on the output page is the same as the order number and order type of the order which causes the DIP to be broken. There are three designations which can appear on the output: (1) IDIP, leave a disconnect in place; (2) ODIP, remove the DIP; and (3) RDIP, reuse the DIP. These designations will appear on the right-hand side of the cable pair and line equipment lines.

Frame Procedures

5.102 The frame person must refer to the DIP designations on the order to determine the action to be taken. In case of a withdrawal or cancellation, if the order has been received at the frame, a withdrawal notice is printed out, and received on the next FOR output. When this notice is received, the frame person must find the original order. If the order is one which reuses a DIP, the CP-OE cross-connect must return to the DIP state at the frame. A general rule applies here. Any DIP which is broken by an order remains broken if the order is withdrawn. Any DIP which is reused by an order goes back to the DIP state if the order is withdrawn.

5.103 A possible problem may exist in the interaction between an assignment change ticket and service order withdrawal. If an ACT is used to change the cable pair on an order which reuses a DIP, and the order is later withdrawn, the CP-OE cross-connect which was originally DIPed will become spare after the withdrawal. If the frame person has already done the work associated with the ACT, this is exactly what is desired, since he should not have to reconstruct the original DIP. If he has not done the work associated with the change ticket before the withdrawal notice is received, it must be remembered that in this case the cross-connection is to be pulled out.

Breaking a "Pending DIP"

5.104 When a disconnect order creates a DIP, the ultimate status of the CP and OE becomes "LI" (left-in), and the frame output indicates that the jumper is "IDIP". If another order, such as a new connect, then breaks the "pending DIP" before the disconnect is completed,

one of two things happens in the computer. If the frame output for the disconnect has not been obtained with transaction FOR, the computer erases the "IDIP" message on the frame output for that order. If the order has already been printed, the computer issues a separate "break-DIP" message to the MDF. In both cases, the ultimate status of the CP and OE is changed from "LI" to "SF."

B. DIP Processing

5.105 One of the advantages of COSMOS is that left-in jumpers are reused whenever possible, because reuse eliminates superfluous work and reduces the possibility of wiring errors.

5.106 To take full advantage of the DIP capabilities a group of parameters must be set that determine when a DIP will be created and when a DIP will be reused. Periodically, DIPs must be removed so that a sufficient amount of line equipment is available for assignment. If the pool of assignable line equipment is insufficient, load balance suffers, search times increase, and short-jumper assignments are less likely.

5.107 When a disconnect service order (SOE or CSA) is processed, a DIP will be created if the line equipment satisified the appropriate conditions and the jumper does not exceed a specified length. For each switching entity that is to have DIPs, the following parameters must be set:

- Load factor
- Equipment class of service
- Frames.

The jumper length must be set for each frame. Independently, the load factor for reusing DIPs is set for each switching entity. Besides creating DIPs, service orders use and break DIPs; work orders, such as cable transfers, also break DIPs.

5.108 Management of DIPs is a three part job:

- Initially establish and set DIP parameters
- Monitor results
- Administer DIP removal when necessary.

5.109 A few transactions have been provided to enable the frame supervisor, in conjunction with the network administrator, to manage DIPs. The following four frame reports show DIP statuses:

(1) OPN: Open of Day Report

(2) CSR: Cable Status Report

(3) ESR: Equipment Status Report

(4) LCP: List Cable Pairs.

Three DIP manipulation transactions are available:

(1) UDP: Update DIP Parameters

(2) DPR: DIP Report and Removal

(3) MEC: Manually Establish a Circuit.

The frame order report (FOR) and the cable transfer work list printout (CTP) both show all required actions to create, reuse, or break DIPs. All service order and work order inquiry transactions also show the left-in status.

5.110 The establishment of service orders and work orders and the modification or withdrawal of these orders may break DIPs. In some cases the left-in jumper must be removed; in other cases the jumper may be removed or the status of the OE-CP may be restored to LI. The procedures for each case will be described in Part F, Processing Orders with DIPs.

C. Creation of DIPS

Required Actions

5.111 Basically the creation of DIPs is a two step process.

(1) Determine entities which are to have DIPs and then select for each entity: a load factor, classes of service, and frames. For each chosen frame select a jumper length.

(2) Set the DIP parameters with transaction UDP; that is, enter:

(a) A load factor for each entity

(b) Each equipment class of service for each entity

(c) Each frame for each entity

(d) A jumper length for each frame.

Notes: 1. An entity denotes the division of line equipment by type and group. Types are: ESS, 1XB, 5XB, and SXS; groups are CG and MG.

2. The load factor is the maximum load factor which a load group may have for an OE to have its OE-CP cross-connection left in on a disconnect order.

3. The jumper length specified is the maximum length of a CP-OE cross-connection which will be left in by a disconnect order.

Conditions Precluding the Creation of DIPs

5.112 DIPs are never created if:

(1) The working frame location of the OE does not correspond to the frame name

(2) The circuit contains elements other than a TN, OE, and one CP

(3) The jumper is in a multiparty circuit

(4) The circuit has a pending order such as a cable transfer

D. Reuse of DIPs

5.113 Transaction UDP is used to set the upper bound of the load factor for each entity. A separate bound is specified for each entity, and may be different from the load factor set to create DIPs.

5.114 DIPs are reused on inward orders when the equipment class of service and features of the line equipment are the same as those requested on the service order, or can be matched by allowable cross loading. The rules for cross loading are the same for DIPed and non-DIPed OE, except loop-start to ground-start and ground-start to loop-start is not permitted for DIPed OE.

E. Removal of DIPs

5.115 Transaction DPR, DIP Report and Removal, is used to break (remove) DIPs. Up to 15 cable pairs or items of line equipment may be specified at one time.

5.116 When option R (the DIP removal option) is used, the DIP status is changed to spare immediately upon running DPR; therefore, only disconnect as many DIPs as will physically be disconnected on the frame. To do otherwise will cause data base inaccuracies. Option L (list DIPs) may be used to obtain a list of DIPs to be removed and then after physically removing the DIPs, use option R to change the COSMOS data base.

5.117 The DIP parameters are changed with transaction UDP. New parameters are entered in the same way as the initial parameters. Each parameter for each entity is changed separately.

F. Processing Orders with DIPs

5.118 Wiring information pertaining to DIPs can be produced by service orders and work orders. DIPs are created only by complete disconnect service orders. New connect service orders use and break DIPs and all work orders and other types of service orders can, and do, break DIPs.

Create DIPs

5.119 Transaction FOR output for all disconnect orders that create DIPs will have the notation to leave a DIP. The notation is IDIP on the line equipment line and cable pair line.

Reuse DIPs

5.120 When a new connect order uses a left-in cross-connection, the notation RDIP appears on the OE and CP lines of the FOR transaction output.

Break DIPs

5.121 The message to break DIPs is also printed by transaction FOR. When a new connect service order cannot reuse the line equipment associated with the DIPed cable pair a message is immediately (on the next FOR output) sent to the frame to break the DIP. This DIP should be removed when the message is received since the

status of the line equipment is spare and it may be used by another service order or work order. The new order will not indicate that the OE previously was DIPed. The order to wire the new connect will appear as a separate output.

5.122 Any service order modification or work order may also cause a DIP to be broken. Transaction FOR will give this information.

5.123 All of the above orders are COSMOS processed exactly as ordered for non-DIPed cable pairs. There are two times when a different processing sequence is required: (1) when an order breaks a DIP and the order is subsequently canceled or withdrawn, and (2) when a DIP is reused on a new connect order and the order is subsequently withdrawn.

5.124 In case one there are two possibilities; either the DIP was physically broken and no work is required, or the DIP is still in place. If the DIP is still in place there are two choices of actions:

(1) Remove the DIP

(2) Leave the DIP in place and recreate the circuit in the COSMOS data base with transaction MEC.

5.125 In case two, the CP-OE goes back to DIP when the order is withdrawn or canceled. The original order should be checked or transaction SOI used when a withdrawal is given. If the CP-OE was DIPed, the heat coil should be removed and the jumper left in place.

G. Explanation of Transactions UDP and DPR

Transaction UDP

5.126 All DIP parameters are set or determined with transaction UDP. All parameters except jumper length are set for each switching entity. The jumper length is set for each frame.

5.127 Transaction UDP operates in a conversational mode; after each H line the computer responds with the value specified or the value of the parameter that was requested.

Transaction DPR

5.128 DIPs are listed or listed and removed with transaction DPR. Transaction DPR can be used in three ways:

(1) List DIPs by switching entity and creation date

(2) List and remove DIPs by switching entity and creation date

(3) Remove specific DIPs.

In (1) and (2) above, the DIP output can be further restricted by frame location and/or equipment class of service.

