

FEATURE DOCUMENT
CALL ROUTING
NO. 2 ELECTRONIC SWITCHING SYSTEM

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NOTICE

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FEATURE DEFINITION AND DESCRIPTION**1. DEFINITION/INTRODUCTION****DEFINITION**

1.01 Call routing comprises a combination of techniques used to select the proper path (route) through the central office to complete or forward a call after all (or some of) the digits have been received.

1.02 The call routing techniques usually incorporated in a given office include the proper path selection for intraoffice calls and for incoming, outgoing, and tandem interoffice calls. Paths are also established to provide various call failure treatments.

INTRODUCTION

1.03 The incorporation of the various call routing techniques into a No. 2 Electronic Switching System (ESS) office requires careful planning which includes the type of calls to be processed and the desired destination to be reached. A thorough understanding of the different call routing techniques is necessary to insure that the correct translation data is prepared and entered into the system.

1.04 This document describes the various call routing techniques which can exist in the No. 2 ESS. Call routing is primarily a software function which can be implemented with any version of the generic program. Techniques unique to centrex require the EF-1 and later generic programs. Call routing is controlled by translations and is established through an office data administration (ODA) run, although portions of the translations can be altered by recent change (RC) messages.

2. USER PERSPECTIVE**CUSTOMER**

2.01 The intended destination for the majority of calls processed by the No. 2 ESS is determined via the pattern of digits either dialed by a customer served by the office or received over incoming trunks from other offices. Manual and hot line calls represent a special type of call in which dialing is not required to determine the desired destination.

2.02 Centrex features are available in offices equipped with the EF-1 and later generic programs. A dialing plan, unique to each centrex customer, is developed to specify dialing patterns (access codes) which are used to identify various centrex features or facilities. Centrex access treatment (CAT) codes are developed to allow only preselected users to access specific features or facilities.

TELEPHONE COMPANY

2.03 Limited telephone company personnel involvement is required in the actual operation of any call routing techniques incorporated into an office. Operators are required in the routing of certain calls. Also, network management personnel may need to make decisions concerning Route Transfer Keys when these keys are used to assign different trunk groups for route transfer service.

2.04 The primary area which involves telephone company personnel is the planning for the initial installation and subsequent growth of a No. 2 ESS office. The successful completion of any call is dependent on adequate planning and the proper incorporation of call routing techniques and associated facilities into the office.

3. SYSTEM PERSPECTIVE**FEATURE OPERATION****A. Overview of Call Routing**

3.01 Call routing can be depicted as a process in which different types of calls are completed as a result of combining various call routing techniques. This process is shown in Figure 1. The call routing techniques included in this document include the following:

- 3-Digit (Code Group) Translator
- Screening Tables
- Route Index Translator
- 1-Digit Translator
- 4-Digit Translator
- Centrex Digit Interpreter Tables

- Loop Around Trunk Groups.

3.02 The Feature Operation has been divided into specific subparts beginning with a description of each call routing technique. Subsequent subparts detail general interactions among the call routing techniques; and finally, specific interactions for processing the various types of calls and for providing the different call failure treatments.

B. Description of Each Call Routing Technique

3-Digit (Code Group) Translator

3.03 The 3-digit (code group) translator is used as the starting point in converting the dialed digits for all 3-digit office codes or area codes (or 6-digit office and area codes) into applicable routing

and charging data. The primary tables associated with 3-digit translation are the code point translator and the code index expansion table. The structure of these tables is shown in Figure 2. The function of the tables is to compress the 810 possible 3-digit codes into a maximum of 256 different combinations of routing and charging.

3.04 Since a number of 3-digit dialed codes may be routed and charged identically, the code point translation is used to associate any given 3-digit code to a code index. The code index is used to select an entry in the code index expansion translator where information pertaining to routing and charging is located.

3.05 The code point translator portion of the 3-digit translator consists of 405 words. Each

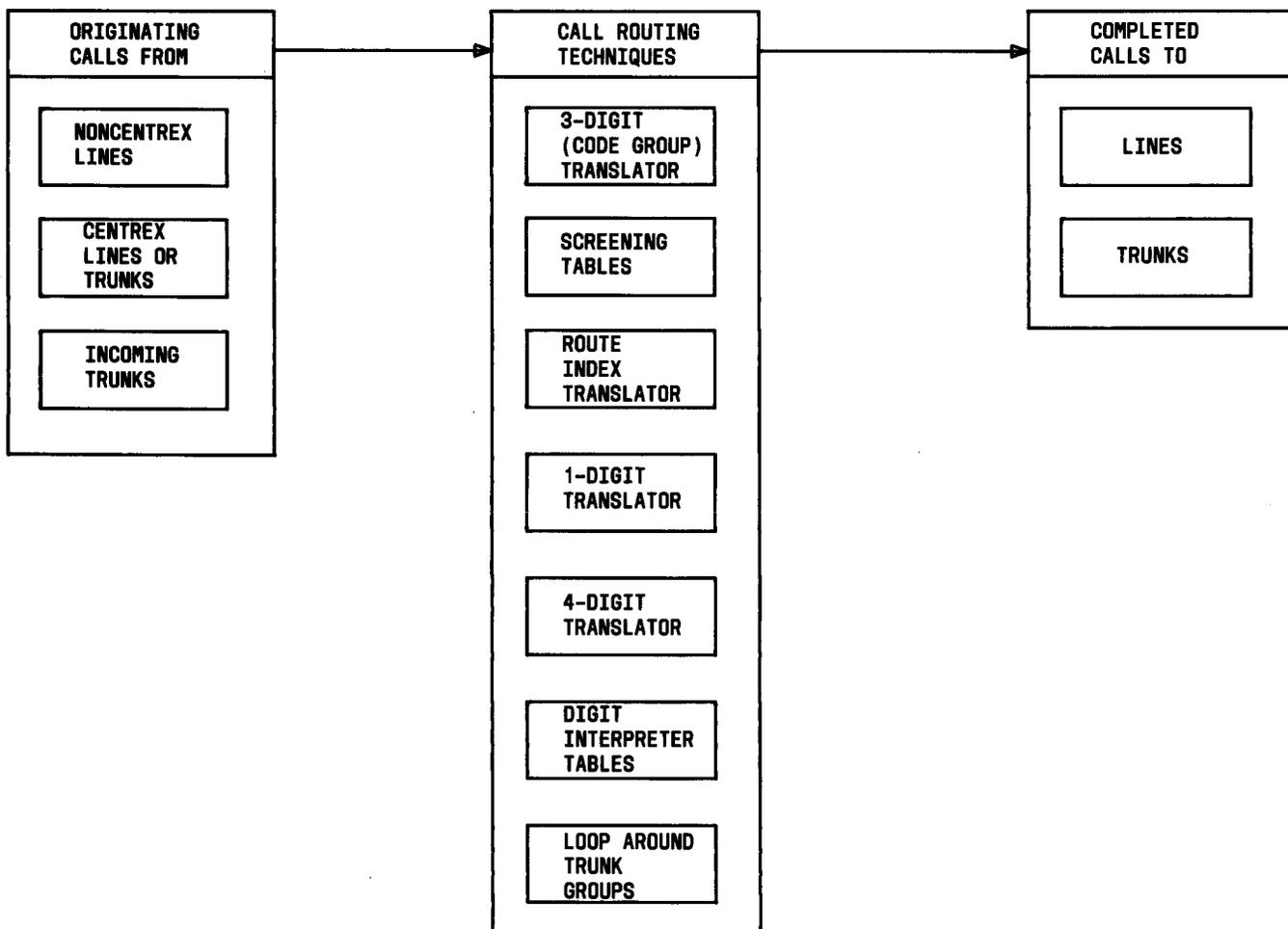


Fig. 1—Simplified Call Routing Process

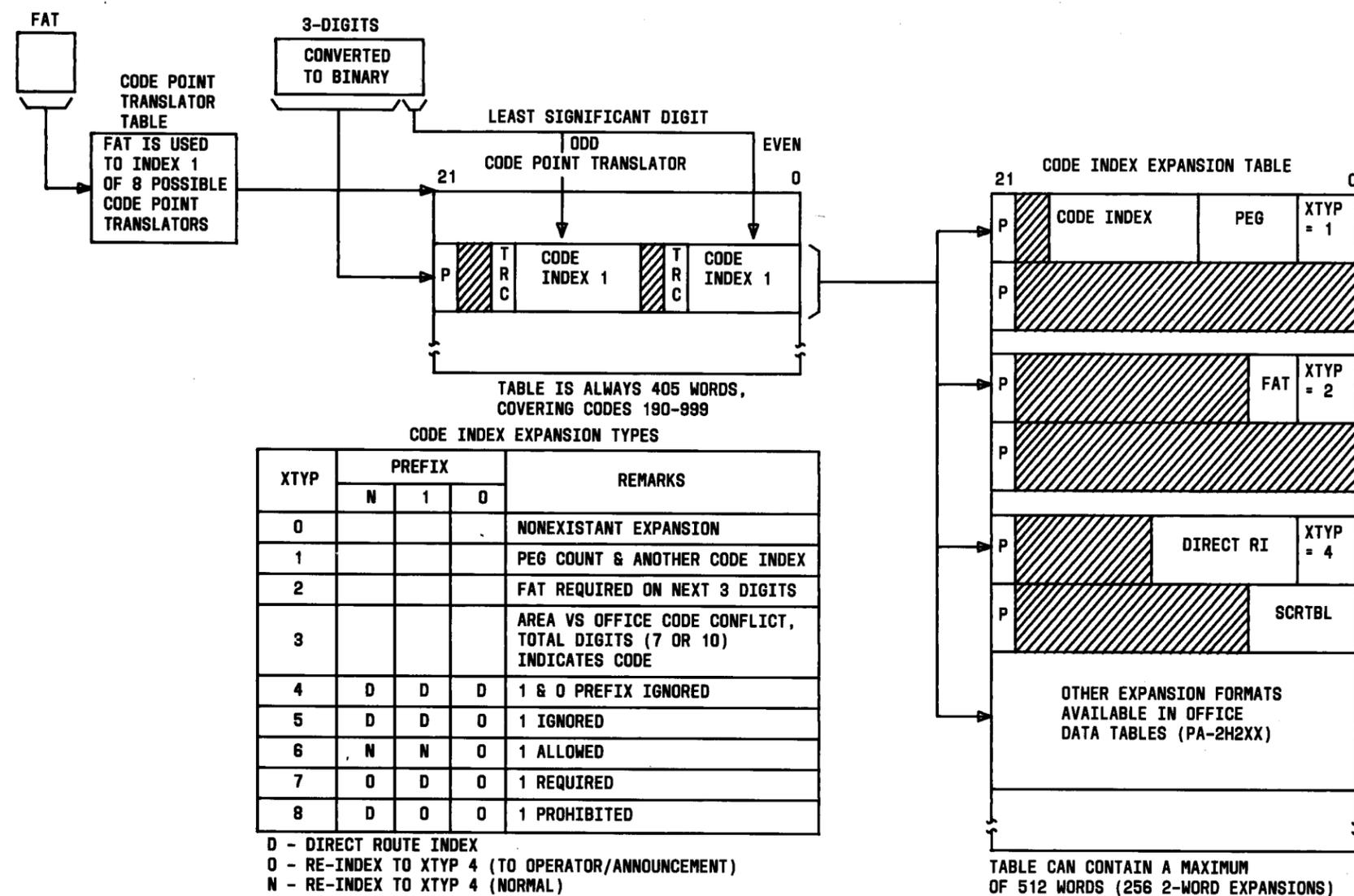


Fig. 2—Three-Digit Translator Structure

word contains two code indexes which may point to two entries in the code index expansion table. The resulting 810 code indexes correspond to three dialed digits in the ranges 190 through 999. Dialed digits between 110 and 119 are translated by converting them to the corresponding 190 through 199 code.

3.06 The three dialed digits are converted to a 10-bit binary number. Bits 1 through 9 are used to select one of the 405 words and bit 0 is used to select one of the two code indexes within the word.

3.07 Up to eight code point translators can be provided with the code index expansion table; the first is referred to as the local area translator and the others are referred to as foreign area translators (FATs). The initial entry for the first three dialed digits into the 3-digit translator is through the local area translator. A FAT is required to interpret the next three digits if the first three digits represent an area code. FATs are accessed from the local area translator.

