SWITCHING SYSTEMS MANAGEMENT
NO. 1 ELECTRONIC SWITCHING SYSTEM
TRANSITION MANAGEMENT
METHOD OF PROCEDURE (MOP)

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FIGURES

TABLES

1. GENERAL

1.01 The purpose of this section is to provide network administrators with recommended procedures for No. 1 ESS office administration when additions, changes, and/or transitions are anticipated.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

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

1.04 When it becomes necessary to add, rearrange, or modify equipment in a working central office, the effect on service will vary according to the way in which the work is performed.

1.05 Successful transitions require good communication, interdepartmental involvement, planning, scheduling and coordination. The most important function for accomplishing the work involved is the method of procedure (MOP). Knowledge of traffic engineering principals, network administration procedures and switching functions of the No. 1 ESS are essential.

1.06 Part 2 of this section lists the responsibilities normally assumed by each department in the preparation of a MOP.

1.07 Parts 3 and 4 outline MOP preparation procedures and considerations.

1.08 Parts 5 and 6 describe growth procedures in both the equipment and memory portions on the No. 1 ESS.

1.09 Parts 7, 8 and 9 provide general, switching network and call processing items that should be considered during a transition.

1.10 Part 10 recommends documents for No. 1 ESS network administrators involved in transition work.

1.11 Tables A through E provide checklists, and references.

1.12 Detailed transition procedures for switching network changes or additions are found in Dial Facilities Management Practices (DFMPs), Division H, Section 6n(2).

1.13 Detailed transition procedures for call processing changes or additions are found in DFMP, Division H, Section 6n(3).

2. DEPARTMENT RESPONSIBILITIES

NETWORK ADMINISTRATOR

2.01 The network administrator has the responsibility to make sure that the network design engineer has provided enough equipment to be able to ensure, at all times, a grade of service that is satisfactory to the customer.

2.02 Load charts and capacity charts can be used by all departments involved in planning the growth job. They are useful guides in determining amount and duration of equipment outage. The charts should generally reflect loads and capacity for the average days when Western Electric Company (WECo) will be removing equipment from service, thereby reducing capacity. Capacities should be shown for all components involved in WECo installation activity. These capacities should be matched against estimates of load for varying periods of time, to determine the most suitable time for reducing capacity in the office, and to determine quantities of equipment that may be safely removed from service.

2.03 Equipment involved in transitions, rearrangements, or relocation work that is service affecting should be identified at the first growth (interdepartmental) meeting. Arrangements should be made as necessary to clear this equipment so that service is not adversely affected, if at all possible. Consideration must be given to other groups and departments in establishing dates for this work; eg, initiating trunk rearrangements requires considerable time and effort to prepare trunk orders, and plant time to complete trunk orders. The availability of outside plant facilities must be coordinated, associated equipment orders must be coordinated, and manpower must be scheduled in various departments.

2.04 Plan ahead for proper machine balance, ie, schedule line equipment transfers to maintain necessary load balance, if not obtainable via line assignments. Utilize new trunk equipment as necessary to achieve an even balance over all grids.

Evaluate the load before, during, and after the change.

2.05 WECo and/or the network maintenance personnel require information in order to properly input the necessary translation data associated with trunks and lines. Coordination of the assignment and translation information is the responsibility of the network administrator. Dates must be established and schedules initiated to ensure proper interdepartmental cooperation.

2.06 A transition — MOP checklist is provided in Table A.

NETWORK MAINTENANCE

2.07 System evaluation tests must be performed by the network maintenance personnel prior to the start of a growth job. These tests establish the status of the office and assure WECo that this office is in excellent operating condition. The results of the system evaluation tests are furnished to the Western Electric installer in the form of teletypewriter (TTY) printouts. These tests are also made after completion of the growth job to ensure that the system can operate without trouble in all possible configurations of the central controls, call stores, and program stores.

2.08 Network maintenance personnel maintain a log of equipment removed from service for any reason. During periods of WECo activity, they also maintain a running record of where the WECo installer is working, and what equipment is involved. This record is very useful when trouble is encountered. The equipment out-of-service record log should be kept close to the maintenance TTY which must be monitored at all times for interrupts to ensure continuity of customer service.

2.09 The network maintenance department has the responsibility for physically removing equipment from service, testing, restoring equipment to service and accepting the new equipment added. Their personnel also have the responsibility of inputting all recent change messages required for the growth job.

2.10 Network maintenance department personnel are responsible for Western Electric's adherence to the MOP.

ENGINEERING DEPARTMENT

2.11 Most operating companies assign an engineering department representative to coordinate WECo installation activities. The engineering department representative is normally responsible for:

(a) Providing the equipment specifications.

(b) Scheduling job meetings between WECo and the Telephone Company (TELCo).

(c) Providing liaison between WECo and TELCo.

(d) Ensuring WECo adherence to MOP.

(e) Economical aspects of the job, ie, overtime, unusual transition methods, etc.

(f) Arranging for advance turnover of equipment.

WESTERN ELECTRIC COMPANY (WECo)

2.12 The WECo installation supervisor is responsible for preparing the MOP. Adherence to the prescribed MOP by WECo is necessary to ensure proper coordination by all groups.

2.13 Removing equipment from service, testing, restoring equipment to service, etc, must be in accordance with WECo handbook instructions and established procedures, and coordinated with the network maintenance personnel.

2.14 Transitions, rearrangements, replacements, etc, must be accomplished with a minimum interval of reduced capacity and with a minimum probability of service interruption, but consistent with reasonable job efficiency. WECo is responsible for determining the work operations that will be service affecting. These work operations should be grouped together in the MOP and identified as service affecting.

2.15 Initiate growth recent change (GRC) data. Consideration must be given to establishing dates for the TELCo information required to complete growth recent change forms, since to provide this information requires considerable time and effort.

3. DEVELOPMENT OF MOP

3.01 The MOP is a detailed step-by-step plan for the installation of a particular job which has been agreed upon and signed by both TELCo and WECo representatives.

3.02 The preparation of the MOP is normally done jointly by WECo and TELCo. The MOP may be a very formal document, or somewhat informal, depending on the magnitude of the job.

3.03 Methods of procedure are required whenever WECo activity involves:

(a) Hardware changes (class A)

(b) Equipment additions

(c) Equipment modifications

(d) Equipment removal

(e) Program changes (class A)

(f) Program changes (conversion, retrofit).

3.04 Installation events which warrant defining responsibilities are those dealing with:

(a) Equipment to be added

(b) Live equipment affected

(c) Choice of periods for taking equipment out-of-service

(d) The determination of whether special working hours are required because of service affecting work.

3.05 A proper MOP involves the following process.

(a) WECo develops and proposes the plan.

(b) The plan is evaluated by TELCo, ie, the network administrator assesses the impact on service. The maintenance supervisor evaluates the maintenance effort and test requirements. The engineering department examines the cost aspect, and other departments are consulted as necessary.

(c) Adjustments in procedures are made based upon the participation of the groups involved.

(d) A final MOP is agreed upon.

(e) The MOP is prepared in writing and is signed by management representatives in the departments involved. Approval by district level or a designated representative is recommended.

3.06 It is recommended that the network administrator have the prime administrative responsibility in connection with MOP for those responsibilities that normally pertain to the traffic department.

3.07 The person having the administrative responsibility at job meetings in connection with MOP must prepare carefully for the meeting. An effective contribution will require thorough preparation and knowledge.

3.08 The network administrator should be satisfied that the WECo job specification agrees with the traffic order, including special instructions, advance turnover, etc.

3.09 The MOP should be discussed at the earliest opportunity, to identify and to resolve any basic difference on how the job should be done.

3.10 The following list may be used as a guideline for what should be included in a MOP:

(a) Equipment to be added.

(b) Time interval for transition or replacement.

(c) In-service equipment affected which may require special considerations depending on the work performed.

(d) Time of day or night during which the work will be performed.

(e) Length of time the equipment will be taken out of service.

(f) Allocation of responsibilities.

(g) Installation and testing procedures.

(h) Translation and parameter update procedures.

(i) Installation and test procedures.

(j) Where necessary, a detailed step-by-step procedure for doing a transition or a rearrangement.

(k) Type of protection and special precautions for each step of the job.

3.11 The work should be done in a logical sequence, each step explained fully and specific responsibility noted. The sequence of progress may be based on the following considerations.

(a) Equipment that will be required first.

(b) The sequence of steps that will provide advance equipment when required to meet service needs.

(c) The amount of work that can be done and still provide a major margin of safety for returning released equipment to service within the specified time.

(d) Work that can be done without affecting working equipment such as: erecting, cabling, wiring, etc.

(e) Work that must be done during lightly loaded (usually night) hours.

(f) Work that must be done on an "in-service" basis.

(g) The type of test and test equipment required during and at the completion of each step.

3.12 The MOP, in its final form, is a written plan concurred in and signed by WECo and TELCo defining:

(1) What has to be done:

(a) Changes or additions involved

(b) Sequence of addition or changes.

(2) How the job will be done with provision for:

(a) Continuity and quality of service

(b) Efficiency in WECo effort

(c) Minimum interference with normal plant routines

(d) Emergency restoral procedures.

3.13 The WECo installer, the WECo regional engineer and the TELCo network maintenance personnel shall not deviate from the signed MOP unless, it is amended and signed.

3.14 When a change in the order of procedure of the work is necessary, due to unforeseen circumstances, WECo and TELCo representatives shall be held responsible for determining the extent of the change and its possible effect on the service and the job.

3.15 If changes are necessary and agreement is reached concerning method of implementing the changes, this agreement shall be indicated on a revised and approved MOP.

3.16 For a typical block diagram of "Sequence of Events Leading to Preparation of MOP," see Fig. 1.

4. MOP CONSIDERATIONS

MEETINGS

4.01 Meetings provide a communication between TELCo and WECo representatives. All departments responsible for the success of a given cutover or transition should appoint a representative for attending required meetings.

4.02 The purpose of the meetings are job planning, method of procedure preparation and follow-up. Suggested meetings are as follows:

(1) Pre-MOP meetings — may include a field review of the No. 1 ESS equipment questionnaire.

(2) Method of procedure meeting — for the final agreement and approval of the MOP.

(3) Cutover meetings — job status reports may be included at these meetings.

(4) Subcommittee meetings — held when necessary for detailed planning and follow-up. Example: line, trunk, etc.

(5) Critique meeting — held after cutover to analyze results. This meeting may prove helpful for future cutovers.

4.03 Minutes of all meetings should be kept and distributed as the formal record of interdepartmental or intercompany agreements and decisions.

SERVICE PROTECTION

4.04 Responsibility for good service to telephone customers must be shared by all telephone people as part of their daily job, but final overall responsibility rests with the network administrator. When there is WECo activity in an office, the network administrator's efforts in connection with this responsibility must be intensified.