TRAINING

5.129 It is suggested that all management and craft personnel involved in COSMOS attend Plant Training Course 51 (PTC-51) prior to COSMOS conversion.

EVALUATION OF PERFORMANCE

5.130 The evaluation of performance will be supplied when this section is reissued.

6. APPLICATION IN THE REPAIR SERVICE BUREAU (RSB)

GENERAL

6.01 This section provides general information on inquiries on circuits in the COSMOS data base, the establishment of Maintenance Change Tickets (MCT) and COSMOS-ANALIT (Analysis of Automatic Line Insulation Tests) module designed for analyzing automatic line insulation test (ALIT) data generated by line insulation test (LIT) frames. The COSMOS-ANALIT programs are quite distinct from the traditional ANALIT programs. The COSMOS-ANALIT module uses existing COSMOS facility files to relate ALIT subscriber line data (line equipment or telephone numbers) to cable pairs. The COSMOS-ANALIT module also maintains cable failure histories and provides ALIT data analysis reports.

A. Inquiries

6.02 Listed below are several inquiries the RSB may make into COSMOS with the following transaction codes:

- Service Order Inquiry (SOI)—This inquiry will with correct Header (H) line input print a pending or completed service order and/or the related order.

- Inquiry-Short Form (ISH)—This inquiry with correct H line input prints statuses, remarks, dates, MDF locations, telephone number type, billing telephone number, tie pair "from" and "to" facilities, universal service order code, class of service, features, etc.

- Check Cable Pairs (CKC)—This inquiry lists the status, remarks, and certain associations for all cable pairs within a specified range.

- Spare Cable Pair Inquiry (SCI)—This inquiry provides a list of spare cable pairs and also indicates the cable pairs that are dedicated inside plant (DIP), which can be reused.

The above transaction codes and their use may be found in the COSMOS User Manual (PA-6P031).

B. Maintenance Change Tickets

6.03 Maintenance Change Ticket (MCT), transaction code MCE in COSMOS, may be made by the RSB, AO, or MDF. The maintenance change ticket can switch any physical facility on a circuit. The telephone number, features, customer class of service or rate zone cannot be changed since they are not physical facilities on the circuit. The incoming facility must have spare reserved or DIP status.

6.04 Maintenance change ticket, withdraw transaction code MCW, can be made by the RSB, AO or the MDF when a MCT was established in error. If the withdrawal is made by the RSB or AO, COSMOS prints out the MCT at the MDF with a cancellation message.

6.05 Maintenance Change Ticket List, transaction code MCL, may be made to obtain a list of all maintenance change tickets and their due dates in COSMOS.

6.06 Maintenance Change Ticket Monthly Report, transaction code MCR, is used to count the number of maintenance change tickets completed.

> ***CAUTION: The use of this transaction will zero out the counter of MCT completions automatically. Therefore, this transaction should be used only once every month on a fixed day of the month if a true monthly count is desired.***

6.07 The above maintenance transaction codes and their input into COSMOS may be found in the COSMOS User Manual (PA-6P031), Plant Reference Manual (PA-6P033), and COSMOS ANALIT Manual (PA-6P013).

C. COSMOS-ANALIT

6.08 The COSMOS-ANALIT module is designed for use by the Repair Service Bureau in analyzing automatic line insulation test (ALIT) data generated by the line insulation test (LIT) frames. The COSMOS-ANALIT module maintains subscriber cable failure histories and provides various ALIT data analysis reports.

HARDWARE SYSTEM

6.09 COSMOS is implemented on a Digital Equipment Corporation (DEC) PDP 11/45 or 11/70 computer system. This hardware system includes moving head disks (up to eight 88 million byte disks), a high-speed paper taper reader and a DATAPHONE terminal network connected to data multiplexers. Moving head disk space required for COSMOS-ANALIT files is estimated to be about 4 percent to 5 percent of disk space allocated for the wire center line equipment file(s).

APPLICATION

6.10 The COSMOS-ANALIT module is designed for wire centers administered by COSMOS. This module analyzes ALIT data obtained from LIT frames of No. 5XB, No. 1XB, and step-by-step switching machines and the ALIT program in the No. 1 ESS. The COSMOS-ANALIT programs are quite distinct from the traditional ANALIT programs that are currently available through several commercial time-sharing computer vendors. ALIT data analysis reports provided by the commercial ANALIT contain either line equipments or telephone numbers of the subscriber lines. The RSB manually

translates this subscriber line data to subscriber cable pairs. However, the COSMOS-ANALIT generates various ALIT data analysis reports with subscriber cable pair data. Further, COSMOS-ANALIT is designed to monitor the operating conditions of pressure contactors (or pressure transducers) which are connected to subscriber lines.

PLANNING

6.11 Factors which should be considered in the planning of COSMOS-ANALIT are the software capabilities, the operational impact, the environmental requirements for the hardware, and the economic considerations.

SOFTWARE CAPABILITIES

6.12 The COSMOS-ANALIT module software capabilities are described in the following sections.

- Transmission of ALIT data to COSMOS
- ALIT data analysis reports
- Cable failure summary reports

Transmission of ALIT Data

6.13 COSMOS accepts a paper tape containing ALIT data obtained from LIT frames of electromechanical switching machines or the ALIT program of No. 1 ESS. ALIT indications are also acceptable to COSMOS for various tests in step-by-step, No. 1 and No. 5XB offices.

6.14 The RSB obtains various ALIT data analysis reports using a COSMOS terminal located in the RSB.

6.15 Two options are available to the RSB for processing ALIT data:

(1) ALIT data are used to update the permanent LIT history file

(2) ALIT data pertain to tests conducted on a temporary basis and are not to be used to update the permanent LIT history file.

ALIT Data Analysis Reports

6.16 ALIT data analysis reports are based on indications maintained in the permanent ALIT history file. The following four different types of ALIT data analysis reports can be obtained from COSMOS-ANALIT:

(1) Band Zero Report

(2) "Indications-to-Test Report" (for most recent input)

(3) Complete "Indications-to-Test" Report

(4) Contactor-Transducer Report.

6.17 Management of the permanent history file is based on a parameter called retention factor (RF). If no ALIT data are recorded for an individual cable pair in the permanent LIT history file within RF days from the last indication, the ALIT history record for that cable pair will be purged from the permanent ALIT history file.

6.18 Subscriber lines to be listed on the "Indications-to-Test" Report are identified with the help of a parameter called the print threshold parameter. Only those subscriber lines with the number of ALIT failures equal to or greater than the value of the print threshold are listed in the "Indications-to-Test" Report.

6.19 The Band Zero Report prints the LIT history of all the subscriber lines that have returned a zero-test-band from the most recent ALIT test.

6.20 The current "Indications-to-Test" Report provides ALIT histories of subscriber lines that satisfy the following conditions:

(1) An ALIT failure was returned from the most recent test

(2) The number of LIT failures recorded in the history file is greater than or equal to the print threshold.

6.21 The complete "Indications-to-Test" Report provides an ALIT history of ***all*** the subscriber cable pairs or pairs in a ***given cable*** that meet the print threshold requirements.

6.22 The Contactor-Transducer Report displays details of subscriber lines which have: (a) returned test band values lower than the normal band values or (b) have contactors but did not return an ALIT indication.

Cable Failure Summary Reports

6.23 The following two cable failure summary reports can be obtained from COSMOS-ANALIT:

(1) ALIT cable summary by 100-pair complements and ALIT demand test

(2) Line Failure Report (for No. 1 ESS only).

6.24 These reports provide a list of 100-pair complements that have cable pairs with an ALIT history. The first report lists the total number of cable pairs in each 100-pair complement that have a permanent ALIT history. The second report provides a history of line failure messages (such as showering line failure, power cross failure, etc) by cable complements for subscriber lines terminated on No. 1 ESS equipment.

OPERATIONAL IMPACT

6.25 COSMOS-ANALIT will have an effect on the RSB operations only. Since COSMOS-ANALIT provides ALIT data analysis reports with subscriber cable pairs, the RSB will realize a reduction in the man-hour requirements for processing ALIT data. Also, the RSB can either eliminate or simplify manual records of cable failure summaries that are being maintained for analysis purposes. COSMOS-ANALIT maintains cable failure histories and provides ALIT data analysis reports with subscriber cable pairs. These features generate savings in two major areas:

- Man-hours spent in processing ALIT data will be cut by 80 percent to 90 percent
- Elimination or simplification of manual records of cable failure summaries that are being maintained in the RSB.

COSMOS-ANALIT IMPLEMENTATION

6.26 The COSMOS-ANALIT module consists of the following nine transactions:

(1) LIN—Transmit ALIT data to COSMOS

(2) TET—Display and/or change the band filter file, retention factor, or print threshold

(3) BYF—Display the bypass file

(4) BYP—Change the contents of the bypass file

(5) CTF—Display the contactor-transducer file

(6) CCT—Change contents of the contactor-transducer file

(7) CLI—COSMOS processed ALIT reports

(8) LCD—LT cable summary by 100-pair complements, LIT demand test

(9) LFR—Line failure report.

