ALTERNATE ROUTE SELECTION FEATURE

FEATURE DOCUMENT

ENHANCED PRIVATE SWITCHED COMMUNICATIONS SERVICE

2-WIRE NO. 1 "ESS*" SWITCH

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INTRODUCTION

1. GENERAL INFORMATION

SCOPE

1.01 This section contains descriptive information for the Alternate Route Selection (ARS) feature that is basically an integral part of the Enhanced Private Switched Communications Service (EPSCS) feature. This section is one of several sec-

tions that describe a collection of No. 1 ESS switch features, options, and/or capabilities that may be used when the EPSCS feature is provided. *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 Whenever this section is reissued, the reason for reissue will be stated in this paragraph.

FEATURE AVAILABILITY

1.03 At an EPSCS switch location, the ARS feature is available to an EPSCS customer with either the 1E5/1E6 generic program or the 1E7 generic program. From a user perspective, both versions of the ARS feature are identical. From an EPSCS switch perspective, the software structure used in providing the ARS feature is completely separate and different.

1.04 The 1E5/1E6 ARS feature or the 1E7 ARS feature is automatically loaded when the optional 9SEPSC feature group is provided. For the feature groups and feature packages associated with the EPSCS feature, see reference A(1) in Part 18.

> *Note:* In some user-oriented EPSCS documentation, the 1E5/1E6 ARS feature may commonly be referred to as Route Pattern Selection (RPS) feature. With the advent of the Electronic Tandem System (ETS) feature, using a No. 1 ESS switch or a No. 1A ESS switch, the RPS term was discontinued and substituted with the ARS term. This was done primarily for compatible terminology between the ETS and EPSCS feature using a No. 1 ESS switch.

2. DEFINITION/BACKGROUND

DEFINITION

2.01 The Alternate Route Selection (ARS) feature, with the 1E5/1E6 generic program, provides an EPSCS customer with up to three sets of on-network and off-network routing patterns. Any one of these routing patterns may be activated from the Customer Network Control Center (CNCC).

> *Note:* At an EPSCS switch, the three sets of on- and off-network routing patterns are re-

ferred to as base route pattern, alternate route pattern 1, and alternate route pattern 2. This combination of routing patterns requires three consecutive rate centers, and each rate center requires a 3-digit translator, plus a 6-digit translator per numbering plan area per alternate route.

2.02 The ARS feature, with the 1E7 generic program, provides more efficient use of rate centers and program store memory by limiting each EPSCS customer to one rate center, one 3-digit translator, and one 6-digit translator per numbering plan area.

BACKGROUND

2.03 The 1E7 ARS feature does not modify the 1E5/1E6 ARS capabilities in any way. The proposed changes only affect rate center and digit translation routines. The overall effects are transparent to call processing and customer status and control routines.

2.04 Translation data for the 1E5/1E6 ARS feature and the 1E7 ARS feature can coexist; however, only one or the other may be used for any one EPSCS customer. Retrofit of existing EPSCS customers' translations to the revised method is only necessary if there is a shortage of program store memory and/or rate centers within an EPSCS switching office. The rationale for the 1E7 ARS feature is as follows:

(a) If a need should arise to increase the maximum number of alternate routing patterns from the existing two to seven, this would increase rate center usage to eight per EPSCS customer. In a heavily-loaded EPSCS switching office, the projected number of EPSCS customers is thirteen (maximum). Therefore, if each EPSCS customer requests full alternate routing capabilities (13 customers x 8 rate centers) the 64 available rate centers within an office become exhausted.

(b) As rate centers are increased, the number of 3- and 6-digit translators must also be increased. Therefore, the program store memory required to provide full alternate routing capability becomes excessive.

DESCRIPTION

3. USER PERSPECTIVE

CUSTOMER

3.01 If an EPSCS customer subscribes to the ARS feature, an EPSCS switching office may provide the feature using either the 1E5/1E6 or the 1E7 generic program.

3.02 The only user operation associated with the ARS feature is that of specifying a desired pattern for call routing. The activation request is in the form of a data input message that can be initiated at any time from the CNCC. This data input message contains basic header information, the requested route pattern number, and the customer's identification (CUSTID) number. For detailed information on how to generate the data input message, refer to the CNCC User Operation Manual (when published).

3.03 At an EPSCS switching office, all processes of the data input message are automatic. No manual man-machine interface is involved. The sequential events are as follows:

(a) The CUSTID number within the data input message is verified against the CUSTID number stored within translation data. The CUSTID number is then used to access the CUSTID call store table where the current route pattern is stored.

(b) The current route pattern in use is overwritten with the requested route pattern number.

(c) The requested route pattern number and the base rate center number are added, and the resultant number is the active rate center index number into digit translations.

