FEATURE DOCUMENT
AUTHORIZATION CODE SCREENING
ENHANCED PRIVATE SWITCHED COMMUNICATIONS SERVICE
2-WIRE NO. 1 ELECTRONIC SWITCHING SYSTEM

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INTRODUCTION

1. GENERAL INFORMATION

SCOPE

1.01 The Authorization Code Screening (ACS) feature provides the customer the ability to modify the routing of a call and/or to identify a call for cost accounting purposes. This section provides coverage of the No. 1 Electronic Switching System (ESS) ACS feature for Enhanced Private Switched Communication Service (EPSCS). ***No attempt is made to define the appropriate intrastate or interstate tariff(s) under which EPSCS is provided. Care must be taken when implementing an EPSCS arrangement to ensure that the arrangement is consistent with the tariff(s) currently in effect.***

REASON FOR REISSUE

1.02 When this document is reissued, the reason for reissue will be stated in this paragraph.

Note: The contents of this document were previously contained in Section 231-090-135, Issue 1.

FEATURE AVAILABILITY

1.03 The ACS feature (consecutive authorization codes) is available with 1E5 and subsequent generic programs.

1.04 The ACS feature (scattered authorization codes) is available with 1E6 and subsequent generic programs.

2. DEFINITION/BACKGROUND

DEFINITION

2.01 The ACS feature provides the ability to require code numbers to be dialed by the originating party for cost accounting and/or call routing purposes.

BACKGROUND

2.02 This document is one member of a family of feature documents pertaining to the EPSCS feature. To fully comprehend this document, readers should be familiar with references A(8) through A(16) in Part 18. See reference A(7) in Part 18 for general queueing information.

2.03 The ACS feature, first introduced in the 1E5 generic program, provides the ability to modify the routing of a call based on an authorization code which can be from three through six digits long. An authorization code can also be used for identification or cost accounting purposes; codes used for this purpose only (no screening capability) are referred to as nonscreening codes. An enhanced version of the ACS feature is available with the 1E6 generic program.

2.04 The ACS feature in 1E6 provides both consecutive (as in 1E5) and/or scattered authorization codes. If consecutive codes are used, only the treatment group (TRTG) is stored; therefore, only the TRTG is changeable by the customer. If scattered codes are used, both the TRTG and the authorization code (less any initial digits used in digit-by-digit interpretation) are stored, and so are changeable by the customer. Also, 1E6 provides that the treatment or class of service of a TRTG can be temporarily changed to that of another TRTG by the customer.

DESCRIPTION

3. USER OPERATION

CUSTOMER

A. General

3.01 Authorization codes (three through six digits in length) allow the customer to define a set

of network dialing capabilities and to restrict the use of these capabilities to authorized personnel. The restrictions are enforced by requiring individuals to dial authorization codes for designated network uses. Each authorization code is assigned a class of service (via a TRTG) corresponding to distinct dialing capabilities, which can be defined by the customer through service orders. The TRTG assigned to an authorization code can be determined and/or changed from the customer network control center (CNCC).

3.02 Portable codes are those having the same meaning throughout the entire network. Nonportable (local) codes may change meaning or be invalid outside the access line group (ALG) for which they are defined. For the system to distinguish portable codes from local codes, portable codes must be identified by the first one, two, or three digits.

3.03 The authorization codes may be chosen by the customer in any blocks of 100 or 1000 consecutive numbers. Additionally, the customer may choose blocks of scattered numbers of similar length in groups which range in size from 1 through 1024 codes.

B. Call Processing

3.04 Following the receipt of tandem dial tone, the calling party dials the desired called number. This called number may be a 3-, 7-, or 10-digit address depending upon the type of private network and the desired destination (see Table A). If the originating party's class of service indicates that an authorization code is required for calls to that called number, recall dial tone is returned to the calling party. The calling party then dials an authorization code.

3.05 If screening is intended, the class of service associated with the authorization code is used to route the call; either completion of the call, or intercept by reorder tone, or an appropriate announcement. If the authorization code is invalid, so that no class of service can be found, the call is also intercepted.

C. Customer Control of Authorization Codes

3.06 Authorization codes may be activated or deactivated or their TRTGs may be changed by telephone company service orders or by messages at the CNCC. The CNCC does not have the ability to turn on or off the requirement for authorization codes nor to change the class of service of TRTGs. These changes can only be made by telephone company generated service orders.

3.07 From the CNCC, the customer may query the ESS data base for authorization code status asking for TRTG of an individual code or for the TRTGs of a range of up to 100 codes. Specifically, the messages initially available in 1E5 are:

(a) Change the TRTG of an authorization code.

(b) Display the TRTG of an authorization code.

The information in response to these queries may be displayed on the cathode ray tube terminal or printed out by the printer. Two types of authorization code customer control messages, change requests and information requests, are available to the customer at the CNCC.

3.08 Additional capabilities have been provided to the customer in the 1E6 generic program. The customer also has the ability to temporarily change

TABLE A

NUMBERING PLAN

DIGIT (NOTE)	MEANING
1XX	Route to Network Attendant Access Line Conferencing
10X	Route to Network Test Lines
NNX XXX	Private Network Number (On-Net)
N0/1X NNX XXXX	DDD Number (Off-Net)

Note: N is any digit other than 0 or 1; X is any digit.

the treatment (class of service) of a TRTG to that of another TRTG. This allows the customer to temporarily change the treatment of all authorization codes having a specific TRTG with one customer control change message instead of changing the TRTG of each individual code with a permanent change message. Restoral of a TRTG to its original treatment is also done by a customer control message.

3.09 The three types of change requests available in 1E6 are as follows:

(a) Change the TRTG of an authorization code.

(b) Change the stored portion of an authorization code.

(c) Temporarily change the treatment of a TRTG.

The following information request messages, available in 1E6, may be used by the customer at the CNCC to query the No. 1 ESS data base as follows:

- Display the TRTG of an authorization code.
- Display the most confining bounds of an authorization code.
- Display all valid local or portable authorization code prefixes.
- Display all authorization codes and TRTGs for a specific ALG.
- Display the treatment(s) of the TRTG(s).

D. Administration of Scattered Authorization Codes

3.10 The scattered authorization code option (introduced in the 1E6 generic program) provides for arbitrarily chosen codes to be stored in ordered lists which may vary from 1 through 1024 words in length. From two through five digits can be stored in a word in the ordered list with the number of digits stored being uniform within the list. The customer can change the stored portion of the authorization code in the ordered list using customer controls. However, the new code must be within the ***most confining bounds***—that is, the bounds imposed by the smaller and larger authorization codes in the list, whether in program store or recent change call store, that most confine the selection of the new code (Fig. 1).

3.11 Authorization code administration can be difficult if authorization codes intended to be scattered and changeable become closely clustered in the list, since the range of changeability then diminishes (Fig. 2A). To avoid clustering, ***administrative range boundaries (ARB)*** should be set up by the customer for initial selection of codes and adhered to when making subsequent code changes. An ARB is any permanent partition into nonoverlapping ranges the customer sets up, such that each range always contains exactly one authorization code. Administrative range boundary is an administrative tool and is not maintained in the ESS.

ORDERED LIST

1	NSD = 4	LENGTH = 7
1	6	0217
1	4	4879
1	3	5000
1	0	6428
1	1	6817
1	7	8994

RECENT CHANGE	MOST CONFINING BOUNDS		
	0000	-	4878
	0218	-	4925
4926	4880	-	6427
	5001	-	6816
7889	6429	-	8993
	7890	-	9999

LEGEND:
NSD - NUMBER STORED DIGITS

Fig. 1—Most Confining Bounds for Scattered Authorization Codes

ORDERED LIST

1	3		9
1	9		024
1	0		030
1	4		048
1	2		051
1	1		618
1	6		695
1	10		768
1	0		894

MOST CONFINING BOUNDS
000-0029*
0025-0047*
0031-0050*
0049-0617
052-694
619-767
696-893
769-999

* TOP 3 CODES HAVE BECOME CLUSTERED

A. MOST CONFINING BOUNDS

$$ARB = \frac{1000}{8} = 125$$

ORDERED LIST

1	3		9	ARB	MCB
1	9		087	000-124	000-220
1	0		221	125-249	088-317
1	4		318	250-374	222-455
1	2		456	375-499	319-617
1	1		618	500-624	457-694
1	6		695	625-749	619-767
1	10		768	750-874	696-893
1	0		894	875-999	769-999

B. ADMINISTRATIVE RANGE BOUNDARIES VERSUS MOST CONFINING BOUNDS

Fig. 2—Administrative Range Boundaries

3.12 Before choosing ARBs, the maximum code range must be determined:

NUMBER OF DIGITS STORED	MAXIMUM CODE RANGE
2 (00-99)	100 codes
2 (000-999)	1000 codes
4 (0000-9999)	10000 codes
5 (00000-99999)	100000 codes.