Operational Transactions

6.27 These are COSMOS-ANALIT operational transactions. Before using these transactions, the AL file (or ANALIT file) must be initialized in COSMOS data base. The AL file contains the following as subfiles:

(a) NXX-LIT frame table

(b) No. 1XB conversion table (for No. 1XB ALIT only)

(c) Bypass file

(d) Band filter file

(e) Contactor-transducer file.

6.28 Two additional transactions ***(ALI*** and ***ALIT)*** are provided for initializing the AL file in the data base of a given wire center.

6.29 COSMOS version 5.0 and later versions of COSMOS contain the COSMOS-ANALIT module as an optional feature. COSMOS-ANALIT is operational after completion of AL file initialization in the data base of a given wire center.

DOCUMENTATION

6.30 The following documents are available through Western Electric Company by specifying document number and quantity desired. Orders

should be placed on a standing order basis and updates will be automatically distributed.

Western Electric Company, Inc.
Reproduction—Dept. 4236-2
Bldg. 23-6
Hawthorne Station
Chicago, Illinois 60623

(a) ***General Document*** ***PA Number***
COSMOS-ANALIT PA-6P013

(b) ***Drawings***
J1P015G-1 COSMOS: Equipment—Software Requirements

(c) ***Ordering Information***
Questionnaire for COSMIC/COSMOS, E-8113, Western Electric, WE Service Division

TRAINING

6.31 The training requirements will be supplied when this section is reissued.

A. Management

6.32 Management training requirements will be supplied upon reissue of this section.

B. Craft

6.33 Craft personnel training requirements will be supplied upon reissue of this section.

7. APPLICATION IN OUTSIDE PLANT ENGINEERING

GENERAL

7.01 This section provides general information to be used by the Outside Plant Engineering Department when querying the COSMOS data base. Reference should be made to the User Manual PA-6P031 and the Outside Plant Operations Training Manual PA-6P036. The User Manual is a reference guide to ***all*** COSMOS transactions. The Outside Plant Operations Training Manual describes COSMOS use in exchange layout operations involving cable pair transfers.

SYSTEM DESCRIPTION

7.02 COSMOS is a mechanized record and assignment system designed to maintain accurate records regarding MDF facilities and circuits and to efficiently administer preferential assignment of exchange facilities.

7.03 COSMOS maintains a record of all line equipment, all underground cable pairs, and all telephone numbers served by the wire center. COSMOS was basically designed to mechanize MDF operations and to interface with the existing manual environment.

7.04 COSMOS is implemented in a "minicomputer." The computer is physically housed in the wire center or an associated location and is in communication with various operational departments of the company via a terminal network. COSMOS is a real-time computer system that has applications programs which provide a variety of services to the users, and which may be addressed by means of a series of transactions.

INTERACTION WITH COSMOS

7.05 It is possible to communicate with COSMOS via a computer terminal.

7.06 To interact with COSMOS:

(1) Turn on the terminal and gain access to the computer. The procedure for logging onto the computer is discussed in the Plant Reference Manual and the User Manual.

(2) Type a transaction code of three characters. Each transaction is designed to perform certain functions. This document contains the functional description of the transactions to be used. For example, transaction CTS will be used to obtain a printout of the cable transfer summary.

(3) Provide COSMOS with the additional information it needs to respond to your request. This information must be typed in a specific format. Formats associated with each transaction code are explained in detail in the Plant Reference Manual and the COSMOS User Manual.

7.07 The data sought will be received if the proper communication is established with COSMOS. If the details are not typed in the proper format, the computer will state that an error has been made.

INQUIRIES—REPORTS

7.08 Inquiries and reports requested from COSMOS by the engineering forces will present a substantial time and money saver. Listed below are some of the transactions and their codes useful to engineering.

TRANSACTION	CODE
Monthly Defective Cable Pair Summary	MDS
Monthly Defective Cable Pairs Identified	MDI
Monthly Defective Cable Pairs Recovered	MDR
Monthly Defective Cable Pairs List	MDL
Summary of Cable Pair Usage	SCU
Analyze Cable Complements	AZC
Check for Vacant Cable Pairs	SCI
Check for Cable Pair Status, Remarks, and Associations	CKC
List Cable Pairs, FROM and TO Prior to Cable Transfers	LCP
Outside Plant Cable Record Inventory System	OPC
Cable Status Report by Modules	CSR
Commercial Growth Forecast	—
Special Services (Designed Circuits)	—
Annual Year End MDF Count of Working Pairs or Stations	—

8. OTHER FUNCTIONS

A. Data Conversion Methods

8.01 In performing its functions of service order assignment and facility management, COSMOS utilizes a system of files and tables known as the data base. The data base contains information relating to central office facilities and working line associations. It is the basic source of data for all of the operational transactions and reports.

8.02 The process of building this data base from telephone paper records is known as data conversion. It is basically a process of taking information from manually maintained plant and traffic records, purging the errors and conflicts, and inputting it to the computer.

8.03 Great attention must be paid to procedures for gathering data and the sequencing of inputs. PA-6P020, Data Conversion Position Practice, covers all phases of data conversion from preliminary planning and initialization through preoperation system configuration and cut-over procedures.

8.04 PA-6P020-J, Data Conversion User Manual, complements these position practices by specifying the detailed rules governing the use of data conversion transactions. Since some data conversion transactions are significantly different from application transactions of the same name, care must be taken not to confuse PA-6P020-J with PA-6P031, COSMOS User Manual.

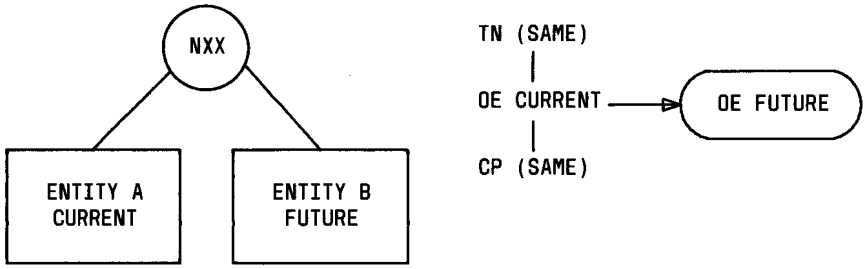
B. Use of the Dial/Frame/Area Transfer Capabilities

8.05 The COSMOS dial transfer module is a system of programs which provide line assignments and frame work lists for dial projects. The system is designed for use in either new or existing COSMOS wire centers to manage subscriber line transfers performed in a variety of environments. For additional information see PA-6P048, Dial Projects Practice.

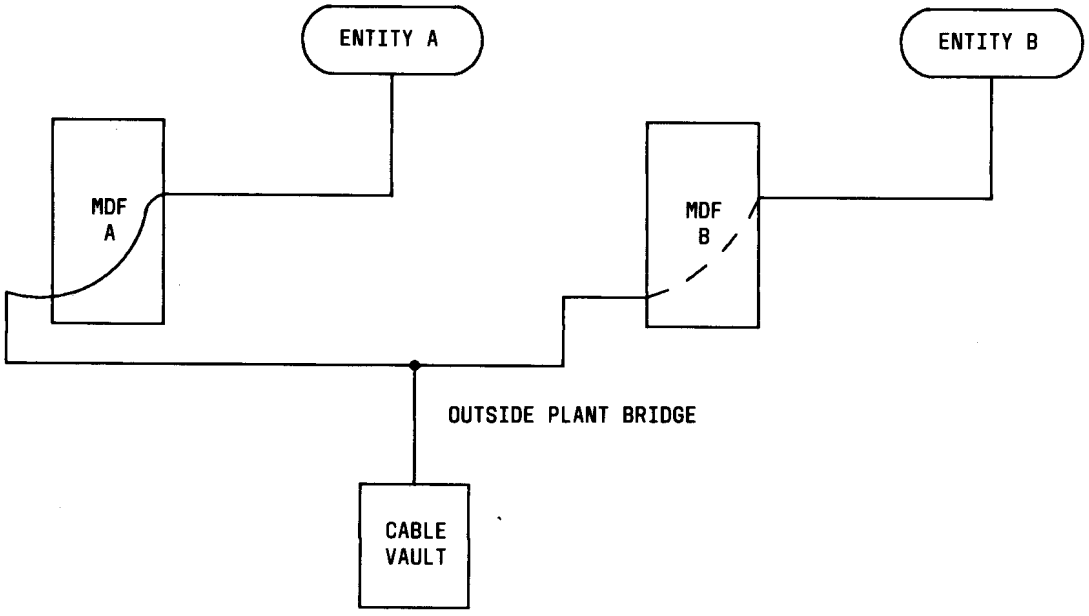
8.06 The dial transfer module can be applied in general to any central office rearrangement requiring mass assignment of line equipment. Some typical applications are described in the following paragraphs.

