FEATURE DOCUMENT

SINGLE DIGIT DIALING FEATURE

2-WIRE NO. 1 AND NO. 1A ELECTRONIC SWITCHING SYSTEMS

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FEATURE DEFINITION AND DESCRIPTION

1. DEFINITION/INTRODUCTION

DEFINITION

1.01 The *single digit dialing* feature permits business customer station users to reach any of a preselected group of stations or other internal facilities by dialing single digit codes.

1.02 The *digit timing code conflict* feature provides the ability to use conflicting, variable-length codes in a business customer group dialing plan to reach similar or different facilities.

1.03 The *override attendant access restriction* (OAR) option permits a business customer station user or attendant to use single digit codes to complete an intragroup call regardless of the originator's class of service.

INTRODUCTION

1.04 Single digit dialing can be used for special hotel/motel services such as room service, lounge, laundry, etc.

1.05 Digit timing code conflict can be used with the flexible numbering of stations feature in a hotel/motel environment to permit mixing of 2-, 3-, and 4-digit station codes with the same first and second digits to associate room extension numbers and room numbers; e.g., room 10 extension 10, room 100 extension 100, room 1000 extension 1000. Also, the code conflict feature may be used to assign 1-, 2-, and 3-digit access codes with the same first, second, etc., digits or assign access codes and extension numbers with the same first, second, etc., digits; e.g., digit 4 to reach single digit extension, digits 40 to reach dial dictation equipment, or digits 4000 for customer extension.

1.06 The override access code (OAR) option is used to allow the attendant or a station to complete a call to extensions accessed by single digit codes from which they would normally be restricted because of the method used to access those single digit codes in the ESS. (See 3.02.) Without OAR, the attendant and fully restricted stations would be denied access to single digit codes used for extensions such as lounge, valet, etc., in a hotel/motel environment or any other

business customer extension which the customer desired to reach using single digit codes.

2. USER PERSPECTIVE

CUSTOMER

Single Digit Dialing

2.01 When a customer with the single digit dialing feature dials a single digit code and no code conflict exists and the called station is idle, audible ringing tone is heard immediately. If a code conflict exists and the customer dials the # (number) digit after the single digit code as *an end of dialing* digit, audible ringing tone is heard immediately. (The # digit can be used only by customers equipped with TOUCH-TONE® calling.) If the # digit is not dialed, a 4- to 6-second delay occurs between the dialing of the single digit code and the receipt of audible ringing tone. When the called party answers, audible ringing tone is silenced and the two parties may converse. If the called station is busy, busy tone is heard instead of audible ringing tone.

Digit Timing Code Conflict

2.02 When a customer dials an access code or a station code for which a code conflict exists and then dials the # digit as an end-of-dial indication, either audible ringing tone or second dial tone is heard immediately. (The # digit can be used only by customers equipped for TOUCH-TONE calling.) If the # digit is not dialed after the code digits, a 4- to 6-second delay occurs between the dialing of the code digits and the receipt of the second dial tone or audible ringing tone. If a busy station or an all-circuits-busy condition is encountered, busy tone or overflow tone is heard instead of audible ringing tone or second dial tone, respectively.

Override Attendant Access Restriction (OAR)

2.03 The business customer attendant or a fully restricted station dials a single digit code to reach an intragroup business customer station. The call is completed as described in 2.01.

3. SYSTEM PERSPECTIVE

SOFTWARE DATA STRUCTURES

3.01 Figure 1 illustrates the translation required for the single digit dialing and code conflict features.

3.02 The single digit dialing feature uses a DTYP 6 word in the centrex digit interpreter tables to reach business customer stations on intracentrex calls that would usually be reached by dialing normal length station codes. If no code conflict exists, the final data DTYP 6 is shown in the first level digit interpreter table. (See Fig. 1.) If a code conflict exists, a DTYP 1 entry is used in the first level digit interpreter table to indicate timing for the next digit; the DTYP 6 entry is used in slot 12 of the second level digit interpreter table. The directory number (DN) in the DTYP 6 word may be any internal business customer group station. The OAR item in the DTYP 6 word must equal 1 to permit the business customer attendant(s) and fully restricted stations to terminate to internal stations using single digit dialing. The OAR item must equal 0 when the DTYP 6 word is used to terminate to the business customer attendant using a single digit code (normally 0).