3.08 The detailed information for each code index expansion table entry includes an expansion type (XTYP) code in the first word which identifies the format of the entry. The different XTYPs

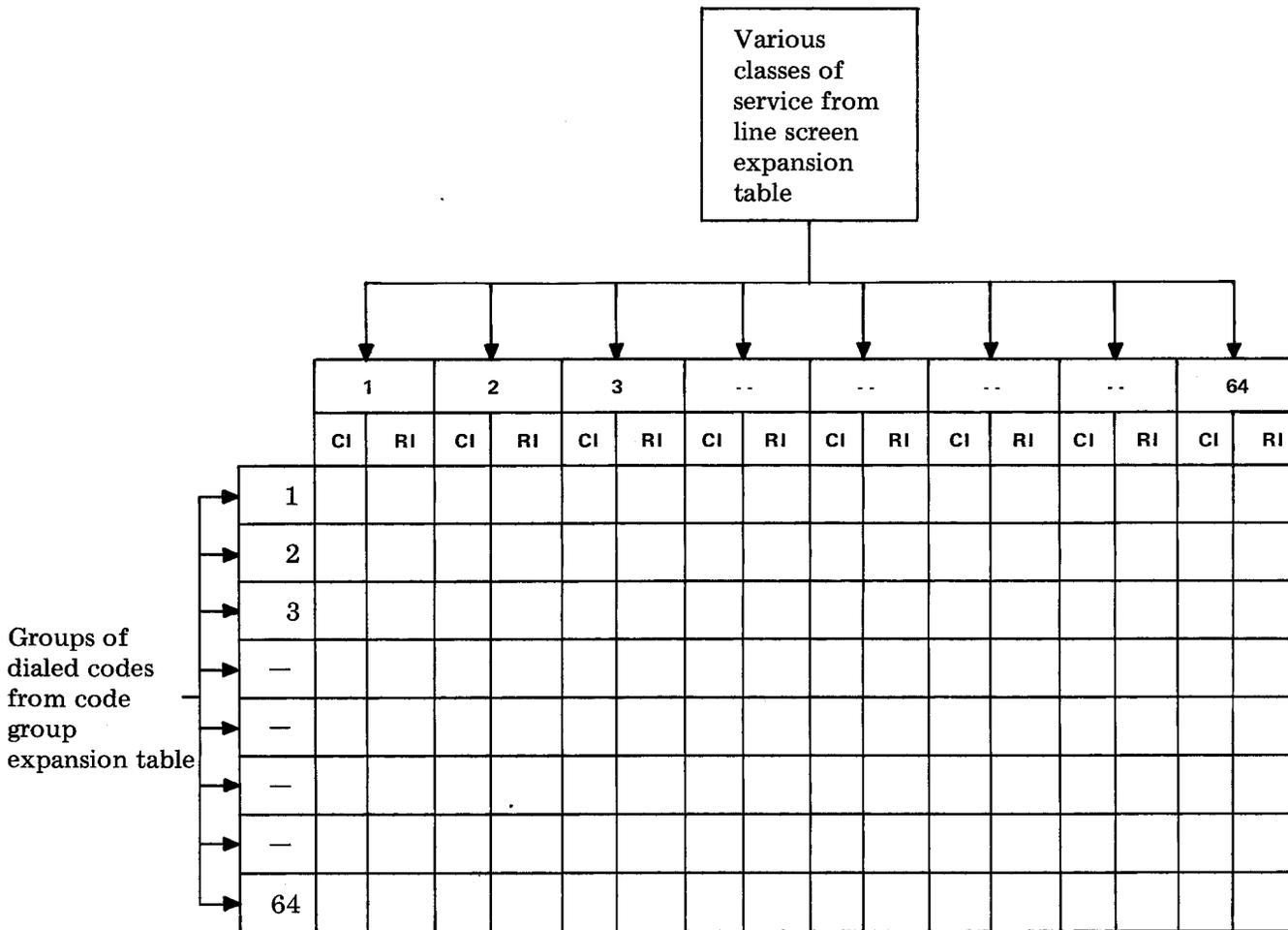
which can be used are summarized in Figure 2. Several of these formats (such as preroute peg counts and a conflict between an area code and an office code) contain a code index to locate other entries in the tables. Complete information pertaining to the various formats is included in References 5 and 17.

3.09 Regardless of how these formats are linked together, the ultimate entry contains the direct route index to route the call and a screening table number to access the screening tables.

Screening Tables

3.10 Screening tables perform additional screening and compression functions in order to determine the ultimate routing and charging for a particular call. The screening tables are analogous to a large matrix (Table A). The columns of this matrix represent the different classes of service and the rows represent the different groups of dialed codes that are to be treated the same. Each intersection of a column and a row contains a charge index (CI) and a route index (RI). A toll diversion bit is also contained at this intersection. See Reference 13 in Part 19 for a discussion of toll diversion.

TABLE A
SIMPLIFIED SCREENING TABLE



3.11 The actual structure of the screening tables is shown in Figure 3. The line screen expansion table provides the screening index (SCRNDX) which is used to index each screening table. The line screen expansion table is entered via the screening class (SCR). The line screen expansion table compresses the possible 255 SCRs into 64 SCRNDXs.

3.12 An SCR is normally obtained from the terminal equipment number (TEN) translator for a noncentrex line, from the centrex group translator for a centrex Dial "9" call, or from the trunk group data translator or 1-digit translator for an incoming trunk. Only incoming trunks which utilize the 3-digit translator and the screening tables require a screening class.

3.13 The screening table number (SCRTBL) is used to index the Screening Table Address

List. The SCRTBLs are obtained from the code index expansion table entries. Each SCRTBL represents the particular group of dialed codes which is to be treated in the same screening table.

3.14 The screening translations consist of a 64-word Screening Table Address List and up to sixty-four 64-word screening tables. An SCRTBL is used to index an entry in the Screening Table Address List which contains the program store address of the first word of the associated screening table. The SCRNDX from the line screen expansion table is used to index the associated word in the designated screening table.

3.15 Only a single type of entry is used in the screening tables. Each word contains a CI and an RI. Also the Toll Diversion (TDV) bit can be utilized for those SCRs which represent classes of service that require toll diversion.

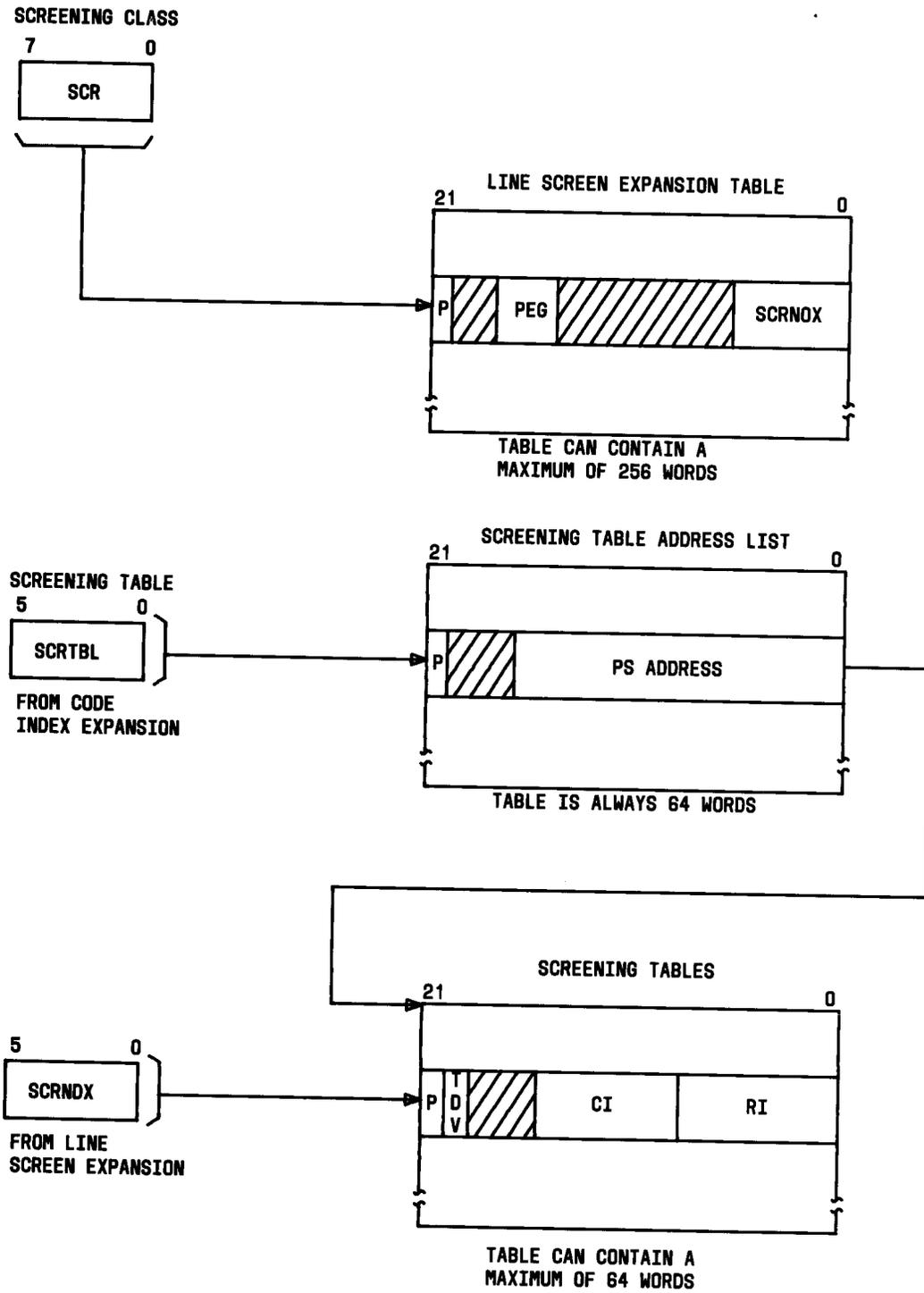


Fig. 3—Screening Table Structure

3.16 The structure of the screening tables allows exception routing to be performed. Nonzero RIs are only included in the entry when the direct route index from the code index expansion table entries is *not* to be used. The RI from the screening table is used when certain SCRs cannot be routed like the majority of other SCRs. Typically, entries in the screening tables contain a CI and an all zero RI.

3.17 The RI from the screening tables can be utilized to provide an RI to certain facilities required by customers with specific screening classes. For instance, the screening tables provide out-of-band screening (denying a call by providing an RI to reorder tone or a recorded announcement) when Outward Wide Area Telecommunications Service (OUTWATS) customers attempt to dial a call that is not within the customer's service area.

Route Index Translator

3.18 The route index translator provides part of the information required to complete a local call and the final information required to complete a call to a distant office. The RI information may include the normalized office code (NOC), the trunk group to be used and an alternate RI in case all members of the trunk group are busy, the specific requirements for prefixing or deleting digits, a table and entry pointer to locate information in the general purpose expansion tables, and data pertaining to centrex facilities. This information is not all included in the same RI entry, but is typical of the information which can be provided.

3.19 An RI is used to index an entry in the Route Index Expansion Table. The general structure of the translator and several of the different types of entries are shown in Figure 4. The actual translation data is limited to a maximum of 512 two-word expansions.

3.20 Each entry contains a 4-bit exit (EXIT) code which indicates the type of call and acts as a pointer to a routine in the generic program. The EF-1 and later generic programs utilize the EX1 and EX2 codes to accomplish this function. A destination code (DEST) is provided in entries with an EXIT code equal to six to further define the call. Figure 5 shows some of the programmed capabilities and limitations for processing route index call types by the generic program. The columns in Figure 5 represent the different call

types. The call type, EXIT code, DEST code, and a brief description are included at the upper left of the figure. To the left of the rows are a series of statements. If a statement applies to a particular call type, an "X" is printed at the intersection of that row and column. Complete information pertaining to the different formats is included in References 5 and 17.

3.21 Several special route index techniques can be used in the route index translator:

(1) Intraoffice—For intraoffice calls, the route index expansion provides the NOC to be used in the 4-digit translator. RIs 0 through 7 are fixed by the generic program and correspond to NOCs 0 through 7.