4.05 Assuring continuity and reliability of service during periods of activity connected with installation of equipment by WECo is the joint interest and responsibility of both TELCo and WECo. To meet this objective requires full and continued cooperation prior to and during the installation period. A procedure generally found practical for attaining this objective involves a full discussion by all departments prior to installation activity of items such as:

(1) Equipment to be added or modified

(2) Line equipment affected

(3) Choice of periods for taking equipment out-of-service

(4) Method of accomplishing transitional work

(5) Amount and duration of equipment outage

(6) Redistribution of trunks and lines

(7) Assignment and translation data required

(8) A contingency plan to protect service in case of emergency or unusually high call and/or load volumes.

4.06 These discussions should begin during the initial planning of the addition. Sometimes these early reviews foresee major problems that require special installation procedures or a redistribution of office load. When this is apparent, a suitable statement should be included in the network design order to serve as a guide to the WECo job planner. These discussions should ultimately result in a MOP agreed to by all departments.

NETWORK DESIGN

4.07 Close coordination with the network design engineer and a detailed knowledge of transitional procedures are required. The effect on service will vary according to the way in which the job is engineered.

4.08 Continuing attention, beginning with the traffic order, is required to ensure protection of customer service. It is necessary that the network design engineer and network administrator concur not only with the equipment requirements, but also the network configuration.

DATA COLLECTION

4.09 Network administration techniques dictate that usage data be used to develop meaningful load service relationships. The use of these techniques become increasingly important during periods of additions to existing facilities because capacities of equipment may be affected by transition work.

4.10 Data obtained from the traffic measurements have many and varied uses, however during transition, data will be the guiding factor in the daily administration of the office. Usage results must be checked to ensure an equal grade of service for all subscribers.

4.11 In order to make appropriate use of the data, it is imperative to know what is included in the data and whether or not the data is valid.

4.12 During periods of growth activity, traffic measurements must be kept current in translations.

4.13 When a generic program retrofit is made, some traffic measurements may change. Investigate this possibility prior to the retrofit.

4.14 The Translation Guide (TG-1A) Division 3, Section 4 gives a full definition of all traffic measurements. Traffic measurement administration is covered in DFMP, Division H, Section 6i.

4.15 DFMP, Division H, Section 6j provides a description of traffic measurement validation techniques.

SERVICE AND LOAD MEASUREMENTS

4.16 Service may be affected by transitions, capacities may be reduced, and measured results may be affected in varying degrees, according to the loads generated during the period of capacity reductions.

4.17 The broad categories of service and load measurements in a No. 1 ESS are:

- Service

  (1) Dial tone speed (DTS)

  (2) Incoming matching loss (IML)

  (3) Receiver attachment delay report (RADR).

  Note: RADR is provided in the Centrex-7 generic program. An explanation is given in DFMP, Division H, Section 6k(1).

- Load

  (1) Service circuits

  (2) Network components

  (a) Line switch frame

  (b) Trunk switch frame

  (c) Junctors

  (3) Traffic sensitive call store areas

  (a) Automatic message accounting (AMA) registers

  (b) Coin charging registers

  (c) Etc.

SERVICE CEILINGS

4.18 Experience has shown that our subscribers ordinarily do not expect perfect service. However, they do expect and deserve an excellent grade of service. To ensure rendering this grade of service, service ceilings have been established for the busy season of exhaust. They are:

(1) Dial tone speed

1.5 percent ABS-BH

(2) Incoming matching loss

2 percent ABS-BH

4.19 IML is normally controlling. When the service ceiling of 2.0 percent IML is reached, the average busy season-busy hour (ABS-BH) dial tone speed is substantially less than 1.5 percent delay of 3 seconds or more.

4.20 IML of 2 percent will be realized at the full network size of 16 line link networks (LLNs) and 16 trunk link networks (TLNs). Smaller sized networks will have substantially less IML.

EQUIPMENT QUANTITIES

4.21 Traffic Facilities Practices are the source documents used to provide facilities for central office relief at the exhaust period. They may also be used by the network administrator to calculate current in-service requirements. They become exceptionally useful in preparing requirements for transition purposes.

4.22 It is recommended that the data that was used to design the relief job be compared to the most recent ESS network measurement data.

4.23 Estimated main stations on the equipment order should be checked against actual main stations records prior to the transition.

4.24 Load records from the past year are useful guides in determining equipment requirements during the transition period.

4.25 Capacities may be matched against estimates of load for varying periods of time to determine the most suitable time for reducing capacity in the office and to determine quantities of equipment that may be safely removed from service.

4.26 The estimated cutover traffic load may be compared with the cutover capacity to ensure that the equipment quantities are sufficient.

4.27 The application of equipment capacities and quantities to a transition may be found in the following:

(1) DFMP, Division H, Section 6n(2) for the switching network

(2) DFMP, Division H, Section 6n(3) for call processing.

IN-SERVICE REQUIREMENTS

4.28 It is the responsibility of the network administrator to determine in-service requirements and the effect that removals of equipment might have on service.

4.29 The network administrator needs to know what margin exist in the call carrying capacity at different hours of the day, days of the week or months, etc. When this is known, capacity reductions during transitions can be gauged more accurately.

4.30 Central office additions and rearrangements are usually planned far in advance of the actual work. The effect such jobs will have on capacity can be assessed early and schedules arranged so that service is not seriously affected.

4.31 When the network design order for the job is issued, the network administrator's careful analysis should reveal what is needed to maintain call carrying capacity while work is in progress.

4.32 The protection of service during installation periods is the joint responsibility of network maintenance, network administration and WECo. The quantities of equipment which can be taken out of service and the time in which they may be removed should be agreed upon by all groups involved in the transitional period.

4.33 These quantities and time frames should be discussed at committee meetings. Plans should be formulated at that time to ensure sufficient work force and to schedule the work force so that the proposals can be followed.

LOAD BALANCE AND LINE TRANSFERS

4.34 Every attempt should be made to prevent unnecessary line transfers. Careful loading plans and follow up are necessary to meet this objective.

4.35 Equipment additions may be treated as separate loading divisions for up to six months. This is an opportunity to balance the new network addition with new assignments rather than line transfers.

4.36 Groups which have exceeded the engineered design may require corrective action. Line equipment transfers should be undertaken if analysis indicates present or imminent service problems.

4.37 If line transfers are required, the following suggestions will make them more effective.

(1) Make as few line transfers as possible to do the job.

(2) Plan them in advance.

(3) Prepare a plan to spread them over a recommended time interval.

(4) Consult the department performing the work for concurrence in the timing and volume of additional work load.

5. OFFICE GROWTH

BASIC CONCEPTS

5.01 In the No. 1 ESS, frames can be added to a working system with relatively few wired connections. Parameter and translation changes in program store instead of wired logic modifications provide most of the information required by the No. 1 ESS as new frames are added.

5.02 When new equipment or equipment frames are added to an ESS office, they are added with minimum interruption in telephone service. The duplicate design of the No. 1 ESS permits numerous working configurations among the duplicated system units. After the new equipment is wired into the system, selected parameter and translation updates are made to allow the system diagnostic and fault recognition programs to test the new equipment. This testing takes place without interference to call processing. In fact, the call processing programs are unaware of the new equipment due to parameters and translation updates that have not yet been made.

5.03 In some cases, due to changes in office traffic, equipment or equipment frames must be removed from a working office. This is accomplished by using a reverse procedure from that required to add the same equipment or equipment frames to an office. The first step in a procedure of this type would be to remove all translation assignments since these changes were made last.

MAJOR OBJECTIVES

5.04 Major objectives during growth of an office are as follows:

(a) Minimize the possibility of interruption or impairment to customer service.

(b) Minimize changes required to normal operating procedures of the TELCo.

(c) Permit allowable margins and overlap of installation effort to allow efficient job schedules and utilization of the workforce.

5.05 These objectives can best be implemented with the following procedures:

(a) Provide a safe and well defined environment in which growth frames can be tested without interference to the working system.

(b) Minimize the intervals where simplex operation (no duplication) of equipment is required.

(c) Installation procedures are sequenced to allow growth frames to be integrated into the system in small steps that can be easily verified.

(d) Several safe stopping points are provided in the growth procedures to allow for unforeseen difficulties that may arise.

(e) The procedures are kept clear and simple.

(f) Computer-generated data, when available, is used.

JOB COORDINATION

5.06 A cooperative effort between TELCo and WECo is absolutely essential when adding equipment frames to an in-service ESS office.

5.07 During the planning stage of each office addition, WECo installation personnel and TELCo personnel prepare a MOP which specifies the sequence of all activities to be performed. Table B shows the general areas of responsibility for WECo engineering, WECo installation, and TELCo during an office addition.

TESTING

5.08 System evaluation testing must be made prior to and after office growth to ensure that the office is in excellent operating condition.

DOCUMENTATION

5.09 Documentation covering growth consists primarily of growth recent change forms and associated Bell System Practices.

5.10 This documentation is written to conform with the following objectives:

(a) To prevent office failure and to minimize any interruptions in customer service

(b) To allow growth frames to be added to the system in small steps

(c) To use relatively short procedures

(d) To verify each procedure

(e) To minimize the number of times PS memory cards must be updated.

GROWTH RECENT CHANGE FORMS

5.11 Growth recent change (GRC) forms are used for the transmittal of information between the WECo regional engineer and TELCo. The assignment of central pulse distributor (CPD) points, master scan (MS) points, and signal distributor (SD) points for growth frames is made by the WECo regional engineer. Up to three types of GRC forms (xxxx.1, xxxx.2, and xxxx.3) are provided for each type of frame. GRC forms are numbered as follows:

GRC xxxx.y

xxxx = Basic GRC number of the frame being added

y = 1, 2, or 3 as explained below.

A. GRC xxxx.1 Form

5.12 This form contains the recent change (RC) messages needed to determine if sufficient head table and/or subtranslator capacity exists for the frame type specified by xxxx. This form also contains the RC messages necessary to seize and reserve only blocks of memory that the addition requires.

5.13 The necessary forms should be ordered by TELCo as early as practical to determine if there is a memory capacity problem. Forms are filled out by TELCo personnel.

5.14 If the GRC point one form(s) indicates that a memory capacity problem exists, this indicates that a head table, subtranslator, or both are not large enough to contain the necessary information to define the new frame(s). In this case, a larger head table or subtranslator must be built.

B. GRC xxxx.2 Form

5.15 This form contains the RC messages necessary to update translations. They are furnished by the WECo regional engineer. The form consists of RC messages filled out in part by the WECo regional engineer. The remaining parts of the form are filled out by TELCo personnel as the RC messages are entered on the maintenance TTY in the office.

C. GRC xxxx.3 Form

5.16 This form contains the RC messages necessary to update parameters. They are also furnished by the WECo regional engineer.

5.17 The forms divide RC procedures into categories which are performed at specific intervals during the installation process.

D. GRC Documentation

5.18 For types of growth and associated documentation, refer to Tables D and E.

CENTRAL CONTROL TO SIGNAL PROCESSOR CONVERSION

5.19 Central control (CC) to signal processor (SP) conversion involves the addition of an SP community to an in-service, nonsignal processor office with a CC-CTX generic program.

5.20 If the CC office contains a 4:1 line switch (LS) frame without a supplementary bay, the supplementary bay must be added and made operational in the CC generic program environment before SP conversion procedures are started. This restriction is imposed because the SP centrex programs are not compatible with only a basic 4:1 LS frame.