3.03 The DTYP 1 word in the digit 4 slot in Fig. 1 is used to resolve a code conflict condition and indicates that 4- to 6-second critical timing is to be performed before collection of the next digit. If another digit is collected before the 4- to 6-second time-out, the digit interpreter program obtains the address of the next level digit
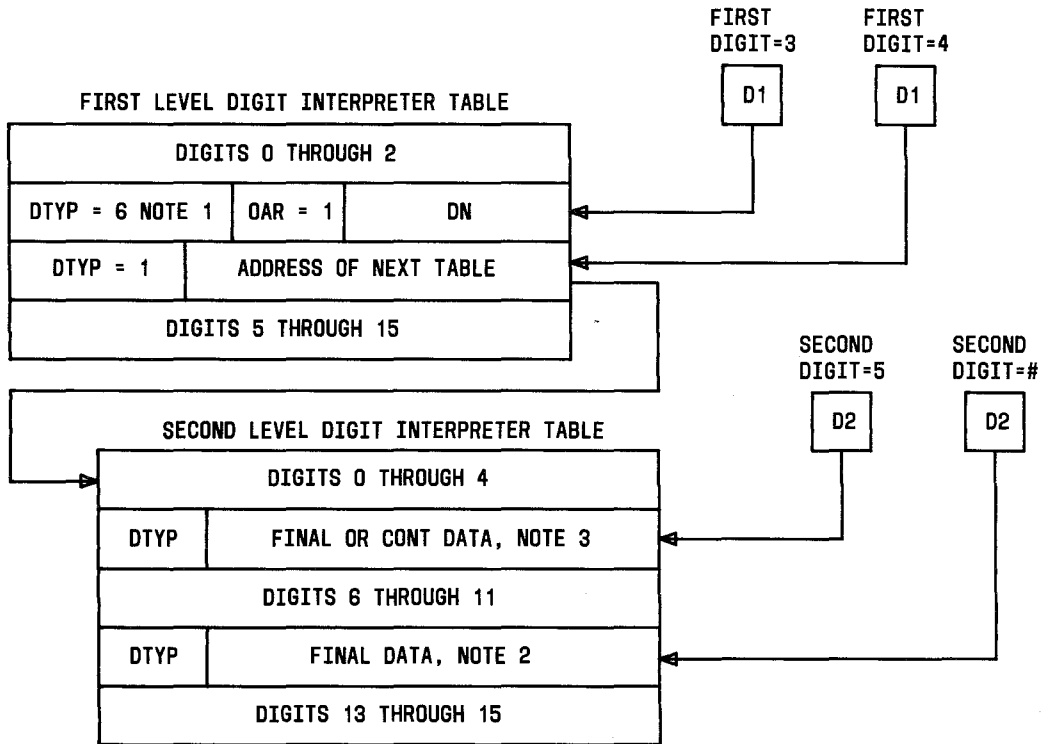
NOTES:
1. THE DTYP = 6 FINAL DATA IS FOUND IN FIRST LEVEL DIGIT INTERPRETER TABLE WHEN NO CODE CONFLICT EXISTS FOR SINGLE DIGIT CODES
2. THIS ENTRY MAY ONLY BE FINAL DATA (DTYP = 0-6). A DTYP = 1 OR DTYP = 7 MAY NOT BE USED
3. THIS ENTRY MAY BE FINAL DATA (DTYP = 0-6), OR DTYP = 1, OR CONTINUATION DATA (DTYP = 7)

Fig. 1—Centrex Digit Interpreter Table for Single Digit Dialing and Code Conflict Features—Typical

interpreter table from the DTYP 1 word, indexes into the next level digit interpreter table using the second digit dialed (digit 5 in Fig. 1), and proceeds in accordance with the data found in the digit 5 slot of the second level digit interpreter table. The next digit may be any digit 0 through 9, *, or #. Digit # (12) is used as the standard end-of-dialing digit. If digit # (12) or any other digit is not dialed in 4 to 6 seconds, time-out occurs and the address is obtained from the digit interpreter table from the data type entry for the last digit collected (e.g., digit 4 in the first level digit interpreter table in Fig. 1). The next digit indexes the next level digit interpreter table to slot 12. Any data type entry 0 through 7 may be used in digit slots 0 through 11. Only final data types 0 and 2 through 6 may be used in the digit 12 slot.

3.04 A change has been made to utilize the digit 12 (#) word in the centrex digit interpreter tables. For the digit timing code conflict feature, the # word in the tables can contain only final data as shown in Fig. 1.