(d) Both the old and new route patterns are then routed (via a data output message) back to CNCC confirming the route pattern change.

TELEPHONE COMPANY

3.04 Refer to paragraph 2.04.

4. SYSTEM OPERATIONS

HARDWARE

4.01 Not applicable.

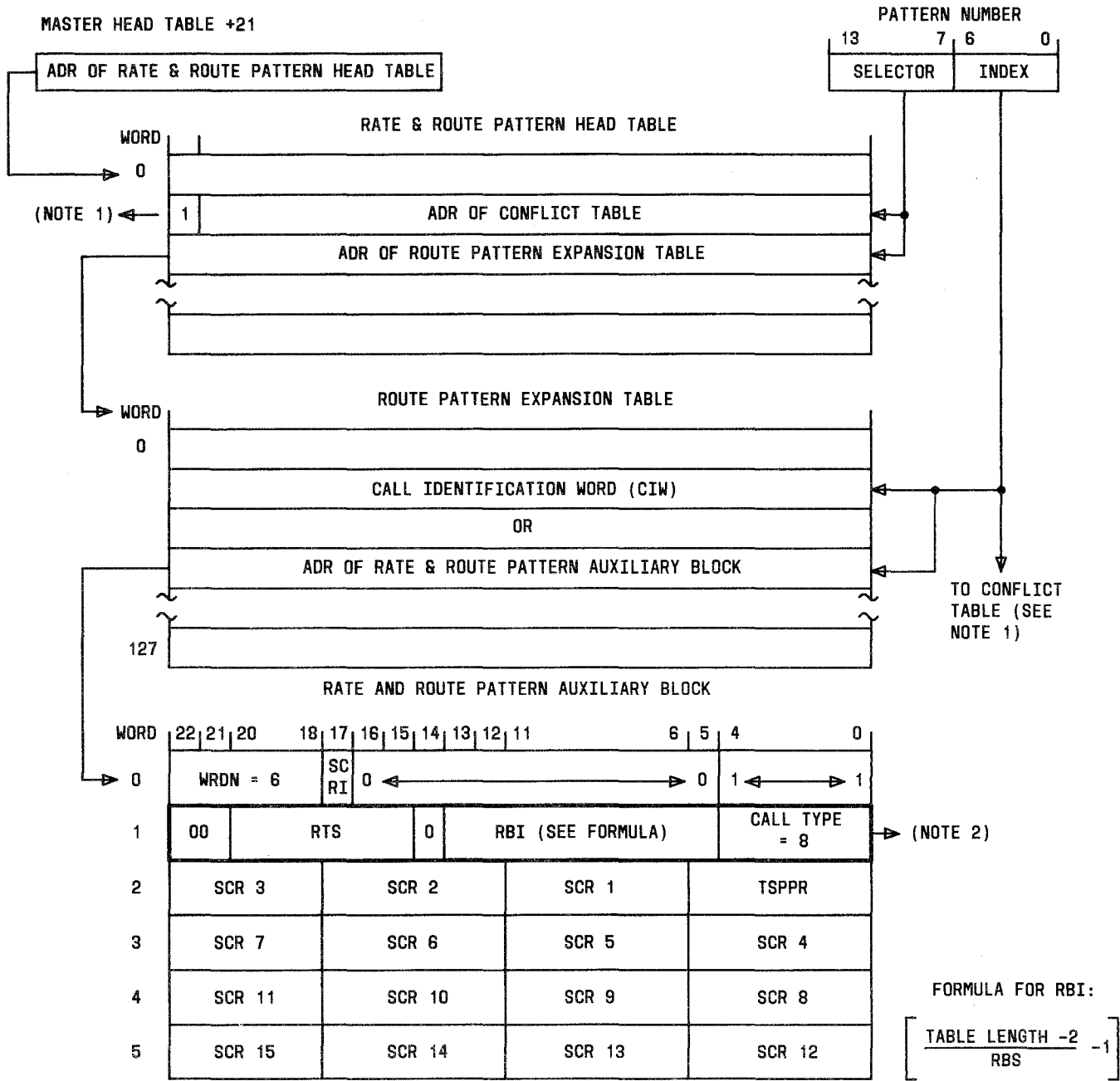#### OFFICE DATA STRUCTURES

A. Translations

4.02 If the ARS feature (1E7 generic program) is to be implemented, minor changes are required to existing translation data and a new translator must be added.

4.03 *Rate and Route Pattern (RRP) Table Translator:* This translator presently exists in the 1E5/1E6 generic program. It is changed to include a new call identification word (CIW) (call type = 8) which was previously unassigned (Fig. 1). The CIW (call type = 8) may be built as a separate primary translation word (PTW) or it may be included in word 1 of the RPAT auxiliary block. In either case, the word format is identical.