5.21 System evaluation tests should be run before conversion to the SP generic program. The operating system hardware, both processor and peripheral, must be kept in a trouble-free state prior to and during the CC to SP conversion.

SEQUENCE OF FRAME ADDITIONS

5.22 Frames and equipment are added to an ESS office in a sequence engineered by WECo. The sequence for each office addition must be made by considering frame interdependencies as well as the hardware and software interrelationships. The general philosophy is to add central processor frames first and then to work outward adding peripheral frames and trunk and service circuit equipment.

5.23 Frames are classified into four groups in order to establish the priority in which they are added. Groups I and II type frames provide the necessary power, memory, and assignment points for the remaining equipment additions. The required frames and equipment are normally added in the following order:

- ***Group I***

  Power distributing frame

  Program store frame

  Central pulse distributor frame

  Central control call store frame

  Signal processor call store frame

Signal processor.

- ***Group II***

Master scanner frame

Miscellaneous trunk supplementary signal distributor frame.

- ***Group III***

Trunk link network (trunk junctor switch and trunk switch frames)

Remreed trunk link network

Universal trunk frame

Junctor switch frame

Line link network (line junctor switch and line switch frames)

Supplementary trunk test frame

Miscellaneous trunk/TTY frame

Centrex data link frame

Miscellaneous trunk frame

Protector frame

Recorded announcement frame

Trunk distributing frame

Main distributing frame

Intermediate distributing frame

Miscellaneous frame

Junctor grouping frame

AIOD.

- ***Group IV***

Trunk and service circuit equipment.

Note: When possible, trunk and service circuit equipment is added in parallel with Group III frames.

5.24 The general list of specific activities to add frames and the sequence given is the most desirable considering all restrictions; however, each office addition is different and each installation sequence is engineered for the specific job by the WECo regional engineer.

5.25 For a flowchart of a typical sequence of additions, see Fig. 2.

5.26 For the operating system requirements to add new frames of equipment, see Table C.

GROWTH ACTIVITIES

5.27 When office growth is made, the required activities are normally performed in the sequence listed below. Many steps are performed by WECo installation, and these steps are listed only to give continuity to the overall process.

- Steps performed for all frames being added

(1) Erection of frames

(2) Ground tests

(3) Cable running

(4) Power verification tests

(5) Trunk and service circuit equipment (if required) mounted and wired

(6) Connections (miscellaneous circuits)

(7) Installation tests (not required for central processor frames)

(8) Connections (private signal leads)

(9) Update of translations (performed prior to or in parallel with the above steps).

6. GROWTH MEMORY CHANGES

6.01 Memory changes refer to the software changes in program store (PS) memory which define the new frames or equipment. These changes are divided into translation changes and parameter changes. Translation changes are performed first and are sometimes completed before parameter changes are started for a given frame

or piece of equipment. Memory changes are made by TELCo personnel at times agreed to jointly with WECo installation personnel.

TRANSLATION CHANGES

6.02 A typical translation change may require the updating of the head table translator and/or a unit type translator.

PARAMETER DATA ASSEMBLER (PDA) LISTING

6.03 The PDA listing is a computer-generated document which gives the input and output of the PDA program. This program generates the parameter data which is used by the ESS generic program. The listing is always required during office growth to obtain set card values and PS addresses.

MASTER HEAD TABLE TRANSLATORS

6.04 The updating procedure consists of building new subtranslators which are accessed by translation programs through the master head table. The link from the master head table to the subtranslator involves a head table. A translator of this type is shown in Fig. 3.

6.05 Typical translators which begin with an entry in the master head table are the directory number (DN) and line equipment number (LEN). A translator of this type is updated as follows:

(1) Obtain the length of the head table. The octal length is stored in the master head table length table.

(2) Compare the actual length of the table to the required length. The required length depends on the number of frames being added. If the table length is insufficient to contain the necessary growth information, a larger head table must be built.

(3) If the head table length is sufficient or after it is moved, the necessary subtranslators are built. Subtranslators are built with unassigned primary translation words.

(4) The new subtranslator(s) is linked to the head table. At this point the head table has an unused word for each new subtranslator. These unused words are initialized to the starting address of the new subtranslator(s).

UNIT TYPE TRANSLATORS

6.06 The updating procedure consists of building new unit type auxiliary blocks which are accessed by translation programs through the unit type head table. The link from the unit type head table to the auxiliary block involves a unit type subtranslator. A unit type translator is shown in Fig. 4.

6.07 Most equipment frames in an ESS office have a unit type number. When any of these frames are added, the associated unit type translator must be updated. A unit type translator is updated as follows.

(1) Obtain the length of the unit type subtranslator. The octal length is stored in the unit type subtranslator length table.

(2) Compare the actual length of the subtranslator to the required length. The required length depends on the number of frames being added. If the table length is insufficient to contain the necessary growth information, a larger subtranslator must be built.

(3) If the subtranslator length is sufficient or after it is moved, the necessary auxiliary blocks are built. Auxiliary blocks are built with final translation data.

(4) The new auxiliary block(s) is linked to the subtranslator. At this point the subtranslator has an unused word for each new auxiliary block. These words are initialized to the starting address of the new auxiliary block(s).

PARAMETER CHANGES

6.08 Parameter information is used in No. 1 ESS offices to define to the system the quantity of each frame type contained in the office. The parameter information is located in the PS and changes only when additions are made to an office.

6.09 During growth, parameter information must be updated so that the system will be aware of the new frames. The TELCo orders parameter information on form E-8056. This is processed by the Regional Center of WECo and is combined with

the office set card record to produce the final parameter data.

TRANSITIONAL PARAMETER MODULE

6.10 Depending on the type of equipment being added, one or more sets of transitional parameter modules may be required. Some office additions do not require a transitional parameter module.

6.11 The data for a transitional parameter module is prepared by taking the information for a final parameter module and backing off selected numerical values. After the transitional module is installed, changes are made in the parameter data at certain intervals as the installation progresses. With each change or transition, the parameter data approaches more closely the final data to be contained in the parameter module. The updates of the transitional parameter module are segmented into categories which are performed at specific time intervals.

6.12 Parameter cards used to update the transitional parameter module are normally written at the office.

SWITCHING FRAME UPDATE

6.13 Examples of switching frame updates are as follows:

(a) ***Line Switch Frames:*** Parameter changes are made to make the new line switch (LS) frames available to the call-processing program. These changes consist of updating parameter tables to permit scanning in the new LS frames.

(b) ***Junctor Switch Frames:*** Changes are required when adding line junctor switch frames and trunk junctor switch frames. These changes consist of updating the network equipage tables.

7. GENERAL TRANSITION CONSIDERATIONS

7.01 This part contains a brief description of some general items that should be considered during a No. 1 ESS transition.

ADVANCE COMPLETION

7.02 The sequence of adding new frames and equipment to a No. 1 ESS office provides for some flexibility. It may be desirable to have line or trunk terminations, service circuits, or other types of equipment prior to the job completion date. This flexibility may permit advanced completion of these items. However, the earlier this requirement is determined and made known to all concerned, the better the changes are of working it into the equipping sequence.

MONITORING THE TRANSITION

7.03 The Program for Administrative Traffic Reports On Line (PATROL) can serve as a very valuable tool for monitoring a No. 1 ESS transition.

7.04 These transitions are normally gradual. New frames and circuits are made available to the call processing programs as they are installed and tested. The necessary rearrangements are accomplished in an orderly fashion. However, with activity of this nature in a working office, the potential for affecting customer service is ever present.

7.05 The data available on a real time basis with the No. 1 ESS can provide an immediate indication of any problems. A program for managing and correlating this data on a real time basis is PATROL.

7.06 The MOP should detail the sequence of adding circuits to the office. As these circuits are added, the PATROL data base must be maintained current. This will require coordination with the installation group to determine when these additional circuits and new arrangements are available to handle traffic.

7.07 By use of the PATROL reports the network administrator can see exactly what is happening in the office. Data obtained can be compared to previous data on file for these items. Abnormalities can be immediately identified and corrective action initiated.

7.08 Improvements are continually being made on No. 1 ESS measurements. PATROL should be updated to take advantage of these new measurements when they become available.

7.09 The Translations Guide, TG-1A, Division 3, Section 4, contains the latest information on measurements. This publication should be monitored for changes affecting growth.

RECORDED ANNOUNCEMENTS

7.10 The No. 1 ESS record announcement frame provides for six announcement channels. Each channel can serve a maximum of 116 circuits. The length of each announcement cycle is approximately 12 seconds. The Centrex-5 and higher generic programs increases the number of recorded announcement frames that can be provided to 16. Each frame still has six channels. With these programs, 96 channels can be provided.

7.11 In conjunction with the No. 1 ESS addition, it is suggested that the announcement channel requirements be reviewed.

7.12 Additional information on recorded announcements may be found in DFMP, Division H, Section 6d(5).

NETWORK MANAGEMENT FEATURE

7.13 The network management feature available with the Centrex-6 and higher generic programs provides a means by which traffic from the No. 1 ESS to the direct distance dialing (DDD) network can be controlled in times of disasters, snowstorms, telethons, etc, depending on the degree of congestion on the DDD network. Specific trunk groups are selected upon which these controls can be imposed. The degree and method of restriction is variable by translations.

7.14 The network management controls for a specific trunk group are preprogrammed into the No. 1 ESS machine and can be controlled automatically via dynamic overload control (DOC) signals from a toll or local tandem office, or the control can be manual via a TTY request.

7.15 If the No. 1 ESS addition includes the implementation of this feature, careful planning will be required. The impact on the local office must be considered. A provision may be required for additional announcement channels aimed at reducing repeated attempts when the network controls are in effect.

7.16 Additional information on the network management feature is provided in DFMP, Division H, Section 6d(2). The Translation Guide, TG-1A provides information necessary for implementation.

APPLIQUE CIRCUITS

7.17 The remote signal distributor applique can be used to operate remote overflow registers and other similar applications. The remote master scanner applique is used to scan for make busy keys operated at remote locations and other similar applications.

7.18 Applique circuits are ordered on the equipment questionnaire (E-8056).

7.19 Review the requirements for growth to ensure that sufficient applique circuits will be available.

SPECIAL CIRCUIT REQUIREMENTS

7.20 The flexibility that is inherent with the stored program concept used in the No. 1 ESS makes customer special communications arrangements possible. Most of the time, standard circuits can be used in conjunction with relatively simple software changes to provide these services.

7.21 However, some services require special circuits. Many of these special circuits are of the type that must be wired in on the miscellaneous trunk frame. If these circuits are not available to meet a customer's special requirement, an undesirable long delay may be encountered.

7.22 By scrutinizing the requirements of the customers to be served from the growth No. 1 ESS, a majority of these delays may be eliminated.

7.23 An interdepartmental decision may be necessary to handle some of these special requirements.

NEW FEATURES

7.24 The list of new features available with the No. 1 ESS continues to grow. As the program provision for these features progresses from the conceptual to the reality stage, changes and modifications are made. A new piece of hardware or changes to software may be required.