FEATURE OPERATION

3.05 When a digit is collected on a call originated by a member of a centrex group, the centrex digit interpreter routines are used to analyze the digit. This routine uses data type (DTYP) information in the centrex digit interpreter tables to identify the type of call and routing for a particular dialed digit.

3.06 When a DTYP 1 entry is found in the centrex digit interpreter table for a dialed digit, the digit code conflict feature is indicated. The DTYP 1 entry indicates that 4- to 6-second timing should be performed for the next digit.

3.07 When a DTYP 6 entry is found in the centrex digit interpreter table for a dialed digit, it indicates that a line is being accessed using fewer digits than would normally be used to reach that line.

3.08 If a DTYP 7 entry is found in the centrex digit interpreter table for a dialed digit, normally 16- to 20-second interdigital timing is indicated for the next digit. In this case, the system expects to enter at least one additional digit before final routing data is found.

3.09 If DTYP 0, 2, 3, 4, 5, or 6 entries are found in the digit interpreter tables for a dialed digit, final data is indicated and the call is routed according to the type of data specified in the DTYP word.

3.10 When a DTYP 1 entry is found in the centrex digit interpreter table for a dialed digit and dial tone is not removed before a subsequent digit is collected, the digit is immediately interpreted through the centrex digit interpreter table. If dial tone is removed before the digit is collected, 4- to 6-second timing is started for the subsequent digit. This is accomplished by placing the originating register (OR) linked to the call on a 2-way timing list.

3.11 When the OR is on the timing list, one of two things can occur: another digit can be collected, or time-out can occur before another digit is collected. If another digit is collected, the OR is removed from the timing list and normal digit interpretation continues. If time-out occurs before another digit is collected, an end-of-dialing digit (digit 12) is generated by the ESS, stored in the OR, the digit counter is incremented, and the OR is removed from the timing list.

3.12 The end-of-dialing digit (#) may also be dialed from the originating station; it is collected and interpreted in the same way as any other digit. The end-of-dialing digit is used as an index in the centrex digit interpreter tables and selects the twelfth word in a digit interpreter table where final data (DTYP) exists (e.g., DTYP 2 extensions, DTYP 5 special services, DTYP 6 directory number). The call is then routed according to the final data obtained.

3.13 Calls originated over incoming tie trunks with dial pulse (DP) or dial pulse/TOUCH-TONE (DP/TT) pulsing are handled in the same way as lines. The incoming digits are collected and analyzed through the centrex digit interpreter tables; the incoming register (IR) linked to the call is placed on a 4- to 6-second timing list if required.

3.14 A different procedure is followed when centrex-originated calls are incoming over tie trunks with multifrequency (MF) pulsing. In this case, the IR is not put on a timing list. The digit analysis program for trunks (1) waits for a digit to be received or (2) waits for the start signal (indicating the last digit has been outpulsed) to be

received. If the start signal is obtained, the address of the location where processing is to continue is stored in the IR. If a digit is collected, centrex digit interpretation is continued. If the start signal is received, it is treated in the same manner as a time-out. Digit 12 is generated by the system and stored in the IR. The digit counter is then incremented, and the centrex digit interpretation routine is continued.

FEATURE ATTRIBUTES

4. APPLICABILITY

4.01 The single digit dialing feature is provided on a per customer group basis unless a centrex complex arrangement is involved. If a centrex complex is involved, access is limited to stations belonging to the centrex group (common block and digit interpreter tables) where single digit dialing is specified.

4.02 Single digit dialing feature access from the trunks may be restricted by normal trunk restriction techniques.

5. LIMITATIONS AND RESTRICTIONS

5.01 The use of the single digit dialing feature is limited to the number of digits available (0 through 9, *, #). Several of these codes are normally taken for standard use (e.g., 0 to reach attendant, 8 to reach toll terminal or CCSA, and 9 for local calls or local and toll calls).

5.02 The digit timing feature cannot be used to time out to another digit timing entry or to subsequent dial access codes of two or more digits. The feature may time out only to final routing data.

5.03 The single digit dialing feature cannot be used on an incoming foreign exchange line.

6. COMPATIBILITY AND INTERACTIONS

6.01 DTYP 1 and DTYP 6 centrex digit interpreter table entries cannot be assigned to slots in the first and second level digit interpreter tables for which timing for unprefixed speed calling is required. For example, if slot 2 in the first level digit interpreter table is used for speed calling, it cannot also be assigned to digit timing or single digit dialing or vice versa.