4.04 The call type = 8 CIW contains two translation items: route table selector (RTS) and routing block index (RBI). Both of these translation items are required when accessing the ARS translator.

4.05 *Alternate Route Selection (ARS) Translator:* This translator (Fig. 2) is added to store the base and alternate route patterns for an EPSCS customer's office codes requiring ARS. The overall structure of the ARS translator consists of a 65-word head table and a 511-word alternate route pattern table. Access into the 63-word head table is via an address, when indexed by the RTS translation item which was added to the call type = 8 CIW.

4.06 Conceptually, the alternate route pattern table stores the rate and route patterns (RRPs) in blocks. Each block can range from 2 to 8 RRPs per block. Access into a block of RRPs is via an address from the ARS head table, when indexed by the resultant number derived from the following formula: [INDEX = 1 + (RBS x RBI) + RPAT]. The RPAT value in this formula is retrieved from a CUSTID call store table utilizing the CUSTID translation item stored in word zero of the table. Once a block of RRPs is located, the active RPAT in effect is used to retrieve a single RRP. The single RRP is then

MASTER HEAD TABLE +21

PATTERN NUMBER

13	7	6	0
SELECTOR		INDEX	

ADR OF RATE & ROUTE PATTERN HEAD TABLE

RATE & ROUTE PATTERN HEAD TABLE

WORD

0

(NOTE 1) ◄── | 1 | ADR OF CONFLICT TABLE |

ADR OF ROUTE PATTERN EXPANSION TABLE

ROUTE PATTERN EXPANSION TABLE

WORD

0

CALL IDENTIFICATION WORD (CIW)

OR

ADR OF RATE & ROUTE PATTERN AUXILIARY BLOCK

TO CONFLICT
TABLE (SEE
NOTE 1)

127

RATE AND ROUTE PATTERN AUXILIARY BLOCK

WORD	22	21	20	18	17	16	15	14	13	12	11	6	5	4	0
0	WRDN = 6				SC RI	0 ◄──────────────────► 0								1 ◄────► 1	
1	00	RTS				0	RBI (SEE FORMULA)							CALL TYPE = 8		(NOTE 2)
2	SCR 3		SCR 2			SCR 1					TSPPR				
3	SCR 7		SCR 6			SCR 5					SCR 4				
4	SCR 11		SCR 10			SCR 9					SCR 8				
5	SCR 15		SCR 14			SCR 13					SCR 12				

FORMULA FOR RBI:

$$\left[\frac{\text{TABLE LENGTH} - 2}{\text{RBS}} - 1 \right]$$

NOTES:
1. FOR SPECIFIC APPLICATIONS OF CONFLICT TABLE, SEE PA591003.
2. THIS WORD WAS ADDED BY THE 1E7 GENERIC PROGRAM FOR ALTERNATE ROUTE SELECTION. THIS
   WORD CAN ALSO APPEAR (SAME FORMAT) AS A PRIMARY TRANSLATION WORD (PTW), IF REQUIRED.

LEGEND:
RBI = ROUTING BLOCK INDEX. RANGE (SEE FORMULA).
RBS = ROUTING BLOCK SIZE.
RTS = ROUTE TABLE SELECTOR. RANGE = 1 TO 63.
SCRI = SCREENING INDEX INDICATOR.

