FEATURE DOCUMENT
RINGING FEATURES
NO. 3 ELECTRONIC SWITCHING SYSTEM

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INTRODUCTION

1. GENERAL INFORMATION

1.01 This document is issued to provide information related to the Enhanced Ringing feature. This new feature is provided with the 3E3 generic program of the No. 3 Electronic Switching System (ESS). The following types of ringing arrangements are provided by the Enhanced Ringing Feature:

- Single party with coded ringing (also called Teen-Age Service)
- Two-party with coded ringing (each party hears both ringing codes)
- Two-party with coded ringing (each party hears only one ringing code)

In addition to the description of these new features, this document also describes the revertive ringing feature which has been modified to provide the appropriate revertive ringing codes to these types of lines. This document will be updated at a future date to include information related to normal single, 2-party, and multiparty ringing services (2-party and multiparty ringing information is currently provided by Section 233-190-126).

1.02 When this section is reissued, the reasons for reissue will be included in this paragraph.

FEATURE AVAILABILITY

1.03 The Enhanced Ringing feature is provided for all No. 3 ESS systems equipped with the 3E3 and later generic program.

2. DEFINITION

2.01 The Enhanced Ringing feature is a group of special ringing services which provide single and 2-party customers with added convenience and minimized disturbance through the use of code 2 ringing.

A. Single Party With Coded Ringing

2.02 This option allows code 2 ringing (1 second of ringing followed by 1 second of silence followed by 1 second of ringing followed by 3 seconds of silence—continuous) to be applied to individual lines which normally receive code 1 ringing (2 seconds of ringing followed by 4 seconds of silence—continuous).

B. Two-Party With Coded Ringing (Each Party Hears Both Ringing Codes)

2.03 This option allows coded ringing to be applied to both parties' telephones where each party hears both ringing codes. Code 1 ringing identifies calls to one of the telephones and code 2 ringing identifies calls to the other telephone.

C. Two-Party With Coded Ringing (Each Party Hears Only One Ringing Code)

2.04 This ringing option is identical to the one described in paragraph 2.03 except that each party hears only one ringing code. Either code 1 or code 2 may be assigned to either party, or both parties may have the same code (code 1 or code 2).

DESCRIPTION

3. USER OPERATION

3.01 The options provided by the Enhanced Ringing feature are used to provide added convenience for the customer. Once implemented, these options may be used in any way desired by the customer. The following paragraphs are only examples of the ways in which these options may be employed.

A. Single Party With Coded Ringing

3.02 This option, sometimes called "Teen-Age Service," may be applied to two telephones (each having its own single party line) located near each other. Each phone receives a distinctive ringing code which may be used to identify the person or persons (as indicated by the directory listing) for whom the call is intended. This option may also be used where two lines come to a single telephone equipped with a key or switch to select one of the two lines.

B. Two-Party With Coded Ringing (Each Party Hears Both Ringing Codes)

3.03 This option may be used when a business telephone and a residence telephone of the same customer comprise the two parties and calls to either number are to be answered at either location. Calls to the business number cause both

telephones to ring with one ringing code, and calls to the residence cause the telephones to ring with the other ringing code.

C. Two-Party With Coded Ringing (Each Party Hears Only One Ringing Code)

3.04 This option causes one of the telephones on the 2-party line to be rung with code 1 and the other to be rung with code 2. A customer having code 2 ringing in this arrangement may also have other main stations collocated with this one. The code 2 ringing may be used to distinguish calls to the 2-party line from calls to the other lines. If desired, both parties may receive the same ringing code.

REVERTIVE RINGING

3.05 Revertive ringing is not directly associated with the Enhanced Ringing features. It is available to any 2-party or multiparty customer. However, it may be used with Enhanced Ringing features (all except the single party with coded ringing) to provide the customer with the ability to ring other parties assigned to the same line. The calling customer on a 2-party line goes off-hook, dials the telephone number assigned to the other party on the line and hangs up after receiving busy tone. The called and calling party telephones are then rung. When the called party answers, the ringing is removed. The calling party may then go off-hook and begin the conversation.

4. SYSTEM OPERATION

4.01 The Enhanced Ringing feature is a software feature which requires no additional hardware. The operations performed by the No. 3 ESS in order to provide ringing are described in the following paragraphs and are illustrated in the flowchart of Figure 1.

4.02 In all types of ringing, alternating current activates the ringer and direct current controls the removal of ringing when an answer is detected. AC-DC ringing consists of 20 Hz 86 volts ac in series with -48 volts dc. Table A includes the ringing codes for ac-dc ringing. AC-DC ringing is used for individual, 2-party, and 4-party semiselective service and requires nonpolarized ringers.

4.03 Superimposed ringing is ringing in which either SUP - (20 Hz 86 volts ac in series with -48 volts dc) or SUP + (20 Hz 86 volts ac in series with +48 volts dc) is selected depending on the party to be rung. Superimposed ringing enhances 4-party service, making it fully selective and allows 8-party semiselective service. Table A includes the ringing codes for superimposed ringing. If 4-party fully selective ringing is desired, superimposed ringers are required and the station ringers must be polarized.