Typically, the ARB should be partitioned into ranges of approximately equal size (Fig. 2B). To do this, the ARB can be computed as follows:

ARB Size = Maximum Code Range/No. of Codes in Table

For administrative ease, the ARB can be rounded to convenient ranges, such as multiples of 20, 100, or 300.

3.13 Note that the ARB is even more confining than the ***most confining bounds*** enforced by the ESS, but has the important administrative advantage of making an authorization code change independent of any changes in its neighboring codes. Continued observance of the ARBs ensures that authorization codes remain evenly scattered throughout the ordered list (Fig. 2B).

E. Customer Originated Recent Changes

3.14 Should a situation arise when, due to the need to conserve remaining recent change call store space, it is necessary for the central office to manually inhibit customer originated recent changes, an indication is sent to the customer when the next change is requested. This indication is used to inform the customer that the requests for authorization code changes are not being processed by ESS. Due to telephone company resource limitations, there may be occasions when customer control changes are denied.

TELEPHONE COMPANY

3.15 The customer control change routines perform basic validity checks on input data and create recent change register data [status, tag, primary translation word (PTW)] which is input to the general recent change insertion routine. The recent change limits mechanism in No. 1 ESS (parameters NONSL, TOTLW, TMPW1, TMPW2) automatically monitors the use of recent change registers. When the nonstandard recent change limit (NONSL) parameter is reached, customer originated recent changes are automatically inhibited. When either of the other three parameters is reached, an RC20 message (limits reached) is printed at the maintenance and service order TTY and a minor alarm is sounded. When No. 1 ESS system problems necessitate, or if the recent change area is filled to the point that remaining recent change registers should be saved for essential messages, customer originated recent change messages to change authorization codes, TRTGs, or the stored portion of scattered codes, may be inhibited by manual request. Customer originated recent change messages can be inhibited at the maintenance TTY by using the RC-INH input message. The RC-INH message restrictions can be removed by the RC-ALLOW input message.

3.16 Beginning with 1E6, if recent change insertion is successful, a customer originated recent change is printed at the TTY if the customer originated recent change log (CLOG) feature package is loaded. Also, the customer limits are incremented appropriately if the recent change administration (RCAD) feature package is loaded and not inhibited. See reference A(17) in Part 18 for detailed information.

4. SYSTEM OPERATION

HARDWARE

4.01 Not applicable.

OFFICE DATA STRUCTURES

A. Translations

4.02 The requirement for message detail (MSGD) is indicated by the MSGD item in the line equipment number auxiliary block (Fig. 3). Message detail is always provided when the ACS feature is used. When the MSGD indicator is set to 1, a MSGD record is sent to the CNCC for every incoming call over the trunk group. This indicator is valid only when the originating major class is 28, 33, 34, or 35.

4.03 The requirement for authorization codes is indicated by item AC in the chart column translator supplementary call identification word (SCIW) (Fig. 4). If item AC is set to 1, an authorization code is required to complete the call. Recall dial tone is returned to the user and the code is collected after the called number is dialed.

4.04 Optional word D (Fig. 5) is added to the trunk group supplementary translator for the ACS feature. The items required in optional word D are as follows:

(a) ***CUSTID:*** A customer identification number (1 through 255) is needed for any trunk dedi-

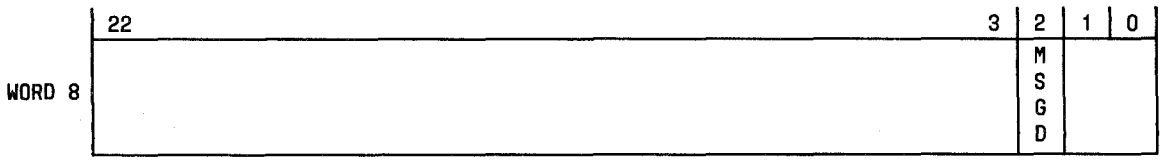
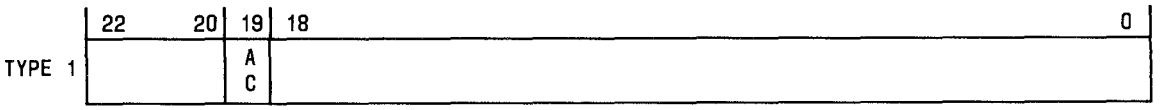


Fig. 3— Line Equipment Number Auxiliary Block—Word 8



LEGEND:
AC - AUTHORIZATION CODE = 1

Fig. 4—Supplementary Call Identification Word

cated to a customer, including any dedicated service circuit.

(b) ***ACI:*** The authorization code index selects a subtranslator for authorization codes received by the trunk group.

4.05 The authorization code translator (Fig. 6) converts an authorization code to a TRTG. The TRTG is then converted to a screening line equipment number (SLEN) via the private network customer translator (Fig. 7). The authorization code translator is a digit-by-digit type. The final level can be a simple PTW if the code is not used for screening; otherwise, it must point to a subtranslator. The master head table annex +51 points to the authorization code head table. The length of the head table is a maximum of 1025. The head table is indexed by the ACI and contains data type (DTYP) and associated data as shown in Fig. 6.

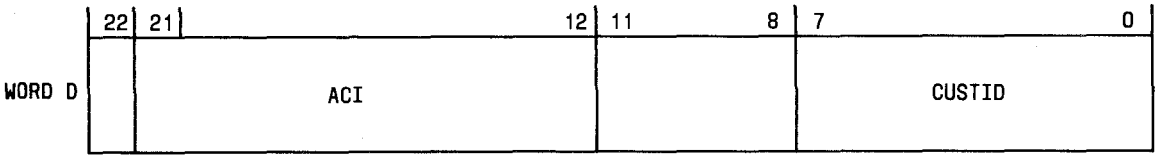
4.06 The digit interpreter tables are indexed by Dn, where n is the level of the table. (Digit 0 is treated as 10.) The digit interpreter tables are 15 words long, with the last five words all zeros. The maximum number of digit interpreter levels is three.

4.07 A thousands block subtranslator, DTYP 1, contains the TRTG for 1000 consecutive authorization codes. These codes are packed four entries per word. The TRTG for XXX is in word XXX-111/4, and the displacement from the right, within the word, is five times the remainder of the index formula (digit 0 is treated as 10). The TRTGs associated with these codes are changeable directly by the customer or may be built by recent change messages.

4.08 The hundreds block subtranslator, DTYP 2, is similar to the thousands block subtranslator but handles only 100 consecutive authorization codes. The index to a code word is XX-11 and the displacement is five times the remainder of the index formula.

4.09 The DTYP 3 data shown in the authorization code translator is used for portable codes or codes not used for screening. A nonzero authorization code index (ACI) indicates portable codes, and is used in place of the original ACI in deriving the TRTG. The number of digits (NDIGS) item does not apply.

4.10 Ordered lists of scattered authorization codes are provided to the customer as a second option. The ordered lists are distinguished from blocks