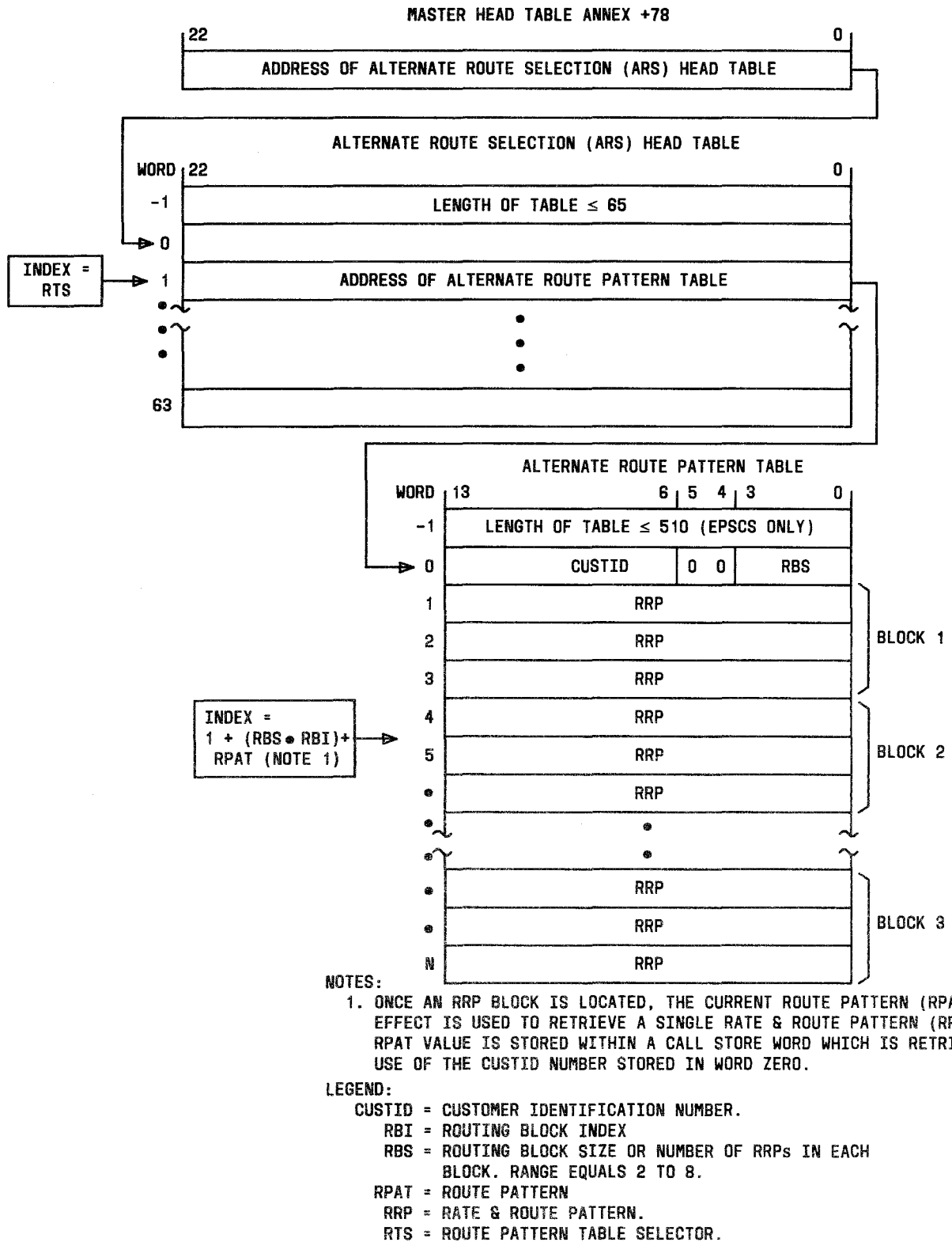Fig. 1—Rate and Route Pattern Translator Structure (1E7 Generic Program)

MASTER HEAD TABLE ANNEX +78

22	0
ADDRESS OF ALTERNATE ROUTE SELECTION (ARS) HEAD TABLE	

ALTERNATE ROUTE SELECTION (ARS) HEAD TABLE

WORD

22		0
-1	LENGTH OF TABLE ≤ 65	
0		
1	ADDRESS OF ALTERNATE ROUTE PATTERN TABLE	
63		

INDEX = RTS

ALTERNATE ROUTE PATTERN TABLE

WORD

13		6	5	4	3		0	
-1	LENGTH OF TABLE ≤ 510 (EPSCS ONLY)							
0	CUSTID		0	0	RBS			
1	RRP							BLOCK 1
2	RRP							
3	RRP							
4	RRP							BLOCK 2
5	RRP							
•	RRP							
•	RRP							BLOCK 3
•	RRP							
N	RRP							

INDEX =
1 + (RBS • RBI)+
RPAT (NOTE 1)

NOTES:
1. ONCE AN RRP BLOCK IS LOCATED, THE CURRENT ROUTE PATTERN (RPAT) IN EFFECT IS USED TO RETRIEVE A SINGLE RATE & ROUTE PATTERN (RRP). THE RPAT VALUE IS STORED WITHIN A CALL STORE WORD WHICH IS RETRIEVED BY USE OF THE CUSTID NUMBER STORED IN WORD ZERO.

LEGEND:
CUSTID = CUSTOMER IDENTIFICATION NUMBER.
RBI = ROUTING BLOCK INDEX
RBS = ROUTING BLOCK SIZE OR NUMBER OF RRPs IN EACH BLOCK. RANGE EQUALS 2 TO 8.
RPAT = ROUTE PATTERN
RRP = RATE & ROUTE PATTERN.
RTS = ROUTE PATTERN TABLE SELECTOR.

Fig. 2—Alternate Route Selection (ARS) Translation Structure (1E7 Generic Program)

expanded to produce a specific route index (RI) number.

4.07 In the 1E5/1E6 generic program, the CUSTID number stored in the number group number to rate center (NGN-to-RAC) translator is used to retrieve an active RPAT. In the 1E7 generic program, the CUSTID number stored in word zero of the alternate route pattern table is used. The CUSTID number in the NGN-to-RAC translator should not be present when ARS is provided by the 1E7 generic program.