7.25 During the period from traffic order to cutover, a continual review of all new features available must be made. Any new or revised hardware and/or software requirements must be identified and appropriate action taken.

7.26 Translation Guide, TG-1A provides good sources for obtaining the latest information on what is required to provide a given feature.

8. NETWORK TRANSITION CONSIDERATIONS

8.01 This part contains a brief description of some of the switching network items that should be considered during a No. 1 ESS transition.

8.02 Determination of switching network transition requirements is a major consideration. It includes equipment capacity requirements, planning loading strategies and the number and configuration of interim junctor assignment programs (JAPs). Procedures have been prepared to aid in making these determinations. They are provided in DFMP, Division H, Section 6n(2).

GROUND START

8.03 This option is required on all coin first lines and on certain types of private branch exchange (PBX) trunks.

8.04 The arrangement of the line scanners on the line switch frame restricts the ground start option to the even switch levels. The line switch frames are shipped from the factory with all lines equipped for loop start. To modify a line for ground start requires a wiring change on the associated line scanner.

8.05 When new line switch frames are added to an office, the requirement for ground start lines should be reviewed. The installers will need to know how many and which lines to modify.

LINE BALANCE

8.06 As the office grows, fewer junctor paths are available between the networks. This makes the hundred call seconds (CCS) capacity more critical and increases the probability of service deterioration in relation to the degree of imbalance.

8.07 Unexpected loads can be experienced in conjunction with a line addition. New customer characteristics frequently are different from those of existing customers. A rebalance of the office may be desirable as soon as practicable in connection with the installation of this new equipment.

8.08 While the basic unit of balance on the line side of a No. 1 ESS is the concentrator, attention must also be given to the balance on each switch in the concentrators. One switch can be overloaded while the concentrator total usage is underloaded. This can be a major source of blocked dial tone problems and must be considered during any office rebalancing.

8.09 Most line balance is accomplished by line assignments. If line transfers are necessary, it is recommended that they be planned and executed as part of the job and included in the MOPs.

8.10 Load balance techniques are provided in DFMP, Division H, Section 6g.

TRUNK BALANCE

8.11 Trunks should be assigned to the networks in a manner which will produce a balanced CCS load over the grids.

8.12 The grid is the basic unit for balance on the trunk side of the office. Usage measurements are available for each grid and should be used to achieve and maintain balance.

8.13 In addition, each individual trunk group should be spread over all the TLNs in the office. This increases the chance of success for retrials by making a different junctor group available to complete the connection.

8.14 The time of an office addition is an ideal time to review the procedures being used to administer the office trunk balance. As an office grows, a more precise balance becomes necessary to achieve the engineered CCS capacity. Every effort should be made when assigning new trunks, or redistributing existing groups, to improve the office balance.

8.15 Additional information on trunk balance can be found in DFMP, Division H, Section 6g.

SIGNAL DISTRIBUTOR LOAD FACTOR

8.16 The signal distributor (SD) provides central control with the means of selecting and controlling relays in junctor, trunk, and service circuits. Should an excessive number of high SD factor trunks be assigned to one universal trunk frame, controller congestion could result.

8.17 The TRUST office record system provides a computer output (Working Signal Distributor Load Factor Report). The use of this report is suggested for maintaining a surveillance of this factor. Each pair of SD controllers should not exceed the 50 percent occupancy level.

8.18 It is recognized that the trunk side of the office may not be under the direct supervision of the network administrator. However, proper management is very necessary if we are to provide our customers with the best possible service.

EQUIPMENT CAPACITIES

8.19 The requirements for equipment items in the No. 1 ESS are determined by the network design engineer.

8.20 For the equipment items, ringing circuits, receivers, transmitters, etc, worksheets are available in the Traffic Facilities Practices. These worksheets recommend the data base, high day or average busy season, and the capacity table to be used in determining quantities required.

8.21 During transitions, sufficient capacity must be available for service requirements.

SERVICE LINK NETWORKS

8.22 The service link network (SLN) was initially designed to improve the call handling capacity of the No. 1 ESS. This was accomplished by simplifying the ringing and incoming receiver connections.

8.23 The later generic programs have increased the call processing capacity of the No. 1 ESS to the extent that SLNs are no longer recommended. Should your growth No. 1 ESS job include the removal of the entire or a portion of a SLN, careful planning is required. Extreme care must be exercised to assure adequate coordination of trunk changes and related service circuit changes to prevent the incurring of any service penalties. The MOP should detail the exact steps involved in this transition. The receiver and ringing circuit capacities available throughout each step must be maintained adequately on both the remaining SLNs and the TLNs.

8.24 The complexity of this activity must be recognized and every effort made to minimize the time period of this transition.

PARTIAL NETWORKS

8.25 A partial network is one that is equipped with less than a full complement (four) of junctor switch frames. Beginning with the CTX-6 generic programs, No. 1 ESS will no longer support partially equipped networks. Offices retrofitting to CTX-6 or later generics will have to eliminate any partially equipped networks prior to this retrofit.

8.26 In a partial network, line or trunk, the "B" links are not connected in a standard pattern. The "B" link is the link between the line or trunk switch frame and the junctor switch frame. These "B" links must be changed to a standard pattern before the network can be filled out. This will involve a possible service hazard.

8.27 Should the office have a partial network, be sure the transition procedure is defined. This is definitely an area that requires interdepartmental cooperation and coordination to arrive at the best transitional procedure.

FRACTIONAL NETWORKS

8.28 A fractional network is one that is equipped with a full complement of four junctor switch frames. The "B" links are arranged in a standard pattern. No service affecting wiring changes are necessary to fill out this type network.

8.29 Beginning with the CTX-6 generic programs, this is the only arrangement that a No. 1 ESS can have if there is a requirement for less than a full network.

8.30 With a fractional network, the missing line or trunk switch frames can be readily added. However, in some cases, the junctor arrangement may not support the additional load. In this case, an interim junctor assignment program (JAP) may be required.

NETWORK RATIO CHANGES

8.31 A network ratio change increases or decreases the number of line or trunk switching frames in a full network. Each network has a full complement of four junctor switch frames. The "B" links are arranged in a standard pattern.

8.32 A network ratio change may be required when remreed networks are added to existing ferreed networks. This will be required if the ferreed ratio does not match the remreed ratio. The ratio change will occur in the old ferreed networks to make them conform to the new remreed network.

8.33 With a full network a change in the number of line or trunk switch frames can be easily made. However, in some cases, the junctor arrangement will not support the load. In this case, an interim JAP may be required.

JUNCTORS

8.34 Junctors in the No. 1 ESS provide the connecting paths between the line link networks (LLNs) and the trunk link networks (TLNs). There are three types of junctors and they are designated according to their function.

- Line-to-Line (L-L)
- Line-to-Trunk (L-T)
- Trunk-to-Trunk (T-T)

8.35 In No. 1 ESS offices, line link and trunk link networks are cabled to a centrally located junctor grouping frame (JGF). The cables leave the networks in junctor subgroups. Each junctor subgroup contains 16 paths. Therefore, the number of paths cabled from a network to a junctor grouping frame is the number of subgroups multiplied by 16. The total figure is referred to as a "junctor group."

8.36 When new networks are added to an office, a new arrangement of interconnecting groups must be made. Each network has a maximum of 64 subgroups. With existing networks requiring connections to the new networks, some of the existing groups will have to be reduced in size. However, the new junctor groups will not be carrying an equal share of the CCS load. The existing groups, now reduced in size, may not be able to handle the existing load. Should this be the case, it may not be possible to go from the existing junctor arrangement to the new desired arrangement without one or more intermediate arrangements. This will require one or more interim JAP runs.

9. PROCESSING TRANSITION CONSIDERATIONS

9.01 This part contains a brief description of some of the data processing items that should be considered during a No. 1 ESS transition.

9.02 Call processing requirements are a major consideration. It includes translation and parameter transition requirements. Additional information and procedures are found in DFMP, Division H, Section 6n(3).

TRANSLATIONS

9.03 A detailed plan and timetable must be established and adhered to in order to have all translations available when required for input into the ESS memory.

9.04 This will require the establishment of committees and/or subcommittees to formulate this plan.

9.05 Special consideration must be given to translations changes required by a new generic program. Existing translations must be reviewed and all necessary changes made at the appropriate time during the transition sequence.

9.06 Most inputs will be via the recent change method. The size of this call store area will govern the volume of translation inputs the machine can handle between card writes. This must be considered when establishing the timetable.

9.07 The use of the TRUST program will greatly facilitate the completion of the trunk translations required for a growth No. 1 ESS. Advantage should be taken of this and any other mechanized aids available.

9.08 Extreme care must be taken in order to achieve a translation job as error free as possible.

MASTER HEAD TABLE

9.09 The master head table serves as a directory for locating all translations data. The data found in this table is the starting address of other head tables or the starting address of blocks of data depending on the indexing requirement.

9.10 An example of head table starting address would be item number 00 on ESS Form 1500A, Directory Numbers. The data in the first word of the master head table is the starting address of the directory number head table.

9.11 An example of an address in the master head table indicating a starting address of data would be item number 10 on ESS Form 1500A, normalized office codes. This table contains the data necessary for normalized office code translating.

9.12 The master head table is established using the 1500A Form as input. During an addition it should be reviewed. The limits set by this master head table are absolute. If necessary however, they can be changed and in conjunction with an office addition would be a good time to make the change.

ABBREVIATED CODES

9.13 Throughout the No. 1 ESS memory, in order to save space, short abbreviated codes are used. These short abbreviated codes denote frequently required translation information. Expansion tables, located elsewhere in the program store, are provided to obtain the detailed version of the abbreviated code. A saving of space is achieved since the detailed version of the abbreviated code is stored only once in an expansion table.

9.14 Many new features become available with the update to a new generic program. Review these, keeping in mind the saving in memory that can be realized through proper administration of the abbreviated class code feature.

9.15 At the time of an addition to a No. 1 ESS office, a translations repack will very probably be required. Prior to this repack, the office abbreviated class codes should be reviewed. If new abbreviated class codes are required, they should be established prior to this computer run.

9.16 For methods of program store word recovery, refer to DFMP, Division H, Section 6h(2), Program Store Administration.

PARAMETERS

9.17 The office parameters are data retained in the program store which informs the generic program about the size and make-up of the office. As a result, this information will vary from office to office and from job to job in the same office. Parameter information includes such items as call store layout, size of switching networks and other memory items which depend on the amount and configuration of equipment provided and features desired. Parameters are compiled and placed in memory by WECo and will be changed in connection with equipment additions.

9.18 The set card is needed to define the parameters of the office. A complete listing of all set cards is contained in the PA-591001 "Office Parameter Specification."

9.19 As mentioned above, parameters are changed during an addition. This then becomes a good time to review the limits placed on the office by these set card values. Obtain the scheduled date of the parameter data assembler (PDA) run and make a review accordingly. Desired changes should be coordinated with the network design engineer.

ESSENTIAL SERVICE

9.20 The line load control feature of the No. 1 ESS can, when required, give preferential service to selected lines. These lines are referred to as essential service lines.

9.21 The percentage of lines in this preferential category is determined by the value of parameter set card "EVL." This item can be set for 6.25, 12.5, 18.75, or 25 percent.