4.04 When the No. 3 ESS recognizes a call which must be terminated within the local network, a translation is performed on the final four dialed digits in order to identify and locate the called party. A test is then made on the called line to determine if it is idle. If the line is not idle, busy tone is returned to the calling party and No. 3 ESS supervises for on-hook. For a description of reverting calls, refer to paragraph 4.15.

4.05 If the called line is idle, a talk path is selected and reserved by which to connect the calling and called parties, and the called line's termination major class (obtained from the 4-digit translation) is examined to determine the ringing code required for the called line. Multiparty terminating major classes (16-23) are used to provide coded ringing. If the called line does not have a multiparty terminating major class, code 1 ringing is provided using a regular ringer. The ringing arrangements associated with the various terminating major classes are shown in Table A. If the terminating major class indicates a multiparty line, a check is made to determine if superimposed ringers are used. Upon completion of this check, a regular or superimposed ringer is selected (based on the results of the check), the customer dial pulse receiver is disconnected, the A party is connected to the talk junctor, and a path is established between the ringing circuit and the B party line. At this time, the CDPR and its path are idled and one side of the called line is chosen (as indicated by the terminating major class) to be rung. If the tip side is to be rung, the tip and ring leads from the ringing circuit must be reversed. If superimposed ringing circuits are provided, the selected ringing circuit must also be arranged to provide the proper polarity of ringing current (also indicated by the terminating major class).

4.06 Before ringing current is applied to the called line, a pretrip test is performed to

determine the state of the line. If the B party has gone off-hook, the talking connection between the calling and called parties is established and no ringing current is applied. If the pretrip test indicates that off-hook has occurred for a call terminating to a coin or ground start line, busy tone is returned to the calling party instead of establishing the talking connection. If the called line is a member of a multiline hunt group (MLHG), an off-hook detected by the pretrip test causes another member of the MLHG to be selected by which to terminate the call. If the B party is still on-hook, ringing current must be applied. The ringer is then activated, a ringing continuity check is performed, and the junctor is set to return audible ringing to the calling party.

4.07 The terminating major class is used to determine which ringing code is required (see Table A). A timer within the transient call register (TCR) is then utilized as a ring timer to time the ring and silence portions of the selected ringing code. These ringing codes are shown in Figure 2.

4.08 The No. 3 ESS supervises the called line for off-hook and the calling line for on-hook during the time the ringing cycles are being applied to the called line. If the B party should go off-hook, the ringing is tripped; the audible ringing is turned off; the talk path is established; the call is set stable; and the ringing circuit and path are idled. The two customers are then free to begin conversation. If the A party should go on-hook, the ringing is turned off; all connections are released and the disconnect process is completed.

4.09 If the ring timer expires before a supervisory change occurs, the ringer is turned on or off to provide the next portion of the ringing cycle. If the ringing cycle is not complete, the ring timer is set to time the next portion of the ringing cycle. As shown in Figure 2, these times vary depending on the ringing code to be provided. The state of the ring code is incremented to reflect the portion of the ringing cycle completed, and the ringing cycle continues until the ring timer expires or a supervisory change is detected. If the timer expires, the process is repeated to provide the next portion of the ring cycle. The process continues until the ring cycle is complete or a supervisory change occurs.

4.10 At the end of the ring cycle, a check is made to determine if the line has been rung for 2 or more minutes. If not, the entire ringing cycle is repeated. If ringing was applied for 2 or more minutes, a check is made to see if all ringing circuits are busy. If all ringing circuits are busy, this ringing circuit may be required for another call; therefore, it is disconnected and idled. If all ringing circuits are not busy, the ring timer is set to begin a new ringing cycle. If a supervisory change has not occurred by the time ringing has been applied for 5 minutes, the ringing circuit and path are disconnected and idled. If the A party remains off-hook, reorder tone is returned for 30 seconds, followed by high-and-wet treatment.

ENHANCED RINGING FEATURES

4.11 The following paragraphs describe the Enhanced Ringing features.

A. Single Party With Coded Ringing

4.12 This feature provides code 2 ringing to an individual line which would normally receive code 1 ringing. For originating purposes, the line is treated as an individual line. The following attributes apply to this feature:

- Customer calling features are allowed.
- On call waiting ringback (refer to Section 233-190-107 for further description of this feature), the phone receives code 1 ringing instead of code 2. A call waiting ringback is required when a customer, while engaged in a stable 2-party conversation, goes on-hook instead of flashing in response to the call waiting alerting tone.
- For operator/911 ringback (refer to Section 233-190-203 for further description of 911 service), the phone receives a single 4-second ring. The operator may repeat this ring by pressing the key a second time.
- Coin lines or multiline hunt lines (PBX) are not eligible for this service.
- Trunk-Line Test Panel (TLTP) provides proper ringing code (code 1 or code 2 as determined by the terminating major class).