Dial-For-Dial Replacements

8.07 A dial-for-dial or switch replacement is defined as the transfer of an NXX code from one switching entity to another. One or more NXX codes may be involved in any given switch replacement; however, within each NXX, the working lines must be moved in their entirety. Generally, assignments are made in TN sequence on a change order basis.



8.08 Typically the new switching entity will be terminated on a new MDF, although this is not necessarily the case.



8.09 The effects on the facilities managed by COSMOS are as follows.

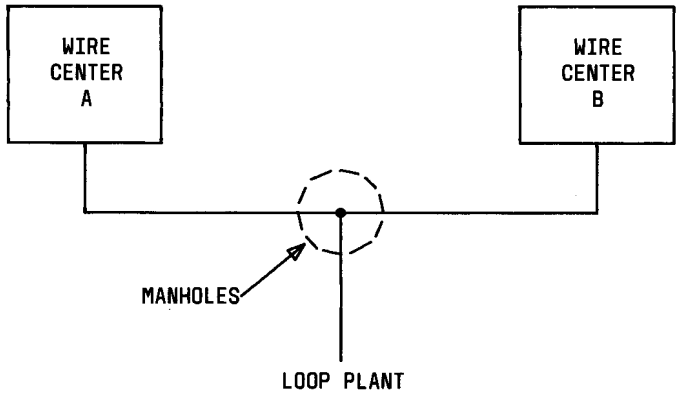
- TNs usually remain the same (WK) although numbers may optionally be added (RS-PC) or dropped (WK-PD).
- TRs may be added for new MLHGs or replaced on control group to control group transfers.
- HTs may be preserved or replaced by MLHGs.
- OEs are replaced by new OEs. The OE in the existing circuit has status WK-PD; the new OE is given status SF-PC.
- CPs may change frame (WK-PC) or may remain on the same frame (WK).
- TKs and CONs are usually reused.
- SEs may be added, deleted, or reused.
- BLs may be reused, dropped, or manually assigned.
- TPs are assigned automatically where necessary.
- XNs, RLYs, and MRs are usually dropped unless they are required in the "to" entity.
- PTYs are preserved.

8.10 The most popular switch replacements are SXS to No. 1 ESS; however, the "from" or "to" switching type is immaterial to COSMOS. Assignments can be made with any combination of the following sets.

From	To
SXS	ESS
PANEL	5XB
1XB	1XB
5XB	SXS
ESS	

Area Transfers

8.11 An area transfer is defined as the movement of lines from one wire center to another as illustrated schematically below. The move may be associated with the building of a new wire center or the recentering of existing centers.



8.12 If the "from" wire center is administered by COSMOS, then the dial transfer program will provide input generation for the affected lines, dead jumper lists, and circuit disconnects; otherwise, no action is taken in the "from" wire center.

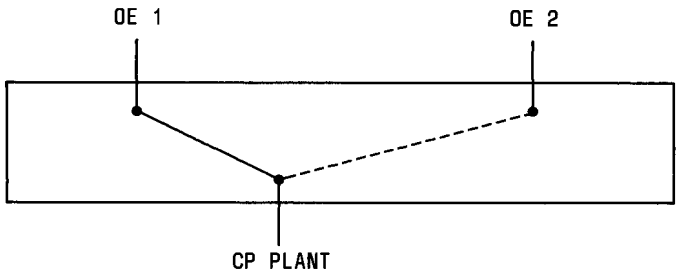
8.13 Assignments in the "to" wire center are generally made in CP sequence on a new connect order basis. Input for the assignment program is generated automatically if the "from" wire center has a COSMOS data base; otherwise, in the absence of an existing COSMOS, the input is prepared manually.

8.14 In an area transfer, the facilities managed by COSMOS are affected as follows.

- TNs usually must be assigned to the transferred lines. The four-digit line number may be preserved if a growth NXX is opened. All seven digits of the TN may require changing if assignments are made into an existing NXX.
- OEs are assigned on a new connect basis.
- CPs may be renumbered, combined, split, or remain the same.
- TPs are assigned automatically where required.
- BLs, TKs, CONs, and SEs must be manually assigned.
- PTY positions must be manually declared.

Line Regroupings

8.15 A line regrouping is defined as the rearrangement of subscriber lines within a switching entity where telephone numbers, cable pairs, and entity are preserved as illustrated schematically below. Line regroupings are generally undertaken to provide better load balance or to retire certain portions of an entity.



8.16 Regrouping assignments are generally made in OE sequence on a change order basis. COSMOS provides capabilities similar to the case of a switch replacement. Assignments may be established and completed on a gradual basis or "flash" cutover basis.

Large Service Orders

8.17 Large new-connect orders or change type orders can sometimes be managed more conveniently using COSMOS dial transfer programs rather than service order processing. The key

considerations in determining whether to use the dial transfer programs for service order processing are as follows.

- ***Size:*** Generally greater than 100 lines and yielding significant savings when on the order of 1000 lines.
- ***Type:*** New connect, change, or complete disconnect ***only.***
- ***Time span:*** Long time interval between establishment and completion.
- ***Frame work:*** Provided as running list rather than individual circuit work lists.
- ***Limitations:*** No service order record or inquiry capability. No MDF completion. No work order interaction permitted.

Frame Transfers

8.18 Specialized COSMOS frame transfer programs are provided for frame to frame transfers. These differ from the dial transfer functions in the following ways:

- Line equipment is typically not assigned.
- Circuits are thrown gradually without any long period of pending activity.
- The dial transfer programs do not provide any discrimination with respect to move-as-is jumper length.

For these reasons, frame transfers are administered using the specialized COSMOS transactions ***FTR, MVE,*** and ***MVL.***

8.19 The COSMOS dial transfer program may be useful after all short jumper circuits have been transferred "as-is", the tie pair distributing frame has been reasonably utilized, and ***all*** of the remaining circuits transferred with a change of line equipment. Under these conditions, dial transfer procedures similar to those used for line regroupings can be used to obtain line equipment assignments for either a sequence of CPs or OEs.

C. Computer Operation

8.20 The computer system hardware is discussed in paragraphs 1.123 through 1.144 and the computer operator responsibilities are discussed in paragraph 2.17.

8.21 PS-6P010, Computer Position Practice, describes the various hardware which make up the COSMOS system and the procedures for starting, operating, and stopping the system (hardware and software). A description is also given on each transaction required to operate the system and an appendix that contains maintenance information for trouble-shooting when a malfunction occurs.

D. Operational Trouble Report System and WE Support of COSMOS

8.22 General Letters 76-05-093 and 76-12-151 introduced two Bell System Practices that provided instructions for the preparation and dissemination of reports documenting routine minicomputer maintenance activity in the operating companies. These reports provide the operating companies, Bell Telephone Laboratories (BTL), and Western Electric (WE) with specific information on the overall performance of Operational Support Systems and their major components, as well as the performance of the various maintenance organizations.

- Section 190-001-000 furnishes instructions for the completion of forms documenting maintenance on minicomputer systems and subsequent forwarding to the centralized Bell System data base at BTL. These forms include an Inventory Form, Activity Report Form, and Minicomputer System Activity Log.
- Section 190-001-002 furnishes instructions for the completion and forwarding of a Minicomputer Repair Report. This report will be prepared only in those cases where the minicomputer is being maintained directly by the operating company rather than through a vendor conract.

8.23 General Letter 76-11-172 provided an expedited procedure for reporting design problems in standard Operations Support Systems. This operational trouble report (OTR) procedure should

be used to report software and/or hardware design problems in the COSMOS system. OTRs should be prepared on any unusual actions observed in the system operation. They should be prepared on hardware as well as software items or on items of uncertain or mixed causes. They should cover all aspects of the system, be they operational, maintenance, or administrative problems. The OTR may be prepared for enhancement items which are not related to the present system design, but should be identified as an enhancement. Other items not related to present system design, such as purely administrative routines, human safety problems nonrelated to system operating design, etc, should not be included in the OTR procedure. A mechanized procedure exists to transmit COSMOS OTRs to the WE Product Engineering Control Center (PECC) via TTY input. All OTRs should be reviewed by the COSMOS data base manager prior to submittal. Each OTR is analyzed and corrective action taken if necessary by the WE PECC and BTL. In addition, OTRs are analyzed and categorized for the recognition of common problems. Additionally, copies of all OTRs should be sent to the WE Regional Installation Engineering Department.