6.02 When tie trunks use the digit timing feature, the collect digits and save access code (SAC) information must be compatible between the far-end office and the ESS. For example, the collect digits information for tie trunks must be specified as variable if a 2-digit time-out code and a 3-digit (no time-out) code can be received over the same trunks. For further details, refer to reference A(4) in Part 19.

7. COST FACTORS

MEMORY—NO. 1 ESS

A. Fixed

7.01 The following memory is required whether or not the feature is active.

- *Generic (program store):* The single digit dialing feature requires an increase of 200 to 250 words of generic program store.

B. Conditional

7.02 Not applicable.

C. Variable

7.03 The following memory is required when the feature is activated on a per customer group basis.

- *Translation (program store):*

  (a) One 15-word digit interpreter table is required for each single digit code assigned. For example, if five single digit codes are required, five extra digit interpreter tables must be added since all codes use # to get final data (1#, 2#, 3#, 4#, 5#). In some cases, if digit interpreter tables already exist, the single digit dialing feature may be implemented without building new digit interpreter tables.

  (b) When variable digit extensions are to be provided, additional PS words are required to build the appropriate level centrex digit interpreter tables. For example, one word is required in the first level digit interpreter table for extensions 4000 through 4999. For variable digit extensions 4000 through 4999 and 400

through 499, one word in the first level digit interpreter table plus one 15-word second level, ten 15-word third level, and one hundred 15-word fourth level tables are required.

MEMORY—NO. 1A ESS

A. Fixed

7.04 The following memory is required whether or not the feature is active.

- *Generic (program store):* The single digit dialing feature requires an increase of 250 to 312 words of generic program store.

B. Conditional

7.05 Not applicable.

C. Variable

7.06 The following memory is required when the feature is activated on a per customer group basis.

- *Translation (unduplicated call store/file store):*

  (a) One 15-word digit interpreter table is required for each single digit code assigned. For example, if five single digit dialing codes are required, five extra digit interpreter tables must be added since all codes use # to get final data (1#, 2#, 3#, 4#, 5#). In some cases, if digit interpreter tables already exist, the single digit dialing feature may be implemented without building new digit interpreter tables.

  (b) When variable digit extensions are to be provided, additional CS/FS words are required to build the appropriate level centrex digit interpreter tables. For example, one word is required in the first level digit interpreter table for extensions 4000 through 4999. For variable digit extensions 4000 through 4999 and 400 through 499, one word in the first level digit interpreter table plus one 15-word second level, ten 15-word third level, and one hundred 15-word fourth level tables are required.

PROCESSOR TIME

7.07 The digit timing feature in a No. 1 ESS, when used by a station, adds 300 cycles in terms of real-time cost. This is opposed to the situation where a digit is dialed and final data is returned immediately. When # end-of-dialing digit is used with digit timing, 50 or more cycles are added to the real-time cost.

7.08 The digit timing feature in a No. 1A ESS, when used by a station, adds 600 cycles in terms of real-time cost. This is opposed to the situation where a digit is dialed and final data is returned immediately. When # end-of-dialing digit is used with digit timing, 100 more cycles are added to the real-time cost.

7.09 The cycle time for the No. 1 ESS is 5.5 microseconds. The cycle time for the No. 1A ESS is 0.7 microsecond.

8. AVAILABILITY

8.01 The single digit dialing and digit timing code conflict feature and the override attendant access option are available with the CTX-7, Issue 1, generic program in the No. 1 ESS and the 1A1 generic program in the No. 1A ESS.

CONSIDERATIONS FOR INCORPORATION OF FEATURE INTO SYSTEM

9. PLANNING

9.01 Not applicable.

10. HARDWARE

10.01 Not applicable.

11. DETERMINATION OF QUANTITIES

11.01 The holding time of the ORs and the IRs is increased 4 to 5 seconds when digit timing is used. IRs are a special use of ORs; both are specified by set card NOR.

11.02 For detailed information concerning call store for determination of the number of ORs required, refer to references B(5), B(6), D(2), and D(3) in Part 19.

12. ASSIGNMENTS AND RECORDS

ASSIGNMENT RECOMMENDATIONS AND GUIDELINES

12.01 Digits that require digit timing to resolve code conflict (DTYP 1) or that are used for single digit dialing (DTYP 6) and digits used for unprefixed speed calling·cannot be assigned to the same digit in the centrex digit interpreter tables. If they are assigned to the same digit, the data type entries take precedence over speed calling. [See reference A(5) in Part 19.]