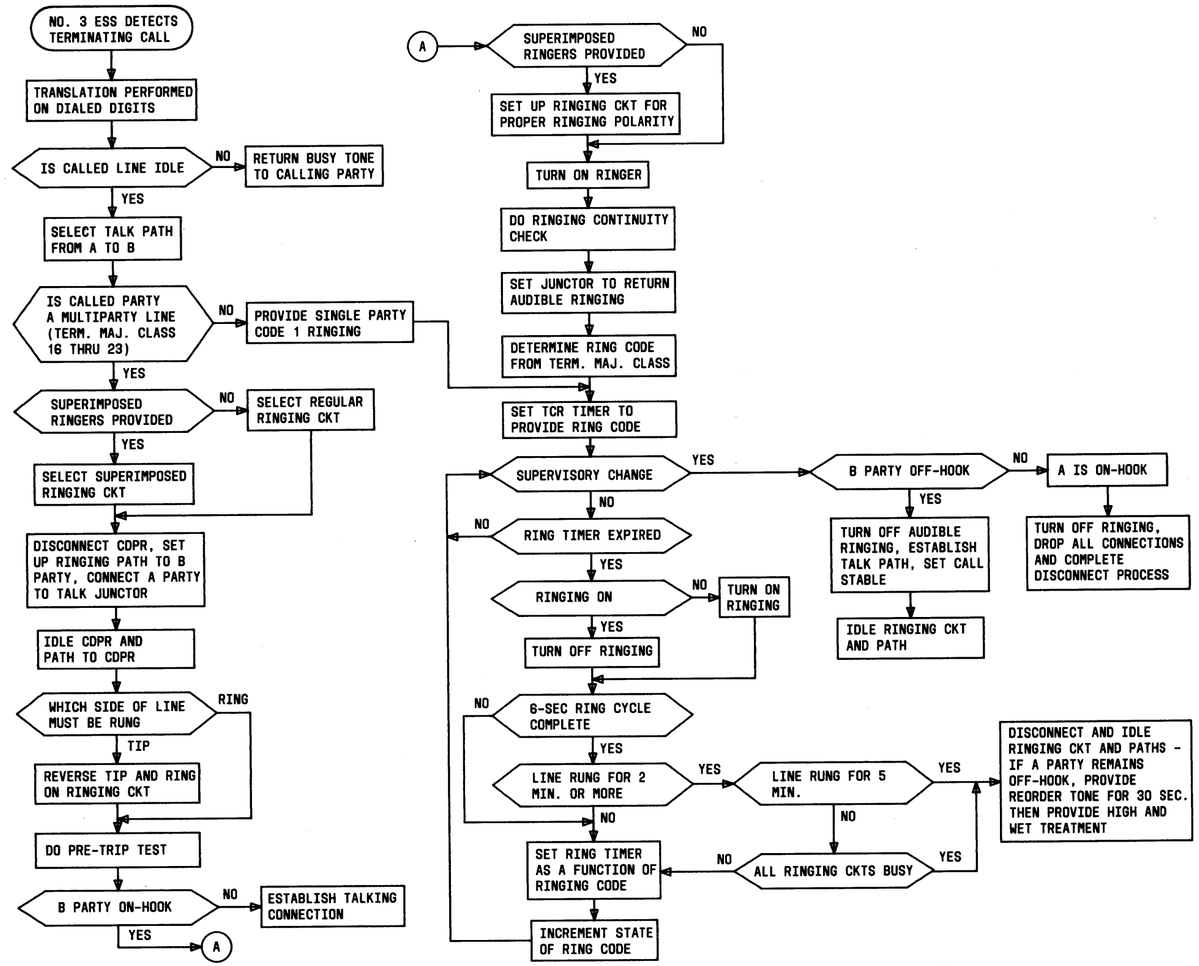


Fig. 1—Ringing Flowchart

TABLE A

RINGING ARRANGEMENTS

TYPE OF LINE	TERMINATING MAJOR CLASS	REGULAR RINGERS		SUPERIMPOSED RINGERS (IF PROVIDED)		
		PARTY	RING CODE	PARTY	RING CODE	ID DIGIT
Individual	8*	1-Ring	Code 1			
2-Party	4 5	1-Ring 2-Tip	Code 1 Code 1			
4-Party	16 17 18 19	1-Ring 2-Tip 3-Ring 4-Tip	Code 1 Code 1 Code 2 Code 2	1-Ring (-) 2-Tip (-) 3-Ring (+) 4-Tip (+)	Code 1 Code 1 Code 1 Code 1	2 3 4 5
8-Party (Coded Ringing)	16 17 18 19 20 21 22 23	1-Ring 2-Tip 3-Ring 4-Tip 5-Ring 6-Tip 7-Ring 8-Tip	Code 1 Code 1 Code 2 Code 2 Code 3 Code 3 Code 4 Code 4	1-Ring (-) 2-Tip (-) 3-Ring (+) 4-Tip (+) 5-Ring (-) 6-Tip (-) 7-Ring (+) 8-Tip (+)	Code 1 Code 1 Code 1 Code 1 Code 2 Code 2 Code 2 Code 2	2 3 4 5 6 7 8 9

* Also other terminating major classes.