LEGEND:
ACI - AUTHORIZATION CODE INDEX
CUSTID - EPSCS/ETS CUSTOMER IDENTIFICATION NUMBER

Fig. 5—Trunk Group Supplementary Auxiliary Block

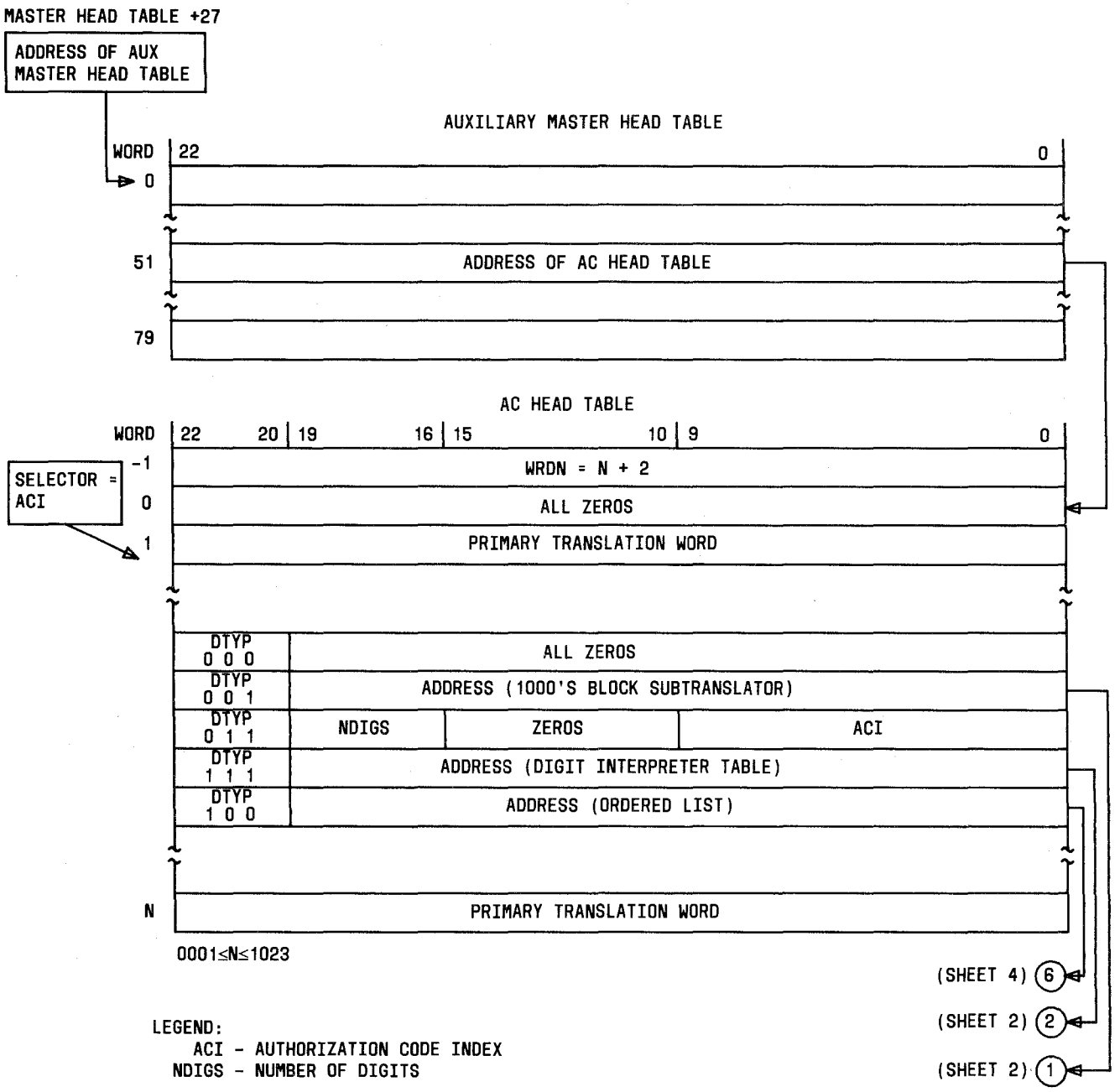


Fig. 6—Authorization Code Translator (Sheet 1 of 4)

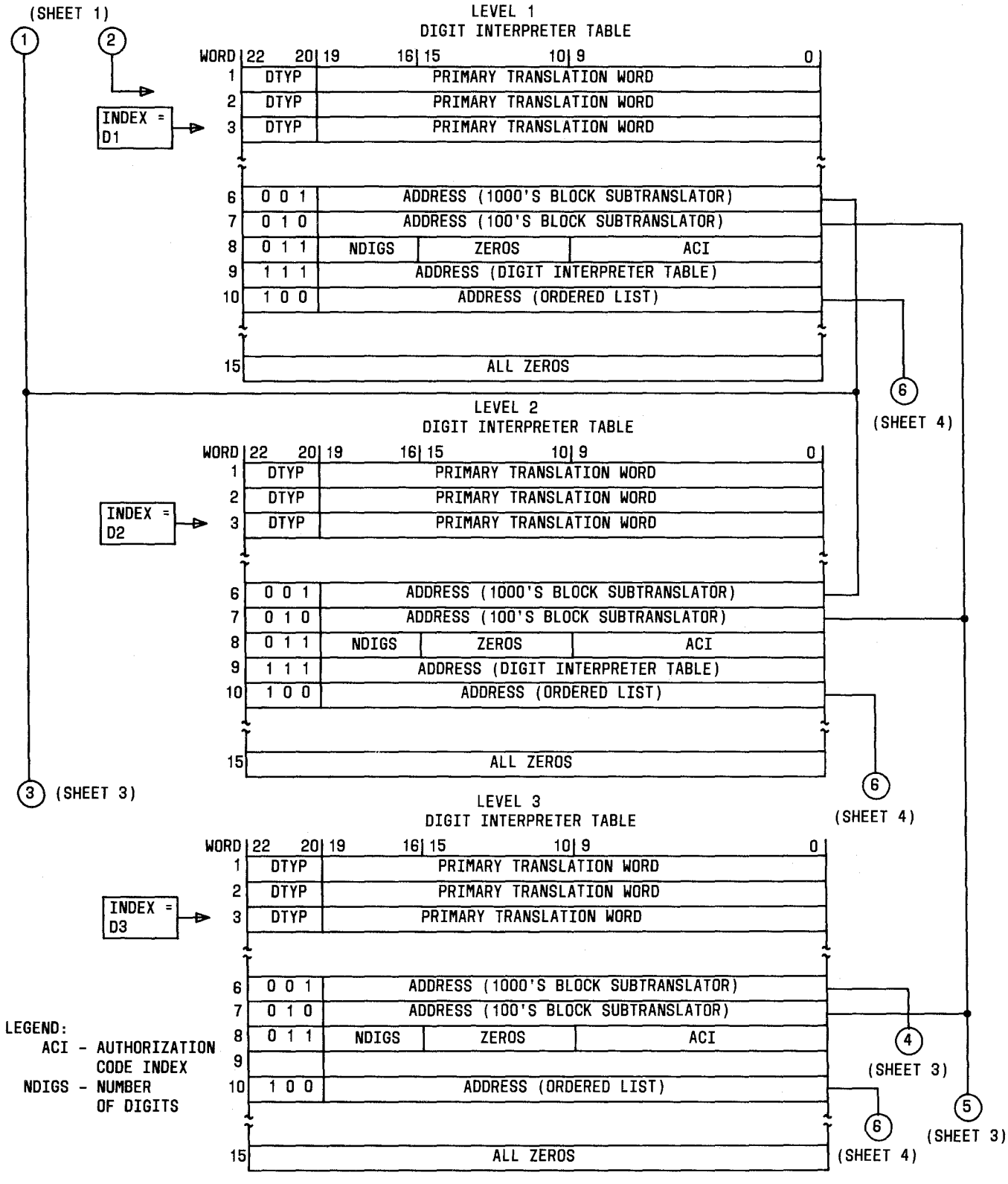
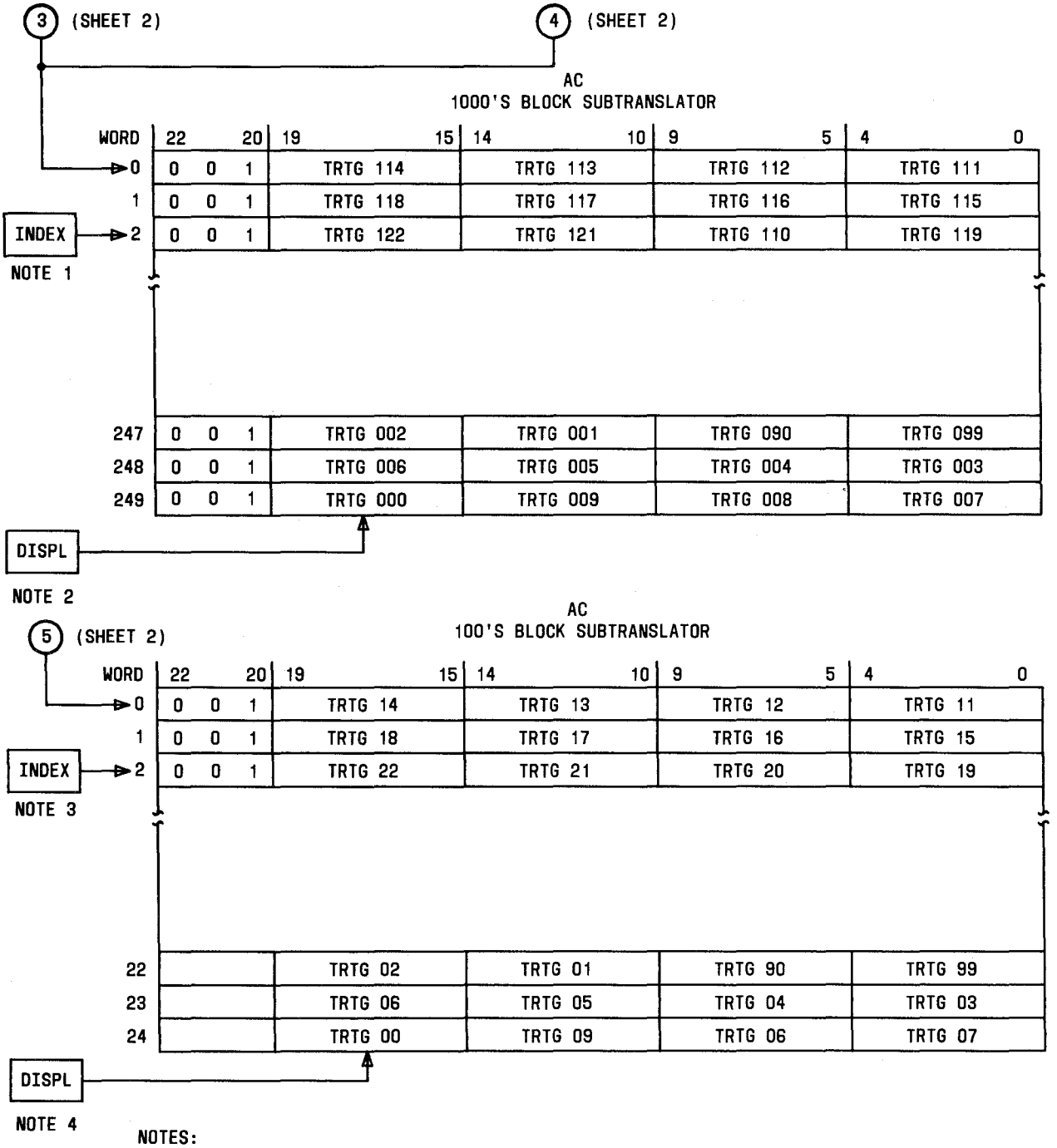