8.24 The WE Regional Installation Engineering Department is also available to support COSMOS operations. Any operational problems, procedural problems, or requests for assistance should be directed to this support group. Problems which are unable to be handled by the group may be referred to the WE PECC "hot line" for assistance.

9. CONDUCTING AN OPERATIONAL REVIEW

9.01 The Operational Review will be supplied as a separate section in the Bell System Practices Division 190.

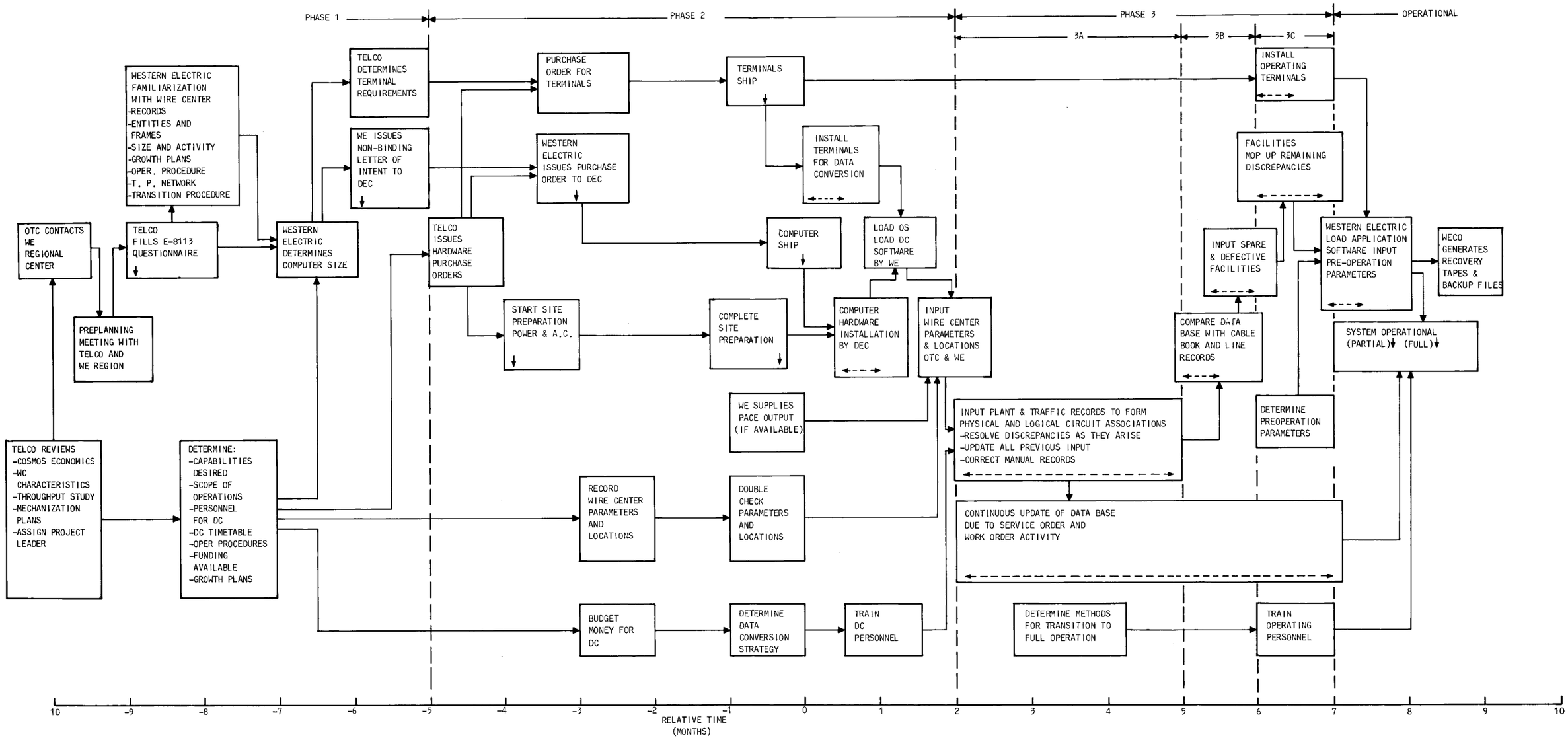


Fig. 1—PERT Chart for Initial COSMOS Installation (1.56)

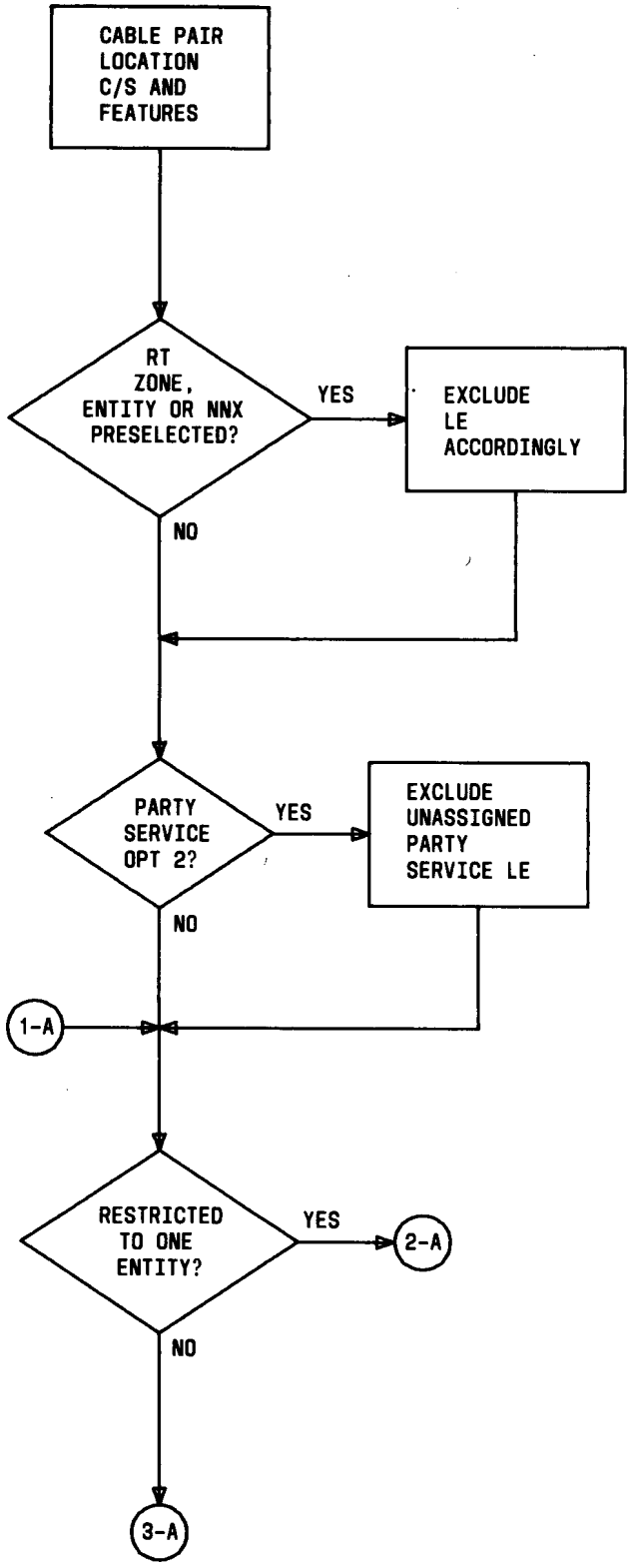


Fig. 2—COSMOS Line Equipment Assignment (4.63)