- Station ringer test provides proper ringing code to verify that the ringing code is correct.

- Revertive service is not provided.

For terminating purposes, the line is treated as a multiparty line in order to provide code 2 ringing. Refer to Section 233-190-126 for further description of multiparty service. Refer to Table B for the appropriate assignment of terminating major classes. These assignments are made through the use of recent change messages as described in Part 12, DATA ASSIGNMENTS AND RECORDS.

B. Two-Party With Coded Ringing (Each Party Hears Both Ringing Codes)

4.13 This feature provides code 1 and code 2 ringing to two telephones located in different locations. Code 1 ringing identifies calls intended for one location and code 2 ringing identifies calls intended for the other location. For originating purposes, the line is treated as a 2-party line. The following attributes apply to this feature:

- Custom calling services are not allowed.

- Operator/911 ringback provides a single 4-second ring on tip side and ring side—rung alternately. The originating major class is used to determine if both sides must be rung.

- TLTP provides proper ringing code for each telephone based on the telephone number dialed as determined by the terminating major class.

- Station ringer test provides proper ringing code for each telephone to verify that the correct ringing code is received (as determined by the terminating major class).

- Revertive service is allowed.

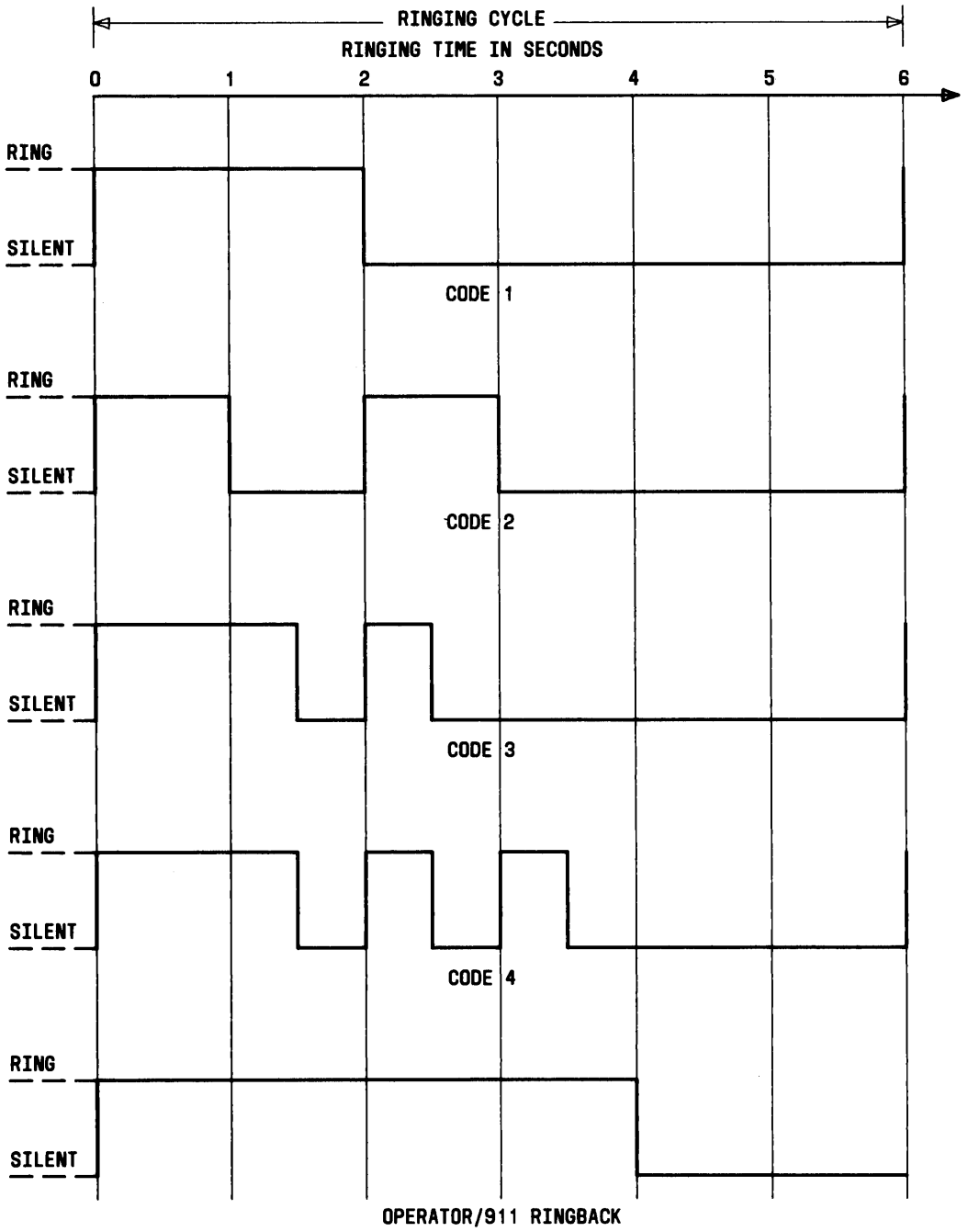


Fig. 2—Ringing Codes

For terminating purposes, the line is treated as a multiparty line in order to provide code 1 ringing for one location and code 2 ringing for the other location. For appropriate assignment of the terminating major class, refer to Table B. Both telephones must have ringers wired between tip and ground. The telephone defined as party 2 must be wired to provide tip ID upon origination.