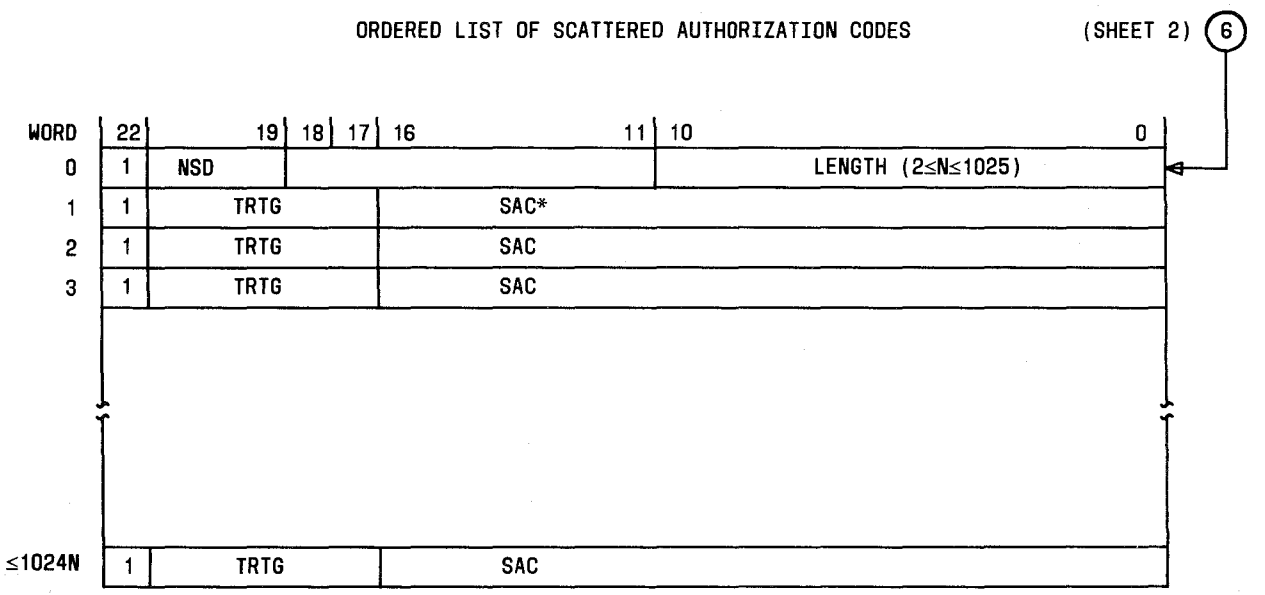
Fig. 6—Authorization Code Translator (Sheet 2 of 4)



NOTES:
1. INDEX=XXX-111 WHERE XXX ARE THE LAST 3 DIGITS OF THE AUTHORIZATION CODE
2. DISPLACEMENT=5 TIMES THE REMAINDER OF THE 1000'S BLOCK INDEX FORMULA
3. INDEX=XX-11. WHERE XX ARE THE LAST 2 DIGITS OF THE AUTHORIZATION CODE
4. DISPLACEMENTS=5 TIMES THE REMAINDER OF THE 100'S BLOCK INDEX FORMULA

LEGEND:
TRTG - TREATMENT GROUP

Fig. 6—Authorization Code Translator (Sheet 3 of 4)



* IF ANY DIGITS ARE USED IN INITIAL DIGIT INTERPRETATION THEY WILL NOT BE INCLUDED IN SAC.

LEGEND:

LENGTH OF TABLE = 2-1025 (1-1024 SACS STORED)
NSD = NUMBER OF STORED AC DIGITS (2-5)
SAC = STORED PORTION OF SCATTERED AUTHORIZATION CODE. FROM 2 TO 5 AUTHORIZATION CODE DIGITS IN BINARY FORM WHERE DIALED 10's HAVE BEEN CONVERTED TO ZERO
TRTG = TREATMENT GROUP - DEFINES CALLING PRIVILEGES AVAILABLE TO AN AC (0-31)

Fig. 6—Authorization Code Translator (Sheet 4 of 4)

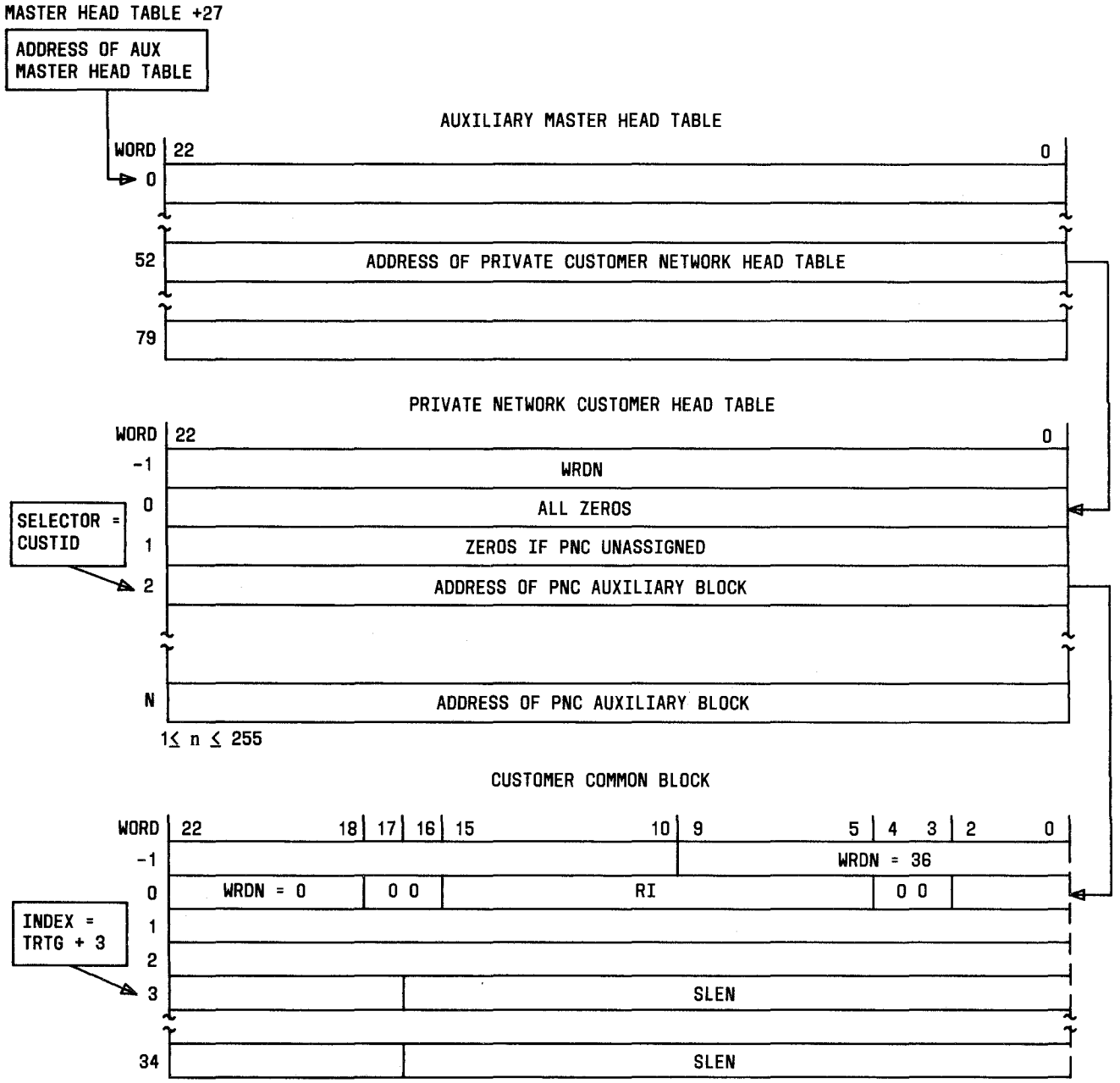
of 100 and 1000 consecutive codes by DTYP 4 in the head table or digit interpreter tables. From two through five digits can be stored in a word in an ordered list with the number of digits stored being uniform within that list. (Thus, 6-digit codes require at least one prefix digit which implies 1-digit interpreter level.) The authorization code digits are converted to binary (after dialed tens have been converted to zeros) and stored in ascending order in the ordered list along with the TRTG.