4.08 *Digit Translators:* The 1E7 ARS feature limits each EPSCS customer to one rate center, one 3-digit translator, and one 6-digit translator per numbering plan area. This arrangement reduces the 3- and 6-digit translations required.

B. Parameters/Call Store

4.09 There are no added or modified parameters/ call store requirements for the ARS feature with the 1E7 generic program. However, the CUSTID call store table (Fig. 3) is still used. This table stores the active RPAT value which is retrieved by the CUSTID number. The RPAT value is customer-changeable via an input data message from the CNCC. Once an RPAT value is retrieved, it is added to the base rate center number to determine the active rate center.

FEATURE OPERATION

A. General

4.10 The ARS feature operation with the 1E7 generic program is similar to that of the ARS feature operation used with the 1E5/1E6 generic program. The basic differences are the processes used during digit analysis and the method(s) used to obtain specific call routing information. This feature operation is limited to these two respective areas. The processes and routines that are utilized for initial call screening and called digit collection are not included. Both an on-network (7-digit) call and an off-network (10-digit) call are discussed.

B. On-Network (7-Digit) Call

4.11 For an on-network call, the dedicated 3-digit translator is accessed by an address from the 3/6-digit head table when indexed by the active rate center number (Fig. 4).

4.12 The RRP information selected from the dedicated 3-digit translation is expanded to specific routing information within a CIW. This expansion is in the form of an RI number. Once an RI number is located, the on-network call is processed in the normal manner.

C. Off-Network (10-Digit) Call Using ARS

4.13 For an off-network call using ARS, the RRP information selected from the dedicated 3-digit translation expands to either of the following:

(a) A CIW (call type = 8) (Fig. 1)

(b) An RRP auxiliary block translator containing the CIW (call type = 8) (Fig. 1)

(c) A CIW, containing a foreign area translator (FAT) number [see reference C(3) in Part 18]

(d) A CIW, containing a toll foreign area indicator (TFAI) number [see reference C(3) in Part 18].

4.14 If a CIW containing a FAT or TFAI number is found, a 6-digit translation is performed. The RRP information from the dedicated 6-digit translation expands to either of the following:

(a) A CIW (call type = 8) (Fig. 1)

(b) An RRP auxiliary block translator containing the CIW (call type = 8) (Fig. 1).

4.15 The CIW (call type = 8) contains two translation items (RTS and RBI) which are used to select a block of RRPs from the ARS translator shown in Fig. 2. Selection of a single RRP from the block of RRPs is dependent on which RPAT is currently in effect. The RPAT in effect is retrieved from a customer-changeable call store table (Fig. 3) with the CUSTID number stored in word zero of the alternate RPAT table. The RPAT value retrieved from the call store table determines which RRP in the block of RRPs is to be used. The selected RRP is then expanded by a CIW which contains an RI number.

D. Off-Network (10-Digit) Call Without ARS

4.16 For an off-network call which does not use the ARS feature, the RRP information from the 3-digit or 6-digit translation expands to routing information in the form of an RI number.