C. Two-Party With Coded Ringing (Each Party Hears Only One Ringing Code)

4.14 This feature provides code 1 ringing to one telephone and code 2 ringing to another telephone when the telephones are located in different areas but share the same line. Additionally, both telephones may be assigned to receive the

TABLE B

MAJOR CLASS ASSIGNMENTS FOR ENHANCED RINGING FEATURES

ENHANCED RINGING FEATURE			ORIGINATING MAJOR CLASS	TERMINATING MAJOR CLASS (SEE NOTE 1)		RINGER SIDE	RING CODE
				REGULAR AC-DC RINGER	SUPERIMPOSED RINGER*		
Single Party With Coded Ringing	Normal Code 1	Ring	8	8	—	Ring	1
(A)	Code 2 Ring		8	18	20	Ring	2
2-Party With Coded Ringing (Each party hears both codes) (B)	See Note 2	Party 1	4	17	17	Tip	1
		Party 2	5	19	21	Tip	2
2-Party With Coded Ringing (Each party hears only one code) (C)	Arrangement No. 1	Party 1	4	16	16	Ring	1
		Party 2	5	19	21	Tip	2
	Arrangement No. 2	Party 1	4	18	20	Ring	2
		Party 2	5	17	17	Tip	1
	Arrangement No. 3	Party 1	4	18	20	Ring	2
		Party 2	5	19	21	Tip	2
	Arrangement No. 4	Party 1	4	4	—	Ring	1
		Party 2	5	5	—	Tip	1

Note 1: If superimposed ringers are provided, the terminating major classes listed in the superimposed ringer column must be used; otherwise, the terminating major classes listed in the regular ringer column must be used.

Note 2: Party 1 is normally the ring party and is treated as such in this case except that the ringer is wired on the tip side; however, only party 2 is wired to provide tip party ID unless both parties use the same billing number.

* For revertive ringing, the ID digit is not required for 2-party customer.

same ringing code (code 1 or code 2). Both phones must be wired for normal 2-party ringing (party 1 ringer wired between ring and ground and party 2 ringer wired between tip and ground). The standard 2-party configuration is used for originations. The line has the same attributes described in paragraph 4.13 and is treated as a multiparty line for terminating purposes.

REVERTIVE RINGING SERVICE

4.15 Revertive ringing service is provided to allow 2-party and multiparty customers the capability to call other parties assigned to the same line. Distinctive ringing sequences are provided for both the calling and called parties based on the ringing code normally received, the line side to be rung, the type of ringer employed (regular or superimposed), and, in the case of superimposed ringers, the ringing polarity required. A flowchart showing the operations required to provide revertive ringing is shown in Figure 3 and the ringing sequences are shown in Figure 4.

4.16 When the No. 3 ESS detects a terminating call, a translation is performed on the dialed digits and a check is made to determine if the called line is idle. If the line is idle, it is rung normally. This indicates a normal terminating call rather than a revertive call. If the called line is not idle, the calling and called party terminal equipment numbers (TENs) are compared. If the TENs are identical, the call is revertive. If the TENs are different, a normal call to a busy line is indicated and busy tone is returned to the calling party.

4.17 When a reverting call is indicated, the call is marked free and a check is made to determine if the calling party is a 2-party or multiparty line. If the A party is a 2-party line with a terminating major class of any number between 16 and 23 (indicating enhanced ringing) or if the A party is a multiparty customer (originating major class 16) and superimposed ringers are not provided, busy tone is returned to the calling party and the CDPR and path are disconnected and idled.