4.11 The private network customer translator (Fig. 7) contains common customer data. The head table is pointed to from the auxiliary master head table +52. The index into the head table is indicated by CUSTID obtained from either the trunk group supplementary translator or the number group number to rate center translator. The CUSTID auxiliary block (common block) is indexed by TRTG+3 where TRTG ranges from 0 through 31. The TRTG is derived through authorization code translation. Items contained in the CUSTID auxiliary block are as follows:

- RI—Intercept route index, used for unassigned TRTGs (route index may route to tone or announcement)
- SLEN—Screening LEN.

B. Parameters/Call Store

4.12 Parameter word F4CUST (Fig. 8) points to a 16-word call store table allocated for ACS in the 1E5 generic program. In 1E6 and later generic programs, the call store table must be increased from 16 through 64 words in length when the customer



LEGEND:
RI - ROUTE INDEX FOR UNASSIGNED TRTGS
SLEN - SCREENING LEN

Fig. 7—Private Network Customer Translator

common identification (CCI) feature package is loaded in the office.

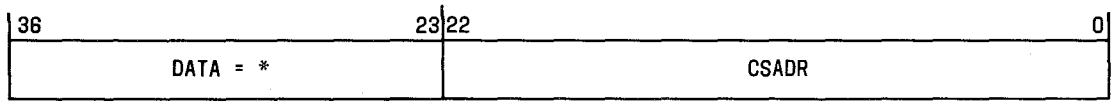
4.13 Parameter word F4RCAC (Fig. 9) points to a 45-word call store table which has one bit allocated for each of 1024 ACIs. This bit per ACI is set if there are recent changes on the head table or digit interpreter tables associated with that ACI. This call store table is allocated when the ACS feature package is loaded in 1E6 and later generic programs.

FEATURE OPERATION

4.14 Network access line seizure occurs as a result of the calling party going off-hook at a PBX or centrex and dialing the appropriate network access code, unless the calling station is served by a direct access line (DAL). For a DAL, trunk seizure occurs when the calling station goes off-hook. A receiver is connected to the incoming trunk and dial tone is returned to the caller (second dial tone in the access code case). Upon receipt of this dial tone, the caller dials (either dial pulse or TOUCH-TONE® dialing) the called number.

4.15 After three digits of the called number are collected, a 3-digit translation is performed with the dialed digits and the chart column of the SLEN. This translation provides routing data, a call type which indicates the number of digits expected in the called number, and an indicator that an authorization code is or is not required. Note that the requirement for an authorization code is based on the originating facility as well as on the first three digits of the called number.

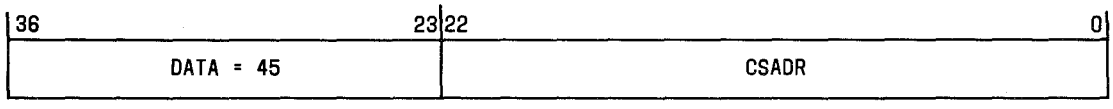
4.16 If an authorization code is required, the routing data is ignored, the remaining called digits are collected, and the user is prompted for the code by recall dial tone. After the first three digits of the code are collected, a trunk group supplementary translation is performed to find the ACI and the CUSTID. Using this data, an authorization code translation is performed whose output is either the final data or the number of digits which still must be collected. When the remaining digits (if any) are collected, the authorization code translation is called again. This time the output is final data — either a new SLEN or an intercept route index if the SLEN is zero.



* - 16 WORDS FOR 1E5 GENERIC PROGRAM
  - 64 WORDS FOR 1E6 GENERIC PROGRAMS

LEGEND:
DATA = LENGTH OF THE CALL STORE BLOCK
CSADR = ADDRESS OF THE CALL STORE BLOCK

Fig. 8—Parameter Word F4CUST



LEGEND:
DATA = LENGTH OF THE CALL STORE BLOCK
CSADR = ADDRESS OF THE CALL STORE BLOCK

Fig. 9—Parameter Word F4RCAC

4.17 If a new SLEN is returned, a second 3-digit translation is done with the same called digits, but with the chart column derived from the SLEN of the authorization code translation. The output of this translation may be the same route and call type derived earlier, or it may indicate the call should be routed to intercept (if the call is not allowed with that authorization code), or it may indicate some other route and call type based on the new chart column. From this point the call proceeds the same as a call without ACS.

4.18 The SLEN output from the authorization code translation has other uses in addition to providing a chart column. If priority queueing is indicated in either the SLEN of the group or of the authorization code and the outgoing circuit group is arranged for queueing, the call is to be given priority queueing.

CHARACTERISTICS

5. FEATURE ASSIGNMENT

5.01 The ACS feature is provided on a per customer basis.

5.02 The EPSCS feature is a prerequisite for the ACS feature and must be loaded in the office.

6. LIMITATIONS

OPERATIONAL

6.01 In the 1E5 generic program, customer originated messages to change the TRTG of authorization codes may be inhibited at the maintenance TTY by using the RC-INH input message. This is necessary if the recent change area is filled to the point that remaining recent change registers should be saved for essential messages.

6.02 Beginning with the 1E6 generic program, customers may be assigned limits on the number of recent change registers which can be seized for authorization code and TRTG changes. The RC:CUSTCB input message is used to limit the number of recent change registers customers may seize as a result of authorization code or TRTG changes. A count associated with each distinct customer originated recent change type reflects the number of primary recent change registers in use by that feature. Counts are updated as customer originated recent changes and are inserted into the recent change area. When a count reaches or exceeds the corresponding limit (established via the RC:LIMITS input message), a warning message is printed on the local maintenance TTY.

ASSIGNMENT

6.03 Not applicable.

7. INTERACTIONS

STATIC

7.01 Not applicable.

DYNAMIC

7.02 Authorization code screening can be used to ensure privacy for the Meet-Me Conferencing feature. A customer may assign one of its 32 classes of service to each conference bridge in the network. This class of service can be set up to block all called numbers except the 1XX code for its bridge. All other classes of service block calls to the bridge. To conserve classes of service, a customer may assign a class of service to several conference bridges but only partial privacy will be provided by this arrangement.

8. RESTRICTION CAPABILITY

8.01 Not applicable.

INCORPORATION INTO SYSTEM

9. INSTALLATION/ADDITION/DELETION

9.01 An efficient method for initializing a large number of authorization codes for the consecutive codes plan using hundreds blocks or thousands blocks must be used. Emphasis is on minimal use of recent change registers, thereby maximizing the data created per card writing. This is achieved by initializing codes in groups, and by creating recent changes on words or areas where recent change registers already exist.

9.02 The recent change message flowcharts and the number of recent change registers created per specific keyword or segment are shown in Fig. 10. There will be additional recent change registers created on link list entries, their number depending on the size of available memory areas. It is suggested

that the available recent change area be closely monitored throughout the entire procedure.

9.03 Depending on the amount of recent change primary area available in the office, hundreds blocks, thousands blocks, or ordered lists can now be seized and initialized until the office threshold is nearly reached. Each hundreds block takes 25 or 26 recent change registers and each thousands block takes 250 or 251 recent change registers. Ordered lists take as many registers as the number of stored authorization codes plus one. This is the number required to initialize a consecutive block to a single value or to initialize the ordered lists.