9.22 At the time of a No. 1 ESS addition, many parameters set cards will require changing. Should the percentage provided initially not conform to the future requirement, a change could also be made to this set card. Recognize if the percentage is reduced, existing essential service lines will have to be transferred from levels discontinued from this category.

TRUNK RECORD UPDATE SUPPORT TECHNIQUE (TRUST)

9.23 TRUST is a WECo computer process that mechanizes the preparation of office trunking records.

9.24 In addition to minimizing the effort required in preparing and maintaining the office trunk records, the TRUST program will permit the use of a mechanized assignment program for growth additions. By the use of "growth flags," trunk additions or rearrangements can be grouped into steps and implemented in an orderly fashion.

9.25 TRUST also provides a summary of the signal distributor load factor for each universal trunk frame. Information detailing the load for each controller, a total for both controllers of a pair, and warning flags indicating areas of high load or overload is available to aid the administrator in keeping this critical item balanced.

9.26 The Mechanized Regional Growth Entries (MERGE) program, when implemented, will automatically generate recent change messages for all new trunks and trunk arrangements necessary for office additions. The MERGE program is totally dependent upon the use of the TRUST program.

9.27 If the growth No. 1 ESS office is not on TRUST, it is strongly recommended that this program be carefully considered early in the transition planning. The complete details for implementation are contained in the Translation Guide, TG-1A.

TRANSLATION DATA RECOVERY AND REPROCESSING SYSTEM SERVICE (TDRRSS)

9.28 The TDRRSS is a series of programs used to recover or reprocess translation data.

9.29 These programs are run at the Western Electric regional centers.

9.30 Recovery and reprocessing services are provided with the following systems:

- Translation Area Analysis (TAA) System
- Translation Retrofit Repack (TRR) System
- Auxiliary Retrofit System (ARS)
- Translation Repack to Implement Memory Savings (TRIMS)
- Translation Growth Process (TGP).

9.31 For additional information refer to User Manual for the Translation Area Analysis and Translation Retrofit Repack Systems PA-591092.

TRANSLATION AREA ANALYSIS (TAA) SYSTEM

9.32 TAA will accept translations data copied from the program store of an in-service or precut No. 1 ESS office.

9.33 TAA will locate and list the structural defects that exist in the translation area.

9.34 Some of the basic reasons for an analysis of a No. 1 ESS office translation area are:

- Verify that link list entries do not overlap or duplicate areas of program store that are assigned to tables of valid translation data.
- Verify that a table of translation data from one translator does not overlap with a different table, or tables, of translation data from the same or a different translator.
- Identify all program store locations that are not assigned to translators or link lists (eg, lost space).

9.35 The translation structural errors are located by two different means.

9.36 A certain class of errors, referred to as EXEC errors, are located from the raw program store dump translation data. The EXEC program uses the information in the master head table to put together the various levels and pointers which allow each piece of translation data to be located.

9.37 During the preparation of these files the EXEC program locates the following type of errors:

- Out of range addresses
- Invalid block sizes.

9.38 The remaining structural errors are found by the ANALYSIS program. These errors include:

- Duplicate pointers
- Invalid pointers
- Overlapping tables
- Broken link lists
- Link list loops
- Lost memory locations.

9.39 In addition to the list of defects, the system will produce a set of magnetic and functional listings.

9.40 Together these three listings provide a complete picture of the office translations at the time they were copied.

9.41 If any defects do exist the systems equipment engineer can analyze the listings and determine what action is required to clear the defects.

TRANSLATION RETROFIT REPACK (TRR) SYSTEM

9.42 TRR is a system that will produce a memory card magnetization tape that contains a complete repack of translation data recovered from an in-service or precut No. 1 ESS office.

9.43 The primary reason for a repack is the relocation of translation data for the purpose of a generic program retrofit.

9.44 A typical example is an office equipped with a CC5 generic retrofitting to an SP generic. The repack moves the translation area located in program store modules up to a new area of program store modules.

9.45 The fragmented and lost link list space is recovered and consolidated by the program. Except for reassignment of addresses, the translation data is identical to the data recovered from the office.

AUXILIARY RETROFIT SYSTEM (ARS)

9.46 ARS is a system which will accept a set of translations copied from an in-service or precut No. 1 ESS office for a retrofit.

9.47 ARS will modify the existing office translations in such a manner as to allow the office to function on both the preretrofit and postretrofit generics.

9.48 With the Centrex-6 retrofit there were certain translation items which were compatible with the Centrex-6 generic but not with the preretrofit generic and vice versa.

9.49 Since the intent of ARS is to modify translations to function on both the preretrofit and the postretrofit generic, certain translations information will be duplicated within program store.

9.50 Those items which are duplicated and are not needed for postretrofit will be packed in translation modules which will be overwritten with the postretrofit generic program.

9.51 ARS processing for the Centrex-7 retrofit uses the same general logic. ARS processing is ***not*** required for Centrex-6 to Centrex-7 retrofit.

9.52 The output of ARS is a memory card magnetization tape that contains a complete repack of translation data.

TRANSLATION REPACK TO IMPLEMENT MEMORY SAVINGS (TRIMS)

9.53 TRIMS is designed to recover No. 1 ESS program store space from the translation data area.

9.54 Some of the basic reasons for the use of TRIMS are as follows:

- Program store space savings may allow some offices to retrofit to new generic programs without the addition of a program store.
- In some cases the savings may allow the office to provide service to new customers without additional program store space.

9.55 TRIMS use data files which are created by TAA. These data files are changed by

TRIMS to provide more efficient use of the program store space.

9.56 The first area where program store space is recovered is auxiliary block data.

- Auxiliary block data usually requires from two to five words.
- Some of the data represented by auxiliary blocks can be represented by an abbreviated code.
- The abbreviated code data is stored in a fixed length table which is present in every office.
- By a process of converting the data represented by auxiliary blocks to abbreviated codes, the auxiliary block space is recovered.

9.57 TRIMS also has the ability to convert abbreviated code data back to auxiliary block data.

- This means that an abbreviated code, which is infrequently referenced, can be converted to an auxiliary block.
- New data, which makes better use of the abbreviated code, can then be substituted.

9.58 Another area where space can be recovered is the head table capacities.

- Each office has a master head table which contains, among others things, pointers to the various head tables of variable length.
- Some variable length tables were built larger than the office could reasonably use. They were built to reflect the life of the office.
- The head table lengths can now be built on an engineering period basis which requires fewer words. TRIMS can recover these words.

TRANSLATION GROWTH PROCESS (TGP)

9.59 TGP is designed to facilitate large scale additions of subscriber lines to in-service No. 1 ESS offices. Traditionally, this has been a manual process using the recent change function of No. 1 ESS.

9.60 The new subscriber line information is submitted by TELCo to the regional engineer. The information uses the existing ESS translation forms.

9.61 The following No. 1 ESS forms are valid forms for TGP processing. (Refer to TG-1A for form examples.)

FORM	FORM CODE	CHARACTERISTICS
1500A	00	Required
1500B	02	Required
1501	04	Required
1502A	06	Required
1502B	08	Required
1503	07	Optional
1306	10	Required
1210	29	Optional
1109	15	Optional
1107	12	Optional
1105	16	Optional
1101	14	Required
1111	14	Optional

9.62 The TELCo may elect to keypunch the ESS forms themselves or have the regional center perform this function.

9.63 The ESS forms are processed by the trunk assignment system (TAS).

- All corrections should be coordinated with the TELCo representative responsible for correction of errors.
- An additional TAS run is required to put the corrections on the TGP library tape.

9.64 The error free TGP library tape and the translation data from the office are then input to the TGP programs.

- The new subscriber line data is merged with the existing subscriber line data and new translations data is produced.
- The new translations have the new subscribers in the precut mode.

10. RECOMMENDED DOCUMENTS

10.01 The following documents are recommended for a No. 1 ESS network administrator.

10.02 ***Dial Facilities Management Practices (DFMP):*** This document outlines the network administrator's responsibilities and provides methods for the administration of No. 1 ESS.

10.03 ***Traffic Facilities Practices (TFP):*** This document outlines the traffic engineering criteria for the equipment order. It is necessary for the network administrator to have a copy of this publication to properly review and evaluate the office capacity.

10.04 ***Translation Guide, TG-1A:*** This publication furnishes the latest instructions concerning preparation and maintenance of No. 1 ESS translations and record forms.

10.05 ***Parameter Specifications — PA 591001:*** This specification describes the input form and data required for producing office parameters. Of special interest to the network administrator is call store work sheets. This section contains the work sheets and a description of each item on these work sheets. It also contains a recommended method for computing the value assigned to each item.

10.06 ***Translations Output Configuration — PA-591003:*** This specification details exactly how translation information is stored in the translators. By using this publication, the network administrator can determine the location of data in No. 1 ESS translation memory and verify if the information is correct.

10.07 ***Input Manual—IM-1A001:*** This document contains the TTY input messages valid for communicating with the No. 1 ESS.

10.08 ***Output Manual—OM-1A001:*** This document contains the output messages used by the No. 1 ESS for communicating through the various TTY channels available.

10.09 ***No. 1 ESS Equipment Questionnaire and Equipment Notes E-8056:*** This questionnaire is recommended to be used as a combined traffic and equipment order for the No. 1 ESS.

10.10 ***Junctor Assignment Program (JAP) Printout:*** This document provides the junctor configuration for each interim and final junctor arrangement. It is necessary for the network administrator to have a copy of each JAP required for the transition to evaluate service requirements.

11. REFERENCES

11.01 The following documents will provide further information in related areas.

DFMP, DIVISION H

SECTION	TITLE
1b(8)	Method of Procedure
6b	System Descriptions
6c	Call Processing
6g	Load Balance
6h	Machine Capacity Management
6i	Traffic Measurements
6j	Data Management
6k	Service Results
6n(2)	Transition Management — Switching Network
6n(3)	Transition Management — Call Processing

BELL SYSTEM PRACTICES

SECTION	TITLE
231-019-101	General Growth Description — No. 1 ESS

PA-DOCUMENTATION

SECTION	TITLE
PA-591092	Translation Data Recovery and Reprocessing System Service

TFP, DIVISION D

SECTION	TITLE
10e(2)	Line Link Network
10e(3)	Trunk Link Network
10e(4)	Junctors and Intraoffice Trunks
10e(5)	Junctor Assignment Program
10f(3)	Central Control and Signal Processor
10g	Program Stores
10h	Call Stores

TG-1A, DIVISION 3

SECTION	TRANSLATION PREPARATION
1	ESS 1100 Series — Lines
2	ESS 1200 Series — Trunks and Service Circuits
3	ESS 1300 Series — Routing and Charging
4	ESS 1400 Series — Traffic Measurements
5	ESS 1500 Series — Office Features and Options
6	ESS 1600 Series — Unit Type Computer Generated Data
7	ESS 1700 Series — Junctors

TG-1A, DIVISION 4

SECTION	BASIC APPLICATIONS
1	Planning the Translation Job
2	Trunks and Service Circuits
3	Routing and Charging
4	Measurements
5	Office Features and Options
6	Junctors
7	Lines
8	Sample POTS Office Translations

TG-1A, DIVISION 8

SECTION	GENERIC PROGRAMS
1	General
2	Major New Developments
3	Services and Features of Generic Programs
4	Generic Program Availability
5	Retrofit and Growth Availability
6	Features Planned for Future Program Issues

TG-1A, DIVISION 10

SECTION	GROWTH
1	Interdepartmental Responsibilities
2	Manual Preparation of Trunk Translation Data
3	Trunk Growth Procedures (Mechanized)

12. GLOSSARY

12.01 The following glossary of No. 1 ESS growth terms and phrases is provided.

Address — An octal number that identifies a memory storage location.