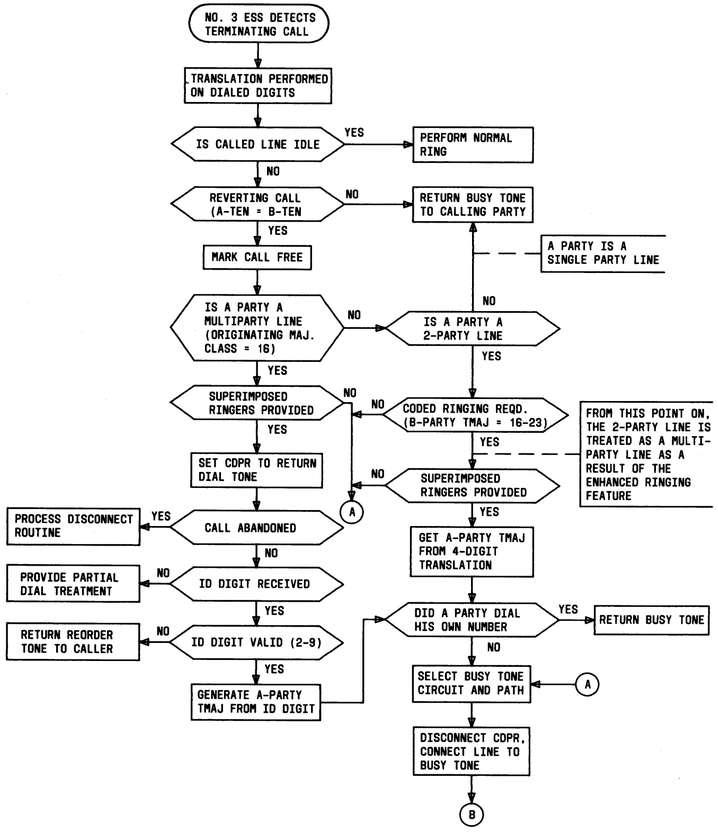
4.18 If superimposed ringers are provided, a second dial tone is returned to multiparty customers (originating major class 16) to indicate that an identification (ID) digit must be dialed (see Table A for the required ID digit). This ID digit is used to identify the calling party. If the calling party is a 2-party line, a terminating translation is performed in order to obtain the calling party's terminating major class from the 4-digit translator. In this case, the ID digit is not required.

4.19 When the ID digit is received from a multiparty customer, it is examined to verify its validity. If the ID digit is invalid, reorder tone is returned to the calling party. If the digit is valid, the calling party's terminating major class is generated from the ID digit (the terminating major class is equal to the ID digit plus 14).

4.20 When the calling party's terminating major class has been obtained (for a multiparty or 2-party customer), a check is made to determine if the called telephone number is assigned to the calling party. Reorder tone is returned if this situation exists. If the calling party has actually dialed another party on the same line, busy tone is returned and the calling party is allowed 30 seconds to hang up so that both calling and called parties may be rung. Partial dial treatment is provided if on-hook does not occur within this time period.

4.21 When the calling party has properly dialed a revertive call and gone on-hook within the 30-second time interval, a check is made to determine which type of ringer (regular or superimposed) is required. The appropriate ringing circuit is then selected, the busy tone circuit is disconnected, and a path is activated between the selected ringing circuit and the multiparty or 2-party line. The call is then marked revertive and the ringer is set up to provide ringing on the appropriate line side (with the appropriate polarity in the case of superimposed ringers) for the calling party. A ringing continuity test is then performed and any failure is reported for error analysis.

4.22 If regular ringers are used, the starting ringing state code is determined based on the called line's terminating major class. This ringing state code indicates the ringing sequence to be provided (see Figure 4A) and also indicates the beginning of the ringing cycle. Two-party lines are normally rung with code 1, and multiparty lines receive the ringing code indicated by the called party's terminating major class (see Table A). The TCR ring timer is then set to provide 0.5 second of ringing to the calling party who is assumed to be on the opposite side of the line from the called party. (As shown in Figure 4A, the A



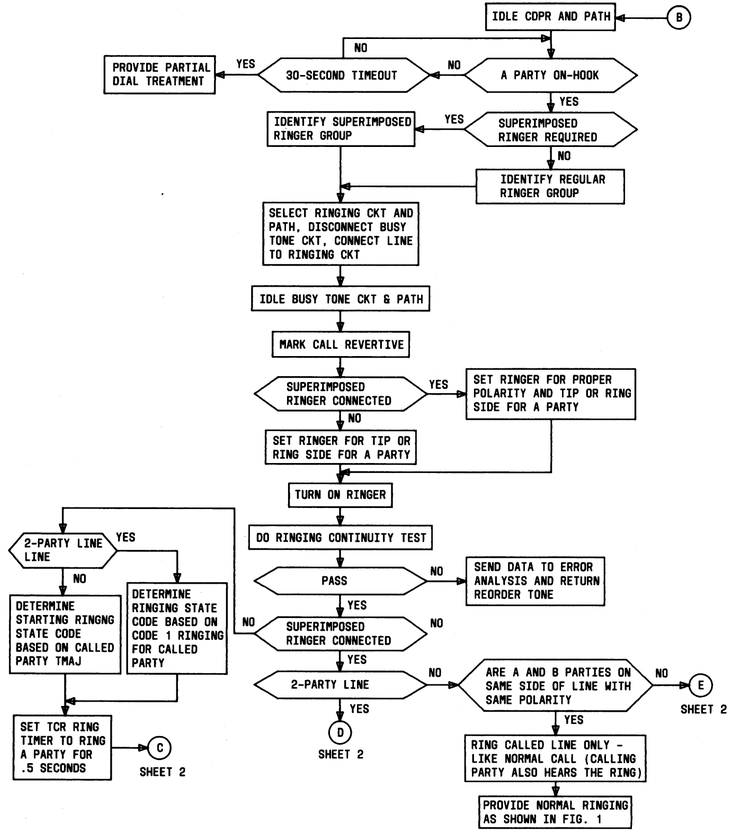


Fig. 3—Revertive Ringing Service Flowchart (Sheet 1 of 2)