9.04 The RC:AC message is used to initialize the consecutive blocks and should be done before

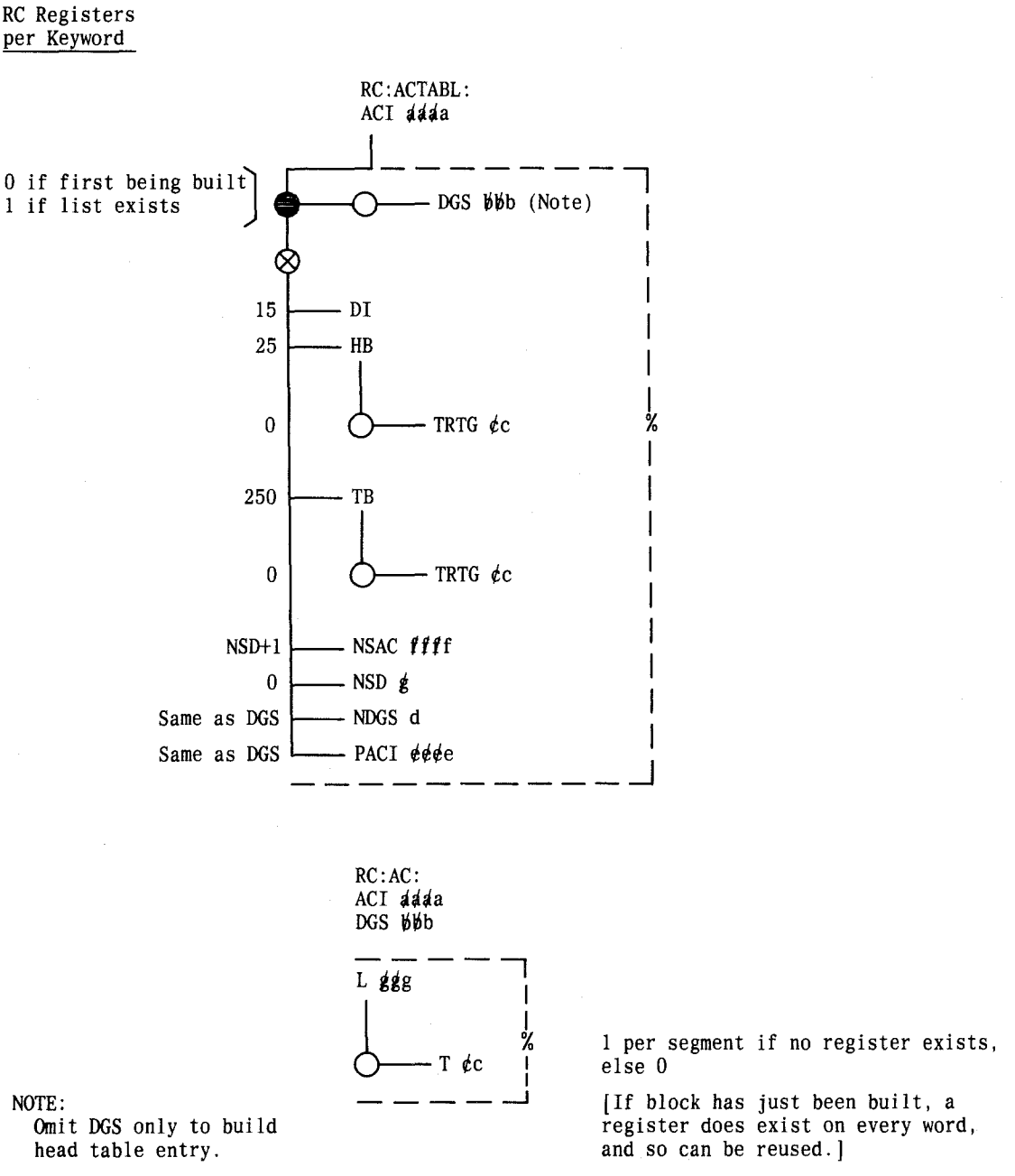


Fig. 10—Recent Change Register Usage for Authorization Code Messages

card writing. This is essential to minimize recent change register usage, since prior to card writing, registers which already exist on each word of the hundreds block and thousands block are being used.

9.05 The RC:SAC message is used to initialize the ordered lists. An ordered list is not usable until it has become completely initialized. This means that an authorization code must be placed in every word in the ordered list before the list becomes active. The ordered list must be card written before the list becomes active.

9.06 The number of recent change registers used for initialization is the same as the number of program store words created, since a single recent change register is used for each word.

9.07 Customer originated recent changes from the customer premises use one recent change register per word changed. If the TRTGs changed reside in the same program store word (consecutive codes case), only one recent change register is used.

9.08 Figure 11 illustrates the procedures required to add the ACS feature. Refer to Part 13 for testing procedures.

9.09 Set cards 9SIAC and 9FACS must be set to 1 to provide the ACS feature.

10. HARDWARE REQUIREMENTS

10.01 Receiver holding times are increased by the ACS feature. When the number of digits to be dialed for authorization codes is unknown, assume holding time of 6 seconds; otherwise, published holding times for digit collection apply.

11. SOFTWARE REQUIREMENTS

Note: This part contains cost factors and determination of quantities. Central Office Equipment Engineering System (COEES) Planning and Mechanized Ordering Modules are the recommended procedures for developing these requirements. However, for planning purposes or if COEES is not available, the following guidelines may be used.

MEMORY

A. Fixed

11.01 The following memory is required whether or not the ACS feature is used.

(a) ***Base Generic Program (Program Store):*** Approximately 10 words are required for the 1E5 generic program. Approximately 40 words are required for the 1E6 generic program.

(b) ***Fixed Parameters (Program Store):*** Two words are required. These words are shared with the EPSCS/ETS features.

B. Conditional

11.02 The memory requirements in paragraphs 11.03 through 11.05 are required only when the ACS feature is activated.

11.03 ***Optionally Loadable Feature Packages:*** Feature package sizes for 1E5 through 1E7 are presented below:

(a) ***1E5:*** The size of the feature package required for the ACS feature is as follows: ACS—1428 words loaded (1728 total).

(b) ***1E6:*** The size of the feature package required for the ACS feature is as follows: ACS—2156 words loaded (2304 total).

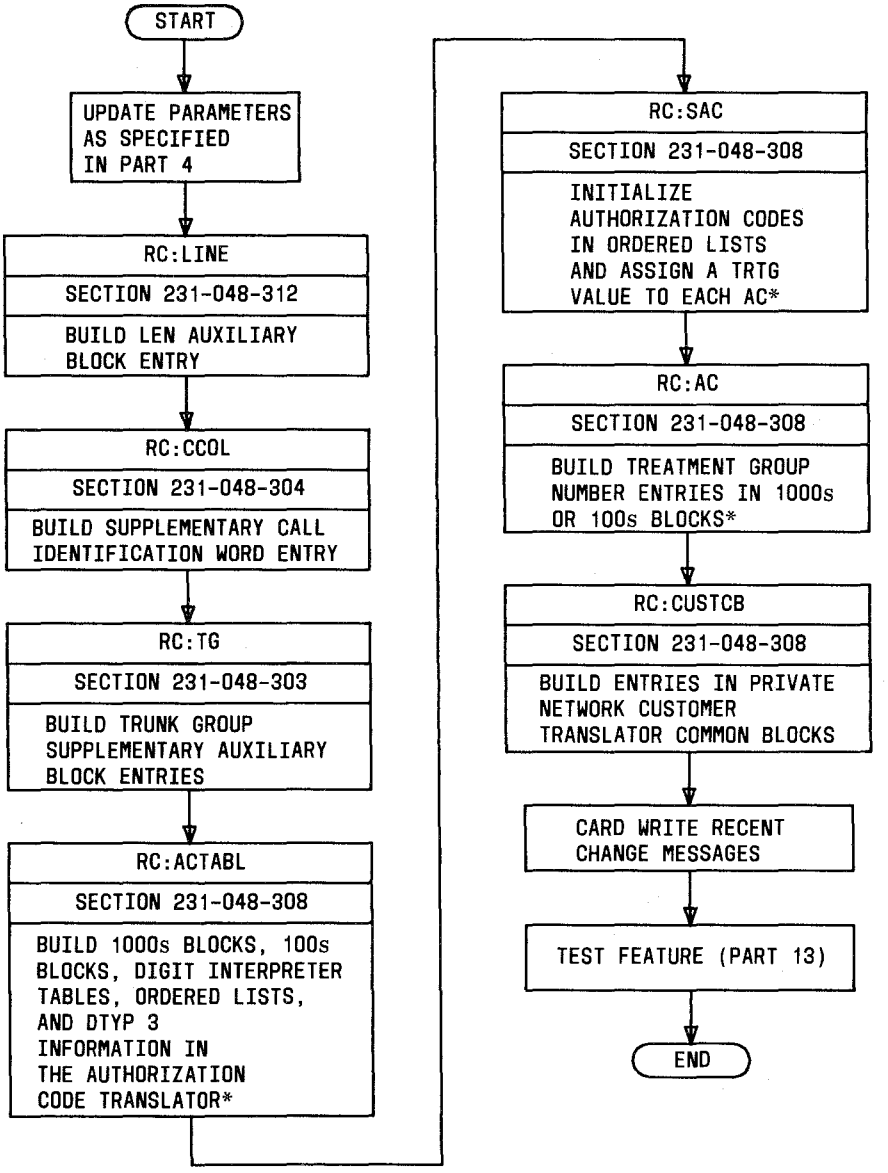
(c) ***1E7:*** The size of the feature package required for the ACS feature is as follows: ACS—2172 words loaded (2368 total).

11.04 ***Call Store:*** The requirements are as follows:

(a) Sixteen words are required for the customer identification table in the 1E5 generic programs. With the 1E6 and later generic programs, 64 words are required for the customer identification table.

(b) Forty-five words are required for the recent change indicator table in the 1E6 and later generic programs.