(2) Code Conversion—An RI expansion can provide a table and entry pointer to index an entry in the general purpose expansion tables which contains a 3-, 7-, or 8-digit directory number. These digits are placed in the originating register (OR) by the generic program and then treated as if they were actually dialed. The CI which was originally encountered in the screening tables is utilized except for calls originated from "hot lines." Code conversion is typically used for service code call, calls from hot lines, and for originating calls of less than seven digits that require outpulsing to a distant office.

(3) Route Transfer Keys—A route transfer key can be used to select one of two RIs to use for a particular call. This type of RI entry includes a key number (KEY NO) and two RIs (RI A and RI B). A ferrod associated with the key is scanned and the RI selected depends on the state of the ferrod. RI A is selected if the ferrod is saturated and RI B is selected if the ferrod is unsaturated. Route transfer keys can be used to divert calls from test desks during unmanned intervals or to vary the traffic load offered to other offices. Eight route transfer keys are fixed assigned to corresponding ferrods in trunk scanner 00.

(4) Alternate Route Index—An alternate route index can be utilized in several RI expansion formats to specify another route index when an all trunks busy condition is encountered in the first choice route. This technique is also used to provide alternate routing for Flexible Route Selection and Most Economical Routing (MER).

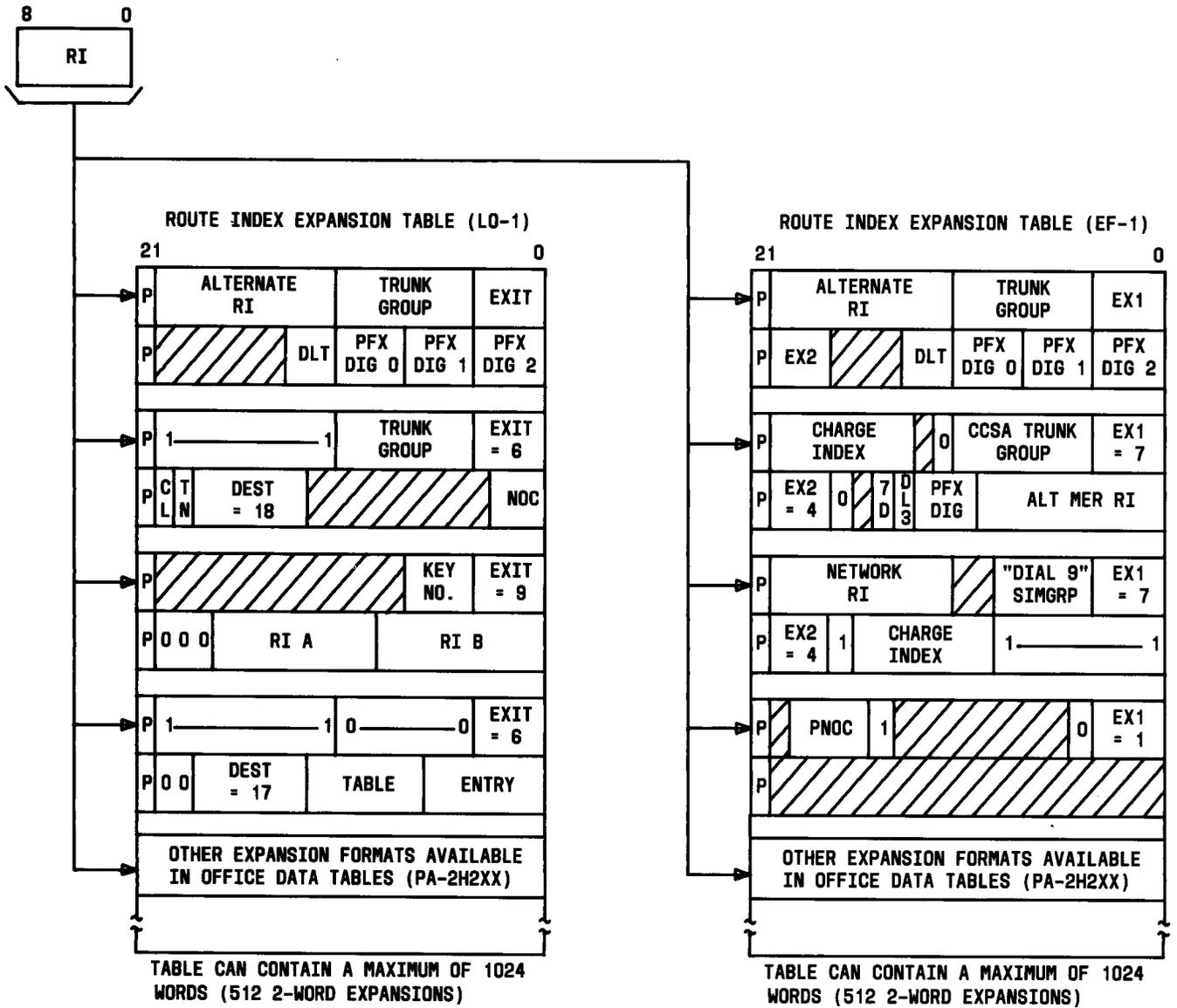


Fig. 4—Route Index Translator Structure

Six RIs (initial plus five) may be linked together in an alternate routing arrangement. With the MER feature, eight RIs can be used.

3.22 In addition to RIs 0 through 7, RIs 8 through 19 are dedicated and must be defined by the operating company to give the desired treatment.

1-Digit Translator

3.23 The 1-digit translator is used to determine the routing of calls received from certain

incoming trunks. This translator interprets digits individually when the digits are not necessarily in a form to be handled by the 3- or 4-digit translator directly, or when several different patterns may be received from the same trunk group. The structure of the 1-digit translator is shown in Figure 6.

3.24 The 1-digit translator is comprised of 52 ten-word tables which are indexed from the incoming digit auxiliary information (IDAUX) in the trunk group data. The IDAUX contains a table

selector which designates the desired table to be used on the first digit. The value of the digit is used to index the corresponding word within the table.

3.25 The first word of the 1-digit translator is a default entry for all undefined digits within a table. It contains an RI to provide the desired treatment (intercept operator, announcement, or tone).

3.26 The entries within the tables are of the same format which includes the type of entry, the total number of digits expected, and auxiliary information. The various entries can contain an RI, an NOC, a screening class, or another table selector to be used in translating the next digit.

4-Digit Translator

3.27 The 4-digit (or directory number) translator is used to provide a TEN and terminating class, or other routing information, for each directory number assigned in the office. The structure of the 4-digit translator is shown in Figure 7. The input parameters for the translator are the NOC (0-7) and the last four digits of a directory number. Pseudo NOCs (8-15) may also be provided in the EF-1 and later generic programs.

3.28 Each 4-digit translator is comprised of a number group table and a hundreds group table. These tables are related to the last four digits of the directory number—the number group table represents the thousands and hundreds digits and the hundreds group table represents and tens and units digits.

3.29 Each entry in a number group table usually contains the program store address of a hundreds group table. Other formats can be used for unassigned hundreds groups or for hundreds groups to be routed to another office. With the EF-1 and later generic programs, another format exists called the hundreds group recent change format.

3.30 The primary purpose of the hundreds group recent change format is to allow a whole hundreds group that is awaiting cutover to be switched to working numbers via RC messages. Groups awaiting cutover are assigned an RI that provides intercept treatment. This format also allows centrex lines associated with a whole hundreds

group to be designated as fully restricted terminating lines.

3.31 Each hundreds group table contains 100 words which are indexed by the last two digits of the dialed number. With the EF-1 and later generic programs, the hundreds group table contains an additional word which provides an intercept format for blank directory numbers.

3.32 Therefore, a 4-digit translator can provide access to a maximum of 10,000 directory numbers for each NOC or pseudo NOC. The actual number to be provided is dependent on the memory space allocated by an ODA run.

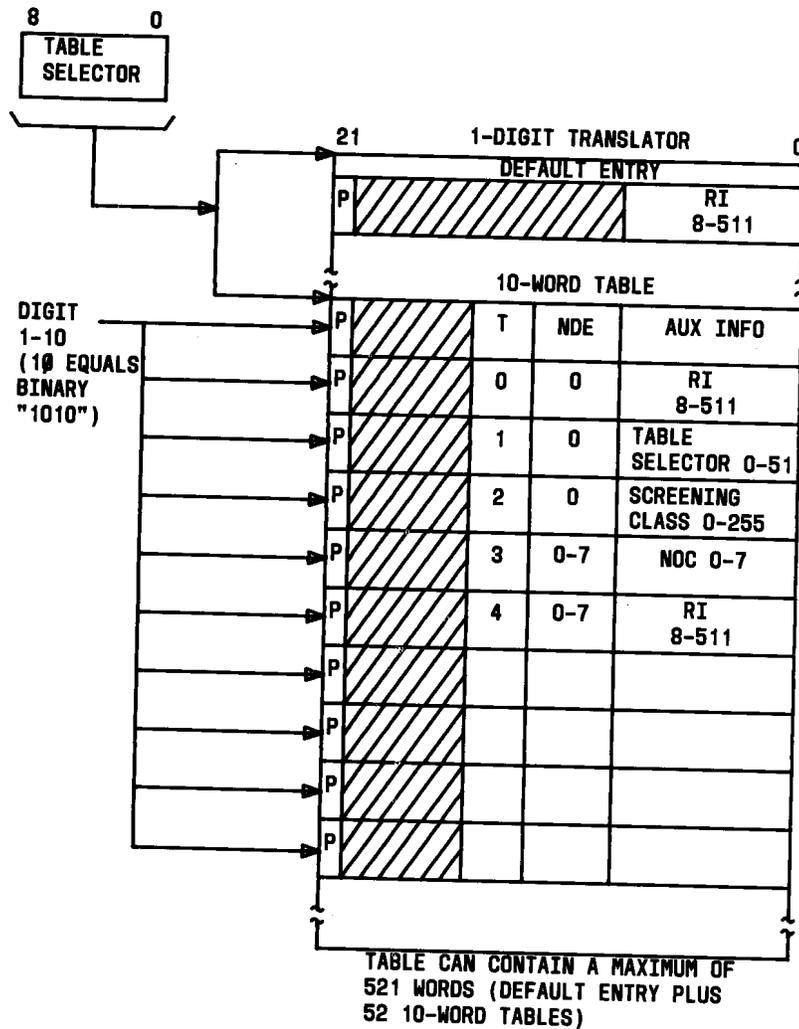
3.33 For many lines in an office, the entry in the hundreds groups table consists of the major class and the TEN. However, a format consisting of a single word cannot contain all of the line information for certain lines. For these lines, the entry contains a table and entry pointer to index larger expansions (two, four, or six words) in the general purpose expansion tables. Other formats can be used for private branch exchanges and multiline hunting groups, intercept by the centrex attendant, and directory numbers with no TEN.

Centrex Digit Interpreter Table

3.34 A Digit Interpreter Table (DIT) assigned to each centrex customer group establishes the dialing plan for that particular customer. The structure of the DIT is shown in Figure 8.

3.35 Sixteen words of each centrex group translator are called the base digit interpreter table. These words contain entries for the interpretation of the initial digit dialed by a centrex station user or an attendant or digits received over incoming tie or common control switching arrangement (CCSA) trunks. Any entry may completely specify the call treatment, or may provide an entry branch to another 16-word DIT for interpretation of the second digit. This arrangement is commonly referred to as a "dialing tree." Digit patterns for up to four digits may be established.

3.36 The final entry in any branch of the dialing tree consists of a terminal entry or a table and entry pointer to a DIT expansion. These expansions provide data whose format is based on the particular centrex feature desired.



NOTES:

1. TABLE SELECTOR IS FROM TRUNK GROUP DATA FOR FIRST DIGIT. FROM THIS TRANSLATOR FOR EACH SUBSEQUENT DIGIT.
2. EACH ENTRY IN THE TABLE MAY BE ASSIGNED ANY OF THE 5 FORMATS SHOWN.
3. NDE NUMBER OF DIGITS TO EXPECT

Fig. 6—One-Digit Translator Structure

3.37 Unique expansion formats exist to access centrex features or facilities such as Central Office Access, Tie and Foreign Exchange (FX) Trunks, CCSA, MER Access, Wide Area Telecommunications Service, Special Service Access, Attendant Access, and Special Routing.