Auxiliary Block — See unit type auxiliary block.

Auxiliary Test Programs — Refers to the concept of removing a special module of PS memory cards and temporarily replacing them with a module containing special purpose programs. Program store module 5 or its duplicate module 15 is the module used for this purpose.

B-Links — The interconnections between junctor switch frames and their associated trunk switch or line switch frames.

Basic Line Switch Frame — Bays 0 and 1 of a 4:1 line switch frame.

Bit (Binary Digit) — A binary unit of information.

Bus — A lead or group of leads providing time-shared communication paths over which information is transmitted from any one of several sources to any of several destinations.

Categories — A group or classification of recent change procedures. A category of procedures is performed at a specific time in the installation sequence.

COMPOOL — The COMPOOL (common pool) record is a collection of mnemonic address to octal address equivalencies.

Error — A malfunction, the symptoms of which ***cannot*** be reproduced under program control.

Fault — A malfunction, the symptoms of which ***can*** be reproduced under program control.

Filled (or Unfilled) Switching Network — Refers to the condition of a network with respect to the number of trunk switch (TS) or line switch (LS) frames present and the number allowed by the given equipage and B-link pattern.

Final Parameters — A parameter module that defines the system configuration at the conclusion of the office addition. In some cases, a final parameter module is supplied for the office. In other cases, the transitional parameter module is modified during the addition sequence and becomes the final parameters.

GRC Forms — Growth recent change forms are used for the transmittal of information between the Telephone Company and Western Electric Company.

Head Table — A memory table which contains the starting addresses of subtranslators.

Home LS Frame — A 2:1 LS frame which contains a line scanner controller.

Initialize — To write into. A memory address or location is initialized by writing into it.

Instruction — A binary word which directs CC to perform a particular operation.

Supplementary LS Frame — Bay 2 of 4:1 LS frame.

Linking — A procedure in which the address of a new memory block is written into a memory location to provide access to the information contained in the new memory block.

Location — Address of a memory storage word.

Mate LS Frame — A 2:1 LS frame which does not contain a line scanner controller but whose ferrods are wired to a 2:1 home LS frame.

MOD 5 — See auxiliary test programs.

Method of Procedure (MOP) — An outline describing a job to be done which involves ***live*** office equipment. A MOP is prepared by Western Electric installation and Telephone Company personnel and signed by authorized Telephone Company and Western Electric Company personnel.

Network Concentration Ratio (Trunk to Junctor or Line to Junctor — The overall concentration ratio of a network is the product of the concentration ratio in the TS or LS frames and the B-link wiring ratio.

Network Equipage — Refers to the number of junctor switch frames contained in a trunk link or line link network. One junctor switch frame gives one-quarter equipped, two give one-half equipped, or four give fully equipped.

Parameter Information — PS information consisting of numerical values and constants which

define the office size, scanning rates, and related information.

PDA Listing — The parameter data assembler (PDA) listing is a computer generated document listing the input set cards and the office parameter data which is generated from the input set cards.

Seize — To obtain. For example, if a new block of memory is needed, it is seized from the list of idle PS space.

Set Card — A computer card containing a number that is used to define the office size or features. Each set card has a mnemonic designation or name. For example, the PSF set card contains the number of PS frames the office has.

Software — The information stored in the systems memory.

Subtranslator — A memory table which contains one primary translation word per index. Growth frequently involves moving or building new subtranslators.

Transitional Parameters — Parameters information which has been modified in some respects so that, during the growth addition and testing interval, call-processing programs will not use the new equipment.

Translation Information — Information contained in the CS or PS pertaining primarily to individual lines or trunks. It may be used, for instance, to convert a DN into an equipment location, to derive the class of service, etc.

Translator — A group of tables connected in a hierarchical pattern which contains data pertinent to a specific type of translation.

Unit Type Auxiliary Block — A block of information containing equipment-related information. Unit type auxiliary blocks link to a unit type subtranslator.

Unit Type Translator — A unit type subtranslator and its associated auxiliary blocks.

Update — Changing translation or parameter information.

Word — A set of digits associated to express system information. (The term ***word*** may be prefixed by an adjective describing the nature of the characters, such as binary word).

Word Number — The length of some memory blocks (of variable length) is contained in the first word of the block. The bits specifying the length contain the ***word number.***

13. ABBREVIATIONS AND ACRONYMS

ABS-BH	Average Busy Season—Busy Hour
AIOD	Automatic Identified Outward Dialing
AMA	Automatic Message Accounting
ARS	Auxiliary Retrofit System
CC	Central Control
CCS	Hundred Call Seconds
CENTREX	Centralized Exchange for Business Customer Service
CPD	Central Pulse Distributor
CTX	Centrex
DDD	Direct Distance Dialing
DFMP	Dial Facilities Management Practices
DN	Directory Number
DOC	Dynamic Overload Control
DTS	Dial Tone Speed
ESS	Electronic Switching System
GRC	Growth Recent Change
IML	Incoming Matching Loss
JAP	Junctor Assignment Program
JGF	Junctor Grouping Frame
LEN	Line Equipment Number

LLN	Line Link Network
LS	Line Switch
MERGE	Mechanized Regional Growth Entries
MOP	Method of Procedure
MS	Master Scanner
PATROL	Program for Administrative Traffic Reports on Line
PBX	Private Branch Exchange
PDA	Parameter Data Assembler
PS	Program Store
RADR	Receiver Attachment Delay Report
RC	Recent Change
SD	Signal Distributor
SLN	Service Link Network
SP	Signal Processor
TAA	Translation Area Analysis
TAS	Trunk Assignment System
TDRRSS	Translation Data Recovery and Reprocessing System Service
TFP	Traffic Facilities Practices
TGP	Translation Growth Process
TLN	Trunk Link Network
TRIMS	Translation Repack to Implement Memory Savings
TRR	Translation Retrofit Repack
TRUST	Trunk Record Update Support Technique
TS	Trunk Switch
TTY	Teletypewriter

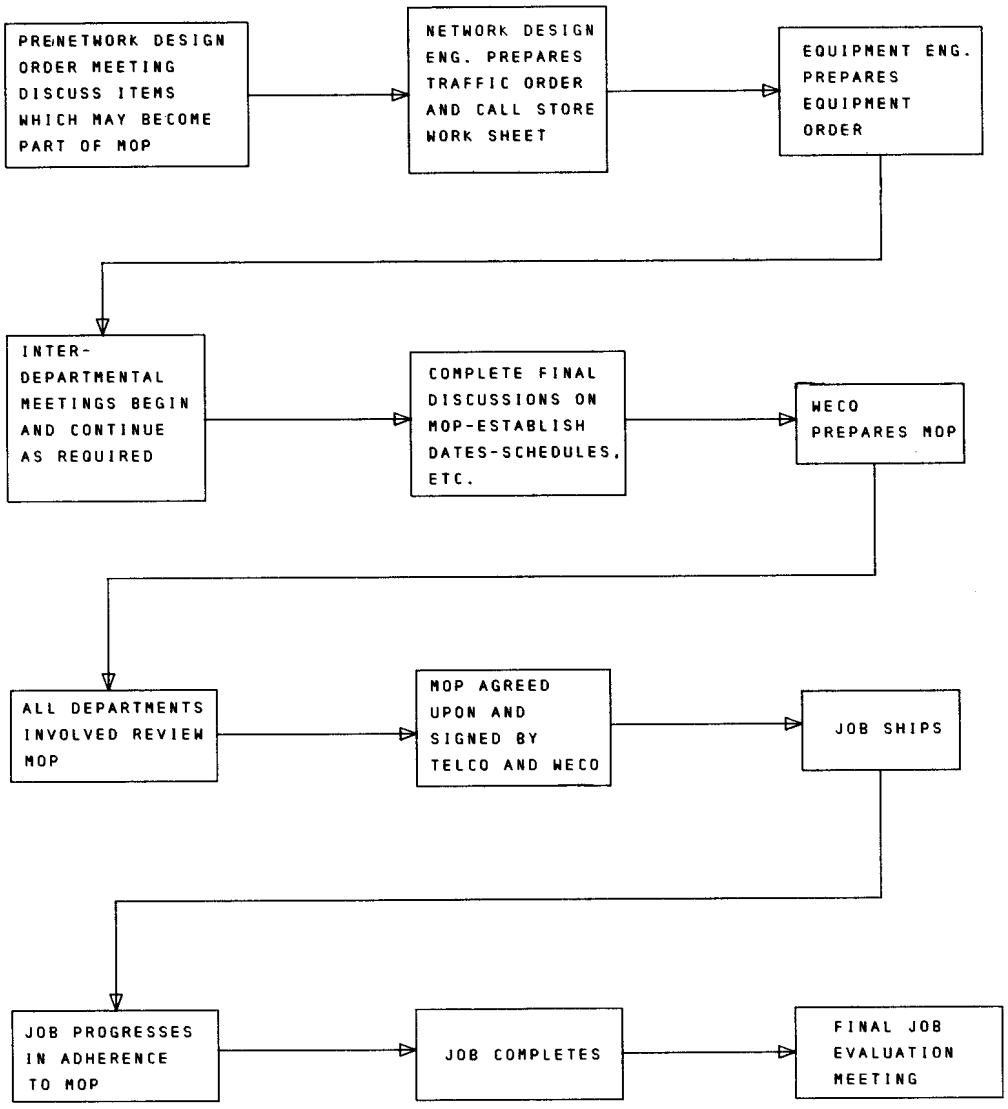


Fig. 1—Block Diagram—Sequence of Events Leading to Preparation of MOP (3.16)