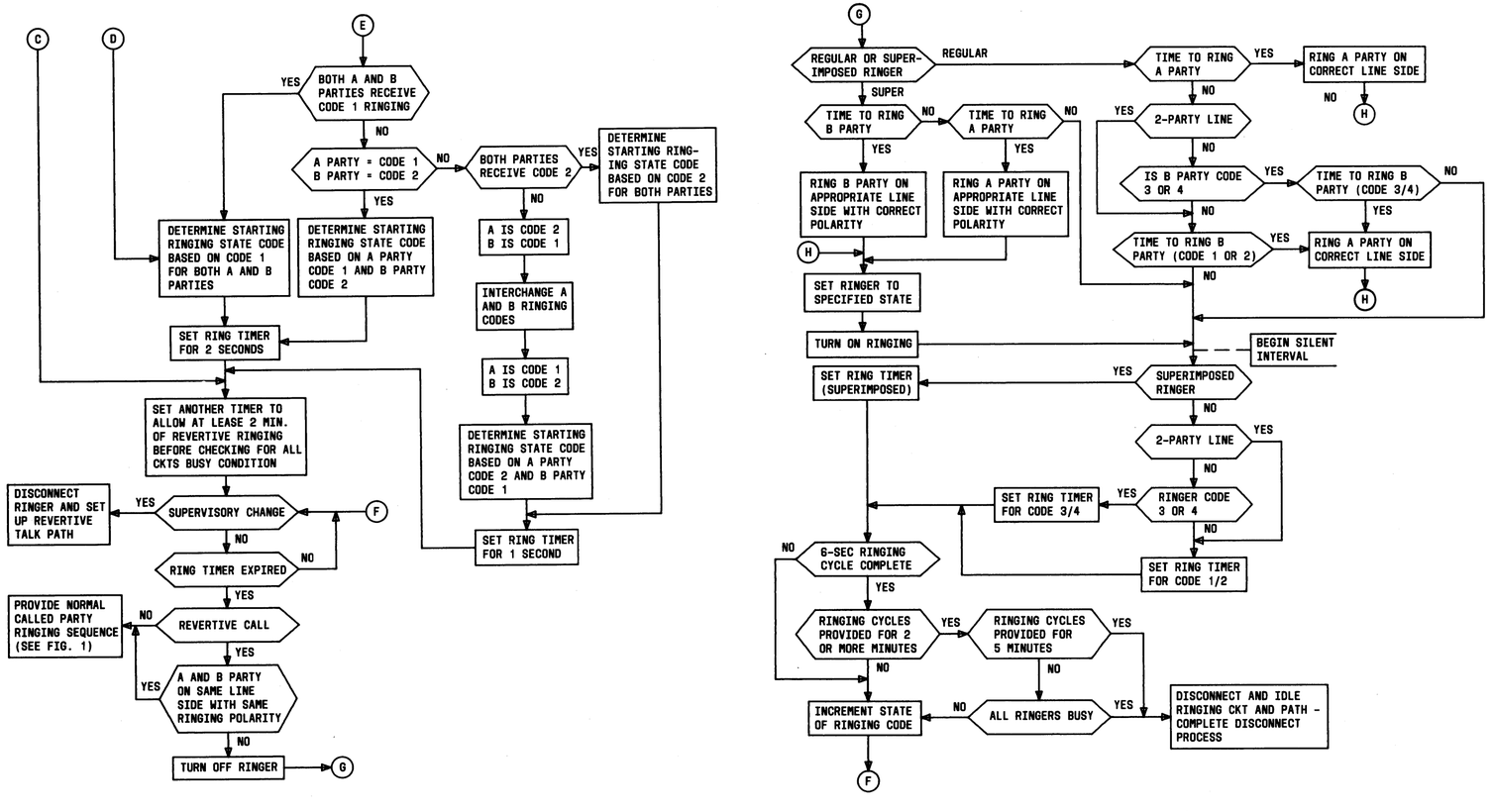
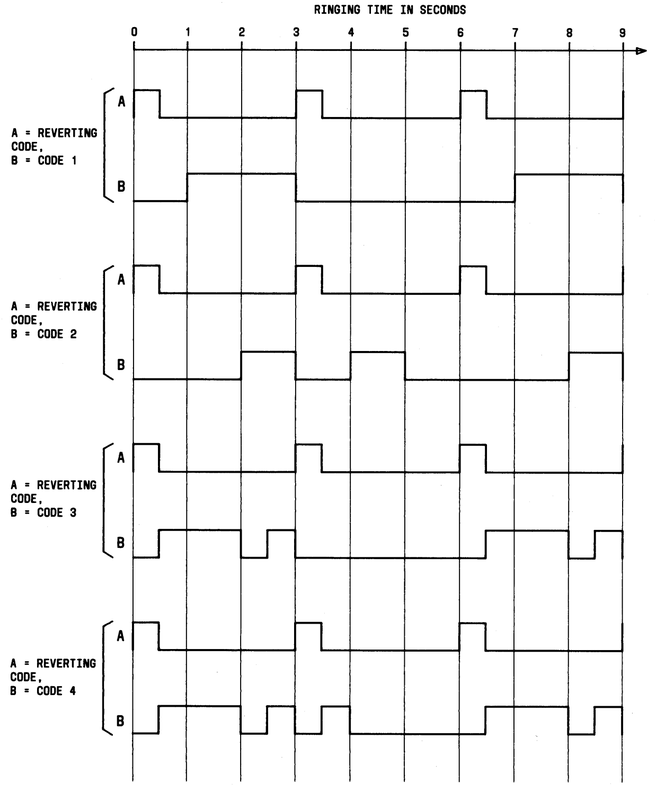
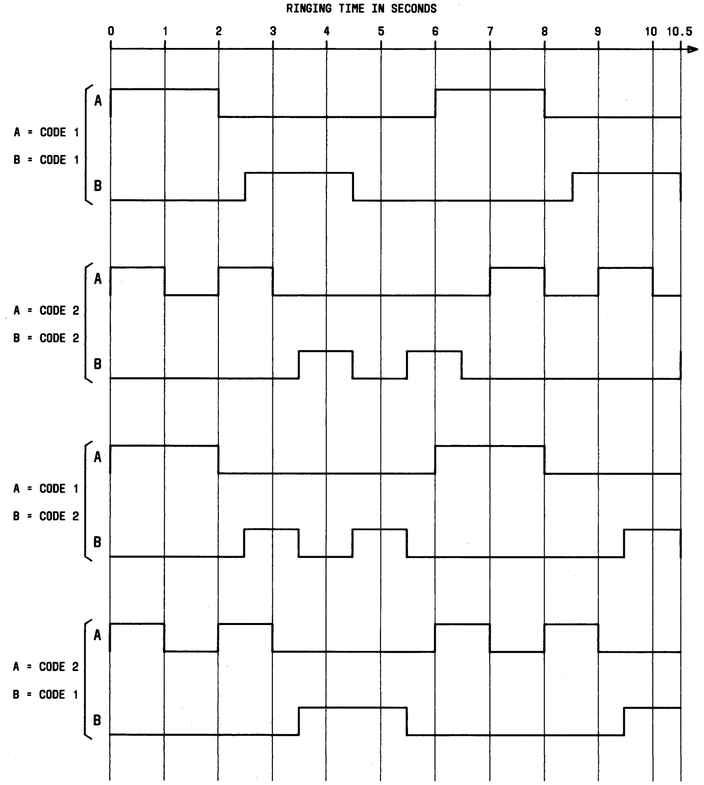