Loop Around Trunk Groups

3.38 A loop around trunk group is a trunk group which terminates in the same central office

as it originates rather than at another central office. This technique has had a limited number of applications; however, it can provide some types of restriction which cannot normally be provided.

3.39 Loop around trunk groups can be established to provide trunk to trunk, trunk to line, or line to trunk connections. Calls which are completed when loop around trunk groups are used are actually processed as *two separate calls*. For a trunk to trunk connection, the two calls are an

outgoing call followed by an incoming call. For a trunk to line connection, the two calls are an outgoing call followed by a local originating call. For a line to trunk connection, the two calls are a local terminating call followed by an incoming call.

3.40 For instance, a particular centrex customer may want to block certain lines from being accessed by a portion of the other lines in the group. Since centrex station to station calls cannot be screened, a loop around trunk group can be installed which can be accessed only by certain lines. This requires access codes in the customer's dialing tree for both the station users and the incoming trunk plus the associated trunk group translation data.

3.41 Loop around trunk groups may also be used in offices routing Inward Wide Area Telecommunications Service (INWATS) traffic to provide screening when the same numbering plan area (NPA) code is shared by several local serving central offices.

C. Call Routing Technique Interactions—General

3.42 Figure 9 depicts the various interactions between the call routing techniques during the processing of the different types of call.

3.43 The figure illustrates how the different call routing techniques are accessed for the various types of calls or from other techniques. For instance, the 1-digit translator is entered from the trunk group data. The various entries in the 1-digit translator can index an entry in the RI translator, the 3-digit translator, the 4-digit translator, or another table in the 1-digit translator for the next digit.

D. Call Routing Technique Interactions—Intraoffice and Outgoing Calls

3.44 The interactions among the various call routing techniques during the processing of intraoffice and outgoing noncentrex calls are shown in Figure 10.

3.45 An intraoffice or outgoing call is initiated when the calling customer goes off-hook. The line scan point table is used to translate the scan point number assigned to the line to its TEN. The TEN is used to access the originating translator to obtain the originating major class, line screen

class, and other information pertaining to the calling line.

3.46 Figure 11 shows the interactions which are applicable to intraoffice and outgoing centrex calls. For centrex customers, the originating translation yields a centrex group number and a centrex access treatment (CAT) code for the calling party. The CAT code indicates the customer group dialing codes which can be accessed by that particular party.

3.47 After this information is identified, dial tone is returned to the calling station. The initial digits dialed by the customer are interpreted in the digit interpreter table until a terminal entry (or a table and entry pointer which points to a 2-, 4-, or 6-word DIT expansion) is found. If the restriction bit which corresponds to the line's CAT code is a one, the call continues. If the restriction bit is a zero, the calling party is denied access and a Centrex Dialing Error (CDE) announcement is returned.

3.48 Since several centrex features associated with outgoing calls are limited to a specific number of simultaneous users, the facilities associated with the feature are checked to determine whether or not an idle member is available. If an idle member exists, a second dial tone can be returned. Reorder tone is returned if no idle members are available. From this point, noncentrex calls and Dial "9", MER, and WATS centrex calls are processed the same. Tie trunk, CCSA, FX, and other types of centrex calls index an entry in the RI translator or the trunk group translator from the DIT expansion.

3.49 At this point, the first three digits of noncentrex calls and Dial "9", WATS, and MER centrex calls are translated by the 3-digit (code group) translator. The initial entry into this translator provides either a direct route index and a screening table entry or another code index. Ultimately, the 3-digit translator provides an expansion containing a direct route index and a screening table number.

3.50 The combination of the screening table entry and the line screen class entry yields a route index and a charge index from the screening tables. If the screening table route index contains all zeroes, the route index from the code group expansion is used.

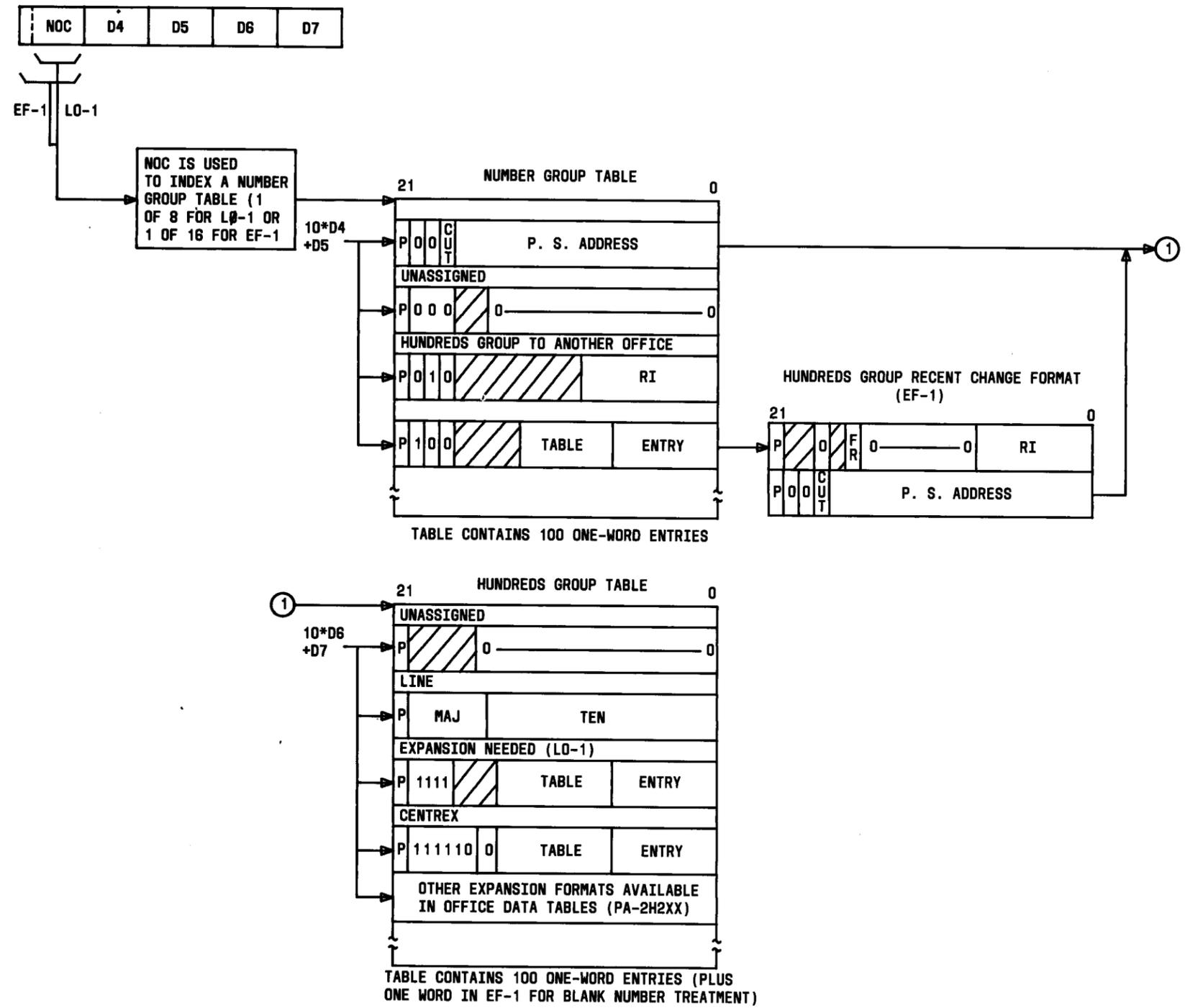
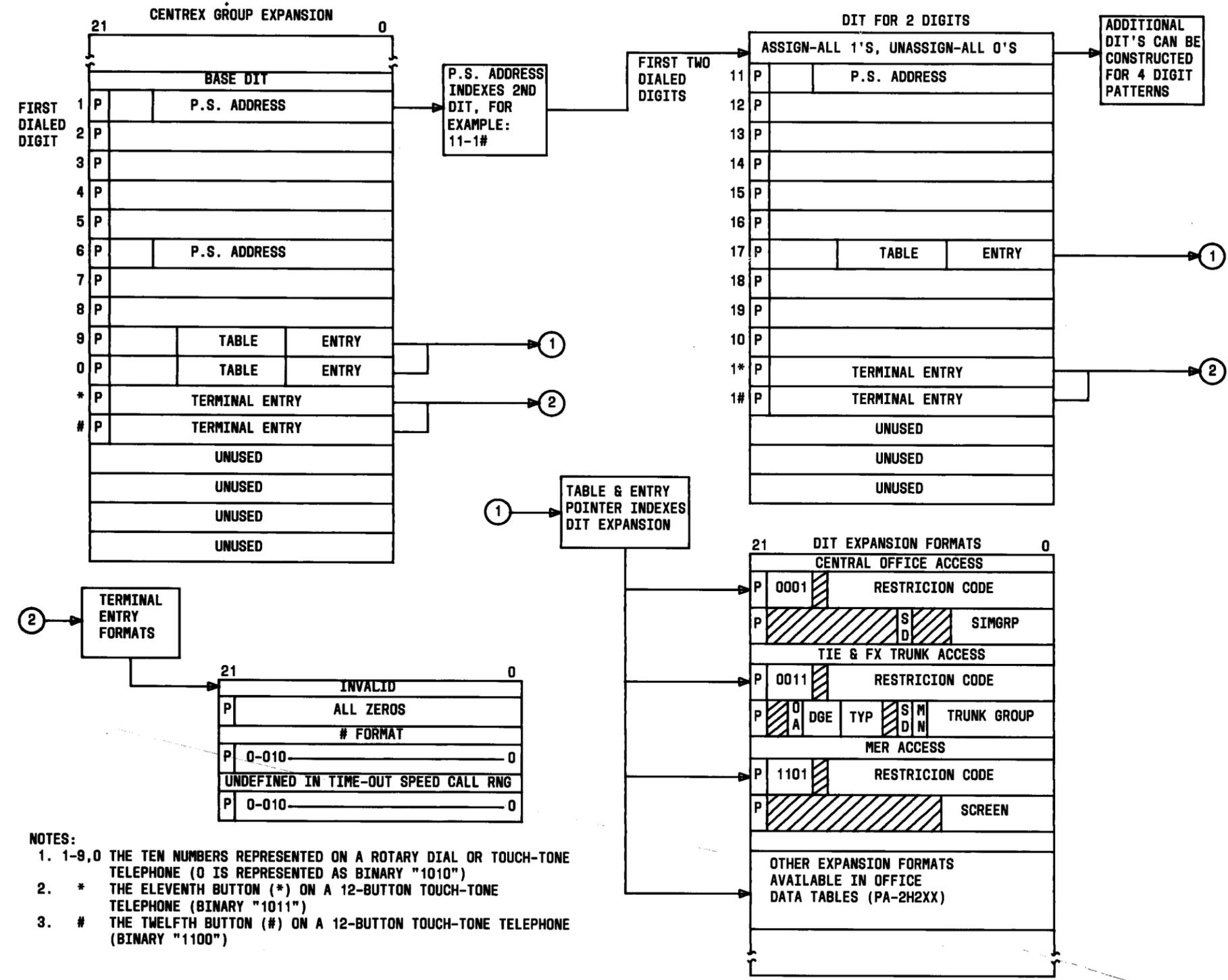


Fig. 7—Four-Digit Translator Structure



- NOTES:
- 1-9,0 THE TEN NUMBERS REPRESENTED ON A ROTARY DIAL OR TOUCH-TONE TELEPHONE (0 IS REPRESENTED AS BINARY "1010")
 - * THE ELEVENTH BUTTON (*) ON A 12-BUTTON TOUCH-TONE TELEPHONE (BINARY "1011")
 - # THE TWELFTH BUTTON (#) ON A 12-BUTTON TOUCH-TONE TELEPHONE (BINARY "1100")