Fig. 3—Parameter Word F4CUST—Program Store Word and Call Store Word Layout
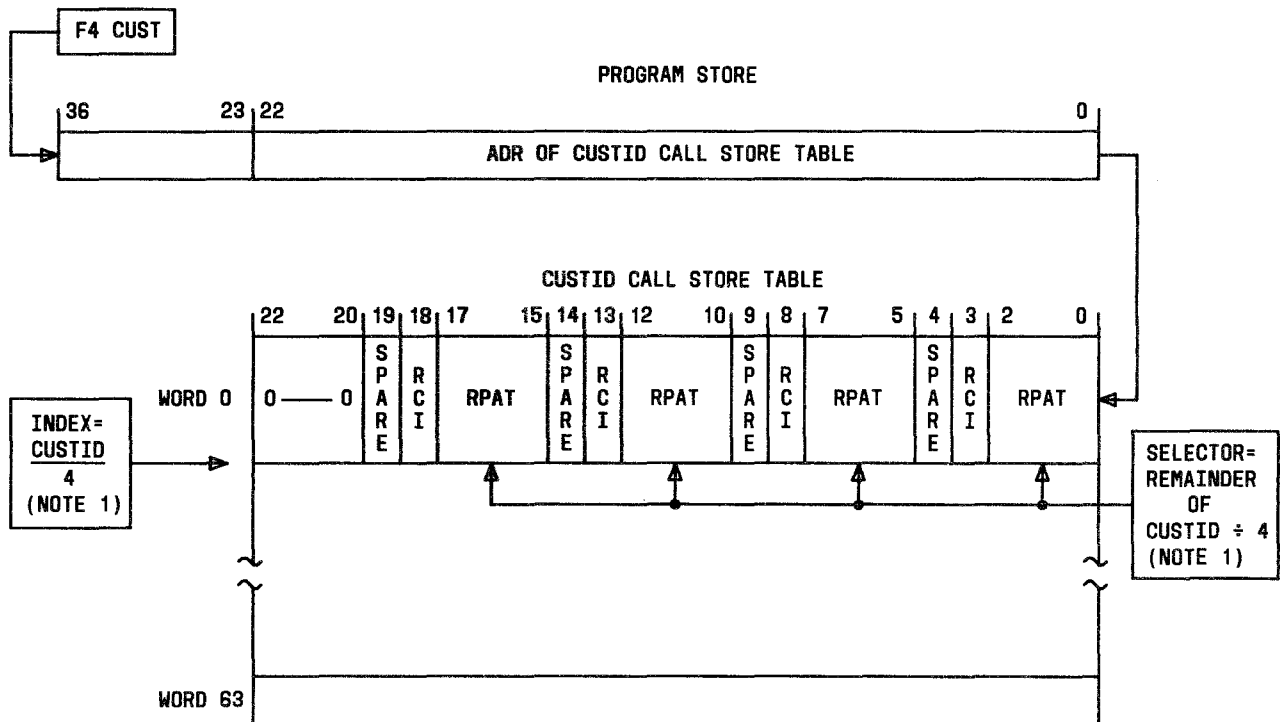
NOTES:
   1. WITH THE 1E5/1E6 GENERIC PROGRAM, THE CUSTID NUMBER USED IS STORED IN THE NUMBER GROUP NUMBER TO RATE CENTER (NGN-TO-RAC) TRANSLATOR. WHEN THE ARS FEATURE IS PROVIDED WITH THE 1E7 GENERIC PROGRAM, THE CUSTID NUMBER USED IS STORED IN THE ALTERNATE ROUTE PATTERN TABLE. THE CUSTID NUMBER DIVIDED BY FOUR LOCATES THE WORD NUMBER. THE REMAINDER FROM THIS CALCULATION DETERMINES THE ROUTE PATTERN (RPAT) FIELD SELECTED WITHIN THE WORD.

LEGEND:

   CUSTID = CUSTOMER'S IDENTIFICATION NUMBER.

   RCI = RECENT CHANGE INDICATOR. THIS RCI IS SET IF RECENT CHANGES FOR THE EPSCS HEAD TABLE EXISTS. THIS ITEM IS USED BY SYSTEM AUDIT AND IS UNRELATED TO THE RPAT FIELD.

   RPAT = ROUTE PATTERN. THE RPAT FIELD IS THE ITEM CHANGED VIA AN INPUT DATA MESSAGE FROM THE CNCC. THE VALUE OF RPAT (0, 1, 2) IS ADDED TO THE BASE RATE CENTER NUMBER (RCNO) TO INDICATE THE CURRENT ACTIVE RATE CENTER. THE RPAT VALUE COULD BE (0-7), BUT IS LIMITED (BY TARIFF) TO 0, 1, OR 2.

4.17 Once an RI number is located, the off-network call is processed in the normal manner.

E. **Chart Column Screening**

4.18 The 1E7 ARS feature does not preclude the use of screening codes. Call screening can be per-formed whenever an RRP is expanded, or as often as three times.