INPUT AND RECORD KEEPING

A. Translation Forms

12.02 The ESS translation form 1109 provides a record of digits requiring digit timing and those that are used for single digit dialing.

B. Recent Change Messages

12.03 Recent change message formats affected by the single digit dialing feature are as follows:

RC MESSAGES	FUNCTIONS
RC:CTXDI	Builds centrex interpreter entries by using key words ATTN and TIME. Refer to Sections 231-118-331 and 231-318-309 for the entire message format.
RC:DITABS	Builds and links digit interpreter table using key words DGS and OAR. Refer to Sections 231-118-331 and 231-318-309 for the entire message format.

UNIFORM SERVICE ORDER CODES

12.04 The uniform service order code for single digit dialing is EES.

13. NEW INSTALLATION AND GROWTH

13.01 The procedures for adding, deleting, or changing the digit timing and single digit dialing feature for business customer groups are shown in Fig. 2 and Fig. 3.

14. TESTING

14.01 The VFY-XDGNT input messages in references C(1) and C(2) in Part 19 can be used to verify digit timing and single digit dialing translation. The system response to this message should be TR18.

14.02 Test calls should be made to verify that the digit timing and single digit dialing features operate correctly and to verify changes and deletions.

15. MEASUREMENTS

15.01 Not applicable.

16. CHARGING

16.01 Not applicable.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

17.01 Not applicable.

18. REASONS FOR REISSUE

18.01 Not applicable.

19. REFERENCES

A. Bell System Practices

(1) Section 231-118-331—Centrex-CO Recent Change Procedures RC:CTXCB, RC:CTXDI, RC:CTXEXR, RC:DITABS, RC:FLXDG, RC:FLXRD, and RC:FLXRS (CTX-6 through CTX-8, Issue 3, Generic Programs)—2-Wire No. 1 Electronic Switching System

(2) Section 231-318-309—Centrex-CO Recent Change Formats RC:CTXCB, RC:CTXDI, RC:CTXEXR, RC:DITABS, RC:FLXDG, and RC:FLXRS (1A2W<G1>1 Generic Program)—2-Wire No. 1A Electronic Switching System (when published)

(3) Section 966-102-100—Centrex-CO and PBX-CO Service General Description (changes planned)

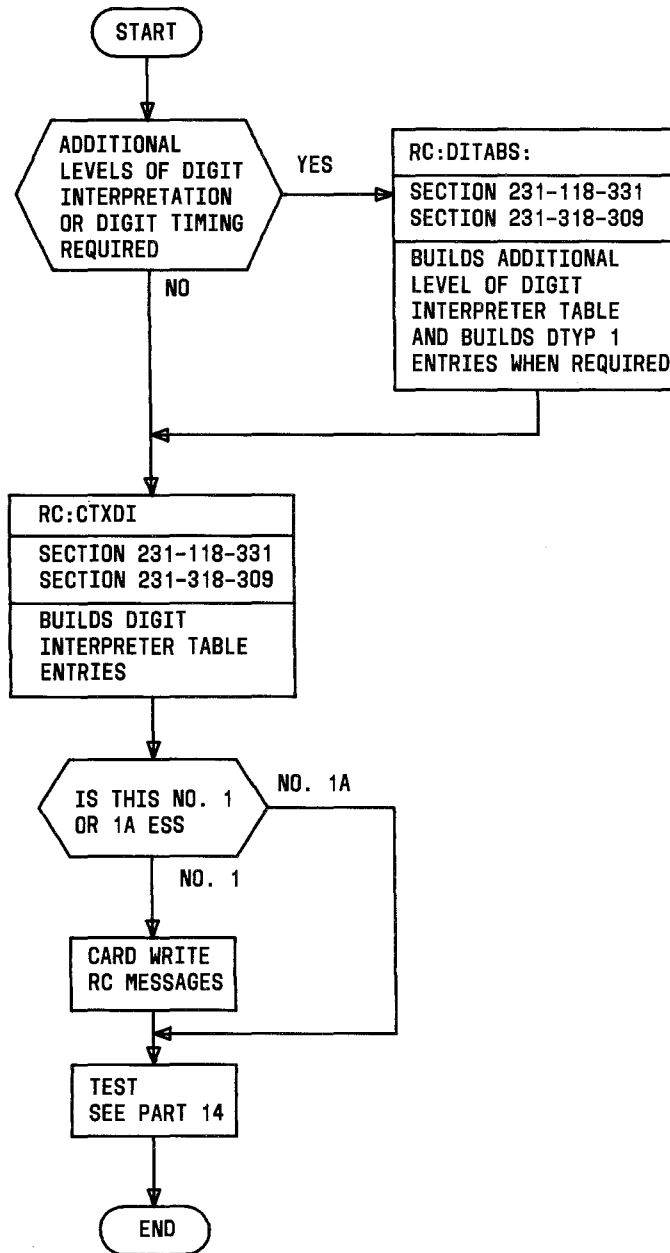(4) Section 231-090-256—Feature Document—Tie Trunk Switching Tandem, Non-Tandem and