Fig. 8—Digit Interpreter Table Structure

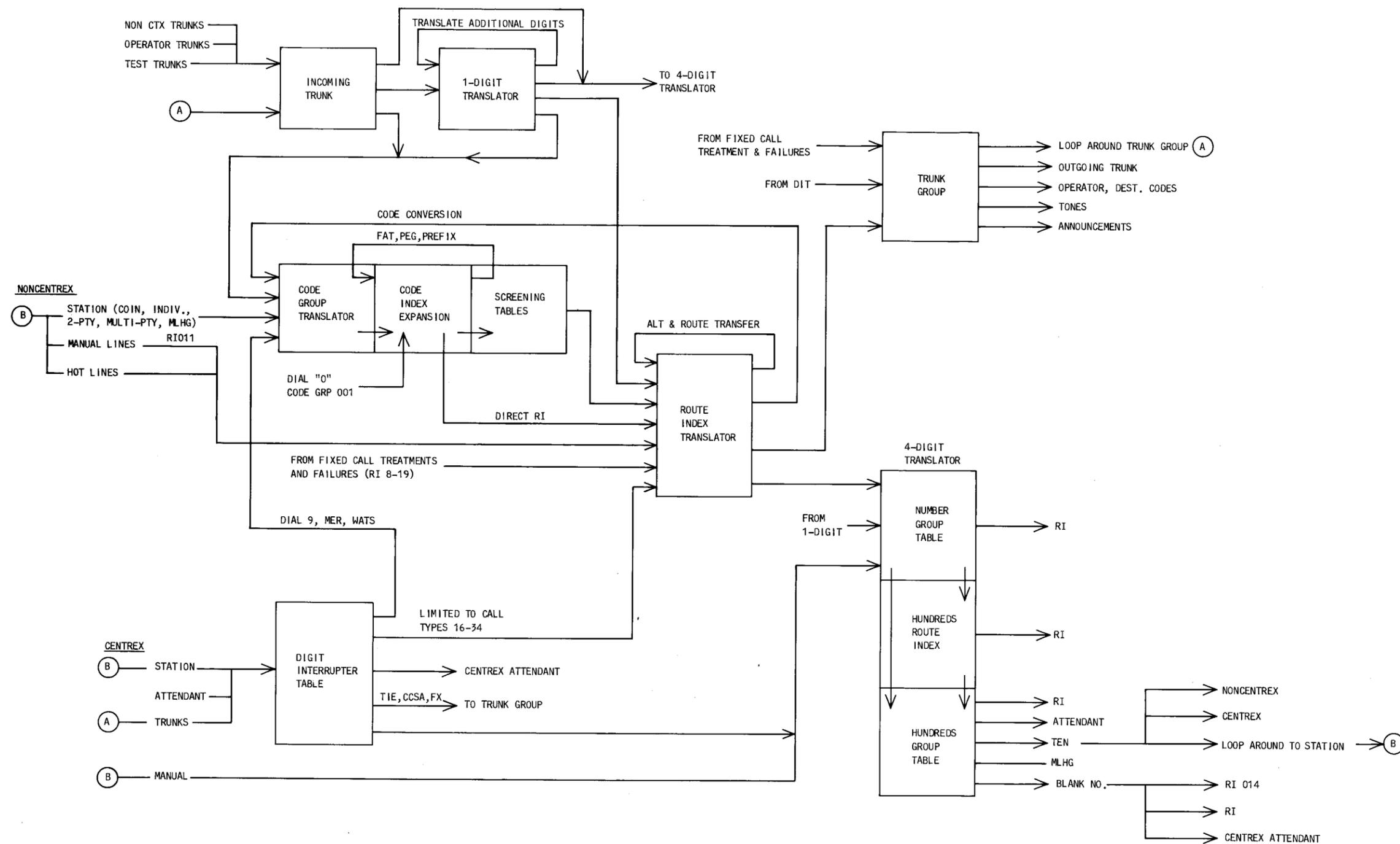


Fig. 9—General Call Routing Technique Interactions

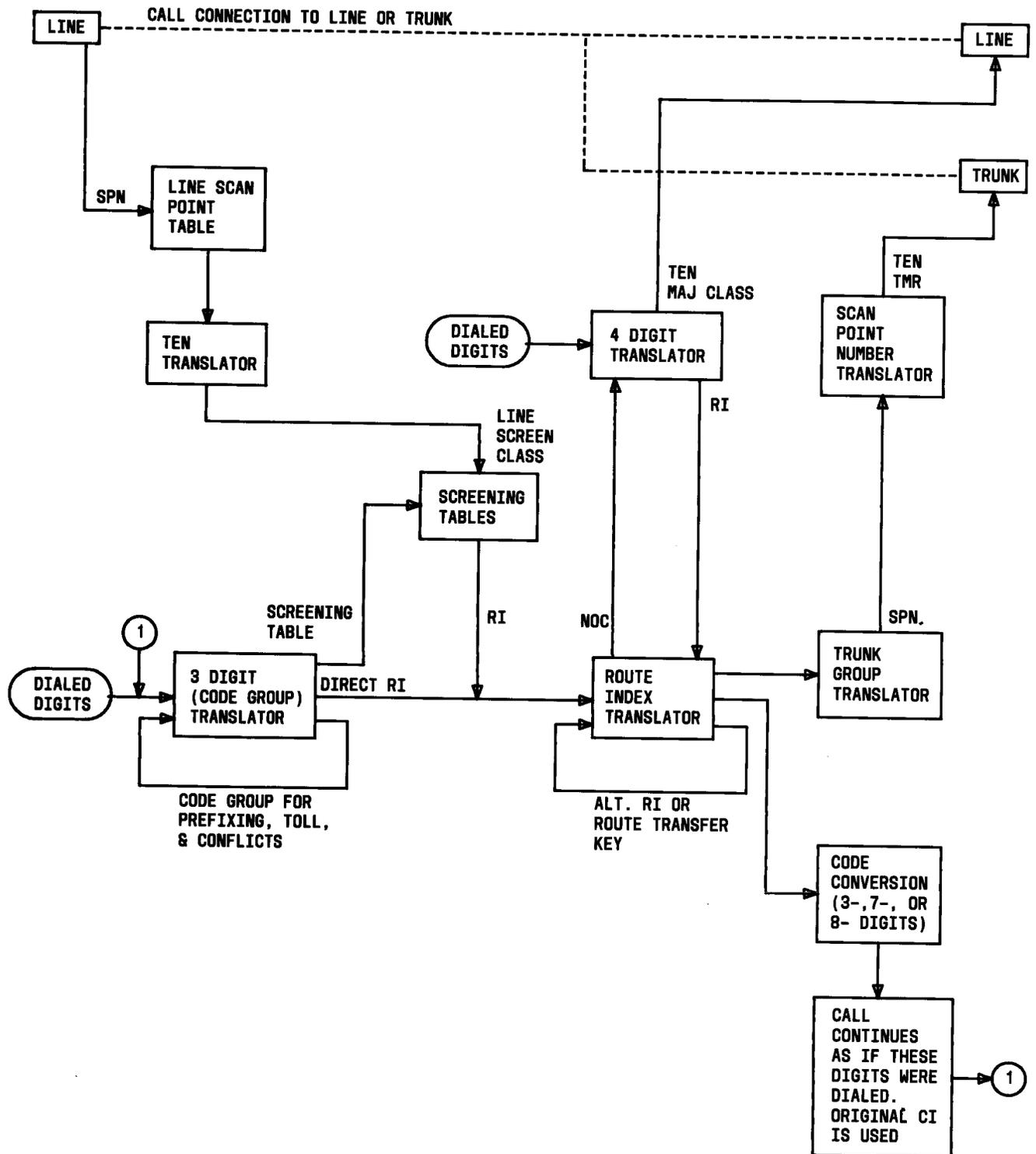


Fig. 10—Call Routing Technique Interactions—Intraoffice and Outgoing Noncentrex Calls

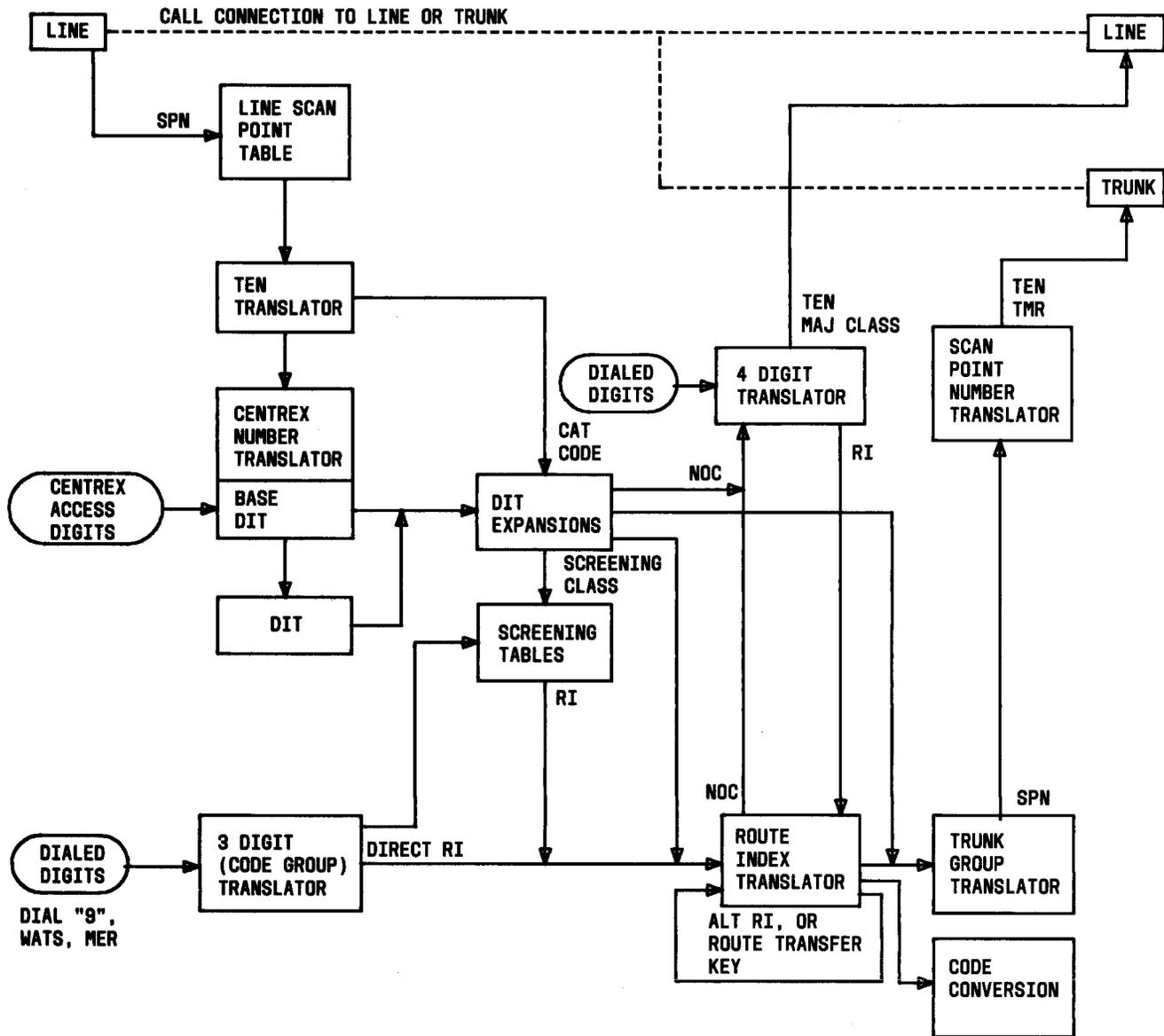


Fig. 11—Call Routing Technique Interactions—Intraoffice and Outgoing Centrex Calls

3.51 The route index expansion table is used to determine the type of call being processed. For intraoffice calls, this expansion yields an NOC (or a pseudo NOC) which accesses the 4-digit translator. For outgoing calls, the expansion yields a trunk group number which is expanded in the trunk group translator.

3.52 The 4-digit translator is indexed to determine the TEN, the terminating major class, and other features of the called line. If the called line is busy, checks are made for reverting calls, call

waiting, and series completion before providing reorder tone. If the line is not busy, the call is completed.

3.53 For outgoing calls, the route index expansion provides the number of digits to delete or prefix and possibly an alternate route index in addition to the trunk group number.