4.19 The RRP auxiliary block translator (Fig. 1) contains the screening indicator (SCRI) and the various screening code indicators (SCR 1 through SCR 15). The SCRI item in word zero is set equal to one whenever screening codes exist.

```
                  3/6-DIGIT
                  HEAD TABLE          3-DIGIT XLTR
                  |22          0|     |13      0|
                  |            |      |  RRP    |  ──→ ⟩⟨ ─→  | CIW          |
                  |            |      |  RRP    |             | RI OR RL     |
  INDEX=RAC ─→    | ADR (3-DIGIT XLTR)| ──→     |  RRP    |
                  |            |      |  RRP    |
                  |            |      |  RRP    |  ──→ ⟩⟨ ─→  | CIW          |
                  |            |      |         |             | FAT OR TFAI  |
                  |            |      |         |
                  |            |      |  RRP    |  ──→ ⟩⟨ ─→  | CIW          |
                  |            |      |   •     |             | CALL TYPE=8  |
                  |            |      |   •     |

                                      6-DIGIT XLTR
                                      |13      0|
  INDEX=FAT ─→    | ADR (6-DIGIT XLTR)|──→      |  RRP    |  ──→ ⟩⟨ ─→  | CIW          |
  OR TFAI NO.     |            |      |  RRP    |             | RI OR RL     |
                  |            |      |  RRP    |  ──→ ⟩⟨ ─→  | CIW          |
            255   |            |      |   •     |             |    CALL TYPE |
                                      |   •     |             |          =8  |
```
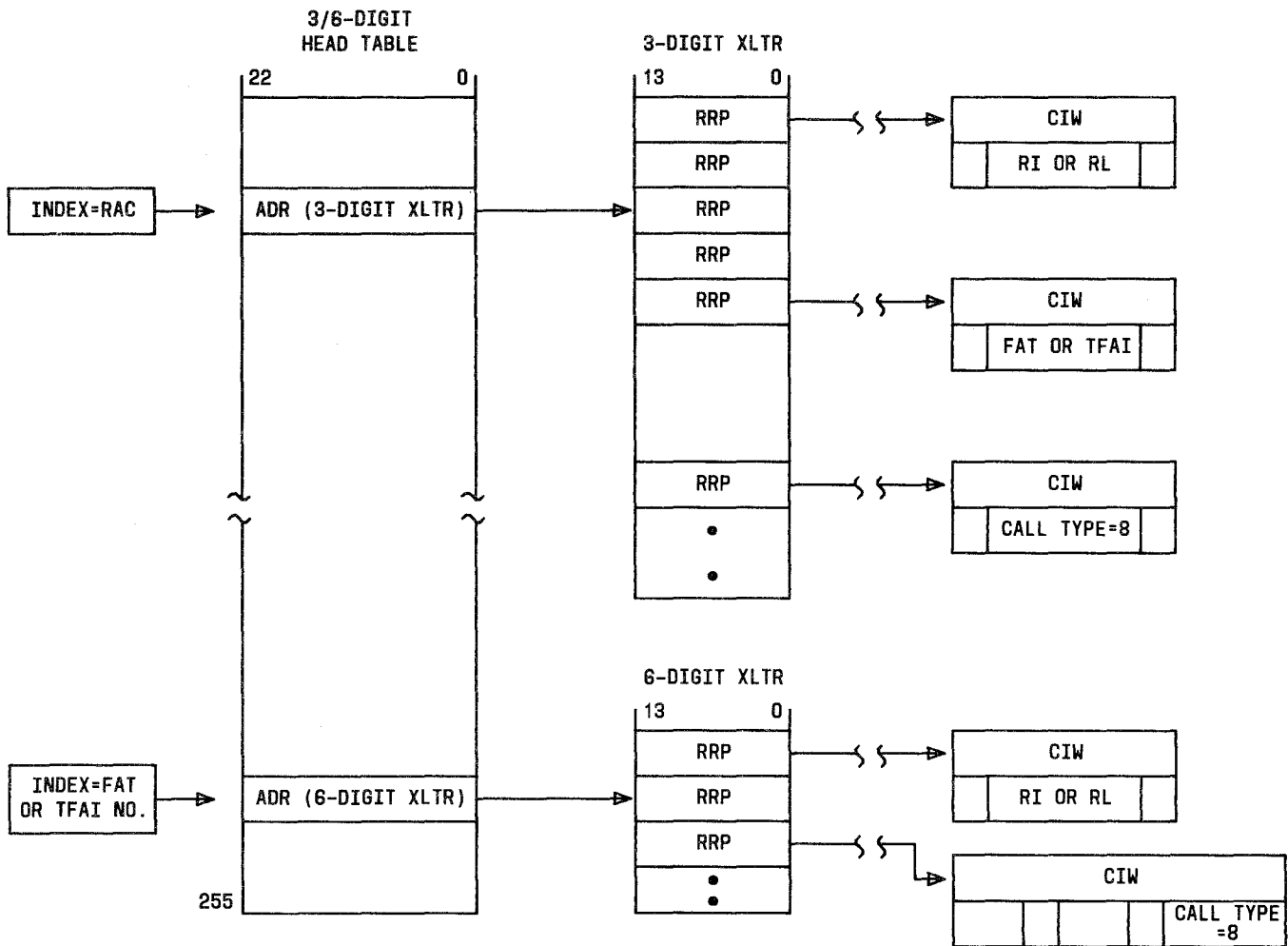
LEGEND:

```
   CIW  = CALL IDENTIFICATION WORD
   FAT  = FOREIGN AREA TRANSLATOR NUMBER
    RI  = ROUTE INDEX
    RL  = ROUTE LIST
   RAC  = RATE CENTER
   RRP  = RATE & ROUTE PATTERN
  TFAI  = TOLL FOREIGN AREA INDICATOR
  XLTR  = TRANSLATOR
```

Fig. 4—Overall Translation Structure for ARS With 1E7 Generic Program

CHARACTERISTICS

5. FEATURE ASSIGNMENT

5.01 The 1E7 ARS feature is assigned on a per EPSCS customer basis in EPSCS switching offices having the 1E7 generic program installed.