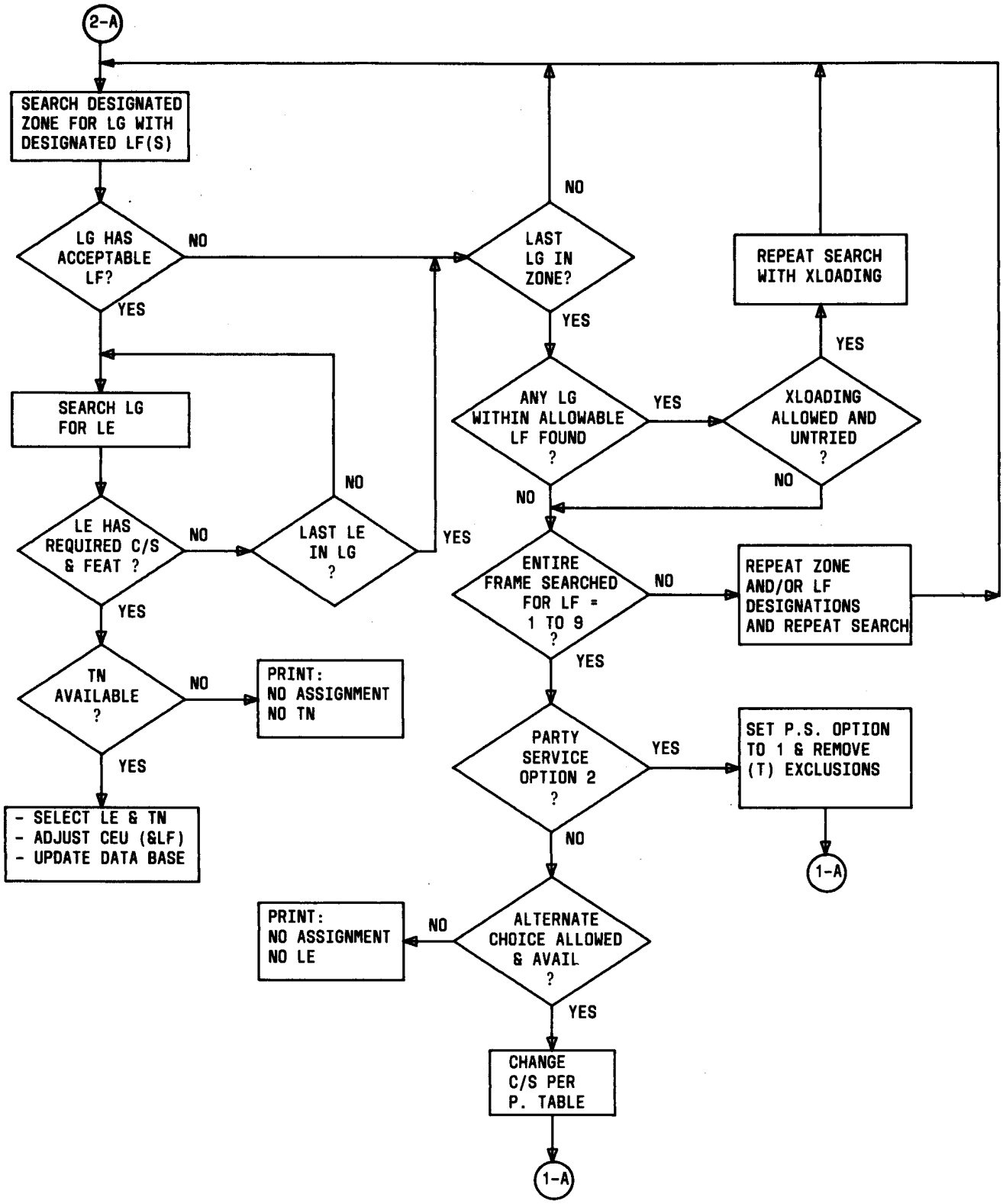
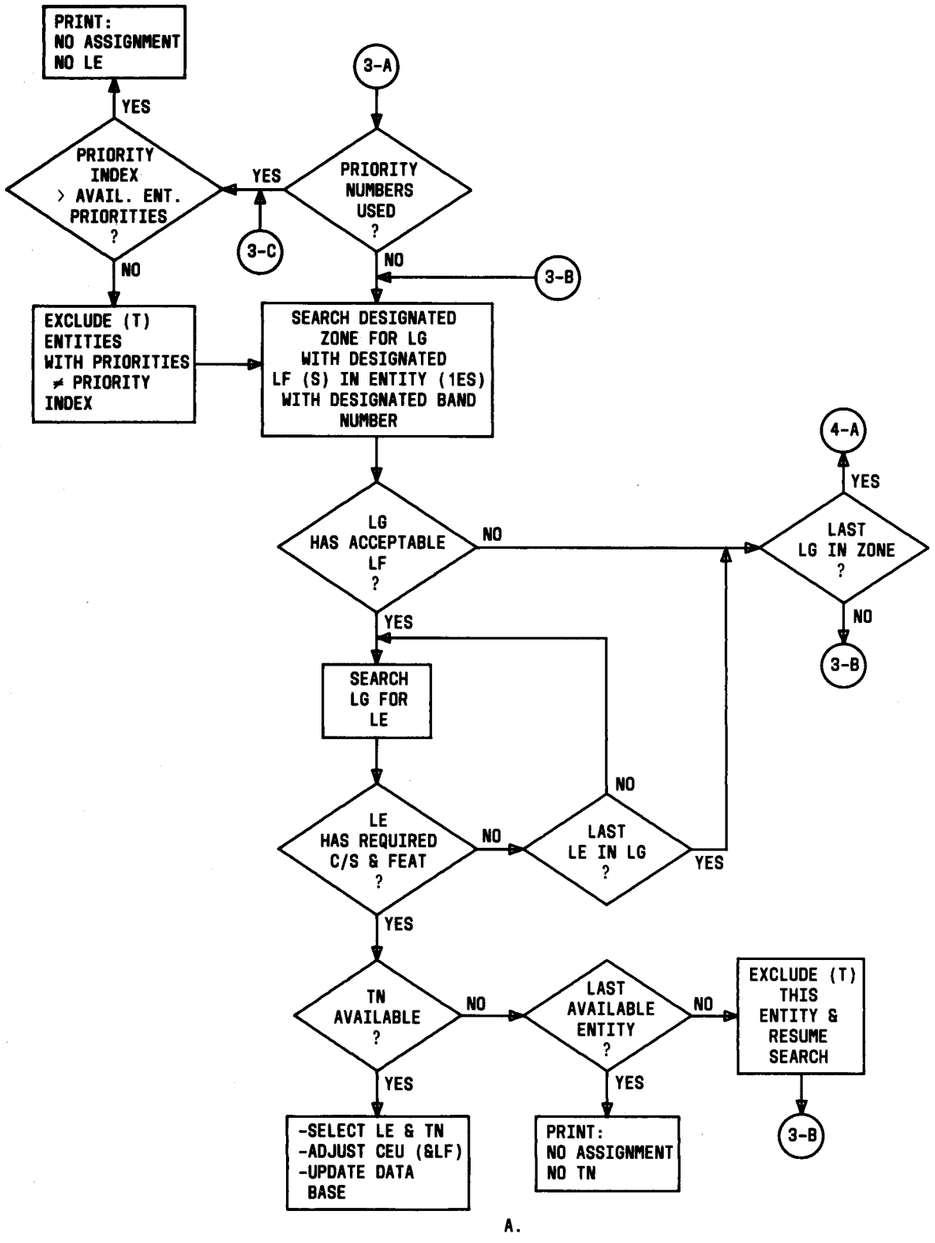


Fig. 3—COSMOS Line Equipment Assignment (Single Entity) (4.63)