3.54 An idle member of the trunk group is selected when the last digit is received, if nonoverlap outpulsing is used. The trunk group number

translator yields the scan point number of the idle member. The scan point number translator provides the TEN of the idle member. This translator is used by the call processing programs throughout the call to determine the status of ferroids assigned to trunk and service circuits. The call is then completed using normal call processing procedures.

E. Call Routing Technique Interactions—Incoming and Tandem Calls

3.55 The interactions among the call routing techniques while processing incoming and tandem calls is shown in Figure 12.

3.56 When an incoming trunk is seized, the scan point number associated with the trunk is used to index the scan point number translator. This translation provides the TEN and the trunk group and member number of the incoming trunk.

3.57 The trunk group data associated with the trunk group is accessed to determine the digit translator initially required to interpret the incoming digits.

3.58 If seven or ten digits are to be received, the 3-digit translator is accessed. The call is completed similar to an intraoffice call.

3.59 If four digits, five digits (with first digit to be ignored), or three digits (with the thousands digit provided from the trunk group data) are to be received, the 4-digit translator is used to complete the call.

3.60 If five, six, or a variable number of digits are to be received, the 1-digit translator is used to translate the initial digits. The 1-digit translator can yield: (1) an NOC to be used with the last four digits in the 4-digit translator, (2) a table selector to be used in the 1-digit translator for the translation of the second digit, (3) a screening class to be used by the 3-digit translator for translating the first three digits, (4) or a route index for a service call or a tandem call.

3.61 Calls which require the 3- and 4-digit translators are completed similar to intraoffice calls. Calls provided a route index by the 1-digit translator are completed through the trunk group and scan point number translators as outgoing calls.

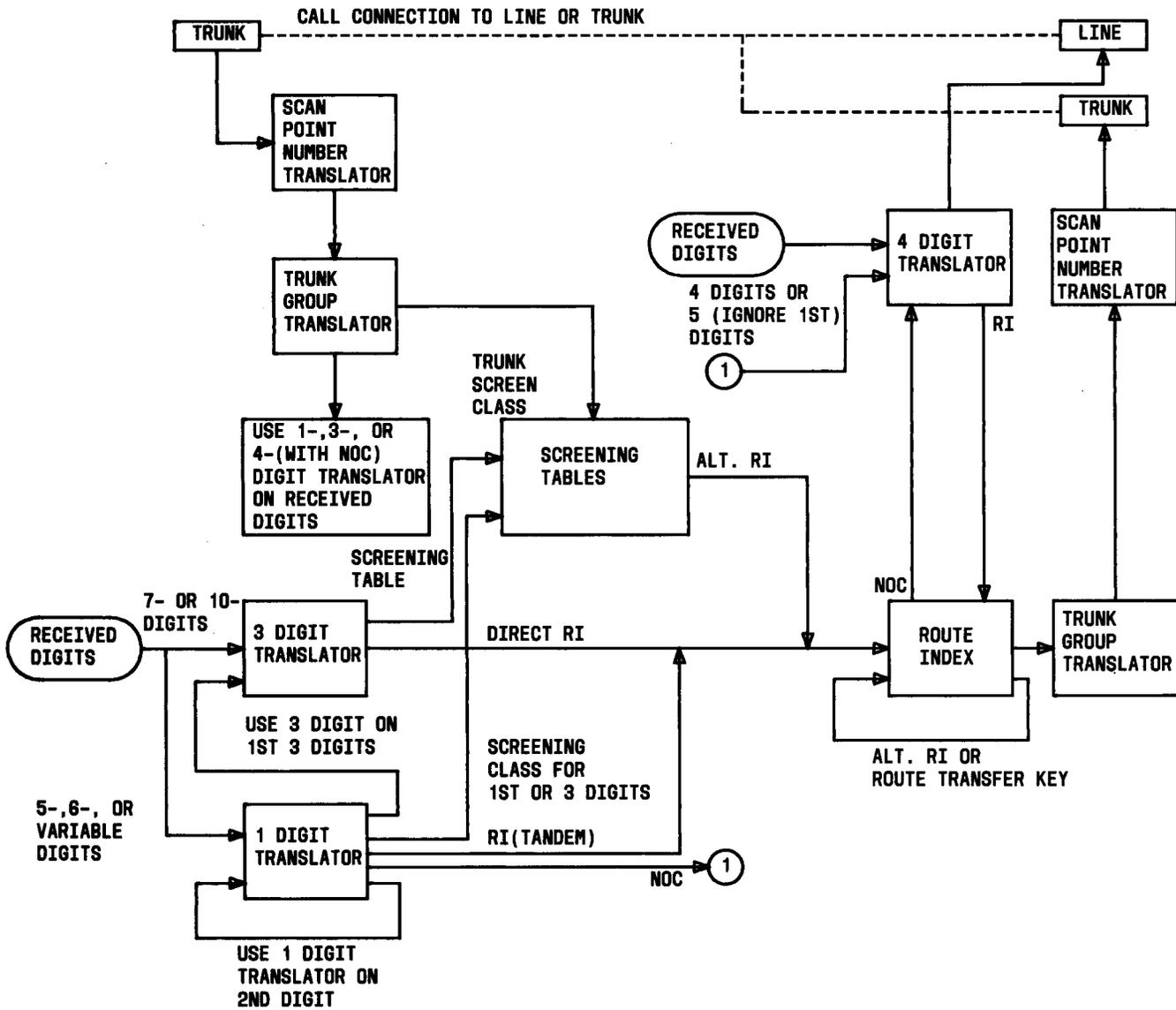


Fig. 12—Call Routing Technique Interactions—Incoming and Tandem Calls

F. Fixed Call Treatments or Failures

3.62 A variety of failure treatments are available to alert the calling party of dialing errors, time-out conditions, the lack of facilities, routing failures, and other conditions which do not allow the completion of a call. The calling party is made aware of these situations through different tones or recorded announcements. Table B lists different

noncentrex failure treatments and Table C lists centrex failure treatments. Table B also applies to centrex calls that have reached the noncentrex world via Dial "9", WATS, MER, etc. Failure treatments are normally determined by the generic program and the program accesses the appropriate RI or trunk group when the given condition is encountered.

TABLE B

FIXED NONCENTREX CALL FAILURE TREATMENTS

NONCENTREX CALL	CALL FROM LINE OR TRUNK	TREATMENT
DIALED CHANGE TEST OR SYNC TEST LINE	LINE (L)	REORDER (REO)
PARTIAL DIAL TIME-OUT	L	REGULAR PARTIAL DIAL TREATMENT (ROUTE INDEX (RI) 18 AND TRK GRP 18)
PERMANENT SIGNAL TIME-OUT	L	REGULAR PERMANENT SIGNAL TREATMENT (RI 15 - 17 AND TRK GRP 18)
PARTIAL DIAL OR PERMANENT SIGNAL TIME-OUT	TRUNK (T)	REO
UNDEFINED OR INVALID 4-DIGIT CODE	L, T	LO-1 RI 14, EF-1 RI 14 OR WORD 101 IN HUNDREDS GROUP TABLE
UNDEFINED OR INVALID 3-DIGIT CODE	L, T	CODE INDEX 000
LINE WITH CUSTOM CALLING FEATURES	L	
USED ACCESS CODE (FEATURE) NOT ALLOWED		RI 12 AND TRK GRP 21
USED FEATURE INCORRECTLY		RI 12 AND TRK GRP 21
CALL FORWARD ACTIVATE USED BUT NO ROOM IN CALL FORWARD TABLE		REO
DENIED ORIGINATING LINE ORIGINATES	L	REO
DENIED TERMINATING LINE CALLED	L, T	AS PER RI ASSOCIATED WITH LINE
REACHED PLUGGED UP LINE	L, T	RI 10
OUTGOING TRUNK FAILURES	L, T	
NO TRUNKS AVAILABLE		REO
SENDER SELECTION FAILURE		REO
NOT ENOUGH DIGITS RECEIVED		REO
PATH SELECTION FAILURE		REO
PERIPHERAL ORDER BUFFER (POB) FAILURES*		REO
INVALID DIGIT RECEIVED		REO
TRANSLATION ERRORS — 4-DIGIT	L, T	RI 14
TRANSLATION ERRORS — 3-DIGIT	L, T	RI 19
NO COIN ON DIAL-TONE-FIRST CALL	L	TRK GRP 16
INCORRECT PREFIX DIALED	L	TRK GRP 20 OR 24
NONMESSAGE RATE AMA RECORDED CALLS WHEN AMA BUFFER IS FULL	L	REO
MAKE BUSY KEY OPERATED ON A LINE	L, T	REO OR BUSY
INVALID DIGIT DIALED	L	REO
CANNOT SELECT A TRANSIENT CALL REGISTER (TCR) TO START CALL WAITING ACTION	L, T	REO
LINE ATTEMPTS TO CHANGE SPEED CALLING LIST, BUT RECENT CHANGE BUFFER IS FULL	L	REO

* POB FAILURES IN THE OUTGOING CALL PROGRAM AFTER THE TRUNK SENDER CONNECTION RETURN DIAL TONE TO CALLING PARTY

TABLE C
FIXED CENTREX CALL FAILURE TREATMENTS

CENTREX CALL	TREATMENT
<u>DIGIT COLLECTION FAILURES</u>	
PARTIAL DIAL TIME-OUT	REGULAR PARTIAL DIAL TREATMENT
PERMANENT SIGNAL TIME-OUT	REGULAR PERMANENT SIGNAL TREATMENT
10-SECOND TIME-OUT WITH NO DIGITS RECEIVED	REORDER (REO)
INVALID DIGIT RECEIVED	REO
TIME-OUT COLLECTING DIGITS AFTER TRUNK ACCESS CODE (DIGITS SPECIFIED)	REO (OVERLAP OUTPULSING) OR REGULAR PARTIAL DIAL/REGULAR PERMANENT SIGNAL (NONOVERLAP OUTPULSING)
TIME-OUT COLLECTING DIGITS AFTER TRUNK ACCESS CODE (DIGITS NOT SPECIFIED)	REO (OVERLAP OUTPULSING) OR REGULAR PERMANENT SIGNAL TREATMENT (NONOVERLAP OUTPULSING)
<u>FAILURES AFTER DIALING</u>	
CALL FAILS CAT CODE CHECK	CENTREX DIALING ERROR (CDE)
UNDEFINED OR INVALID TERMINAL ENTRY	CDE
CALL HOLD ACCESS NOT ALLOWED	REO
CALL PICKUP (CPU) ACCESS NOT ALLOWED	REO
CPU ACCESS ALLOWED BUT NO RINGING CALL	REO
DIRECTED CALL PICKUP (DCPU) ACCESS NOT ALLOWED	REO
DCPU ACCESS ALLOWED BUT NO RINGING CALL	REO
TRUNK FLASH REQUEST DIALED WITH NO TRUNK INVOLVED	REO
ATTEMPT TO ADD A RECORDED TELEPHONE DICTATION CIRCUIT TO AN EXISTING CALL	REO
DIAL "9", WATS, OR DID/LDN SIMULATED FACILITIES GROUP OVERFLOW	REO
CALL FORWARD (CF) ACTIVATE NOT ALLOWED	CDE, REO
CF ACTIVATE ALLOWED BUT NO ROOM IN CENTREX SCATTER TABLE ENTRY (CSTE)	REO
TRUNK ANSWER ANY STATION (TAS) ACCESS WITH NO RINGING CALL	REO
ATTENDANT ATTEMPTS TO ACTIVATE CALL FORWARD FOR STATION NOT ALLOWED CALL FORWARD	CDE
CTX STATION DIALS FOUR DIGITS TO REACH VALID STATION OUTSIDE CTX GROUP	CDE
CTX STATION DIALS FOUR DIGITS TO REACH DENIED TERMINATING STATION	CDE
INCOMING TIE TRUNK OR CENTREX ATTENDANT DIALS DENIED TERMINATING OR FULLY RESTRICTED STATION	CDE
NO MORE MOST ECONOMICAL ROUTING (MER) ALTERNATE ROUTES	REO
INVALID SPEED CALLING DIGITS DIALED	CDE
VALID SPEED CALLING DIGITS, BUT CTX LINE DOES NOT HAVE SPEED CALLING	CDE
CTX STATION ATTEMPTS TO CHANGE SPEED CALLING LIST, BUT RECENT CHANGE BUFFER IS FULL	REO
ATTENDANT ATTEMPTS TO BUSY VERIFY A CONNECTION WHICH IS NOT STABLE	REO
VARIOUS TRANSLATION INCONSISTENCIES	REO

TABLE C (Cont)

FIXED CENTREX CALL FAILURE TREATMENTS

CENTREX CALL	TREATMENT
OUTGOING TRUNK FAILURES	
NO TRUNKS AVAILABLE	REO
SENDER SELECTION FAILURE	REO
DIALING CIRCUIT SELECTION (TANDEM TIE TRUNK OPERATION)	REO
PATH SELECTION FAILURE (TRUNK - A)	REO
PATH SELECTION FAILURE (SENDER - TRUNK)	REO
VARIOUS PERIPHERAL ORDER BUFFER (POB) FAILURES*	REO
FAIL TO GET START DIAL	REO

* POB FAILURES IN THE OUTGOING CALL PROGRAM AFTER THE TRUNK SENDER CONNECTION RETURN DIAL TONE TO CALLING PARTY.