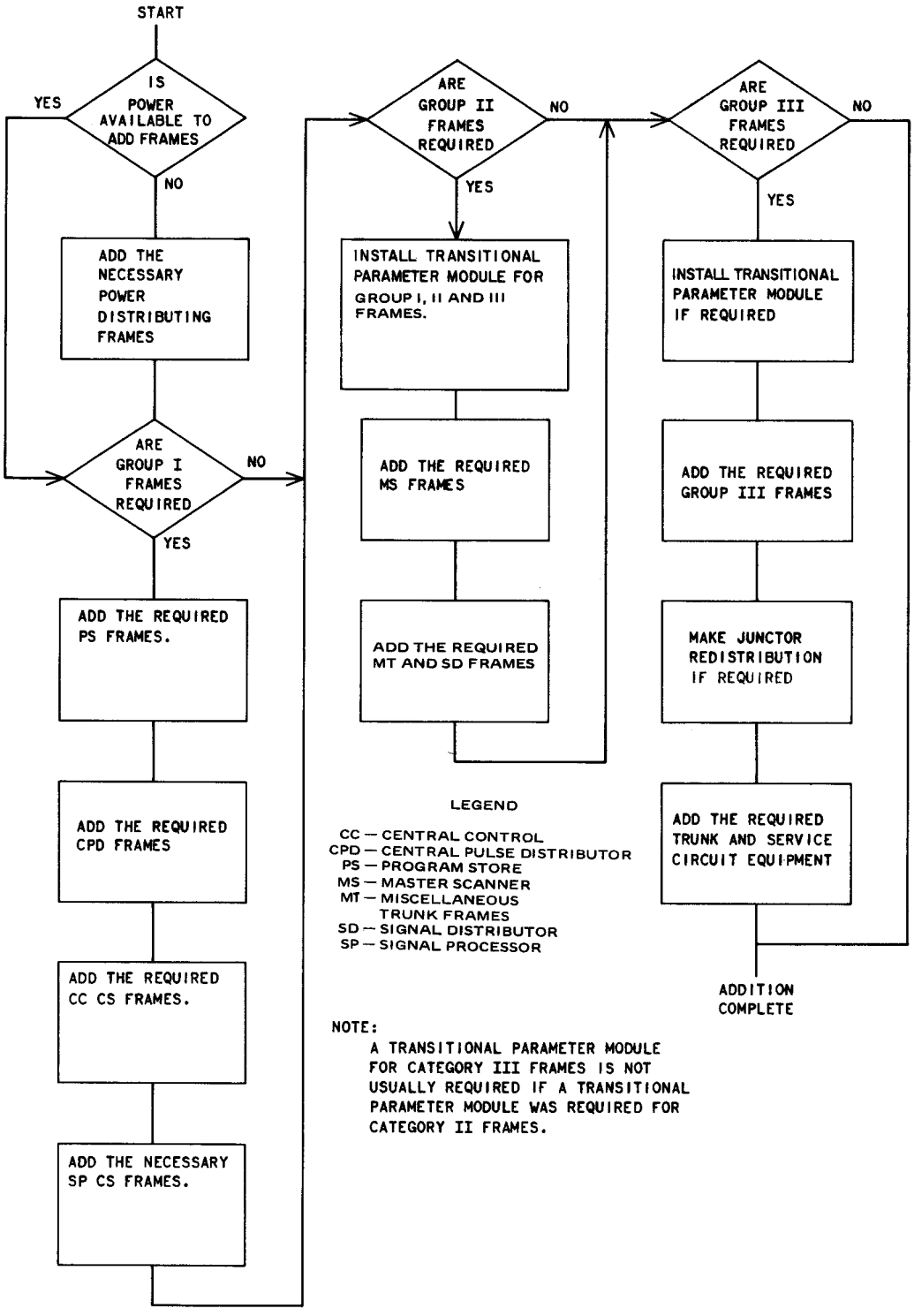
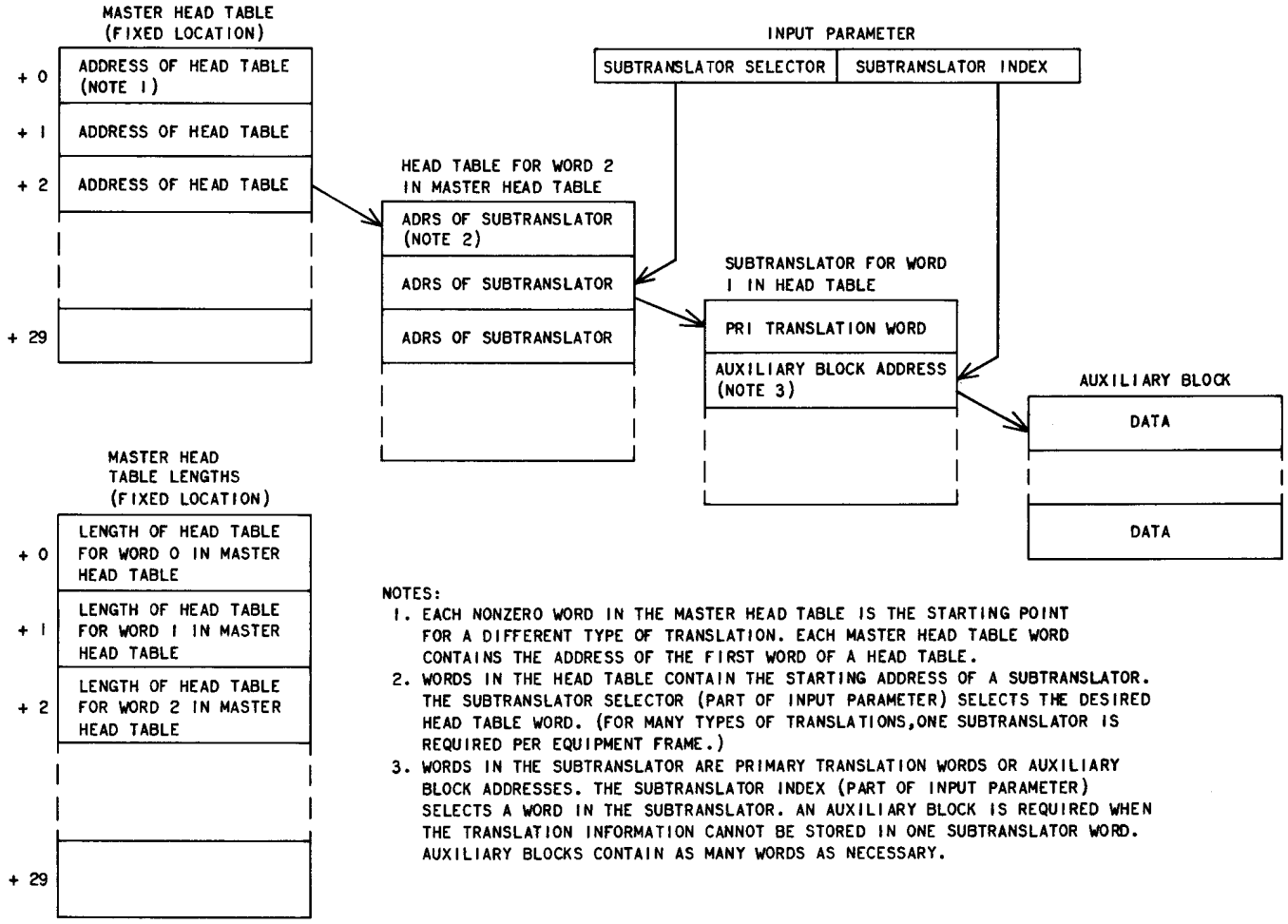


Fig. 2—Flowchart — Sequence of Additions (5.24)



NOTES:

1. EACH NONZERO WORD IN THE MASTER HEAD TABLE IS THE STARTING POINT FOR A DIFFERENT TYPE OF TRANSLATION. EACH MASTER HEAD TABLE WORD CONTAINS THE ADDRESS OF THE FIRST WORD OF A HEAD TABLE.
2. WORDS IN THE HEAD TABLE CONTAIN THE STARTING ADDRESS OF A SUBTRANSLATOR. THE SUBTRANSLATOR SELECTOR (PART OF INPUT PARAMETER) SELECTS THE DESIRED HEAD TABLE WORD. (FOR MANY TYPES OF TRANSLATIONS,ONE SUBTRANSLATOR IS REQUIRED PER EQUIPMENT FRAME.)
3. WORDS IN THE SUBTRANSLATOR ARE PRIMARY TRANSLATION WORDS OR AUXILIARY BLOCK ADDRESSES. THE SUBTRANSLATOR INDEX (PART OF INPUT PARAMETER) SELECTS A WORD IN THE SUBTRANSLATOR. AN AUXILIARY BLOCK IS REQUIRED WHEN THE TRANSLATION INFORMATION CANNOT BE STORED IN ONE SUBTRANSLATOR WORD. AUXILIARY BLOCKS CONTAIN AS MANY WORDS AS NECESSARY.

Fig. 3—Layout of Master Head Table Translator (6.04)

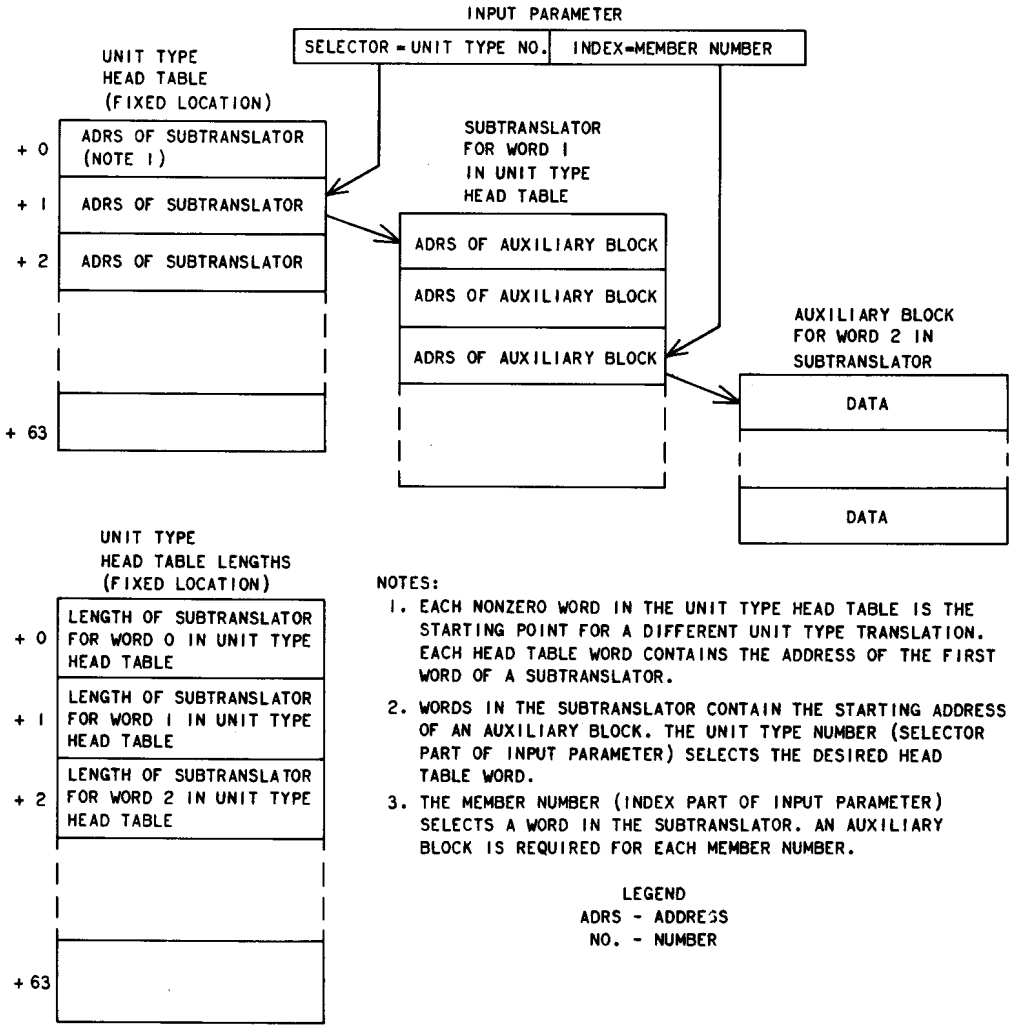


Fig. 4—Layout of Unit Type Translator (6.06)

TABLE A

TRANSITION – MOP CHECKLIST

A. REVIEW THE CONTENTS OF THE NETWORK DESIGN ORDER TO INSURE THAT:

(1) The installation interval and date of completion are adequate.