11.05 Additional feature packages required to support the ACS feature are detailed in Table B.



*ALWAYS USE THE RC-AC AND RC:SAC MESSAGES TO ASSIGN SPECIFIC TREATMENT GROUP VALUES WITHIN THE NEWLY BUILT THOUSANDS AND HUNDREDS BLOCKS AND ACs AND TRTGs WITHIN THE ORDERED LISTS BEFORE CARD WRITING. THIS WILL MINIMIZE RC REGISTER USAGE THEREBY MAXIMIZING DATA CREATED PER CARD WRITING.

Fig. 11—Procedure for Adding the Authorization Code Screening

Since these packages are shared by other features, care should be taken not to count these packages twice when determining total program store requirements.

C. Variable

11.06 The following ***translations (program store)*** memory is required only when the ACS feature is applied:

(a) One word is required in the LEN auxiliary block for each EPSCS trunk group with ACS.

(b) One chart column is required for each different authorization code entry pattern.

(c) One chart column is required for each different treatment.

(d) One word is required in the trunk group supplementary auxiliary block for each network access line or trunk group.

(e) The authorization code translator requires the following words:

(1) The authorization code head table is of variable length with a maximum length of 1025 words.

(2) Fifteen words are required for each digit interpreter table. Thus, for each ACI, one level takes 15 words, two levels take 30 to 165 words, and three levels take 45 to 1665 words.

(3) Two hundred and fifty words are required for each thousands block subtranslator.

(4) Twenty-five words are required for each hundreds block subtranslator.

(5) One word is required for each scattered authorization code in an ordered list. The ordered list is of variable length with a minimum of 2 words and a maximum of 1025 words.

(f) The private network customer translator requires the following words:

(1) The private network customer head table is of variable length up to 257 words.

(2) Thirty-six words are required for the customer common block. The maximum number of customer common blocks is 255.

11.07 The following procedures may be used to calculate additional memory requirements for consecutive or scattered authorization code assignments:

(a) Authorization codes to be assigned may be grouped into individual hundreds and thou-

TABLE B

AUTHORIZATION CODE SCREENING FEATURE LOADED PACKAGES

FEATURE GROUP	ACRONYM	FEATURE PACKAGE	PROGRAM STORE WORDS					
			1E5/1E6			1E7		
			LOADED	PATCH	TOTAL	LOADED	PATCH	TOTAL
9SEPSC	9FCCI	Customer Common Identification	1440	224	1664	2504	248	2752
9SIAC	9FRCAD	Increased RC Administration and Control	579	189	768	1205	329	1534
9SCLOG	9FCLOG	Printed Record of Customer Originated RC	590	114	704	1248	222	1470

sands blocks or ordered lists for each ACI. Compute memory requirements one ACI at a time as follows:

- 1 word for ACI into head table
- 25 words per hundreds block
- 250 words per thousands block
- Variable per ordered list (minimum 2 words, maximum 1025 words).

(b) Truncate the last two digits from the hundreds block codes and the last three digits from the thousands block codes (there should be no duplicate prefixes remaining). Computation is complete at this point if no prefixes remain. If prefixes remain, the following words must be added:

- 15 words (digit interpreter level 1)
- 15 words (digit interpreter level 2) for ***each*** different first digit which is not the last digit in the prefix
- 15 words (digit interpreter level 3) for ***each*** different first 2-digit number of a prefix.

Table C is an example showing memory computation for consecutive authorization code assignments.

(c) Truncate the portion of scattered codes that are to be stored in the ordered lists. The remaining portion of the code is the prefix. Table D is an example showing memory computation for scattered authorization code assignments.

REAL TIME IMPACT

11.08 The processor time required for a typical 3- to 6-digit authorization code with a screening code is as follows:

3-digit	1700 cycles

TABLE C

EXAMPLE OF MEMORY COMPUTATION FOR CONSECUTIVE AUTHORIZATION CODES ASSIGNMENTS

EXAMPLE		CALL STORE COMPUTATION		
ACI	AUTHORIZATION CODES	1	(ACI)	51 (Subtotal)
				15 (Digit Interpreter Level 1)
17	8XX	25	(100's)	66 Total
	9XX	25	(100's)	
		51	Subtotal	
		1	(ACI)	326 (Subtotal)
				15 (Digit Interpreter Level 1)
20	623XX	25	(100's)	30 (Digit Interpreter Level 2)
	724XXX	250	(1000's)	30 (Digit Interpreter Level 3)
	8XX	25	(100's)	401 Total
	9XX	25	(100's)	
		326	Subtotal	
		1	(ACI)	301 (Subtotal)
				15 (Digit Interpreter Level 1)
21	1XX	25	(100's)	15 (Digit Interpreter Level 2)
	32XX	25	(100's)	15 (Digit Interpreter Level 3)
	386XX	250	(1000's)	346 Total
		301	Subtotal	

TABLE D

EXAMPLE OF MEMORY COMPUTATION FOR SCATTERED AUTHORIZATION CODES ASSIGNMENTS

EXAMPLE			CALL STORE COMPUTATION
ACI	ACS	PREFIX	
31	4237	4	1 (ACI)
	4898		7 (Number of codes stored
	4899		+ 1)
	4917		15 (Digit interpreter
	4989		__ level 1)
	4995		23 Total
33	10017	1	1 (ACI)
	10020		
	10926		6 (Codes stored + 1
	14886		for prefix 1)
	15429		3 (Codes stored + 1
	24001	24	for prefix 24)
	24692		
	25318	25	5 (Codes stored + 1
			for prefix 25)
	25461		15 (Digit interpreter
	25980		level 1)
	25990		15 Digit interpreter
			__ level 2
			45 Total

4-digit 2100 cycles

5-digit 2200 cycles

6-digit 2300 cycles.

Note that this is in addition to the average base EPSCS call of 6900 cycles with 1E5 and 7600 cycles with 1E6.

11.09 The processor time required for a typical 3- to 6-digit scattered authorization code with a screening code is shown in Table E. This processor time is in addition to the processor time required for the base call.

11.10 The cycle time for No. 1 ESS is as follows: 5.5 microseconds (0 percent speedup), 5.24 microseconds (5 percent speedup), or 5.0 microseconds (10 percent speedup). Clock speedup is available with 1E7 and base restarts of the 1E6 generic programs.

12. DATA ASSIGNMENTS AND RECORDS

TRANSLATION FORMS

12.01 The following ESS translation forms, detailed in reference C(1) in Part 18, are applicable to the ACS feature:

(a) ESS 1101—Directory Number Record

(b) ESS 1119—Authorization Code Digit Interpretation

(c) ESS 1120—Customer ID Record

(d) ESS 1125—Scattered Authorization Code Ordered List Record

TABLE E

SCATTERED AUTHORIZATION CODES—CYCLES

TYPE OF CALL	CYCLES
Authorization Code—3-digit	1390
Authorization Code—4-digit	1755
Authorization Code—5-digit	1770
Authorization Code—6-digit	1810

(e) ESS 1216—Trunk Group Supplementary Record

(f) ESS 1304—Rate and Route Chart.

RECENT CHANGES

12.02 The following recent change messages are affected by the ACS feature. For details, see references A(1) through A(4) in Part 18.

RC MESSAGE	FUNCTION
RC:LINE	Keyword MSGD sets the bit in the line equipment number auxiliary block indicating MSGD records to the customer.
RC:CCOL	Keyword AC sets the bit in the SCIW requiring an authorization code.
RC:TG	Keyword ACI identifies the ACI for authorization codes received over the trunk group. Keyword CUSTID inputs the customer identification number.
RC:ACTABL	This message builds the digit interpreter tables and the hundreds and thousands blocks. This information is specified by keywords ACI, DGS, DI, HB, TB, TRTG, NDIGS, and PACI. Two keywords have been added to the RC:ACTABL message for the 1E6 generic program. Keyword NSAC builds an ordered list for the specified number of stored authorization codes. Keyword NSD specifies the number of stored digits in each code in the ordered list.
RC:SAC	This message initializes authorization codes in ordered lists and assigns a TRTG value to each code. This message can also be used to change individual code or TRTGs after the list is completely initialized.
RC:AC	This message is used to insert or change the TRTG number entries in the thousands or hundreds blocks with keywords ACI, DGS, L, and T.
RC:CUSTCB	This message is used to build the private network customer common block entries for the private network customer translator with keywords CUSTID, RI, TRTG, NPAT, and SLEN.

13. TESTING

13.01 Teletypewriter input and output messages given in references B(1) and B(2) in Part 18 can be used to verify the ACS feature. The messages are:

(a) The VFY-LEN message verifies the MSGD item in the line equipment number auxiliary block. System response is a TR03 output message.

(b) The VFY-TKGN message verifies the trunk group and returns the address of the supplementary trunk group auxiliary block. The T-READ message verifies the ACI and CUSTID items in the supplementary trunk group auxiliary block. System response is a TW02 output message.

(c) The V-ACS message verifies the contents of the authorization code translator for each code. System response is a TR68 output message.

(d) The VFY-OFFC message verifies the authorization code item assignment in the SCIW. System response is a TR04 output message.