3.63 Route indexes 8 through 19 are dedicated and must be defined by the operating company to provide the actual desired treatment. All provide call failure treatment except RI 11 which is used for manual line originations. Also certain service circuit groups in the trunk group data are reserved

for various recorded announcements and tones. Complete information pertaining to dedicated RIs or trunk groups is included in Reference 17.

3.64 Table D shows normal call treatments that result in busy tone being returned.

TABLE D

NORMAL CALL TREATMENTS RECEIVING BUSY TONE

TYPE OF CALL RECEIVING BUSY TONE
<p>CALLED LINE IS BUSY.</p> <p>2-PARTY OR MULTIPARTY LINE CALLS OTHER PARTY ON SAME LINE.</p> <p>CALL TO A FORWARDED TELEPHONE WITHIN ONE MINUTE OF THE PREVIOUSLY FORWARDED CALL.</p> <p>CALL TO A LINE WITH AN OPERATED MAKE BUSY KEY (e.g., MOBILE RADIO AND TRUNK TEST PANEL). OPTION EXISTS TO RETURN REORDER TONE.</p> <p>CALL TO A LINE WITH CALL WAITING WHEN THE LINE IS BUSY, AND THE LINE IS ALREADY BEING WAITED UPON.</p>

FEATURE ATTRIBUTES

4. APPLICABILITY

4.01 Call routing is provided on a per-system basis with each of the generic programs. Customers whose lines have equivalent line class codes and originating and terminating major classes are treated identically.

4.02 Call routing for centrex customers is provided on a per-customer group basis. The CAT

code assigned to each centrex station is used to allow or deny access by that station to a particular feature of the centrex group.

5. LIMITATIONS AND RESTRICTIONS

5.01 Limitations and restrictions applicable to the call routing techniques are primarily those involving the allowable size of the various translations. The LIMITATIONS column of Table E summarizes this information.

TABLE E

SUMMARY OF TRANSLATION DATA ASSOCIATED WITH CALL ROUTING TECHNIQUES

CALL ROUTING TECHNIQUE	APPLICABLE GENERIC PROGRAM		TRANSLATION DATA			ASSIGNMENT CAPABILITY	
	ALL	EF-1 & LATER	FUNCTION	STRUCTURE	LIMITATIONS	FIXED	VARIABLE
3-Digit Translator	✓		Code Point Translator — compresses 1000 3-digit codes into 256 code indexes	Each word contains 2-code indexes.	8—each always contains 405 words	Code Indexes 0—2	Code Indexes 3—255
			Code Group Expansion Table — contains expansion data indexed by the code index	Each expansion consists of 2 words.	1 — maximum of 512 expansions or 1024 words		
Screening Tables	✓		Line Screen Expansion Table — compresses 256 screening classes into 64 screening indexes. Based on class of service.	Each word contains codes for PEG count and 1 of 64 screening indexes.	1 — maximum of 256 words		All
			Screening Table Address List — each entry provides a PS address for each screening table. A Screening Table represents a group of 3-digit codes	Each word contains the PS address of the screening table.	1 — always contains 64 words		All
			Screening Tables — provides a CI and RI for each class of service included in a table.	Each word contains a CI and RI for a class of service.	64 — maximum of 64 words		All
Route Index Translator	✓		Provides routing data for different types of calls	Each expansion consists of 2 words.	1 — maximum of 512 expansions or 1024 words	0—19	20—511
1-Digit Translator	✓		Provides routing data based on digits received over incoming trunks. Used when 3- or 4-digit cannot be used directly	A table selector indexes 10-word tables (1 word for each digit).	1 — maximum of 521 words (52 10-word tables plus a default entry)		All
4-Digit Translator	✓		Provides terminating or routing data for each directory number in an office code (NOC or Pseudo NOC)	Number Group Tables of 100 words indexing Hundreds Group Tables of 100 words (101 with EF-1). EF-1 contains expansions for hundreds group recent changes	Size depends on memory spare allocated in ODA. The maximum sized translator could provide 10,000 directory numbers.	Word 101 of Hundreds Group Table for blank number treatment.	All
Digit Interpreter Tables		✓	Establish dialing patterns along with the necessary access for each centrex customer group.	Last 16 words of centrex Group Translator are used for the interpretation of the 1st digit. 16 word tables provided for each additional digit. Entry formats index following DITs or DIT expansions	Dialing patterns of up to 4 digits can be established. Office limited 127 centrex customers and 256 DITs.		All
Loop Around Trunk Groups	✓		Provide additional restrictions not normally available. Connections can be made for trunk to trunk, line to trunk, or trunk to line.	Trunk Group Data for trunk end and line data for line end.	Trunk Limitations: EF-1 — 512 groups, 256 members/group LO-1 — 256 groups, 512 members/group		Trunk Group between 70-511 with EF-1 or 70-255 with LO-1.

5.02 Additional limitations and restrictions applicable to the Route Index Translator are included in Figure 5.

5.03 No specific limitations and restrictions apply to loop around trunk groups that do not apply to other trunk groups. References 2, 14, 19, and 20 document the trunking arrangements available in the No. 2 ESS.

6. COMPATIBILITY AND INTERACTIONS

6.01 Individual feature documents should be referenced to obtain compatibility and interaction information pertaining to specific No. 2 ESS features.

7. COST FACTORS

Program Store

7.01 The program store requirements for the call routing techniques are summarized in the STRUCTURE and LIMITATIONS columns of Table E. Most of the translation tables are structured so the tables can be enlarged to a maximum size as additional lines, trunks, and features are incorporated.

7.02 The program store requirements for loop around trunk groups require either one or two groups of trunk group data depending on the arrangement.

Call Store

7.03 Each trunk end of a loop around trunk group has an associated group status block in call store for group peg, usage, and overflow counts and for busy/idle status. A status block contains a minimum of 5 words and a maximum of 36 words (LO-1) or 20 words (EF-1).

7.04 A maximum of 32 peg counters can be assigned to provide preroute peg counts for specified code groups. These counters are specified in the code group expansions with XTYP equal one. Each counter requires one word.

7.05 A maximum of seven peg counters can be assigned to words in the Line Screen Expansion Table to provide peg counts of the number of times particular Line Screening Class

Codes are accessed. Each counter requires one word.

Hardware

7.06 The hardware costs attributable to route transfer keys and loop around trunk groups are described in Part 10, HARDWARE.

8. AVAILABILITY

8.01 Call routing techniques for noncentrex customers are incorporated in all generic programs. Call routing techniques available to centrex customers are incorporated in the EF-1 and later generic programs.

CONSIDERATIONS FOR INCORPORATION OF FEATURE INTO SYSTEM

9. PLANNING

9.01 Careful consideration of the call routing techniques is an important aspect of the total planning required to incorporate the available features and services into a No. 2 ESS office. Effective planning can insure that the call routing techniques utilized with the various features and associated facilities allow the No. 2 ESS to properly route the different type calls.

9.02 An ODA run is necessary to incorporate the call routing techniques. Spare quantities should be provided, when possible, to allow for change and growth utilizing RC messages.

9.03 The following paragraphs include factors which should be given consideration when utilizing the various call routing techniques.

9.04 The 3-digit translator must be capable of eventually providing a direct route index and/or a screening table entry for all dialable combinations of the first three or six digits and for the digit combinations received from incoming trunks which use this translator. The code group expansions should include the separate routing which can be provided for the different prefixes.

9.05 The screening tables must provide a CI and an RI for each combination of SCRNDX and SCRTBL. A trunk class code is required for trunk groups which use the 3-digit translator. Reference 1 documents the different charging arrangements.

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Features which utilize toll diversion require entries in the screening tables.

9.06 The RI data should be carefully considered to make certain that the exit codes and destination codes associated with the various call types are correct. The utilization of features such as alternate routing, deletion and prefixing of digits, and route transfer keys should also be considered. Spare RIs should be provided in each ODA run.

9.07 The 1-digit translator should be checked to verify that each word in the 10-word groups reflects the desired information for the incoming digit. The proper entries which provide the table selector should be reflected in the trunk group data for the trunk groups which use the 1-digit translator.

9.08 The 4-digit translator data should be checked to verify that the proper number group tables and hundreds group tables have been allocated and that the correct expansions has been specified for each directory number.

9.09 The digit interpreter tables should be established to reflect the dialing plan desired by each centrex customer. The customer's dialing plan should be flexible enough to allow introduction of future features. Facilities required for the specified features should be available. Spare tables should be established during ODA runs.

9.10 The hardware associated with any loop around trunk groups should be determined based on the intended application. For centrex trunks, the desired centrex access code and CAT code should be established and included in the customer's dialing plan.

10. HARDWARE

Route Transfer Keys

10.01 Eight remote master scanner applique circuits are required for the route transfer keys. These circuits are fixed assigned to row 45, scan points 08 through 15 of trunk scanner 00. Activation of route transfer is indicated by changing the ferrod in the scanner from the unsaturated to the saturated state.

10.02 A remote master scanner applique circuit unit (SD-1A210, trunk order code 74300)

contains eight circuits and occupies a mounting plate in the miscellaneous trunk frame.

10.03 A variety of circuits are available to provide the proper connection to the remote master scanner applique circuit. The specific circuit to be used should be determined by the operating company.

Loop Around Trunk Groups

10.04 Loop around trunk groups are a unique type of trunk group because a single central office is involved instead of two. Each loop around trunk requires either a trunk circuit at each end or a trunk circuit at one end and a line at the other end. The proper cross-connections are required. The trunk circuits to be utilized depend upon the specific application and should be determined by the operating company.

10.05 References 2, 14, 19, and 20 contain No. 2 ESS trunk information.

11. DETERMINATION OF QUANTITIES

Hardware

11.01 Hardware is required to incorporate the route transfer key function and to provide loop around trunk groups. The total hardware required is based on the number of route transfer keys and the number of loop around trunk groups and the number of members per trunk group. The total quantities of hardware required can be determined utilizing Part 10, HARDWARE.

Memory

11.02 The memory required for the different call routing techniques is described in 7.01 and 7.02 of Part 7, COST FACTORS.

11.03 The maximum number of translation words which can be allocated to a specific call routing technique are summarized in Part 5, LIMITATIONS AND RESTRICTIONS.

12. ASSIGNMENTS AND RECORDS**Input And Record Keeping****A. Office Data Administration (ODA)**

12.01 When an ODA run is required, the completed forms must be submitted to the appropriate WECo Regional Data Center for processing. The forms required for each call routing technique are as follows:

(1) 3-Digit Translation

- ESS 2300 Three- and Six-Digit Translation Table: This form is used to define a code group for the various office and area codes which can be dialed. Code groups are defined for 0+, 1+, and no prefix dialing.
- ESS 2304 Code Group Translation Table: This form is used to assign either a direct route index and a zone index (screening table number) or other treatment for each code group.

(2) Screening Tables

- ESS 2301 Rate and Route Table: This form is used to define a route index and a charge index for each combination of zone index and rate area line or trunk class code.
- ESS 2306 Line Class Code Table: This form is used to associate the various combinations of line class code, rate area, party number, and synonymous line class code to originating and terminating major class combinations. For centrex lines, different service restrictions or types of service are assigned instead of originating and terminating major classes.