(2) The estimate of equipment requirements reflect the latest view of demands.

(3) The department representative responsible for the toll, directory assistance, and intercept facilities concur in equipment provision and arrangements.

B. BE AWARE OF LOAD-SERVICE RELATIONSHIPS.

(1) Arrange for monitoring the various load service barometers to insure sufficient equipment quantities are available during the transition.

(2) Understanding of load-service relationships so that proper in-service requirements can be determined.

C. DETERMINE AND EVALUATE THE EFFECT ON SERVICE OF THE PROPOSED MOP. PARTICIPATE IN DETERMINING THE PREFERRED TIME FRAME FOR SERVICE AFFECTING OPERATIONS SUCH AS:

(1) Junctor pattern changes.

(2) Trunking and/or equipment rearrangements.

D. TRANSLATION CHANGES

(1) Participate in determining and scheduling interdepartmental translation record verification in which the network administrator would be involved.

(2) Arrange for line, trunk and related translation changes. Provide the appropriate coordination.

(3) Arrange for changes to traffic register assignments (i.e., obsolete measurements or new measurements).

E. HAVE VARIOUS DOCUMENTS AVAILABLE FOR EASY REFERENCE. THESE MAY INCLUDE:

(1) Network design orders

(2) Job specification

(3) MOP

(4) Various traffic practices

(5) Trunk forecasts

(6) Data summaries

TABLE A (Cont)

TRANSITION – MOP CHECKLIST

(7) Line and station forecasts

(8) Demand and facility charts.

F. PLANS

(1) Equipment required first.

(2) Minimum in-service requirements.

(3) Expected service penalities due to overloads and/or equipment outages.

(4) Planned line or trunk transfers.

(5) Alternate plan, etc.

G. TRANSITION ITEM CHECKLIST

(1) Ground start

(2) Line and trunk balance

(3) Signal distributor load factor

(4) Partial and fractional networks

(5) Network ratio changes

(6) Junctor and JAP runs

(7) Parameters and PDA set cards

(8) Percent essential service

(9) Master head table

(10) Abbreviated codes

(11) Recorded announcements

(12) Network management feature

(13) Remote signal distributors and master scanners

(14) Special circuit requirements

(15) New features

(16) Traffic measurement changes.

TABLE A (Cont)

TRANSITION – MOP CHECKLIST

H. SUGGESTED MEETINGS

(1) Field review of equipment order

(2) Pre-MOP meetings

(3) Method of procedure meetings

(4) Status of job meetings

(5) Cutover meetings

(6) Critique meetings.

TABLE B

GENERAL DIVISION OF RESPONSIBILITY BETWEEN TELEPHONE COMPANY AND WESTERN ELECTRIC COMPANY ON NO. 1 ESS ADDITIONS

OPERATION	RESPONSIBILITY		
	WESTERN ELECTRIC COMPANY REGION ENGINEERING	WESTERN ELECTRIC COMPANY INSTALLATION	TELEPHONE COMPANY
Project Development	Sequence Equipment Installation	Joint Preparation of Method of Procedure	
System Evaluation Tests		Check Output Messages From System Evaluation Testing	Perform System Evaluation Testing
Growth Recent Change Forms	Assignment Data	Coordinate Growth Recent Change Activity	Input Messages for Translation and Parameter Updates
		Joint Interpretation of Output Messages	
Testing Added Frames		Perform Prescribed Tests on Added Frames and Monitor System Reaction	Operate Central Office

TABLE C

OPERATING SYSTEM REQUIREMENTS TO ADD NEW FRAMES OR EQUIPMENT

FRAME GROUP	FRAME OR EQUIPMENT ADDED	TRANSITIONAL PARAMETER REQUIRED	AVAILABILITY REQUIRED IN OPERATIONAL FRAMES				
			PROGRAM STORE SPACE	CENTRAL PULSE DISTRI-BUTOR POINTS	CALL STORE SPACE	MASTER SCANNER POINTS	SIGNAL DISTRI-BUTOR POINTS
I	Program Store		X	X		X	X
	Central Pulse Distributor		X			X	
	Call Store		X	X		X	X
	Master Scanner	X	X	X	X	X	
II	Miscellaneous Trunk with Supplementary Signal Distrib-utor	X		X		X	
III	*Peripheral	X	X	X	X	X	
IV	*Trunk and Service Circuit Equipment	X	X	X	X	X	

*Some peripheral frames and trunk and service circuit equipment do not require all items listed.

TABLE D

TYPES OF GROWTH AND ASSOCIATED DOCUMENTATION
(CTX-5 AND LOWER GENERIC PROGRAMS)

EQUIPMENT OR FRAME TYPE	GRC NUMBER	GRC FORMS USED			BSP SECTION
		XXXX.1	XXXX.2	XXXX.3	
Program Store	0100	X	X	X	231-019-303
8K CC Call Store	0110	X	X	X	231-019-302
32K CC Call Store	0112	X	X	X	231-019-307
Signal Processor Conversion with 8K Call Store	0270		X	X	231-119-310
Signal Processor Conversion with 32K Call Store	0271		X	X	231-119-310
Master Scanner	0130	X	X	X	231-019-301
Central Pulse Distributor	0120	X	X	X	231-019-304
Miscellaneous Trunk	0220		X		231-019-305
Recorded Announcement	0300	X	X	X	231-019-306
Signal Processor Call Store (8K)	0111	X	X	X	231-019-302
Ringing and Tone	0310		X		
Power Distributing	0210	X	X	X	231-019-306
Centrex Data Link Frame and Unit 0	0260	X	X	X	231-119-309
Centrex Data Link Units	0261		X	X	231-119-309
Miscellaneous Power					231-019-306
Miscellaneous	0230		X		231-019-306
Universal Trunk	0180	X	X	X	231-119-302

TABLE D (Cont)

TYPES OF GROWTH AND ASSOCIATED DOCUMENTATION
(CTX-5 AND LOWER GENERIC PROGRAMS)

EQUIPMENT OR FRAME TYPE	GRC NUMBER	GRC FORMS USED			BSP SECTION
		XXXX.1	XXXX.2	XXXX.3	
Line Switch (Ferreed or Remreed)	0140	X	X	X	231-119-301 231-119-303
Line Junctor Switch (Ferreed or Remreed)	0150	X	X	X	231-119-301 231-119-303
Junctor	0190	X	X	X	231-119-305
Trunk Switch (Ferreed or Remreed)	0160	X	X		231-119-304
Trunk Junctor Switch (Ferreed or Remreed)	0170	X	X	X	231-119-304
Miscellaneous Trunk Frame with Supplementary Signal Distributor	0200	X	X		231-019-305
Service Link Network	0250	X	X		231-119-307
Supplementary Trunk Test Panel	0240	X	X		231-119-308
Miscellaneous Trunk Frame with Step-By-Step Trunks	0220		X		231-119-311
Miscellaneous Trunk Frame with TTY (List 1 and 2)	0900	X	X		231-119-306
Miscellaneous Trunk Frame with TTY (List 1 and 3)	0220		X		231-119-306
Miscellaneous Trunk Frame with Data Link Circuit	0280		X		
Miscellaneous Trunk Frame with AIOD and First ANI Connecting Unit	0290	X	X		231-119-312
AIOD ANI Connecting Units	0291		X		231-119-312

LEGEND

AIOD — Automatic Identified Outward Dialing
ANI — Automatic Number Identification
TTY — Teletypewriter

TABLE E

TYPES OF GROWTH AND ASSOCIATED DOCUMENTATION
(CTX-6 AND CTX-7 GENERIC PROGRAMS)

EQUIPMENT OR FRAME TYPE	GRC NUMBER	GRC FORMS USED			BSP SECTION
		XXXX.1	XXXX.2	XXXX.3	
Program Store	0105	X	X	X	231-119-343
8K CC Call Store	0115	X	X	X	231-119-342
32K CC Call Store	0117	X	X	X	231-119-347
Signal Processor Conversion with 8K Call Store	0275		X	X	231-119-330
Signal Processor Conversion with 32K Call Store	0276		X	X	231-119-330
Master Scanner	0135	X	X	X	231-119-341
Central Pulse Distributor	0125	X	X	X	231-119-344
Miscellaneous Trunk	0225		X		231-119-345
Recorded Announcement	0305	X	X	X	231-119-346
Signal Processor Call Store (8K)	0116	X	X	X	231-119-342
Ringing and Tone	0315		X		
Power Distributing	0215	X	X	X	231-119-346
Centrex Data Link Frame and Unit 0	0265	X	X	X	231-119-329
Centrex Data Link Units 1 Thru 7	0266		X	X	231-119-329
Miscellaneous Power	0235		X		231-119-346
Miscellaneous	0235		X		231-119-346
Universal Trunk	0185	X	X	X	231-119-322
Line Switch (Ferreed or Remreed)	0145	X	X	X	231-119-321 231-119-323
Line Junctor Switch (Ferreed or Remreed)	0155	X	X		231-119-321 231-119-323

TABLE E (Cont)

TYPES OF GROWTH AND ASSOCIATED DOCUMENTATION

(CTX-6 AND CTX-7 GENERIC PROGRAMS)

EQUIPMENT OR FRAME TYPE	GRC NUMBER	GRC FORMS USED			BSP SECTION
		XXXX.1	XXXX.2	XXXX.3	
Junctor	0195	X	X	X	231-119-325
Trunk Switch	0165	X	X		231-119-324
Trunk Junctor Switch	0175	X	X		231-119-324
Miscellaneous Trunk Frame with Supplementary Signal Distributor	0205	X	X		231-119-345
Service Link Network	0255	X	X		
Supplementary Trunk Test Panel	0245	X	X		231-119-328
Miscellaneous Trunk Frame with Step-By-Step Trunks	0225		X		231-119-331
Miscellaneous Trunk Frame with TTY (TR) (List 1 and 2)	0905		X		231-119-326
Miscellaneous Trunk Frame with TTY (List 1 and 3)					
Miscellaneous Trunk Frame with Data Link Circuit	0285		X		
Miscellaneous Trunk Frame with AIOD and First ANI Connecting Unit	0295	X	X		231-119-332
AIOD ANI Connecting Units	0296		X		231-119-332
Remote Office Test Line (ROTL) Frame	0325		X		231-119-333
Network Management Growth					231-119-334

LEGEND

AIOD — Automatic Identified Outward Dialing
ANI — Automatic Number Identification
TTY — Teletypewriter