Fig. 2—Procedure for Adding Digit Timing and Single Digit Timing Features

Foreign Exchange Access—2-Wire No. 1 and 1A Electronic Switching Systems (when published)

(5) Section 231-090-401—Feature Document— Speed Calling Feature—2 Wire No. 1 and No. 1A Electronic Switching Systems (when published).

B. Traffic Facilities Practices

(1) Division D, Section 10j—Dial Facilities— No. 1 Electronic Switching System—Centrex

(2) Division D, Section 11h—Dial Facilities— No. 1A Electronic Switching System—Centrex

START

ARE DIGIT
INTERPRETER   NO
TABLES TO BE
DELETED

YES

RC:DITABS:OUT:

SECTION 231-118-331
SECTION 231-318-309

DELETE DIGIT
INTERPRETER TABLE
AS REQUIRED

RC:CTXDI:CHG:

SECTION 231-118-331
SECTION 231-318-309

DELETES OR CHANGES
ENTRIES IN DIGIT
INTERPRETER TABLES

IS THIS NO. 1   NO. 1A
OR 1A ESS

NO. 1

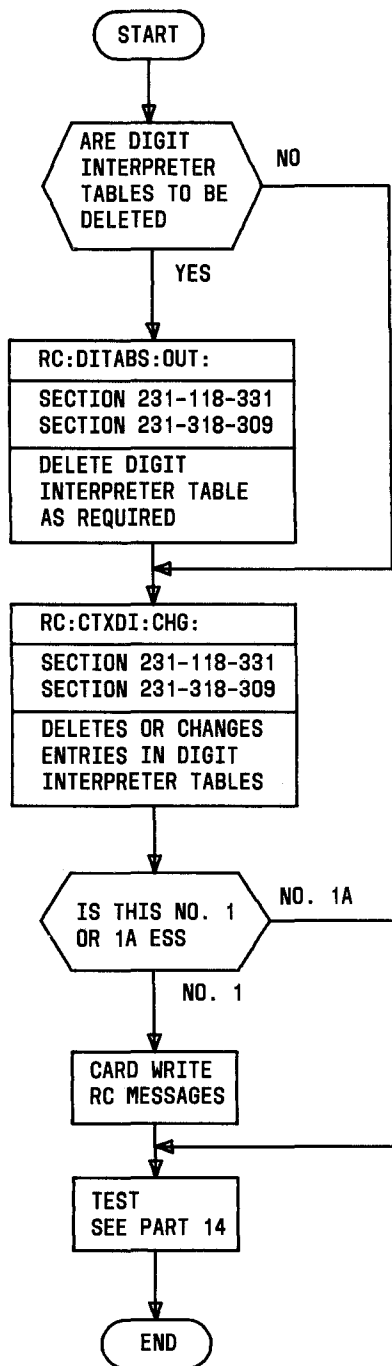CARD WRITE
RC MESSAGES

TEST
SEE PART 14

END

Fig. 3—Changing or Deleting Digit Timing and Single Digit Dialing Features

(3) Division D, Section 10a(5)—Dial Facilities—No. 1 Electronic Switching System—Service Features

(4) Division D, Section 11a(5)—Dial Facilities—No. 1A Electronic Switching System—Service Features (when published)

(5) Division D, Section 10h—Dial Facilities—No. 1 Electronic Switching System—Call Stores

(6) Division D, Section 11f(5)—Dial Facilities—No. 1A Electronic Switching System—Duplicated Call Stores (when published).

C. TTY Input and Output Manuals (TMs and OMs)

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

(2) Input Message Manual IM-6A001—No. 1A Electronic Switching System

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

(4) Output Message Manual OM-6A001—No. 1A Electronic Switching System.

D. Other References

(1) Translation Guide TG-1A

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

(3) Office Parameter Specification PA-6A1001—No. 1A Electronic Switching System

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

(5) Translation Output Configuration PA-6A002—No. 1A Electronic Switching System.