(3) Route Index Translation

- ESS 2303 Route Index Expansion Table: This form is used to define the routing information for the office.

(4) 1-Digit Translation

- ESS 2209 Incoming Trunk Digit Translation Table: This form is used to establish the routing for incoming trunks where the

incoming digits cannot be initially translated in the 3- or 4- digit translators.

(5) 4-Digit Translation

- ESS 2100 Directory Number Table: This form is used to assign the directory number and related information for the 4-digit and the TEN translator for noncentrex lines.
- ESS 2101 Centrex Directory Number Table: This form is equivalent to ESS 2100 for centrex lines.
- ESS 2105 Multiline Hunting Group Table: This form is used to assign information associated with multiline hunting groups.
- ESS 2107 Supplementary Information Table: This form is used to enter additional information that is not included on ESS 2100, 2101, or 2105.
- ESS 2501 Office Code Table: This form is used to allocate the number group tables and hundreds group tables for the various office codes.

(6) Digit Interpreter Table

- ESS 2109-2 Dialing Assignments: This form is used to assign the desired dialing patterns (access codes and station numbers) for each centrex customer group.

(7) Trunk Groups

- ESS 2201 Trunk Assignment Table: This form is used to provide the associations between scan points, peripheral decoder points, and their central pulse distributor enable points with particular circuits. These circuits are also defined as a specific member of a trunk group.
- ESS 2202 Trunk Group Table: This form is used to establish a trunk group number for each trunk group.
- ESS 2204 Trunk Feature Table: This form is used to define the features to be applicable to a particular trunk group.

- ESS 2505 Automatic Trunk Test Table: This form is used to supply the data required for trunk maintenance.

12.02 The No. 2 ESS Translation Guide, TG-2H, contains the details required to complete the ESS forms.

B. Recent Change Messages

12.03 The following RC messages can be used to affect various aspects of the different call routing techniques:

(1) 3-Digit Translation

- A RC:CRI—changes the direct route index in the code group expansion table entry for a given code group.
- A RC:DIG—assign an existing 3- or 6-digit code to a new code group.
- A RC:NCG—add a new code group that is identical to an existing code group, or to remove an existing code group.
- A RC:RCH—used to indicate to the system that the above RC messages should be recent change hunted.

(2) Screening Tables

- Changeable only with an ODA run.

(3) Route Index Translation

- A RC:RI (LO-1)—used to add a new route index, change, or remove an existing route index.
- A RC:RI (EF-1)—used to change a given word in the route index expansion table.
- A RC:RCH—used to indicate to the system that the preceding RC messages should be recent change hunted.

(4) 1-Digit Translation

- Changeable only with an ODA run.

(5) 4-Digit Translation

- A RC:HRI (EF-1)—used to change the route index associated with the particular number group.

- A RC:L—used to insert, change, or delete data corresponding to a given line.

- A RC:VTN (EF-1)—used to change the treatment given to a vacant telephone number.

(6) Digit Interpreter Tables

- A RC:DIT (EF-1)—used to change the information contained in the terminal entry in the digit interpreter tables.

- A RC:DTB (EF-1)—used to add or delete a 16-word digit interpreter table to or from the dialing tree of a given centrex group.

(7) Trunk Groups

- A RC:GRP (EF-1)—used to change a given word in a trunk or service circuit group.

- A RC:TRK—used to change the TEN of a given member of the group or to move a member of a group to another group.

12.04 The corresponding A VY messages are used to verify the A RC messages.

C. Record Keeping

12.05 The translation administration record forms reflecting the incorporation of the various call routing techniques are returned to the operating company after each ODA run is made.

12.06 A record of all recent change messages must be maintained in addition to the ESS-R forms.

13. NEW INSTALLATION AND GROWTH

13.01 Call routing techniques applicable to noncentrex customers are available in No. 2 ESS offices equipped with either generic program. An office with LO-1 can be retrofitted with EF-1 so that call routing techniques unique to centrex customers can be incorporated.

13.02 An ODA run is required to initially establish particular aspects of call routing in a central office. After the initial ODA, certain changes can be made by RC message while others require another ODA run (refer to Part 12).

13.03 After the call routing techniques are established, they can normally be made available to new customers or expanded for existing customers by RC messages if proper spare allocations were made in the ODA run.

14. TESTING

14.01 The translations pertaining to call routing should be verified using the office records and the A VY: input messages corresponding to the A RC: messages in Part 12.

14.02 A comprehensive list of test calls which utilize the various call routing techniques should be developed. Successful completion of these calls indicates that the proper translation data and hardware connections pertaining to call routing techniques have been incorporated into the No. 2 ESS.

15. MEASUREMENTS

15.01 Each end of a loop around trunk group connected as a trunk has a set of four traffic registers assigned to it. These registers include peg, usage, overflow, and maintenance busy counts.

15.02 A set of 32 traffic registers (PRC00 through PRC31) can be assigned to provide preroute peg counts for specific code groups.

15.03 A set of seven traffic registers (PRC32 through PRC38) can be assigned to provide class of service peg counts for specific Line Screening Class Codes.

15.04 Counts on the preceding traffic registers are collected continuously. The registers can be read when a TTY printout is requested or when traffic data is automatically printed in accordance with the H or C schedules in the Traffic Work Table. Reference 16 in Part 19 provides the assignment and verification messages, the traffic schedules, and other information pertaining to these measurements.

16. CHARGING

16.01 With the exception of loop around trunk groups where the customer may be billed for the number of trunks, charging for a specific type call is not directly attributable to the specific call routing technique(s) utilized in completing that type call. Reference 1 of Part 19 provides information concerning charging arrangements for various calls.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

17.01 The following list identifies terms used in this document:

- **Alternate Routing**—The procedure at a switching center by which a call encountering an all trunks busy condition in the first choice route is offered, either manually or automatically, another route to or toward the terminating switching system.
- **Announcement Service**—Announcements made to calling parties fall into three basic categories:
 - (a) Operating company announcement which alert the calling party of incorrect dialing or machine operation
 - (b) Announcements for customer use to calling parties, such as delay announcements
 - (c) Announcements dialed by the public such as weather and time.
- **Centrex Access Treatment (CAT) Code**—A code used to identify which of the customer's access digits the station user can use.
- **Charge Index**—A code in the Screening Tables that points to information concerning the type of charging to be done on a particular call.
- **Common Control Switching Arrangement (CCSA)**—CCSA is an assemblage of switching and other facilities used to arrange an automatic switching system to serve as a switching center for one or more switched

services networks. In addition, CCSA provides access to a CCSA network for network inward calling to the centrex group, direct outward dialing to the network, and other features similar to access to the exchange network.

- Digit Interpreter Table (DIT)—A part of the centrex number translator that provides initial digit(s) interpretation for calls dialed from a centrex station or an attendant.
- Foreign Area Translator (FAT): Code point translator tables used to associate a code index with a given 3-digit code in a foreign area.
- Foreign Exchange (FX) Service—An exchange service furnished under tariff provisions by means of a circuit connecting a subscriber's main station or PBX system with a central office of an exchange other than that which regularly serves the exchange area in which the subscriber is located.
- Inward Wide Area Telecommunications Service (INWATS): A form of distance dialing telephone service which allows a customer, in consideration of a monthly charge, to receive calls from specified geographical areas with no charge to the originating caller.
- Line Class Code—A 3-character alpha-numeric code assigned by the operating company to represent a class of service.
- Major Class—A term used to describe an originating or terminating class of service for noncentrex customers which is exclusive of screening treatment.
- Most Economical Routing (MER)—The MER feature is an arrangement which permits the centrex station user to dial an access code (set of preassigned digits), followed by a directory number, and have the call automatically routed to its destination in a preselected pattern (which is usually the "most economical" route).
- Normalized Office Code (NOC)—A 3- (LO-1) or 4- (EF-1) bit number which represents a

3-digit office code. The NOC is required to access the 4-digit translator.

- NXX—An abbreviation commonly used to represent a 3-digit office code.
- Numbering Plan Area (NPA)—A 3-digit code used to identify an area code.
- Office Data Administration (ODA) Run—The mechanism by which No. 2 ESS office data may be changed. Information from the ESS input forms are inputted onto the WECO Regional Data Center computer, assembled, and then sent back to the No. 2 ESS office.
- Originating Register—Eight words of call store used for control and digit storage during the receiving and outpulsing phases of a call.
- Outward Wide Area Telecommunications Service (OUTWATS): A form of distance dialing telephone service which allows a customer, in consideration of a monthly charge, to place calls to specified geographical areas.
- Overflow Count—A cumulative count of the number of times an attempt to cause an event failed because of network blocking or lack of facilities.
- Peg Count—A cumulative count of the number of times a given event occurs during a fixed time interval.
- Pseudo Office Codes—Pseudo office codes are 3-digit prefixes which do not correspond to real prefixes (or office codes). Pseudo office codes are used for groups of extensions which are not to be assigned real directory numbers (such as groups of fully restricted terminating extensions or "PBX-CO" extensions). Pseudo office codes are also used for special billing numbers (like WATS billing numbers) where it is undesirable to use real office codes.
- Recent Change (RC)—The mechanism for making changes to information stored in the program store. These changes are

accomplished via TTY input messages and are stored in the recent change area of call store until some later time when the program store can be updated.

- Route Index (RI)—A code in the 3-digit translator that indicates what route a call takes (e.g., which trunk group, trunk, etc.) through a No. 2 ESS office.
- Scan Point Number (SPN)—The number used to locate the ferrod assigned to a line or trunk circuit to determine its present state (on-hook or off-hook).
- Screening Class (SCR): A code included in the customer's class of service data that is used to determine routing and charging on calls which require the 3-digit translator and the screening tables.
- Terminal Equipment Number (TEN)—A 6-digit number representing the physical location of a line, trunk, or service circuit in the switching network. This number includes the network number, concentrator, grid, switch, and level assigned to the terminal.
- Terminal Memory Record (TMR)—An area in call store used to record how lines, trunks, and junctors are associated with the paths existing at any time through the switching network.
- Traffic Service Position System (TSPS)—An electronic store program control system in a central location that provides operator and charging functions for associated offices.
- Transient Call Record (TCR): A call store register designated for storage of information concerning calls in progress.
- Translator—A translator consists of a group of tables which contain data pertinent to a specific translation process.
- Usage Count—A cumulative count of the number of circuits or registers that are placed in a busy state during each periodic scan of a particular group of circuits or registers.

18. REASONS FOR REISSUE

- 18.01 This is the initial issue of this document.

19. REFERENCES

19.01 The following documents provide supplementary information concerning the call routing techniques:

- (1) Charging Arrangements—Section 232-190-101
- (2) Centrex Group Trunk Facilities—Section 232-190-313
- (3) Digit Interpretation Program—PD-, PF-, and PR-2H204-01
- (4) Input Message Manual No. 2 ESS—IM-2H200
- (5) Office Data Tables Layout Specification No. 2 ESS—PA-2H2XX
- (6) Output Message Manual No. 2 ESS—OM-2H200
- (7) Office Update Procedures Using Regional ODA Program—Sections 232-124-301 and 232-324-301
- (8) Procedures for Adding a Centrex-CO Customer—Section 232-118-301
- (9) Recent Change Procedures (Central Office Changes) EF-1—Section 232-118-103
- (10) Recent Change Procedures (Central Office Changes) LO-1—Section 232-118-102
- (11) Remote Master Scanner Applique Circuit—CD- and SD-1A210
- (12) Scanner Assignment Rules—SD-2H167-01
- (13) Toll Diversion and Toll Restriction—Section 232-190-139
- (14) Traffic Facilities Practices, Division D, Section 12d
- (15) Traffic and Plant Measurement Program—PD-, PF-, and PR-2H116-01

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- (16) Traffic and Plant Measurements—Section 232-120-301
- (17) Translation Guide, TG-2H
- (18) Translation Program—PD- and PF-2H213-02

(19) Trunk and Service Circuit Engineering Specification—J2H031A-1

(20) Trunking Arrangements—Section 232-190-024