6. LIMITATIONS

OPERATIONAL

6.01 Not applicable.

ASSIGNMENT

6.02 The 1E7 ARS feature limits each EPSCS customer to one rate center, one 3-digit translator, and one 6-digit translator per numbering plan area.

7. INTERACTIONS

7.01 Not applicable.

8. RESTRICTION CAPABILITY

8.01 The number of route patterns available to an EPSCS customer with the ARS feature may be restricted by tariff to one base pattern, plus two alternate route patterns. The total number of route patterns that may be made available to one EPSCS customer is seven. The actual number of route patterns subscribed to is stored in translation data.

INCORPORATION INTO SYSTEM

9. INSTALLATION/ADDITION/DELETION

9.01 See reference A(2) in Part 18 for the recent change (RC) implementation procedures associated with the ARS feature. Once the ARS feature is installed, refer to Part 13 for testing.

9.02 There are no set cards that must be inputted or updated as a result of the ARS feature available with the 1E7 generic program. The set cards that apply to the basic EPSCS feature (1E5 generic program) or the expanded EPSCS feature (1E6 generic program) are required.

10. HARDWARE REQUIREMENTS

10.01 Not applicable.

11. SOFTWARE REQUIREMENTS

MEMORY

A. Fixed

11.01 The *base generic program (program store)* memory required whether or not the ARS feature is used is approximately 225 words.

B. Conditional

11.02 With the 1E7 ARS feature approximately 225 words have been added to the 9FCCI feature package.

C. Variable

11.03 The following *translations (program store)* are required when the 1E7 ARS feature is applied.

(a) One word is required in the RRP table translator to build the CIW (call type = 8).

(b) A total of 578 words are required to build the ARS translator (Fig. 2).

REAL-TIME IMPACT

11.04 The 1E7 ARS feature has negligible impact on the number of cycles required to complete a network call.

11.05 Cycle times for the No. 1 ESS switch are as follows: 5.5 microseconds (0 percent or no speedup) or 5.0 microseconds (10 percent speedup).

12. DATA ASSIGNMENTS AND RECORDS

TRANSLATION FORMS

12.01 The following translation forms, detailed in reference C(4) in Part 18 are affected by the 1E7 ARS feature.

(a) *ESS 1305—Rate and Route Pattern Record:* This form is used to record the routing block index (RBI) and the private network alternate route pattern table number associated with the ARS feature. This form may also be used for recording screening codes.

(b) *ESS 1325A/B—Private Network Alternate Route Pattern Table Record:* This form is used to build the base and alternate route patterns for an EPSCS customer's office codes requiring ARS.

RECENT CHANGES

12.02 If the 1E7 ARS feature is adopted for use, the following recent change (RC) messages are used.

RC MESSAGE	FUNCTION
RC:SUBTRAN	Used to build and link alternate route pattern table to ARS head

RC MESSAGE	FUNCTION
	table. See reference A(2) in Part 18 for keywords and entire message format.
RC:ARS	Used to build the data in the alternate route pattern table (built by RC:SUBTRAN). See reference A(2) in Part 18 for keywords and entire message format.
RC:RATPAT	Used to build the data necessary to access a particular RRP block in the alternate route pattern table. See reference A(2) in Part 18 for keywords and entire message format.

13. TESTING

13.01 The teletypewriter input and output (I/O) messages listed below may be used to verify the ARS feature available with the 1E7 generic program.

(a) The V-ARP input message requests verification of the RRPs from a customer's alternate route pattern table. System response is a TR97 output message or a sequence of them.

(b) The VFY-OFFC input message requests verification of the CIW (call type = 8) data items if encountered for an office code.

(c) The VF-ROUTE input message, using the ARP keyword, allows verification of the data in the alternate route pattern table.

13.02 Test calls should be made to verify the ARS feature is routing network calls properly.

14. OTHER PLANNING TOPICS

14.01 Not applicable.

ADMINISTRATION

15. MEASUREMENTS

15.01 Not applicable.

16. CHARGING

16.01 Not applicable.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

17.01 Not applicable.

18. REFERENCES

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

A. Bell System Practices

(1) Section 231-190-127—Feature Document—Enhanced Private Switched Communications Service Feature

(2) Section 231-118-343—Enhanced Private Switched Communications Service (EPSCS II)—Recent Change Implementation Procedures (1E6 and 1E7 Generic Programs).

B. Teletypewriter Input and Output Message Manuals

(1) Input Message Manual IM-1A001

(2) Output Message Manual OM-1A001.

C. Other Documentation

(1) Office Parameter Specification PA-591001

(2) Parameter Guide PG-1

(3) Translation Output Configuration PA-591003

(4) Translation Guide TG-1A

(5) Translation Guide Interface Systems TG-IS.