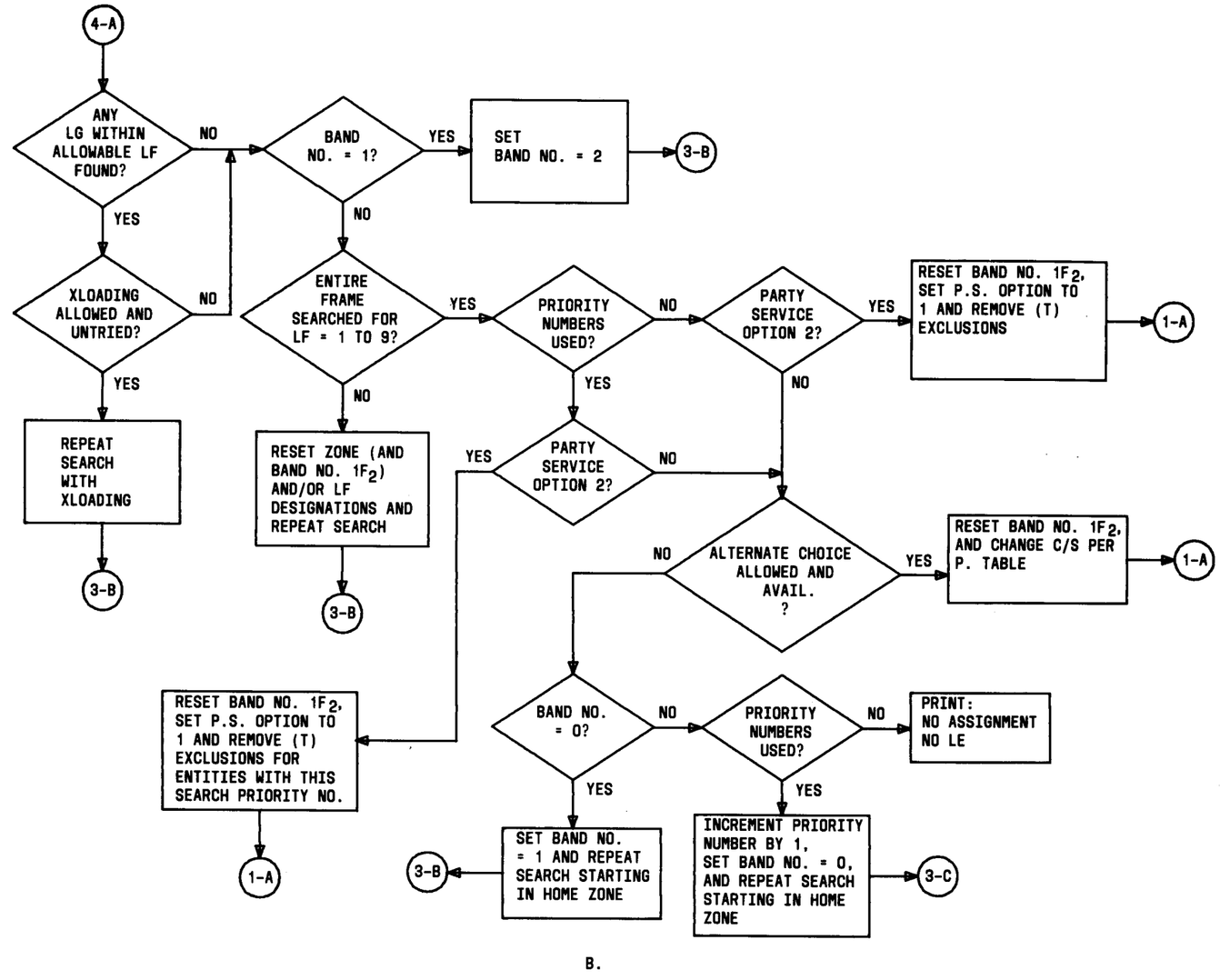
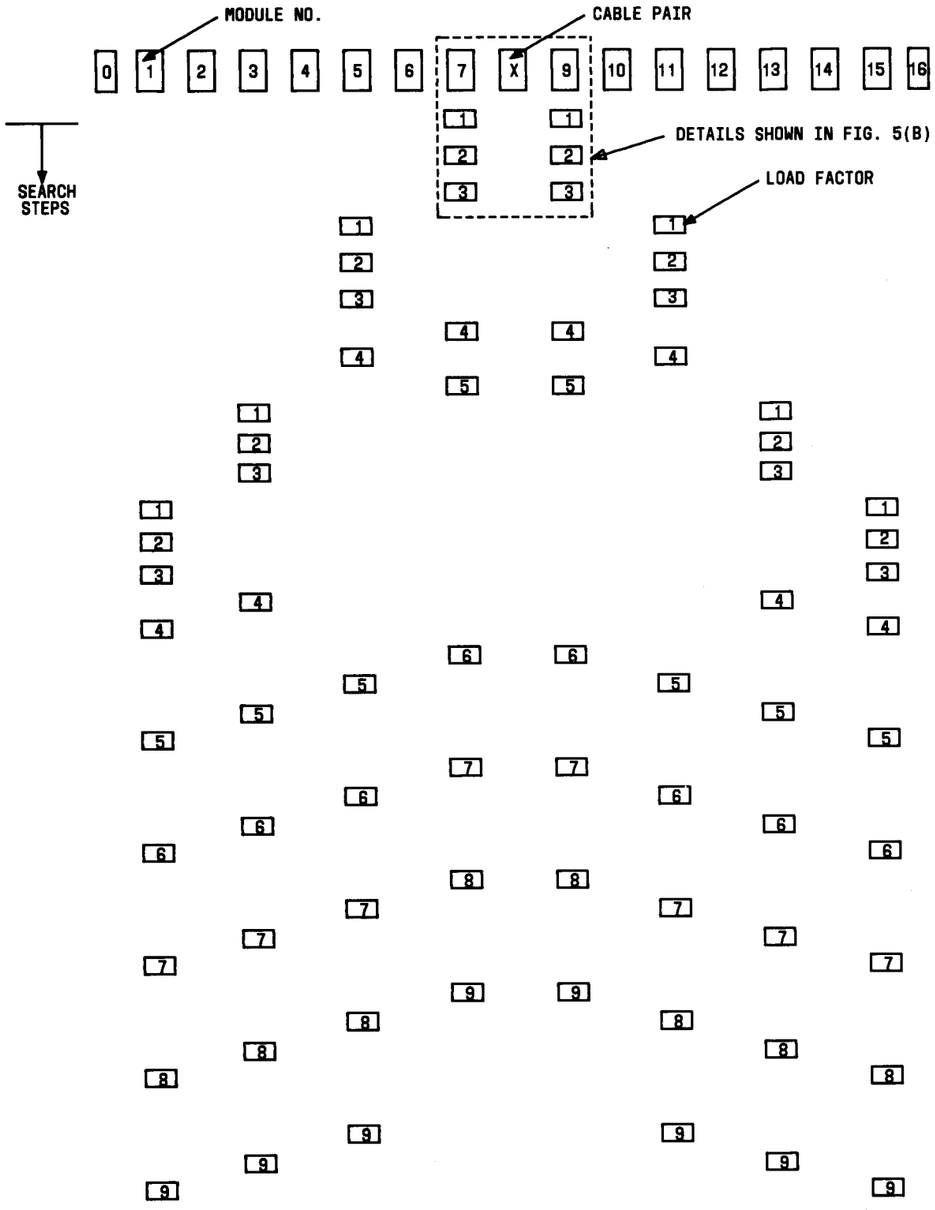
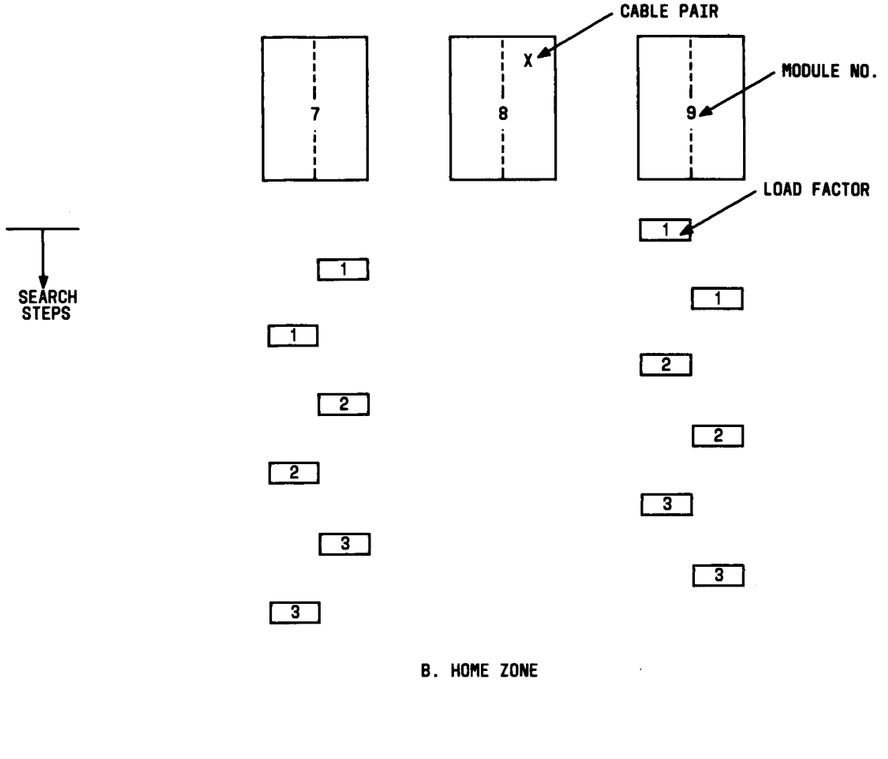


Fig. 4—COSMOS Line Equipment Assignment (Multientity)
(4.63)



A. LOAD FACTOR VERSUS MODULE NUMBER



B. HOME ZONE

Fig. 5—Preferential Assignment Steps (4.63)