(e) The V-CUSTID message verifies the contents of the CUSTID auxiliary block. System response is a TR67 output message. Use VF:CUST with 1E7 and later generic programs.

(f) The VFY-ACBLK-T message verifies a block of authorization codes and their associated TRTGs. System response is a multiple number (up to 128) of TR79 messages which print the codes and their TRTGs.

(g) The VFY-ACBLK-B message verifies a block of scattered authorization codes and the change boundaries for each code. System response is a multiple number (up to 256) of TR80 messages which print the code change boundaries for each code in the list.

13.02 The ACS feature may be tested in two steps: (a) verify that requests from the CNCC are acted upon, and (b) verify that customer originated calls can be made.

13.03 The following requests may be initiated at the CNCC:

(a) Request the TRTG of an authorization code.

(b) Request the most confining bounds of an authorization code.

(c) Request all valid local or portable authorization code prefixes.

(d) Request all authorization codes and TRTGs for a specific prefix.

(e) Request the treatment(s) of the TRTG(s).

13.04 Authorization code calls may be made to other customer stations outside of the EPSCS switch using portable codes or local codes. Recall dial tone should be heard after dialing the called number and is an indication to dial the code. Calls must also be made using invalid portable codes and local codes. When an invalid code is dialed, an indication (either 120 ipm or recording) is received.

13.05 Additional test information for the ACS feature is contained in reference A(10) in Part 18.

14. OTHER PLANNING TOPICS

A. Consecutive Authorization Codes

14.01 Authorization codes to be available to each customer must be specified so that the system can make them available on a block basis. The TRTG assigned to each code must be specified. The codes may represent extension numbers, case or account numbers, or any identifier desired by the customer. The only restriction is that the codes must be assigned in blocks of a hundred or a thousand consecutive codes (in which only the last two or three digits, respectively, vary).

B. Portable Authorization Codes

14.02 If a customer wants portable codes, the customer must select a set of first digits and/or first two digits and/or first three digits that will be used only for portable codes. For efficient use of memory, a set of (one or more) first digits should be selected.

C. Scattered Authorization Codes

14.03 The scattered authorization code option provides for arbitrarily chosen codes to be stored in ordered lists which may vary in length from 1 through 1024 words. Authorization codes are stored one per word in ascending but not necessarily consecutive order, ie, they can be scattered. If specified by the customer, the ordered lists may be consecutive or nearly consecutive to emulate the hundreds and thousands block consecutive code option.

ADMINISTRATION

15. MEASUREMENTS

15.01 Not applicable.

16. CHARGING

AUTOMATIC MESSAGE ACCOUNTING

16.01 Not applicable.

UNIFORM SERVICE ORDER CODES (USOCs)

16.02 Refer to the AT&T USOC manual or contact the local telephone company USOC coordinator.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

Authorization Code—A 3- through 6-digit dialed code required on certain calls in an EPSCS network, used for screening and/or identification of individuals, groups, or projects.

Customer Network Control Center (CNCC)—A dedicated facility located on customer premises. The CNCC allows the customer to monitor and control the network use and cost. The CNCC can be used to exercise control of some network operations and to obtain usage and status information automatically on demand.

Customer Service Administrative Control Center (CSACC)—A shared, centrally-located facility used by the telehone companies and Long Lines to monitor and control the operation of all EPSCS networks. The CSACC serves as a single maintenance contact point for customers; it responds to all problems and questions related to service operations. From this location, all network installation and rearrangement activity is controlled. Customer service administrative control center personnel direct network testing and maintenance activity and, with the use of automated equipment, perform many of the routine transmission tests for the Bell System provided facilities.

Customer Identification (CUSTID)—The CUSTID item is a customer identification, and is unique for the entire country for EPSCS. Customer identification is required since a given ESS switch may service more than one EPSCS customer.

Direct Access Lines (DAL)—Four-wire connections directly to individual telephone stations, key telephone stations, or voice-frequency data sets. The stations will normally be remotely located with respect to the switch and connected on the trunk link network via a carrier system.

Enhanced Private Switched Communications Service (EPSCS)—A private network of dedicated facilities providing full duplex communication on all connections.

Message Detail (MSGD)—Item in the SLEN translator indicating 100 percent MSGD; that is, a MSGD is sent to CNCC for every incoming call over the trunk group. The MSGD indicator is valid only when the major class is 28, 33, 34, or 35. This feature must be used if ACs are used.

Portable Authorization Code—Portable codes have the same meaning throughout the network as contrasted with local codes which may differ in validity and meaning at different switches or ALGs.

Recall Dial Tone—Three short bursts of tone (100 ms on, 100 ms off) followed by steady dial tone. Used to request the caller to dial an authorization code.

Treatment Group (TRTG)—Treatment groups 1 through 31 (TRTG 0 invalid) are assigned to an authorization code. Each customer has this set of TRTGs at each switch (different customers at the same switch can have different sets, and each one can have different sets at different switches).

18. REFERENCES

18.01 The following documentation contains information related to or affected by the ACS feature.

A. Bell System Practices

(1) Section 231-048-303—CCIS, CFTRK, TG, TGBVT, TGMEM, TKCONV, and TRK, Trunk Translation Recent Change Formats (1E6/1AE6 and 1E7/1AE7 Generic Programs)—2-Wire No. 1 and No. 1A Electronic Switching Systems

(2) Section 231-048-304—ARS, CCOL, CHRGX, DITABS, DIGTRN, DNHT, IDDD, IWSA, NOCNOG, NOGRAC, RATPAT, RI, RLST, TDXD, and TNDM, Rate and Route Translation Recent Change Formats (1E6/1AE6 and 1E7/1AE7 Generic Programs)—2-Wire No. 1 and No. 1A Electronic Switching Systems

(3) Section 231-048-308—AC, ACTABL, CUSTCB, DALNK, DAMBI, DAMSK, DATER, ESCO, ESN, SAC, TCM, and TNESN Recent Change Formats (1E6/1AE6 and 1E7/1AE7 Generic Programs)—2-Wire No. 1 and No. 1A Electronic Switching Systems

(4) Section 231-048-312—ACT, CFV, LINE, MLHG, MOVE, MPTY, OBS, SCLIST, SIMFAC, TNESN, TWOPTY, and VSS, Line Recent Change Formats (1E6/1AE6 and 1E7/1AE7

Generic Programs)—2-Wire No. 1 and No. 1A Electronic Switching Systems

(5) Section 231-061-450—Program Stores, Network Switching Engineering—No. 1 Electronic Switching System

(6) Section 231-061-460—Call Stores, Network Switching Engineering—No. 1 Electronic Switching System

(7) Section 231-090-167—Basic Queueing for Trunks and Lines Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems

(8) Section 231-090-340—Selected Traffic Data to Customer Feature—2-Wire No. 1 and No. 1A Electronic Switching Systems

(9) Section 231-190-127—Enhanced Private Switched Communication Service Feature—2-Wire No. 1 Electronic Switching System

(10) Section 231-190-128—Meet-Me Conferencing Feature—Enhanced Private Switched Communication Service—2-Wire No. 1 Electronic Switching System

(11) Section 231-190-129—Network Trunk Queueing (NTTQ)—Enhanced Private Switched Communication Service—2-Wire No. 1 Electronic Switching System

(12) Section 231-190-130—Network Message Detail Recording Feature—Enhanced Private Switched Communication Service—2-Wire No. 1 Electronic Switching System

(13) Section 231-190-131—Interface With Customer Network Control Center Feature—Enhanced Private Switched Communication Service—2-Wire No. 1 Electronic Switching System

(14) Section 231-190-133—4-Wire Direct Access Line Feature—2-Wire No. 1 Electronic Switching System

(15) Section 231-190-134—Off-Network Calling Feature—Enhanced Private Switched Communication Service—2-Wire No. 1 Electronic Switching System

(16) Section 231-190-136—Interface With the Peripheral Data Storage Processor Feature—2-Wire No. 1 Electronic Switching System

(17) Section 231-104-305—Monitoring Recent Change Area— Customer Originated Recent Change (CORC)—2-Wire No. 1 Electronic Switching System.

B. Teletypewriter Input and Output Manuals

(1) Input Message Manual IM-1A001—2-Wire No. 1 Electronic Switching System

(2) Output Message Manual OM-1A001—2-Wire No. 1 Electronic Switching System.

C. Other Documentation

(1) Translation Guide TG-1A—No. 1 and No. 1A Electronic Switching Systems—2-Wire

(2) Office Parameter Specification PA-591001—No. 1 Electronic Switching System—2-Wire

(3) Parameter Guide PG-1—No. 1 Electronic Switching System—2-Wire

(4) Translation Output Configuration PA-591003 — No. 1 Electronic Switching System—2-Wire

(5) BISP 759-100-000—Subject Index—Central Office Equipment Engineering System (COEES)

(6) BISP 759-100-100—General Description—Central Office Equipment Engineering System (COEES).