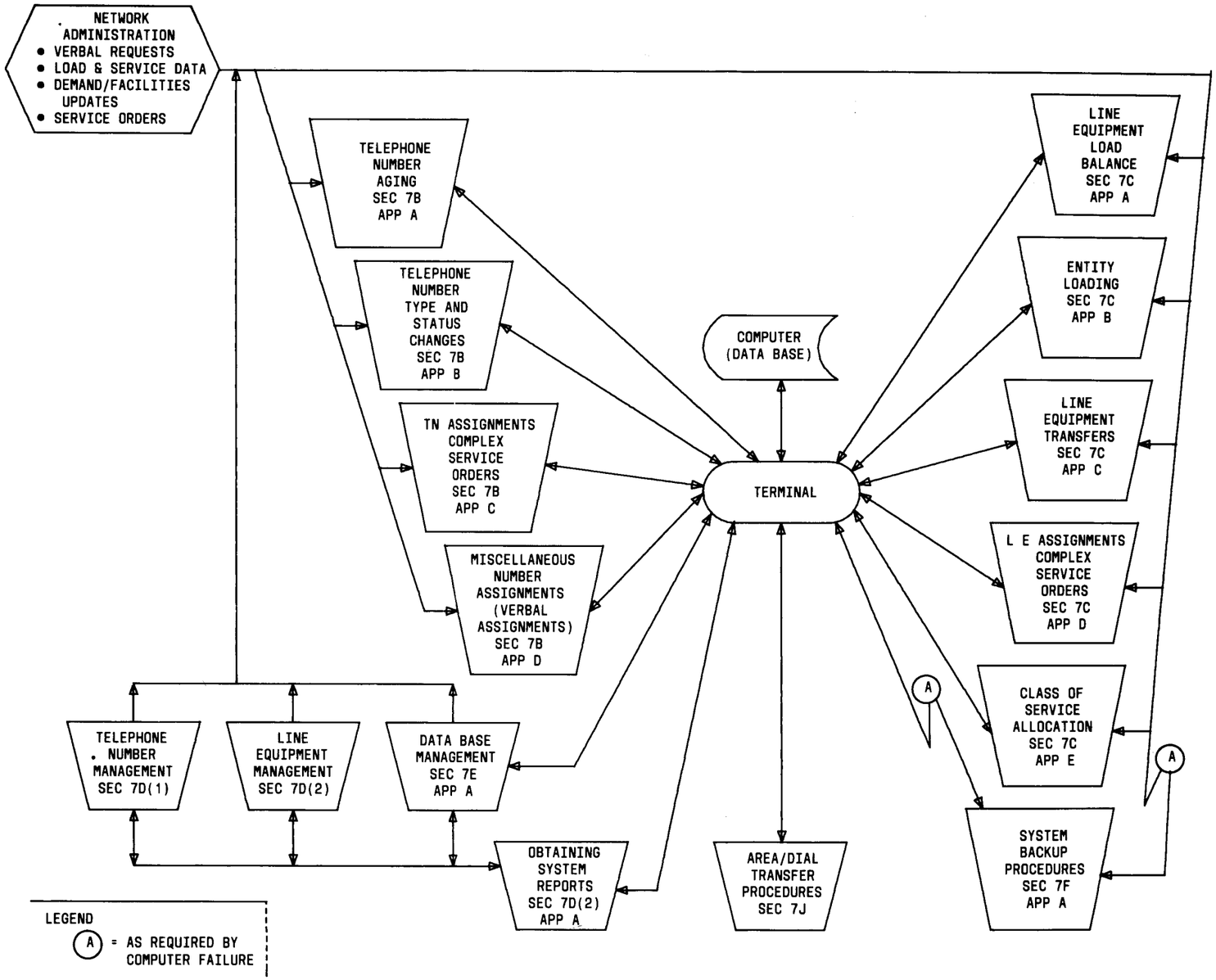


Fig. 6—Position Flowchart (4.66)

<table>
<tr><td></td><td colspan="4">PENDING ORDERS</td><td></td><td colspan="4">COMPLETED ORDERS</td></tr>
<tr><td>PRIVATE LINE FILE</td><td>NNX 271 0000-0999</td><td>NNX 779 0000-0999</td><td>NNX 461 0000-0999</td><td>ORDERS IN JEOPARDY</td><td>PRIVATE LINE FILE</td><td>NNX 271 0000-0999</td><td>NNX 779 0000-0999</td><td>NNX 461 0000-0999</td></tr>
<tr><td rowspan="6"></td><td>NNX 271 1000-1999</td><td>NNX 779 1000-1999</td><td rowspan="6">.
.
.
.
.
.
.
.
.
.
.
.</td><td>LINE EQUIPMENT TRANSFERS</td><td rowspan="6"></td><td>NNX 271 1000-1999</td><td>NNX 779 1000-1999</td><td>NNX 461 1000-1999</td></tr>
<tr><td rowspan="2">.
.
.
.
.
.
.</td><td>NNX 779 2000-2999</td><td rowspan="2">CABLE PAIR TRANSFERS</td><td rowspan="2">.
.
.
.
.
.
.</td><td rowspan="2">.
.
.
.
.
.
.</td><td rowspan="2">.
.
.
.
.
.
.</td></tr>
<tr><td>NNX 779 2001-2999
.
.
.
.
.
.</td></tr>
<tr><td rowspan="2">.
.
.
.
.
.
.</td><td rowspan="2">CABLE PAIR TRANSFERS</td></tr>
<tr><td>NNX 271 9000-9999</td><td>NNX 779 9000-9999</td><td>NNX 461 9000-9999</td><td>.
.
.</td><td>NNX 271 9000-9999</td><td>NNX 779 9000-9999</td><td>NNX 461 9000-9999</td></tr>
<tr><td></td><td></td><td></td><td>CABLE PAIR TRANSFERS</td><td></td><td></td><td></td><td></td></tr>
</table>

Fig. 7—COSMOS Order Filing System (5.11, 5.17)

TABLE A

SAMPLE DATA CONVERSION TEAM

NUMBER	TITLE	FUNCTION
4	Plant Input Clerks	Input line cards at computer terminal.
1	Plant Analyst	Controls production of plant clerks; deciphers complex records; resolves discrepancies in plant records; corrects plant records.
3	Traffic Input Clerks	Input directory number records at computer terminal.
1	Traffic Analyst	Controls production of traffic clerks; deciphers complex records; resolves discrepancies in traffic records; corrects traffic records.
1	Update Clerk	Inputs changes to data base due to service orders, work orders, and discrepancy resolution.
1	Frame Person	Aids analyst in resolving conflicts.
1	General Coordinator	Controls overall production; maintains proper sequencing; controls data base updates and changes; responsible for data conversion success.

TABLE B

DATAPHONE® REQUIREMENTS

COMPUTER END OF LINE	TERMINAL END OF LINE
Private Line	
108D data set with 2-wire FDX, ie, options Y, X, U, and S	108 data sets Y, X, and U options
1 27B1 data unit with Q option with 8 or fewer 108Ds.	
1 28A1 data mounting with 8 or fewer 108Ds.	
1 KS-20575 rectifier with 16 or fewer 108Ds	
Cabinet as follows KS-20018 L10 8 data sets KS-20018 L8 24 data sets KS-20018 L7 32 data sets KS-20093 L1 88 data sets	
Dial-Up Lines	
113B data set	113A data set
Common CB-CF option. Ignore CN control (unless using 804T data auxiliary set) with W, X, and Y options. Mounts in 32A1 data mounting with V option.	*or* 103A2 data set with mark hold option. Disconnect on carrier fail. Responds to disconnects option. 804B1 data auxiliary set.
or	*or*
103A2 data set with mark hold option.	Acoustic coupler and ordinary voice telephone set.
Disconnect on carrier fail. Alternate automatic or manual answering responds to disconnect.	
804B1 data auxiliary set.	

TABLE C

ENTITY BAND ASSIGNMENT

ENTITY	CONDITION	BAND NO.
STABLE	Actual Main Station Fill < Lower Limit	0
	Lower Limit ≤ Actual Fill ≤ Halfway Between Lower and Upper Limits	1
	Halfway Point < Actual Fill < Upper Limit	2
	Upper Limit ≤ Actual Fill	3
GROWTH	Actual Main Station Fill < Upper Limit	2
	Actual Main Station Fill ≥ Upper Limit	3

TABLE D

EXAMPLES OF THE ORDER IN WHICH COSMOS WILL SELECT ENTITIES FOR ASSIGNMENT

ENTITY	DESIGNATION	MINIMUM MAIN STATION FILL	MAXIMUM MAIN STATION FILL	ACTUAL WORKING MAIN STATION FILL	BAND	PRIORITY NUMBER	COSMOS ORDER OF SELECTION FOR ASSIGNMENT
Example No. 1							
No. 1 ESS	G	—	10,000	8,500	2	1	3
No. 5 Crossbar	S	18,500	19,000	19,500	3	1	Will Not Select
No. 1 Crossbar	S	12,000	13,000	12,320	1	1	2
Step-by-Step	S	19,000	20,000	18,895	0	1	1
Example No. 2							
Using the same example as above, but by changing the priority numbers, COSMOS entity selection will change.							
No. 1 ESS	G	—	10,000	8,500	2	1	2
No. 5 Crossbar	S	18,500	19,000	19,500	3	2	Will Not Select
No. 1 Crossbar	S	12,000	13,000	12,320	1	1	1
Step-by-Step	S	19,000	20,000	18,895	0	2	3

Note: It should be noted that in Example 2, COSMOS will search the entire No. 1 Crossbar and No. 1 ESS entities for available line equipment up to load factor 9 before it will search the Step-by-Step entity. Regardless of the priority number assigned or the entity designation, COSMOS will not assign into an entity which is over the designated main station capacity unless specifically requested by designation of the NNX code in the transaction input.