Fig. 3—Revertive Ringing Service Flowchart (Sheet 2 of 2)



A. AC-DC REVERTING RING SEQUENCE (A = CALLING PARTY, B = CALLED PARTY)



B. SUPERIMPOSED REVERTING RING SEQUENCE (A = CALLING PARTY, B = CALLED PARTY)

Fig. 4—Revertive Ringing Sequences

party always receives 0.5 second of ringing followed by 2.5 seconds of silence.) Another timer is also set to allow 2 minutes of revertive ringing before checking for an all-ringers-busy condition.

4.23 When revertive ringing is to be provided to a multiparty line with a superimposed ringer, a check is made to determine if both parties must be rung on the same line side with the same polarity. If so, only the called line is rung with the appropriate ringing code and the calling party hears the same ring. When a revertive call is made (requiring a superimposed ringer) to a multiparty customer whose line side or polarity is different than that of the calling customer, a ringing state code is determined, based on the ringing code required for each party. A unique starting ringing state code is provided for each of the ringing sequences shown in Figure 4B. This ringing state code is then incremented each time a portion of the ringing cycle is completed. Also, the ring timer is set for 1 or 2 seconds as a function of the A-party's ringing code. Just as for regular ringers, the 2-minute timer is set to time the revertive ringing before checking for an all-ringers-busy condition. When revertive ringing is to be provided on a 2-party line without the enhanced ringing features, regular ringers are used and ringing code 1 is provided for both parties. When revertive ringing is to be provided on a 2-party line (with enhanced ringing feature) with a superimposed ringer, multiparty revertive treatment is provided. This ensures that the appropriate ringing code is used for each party. The ringing state code is determined, the ring timer is set for 2 seconds, the 2-minute timer is started, and the ringing cycles are provided, as previously described, until off-hook occurs.

4.24 For either type of ringer, supervision is maintained for off-hook after which the ringing circuit is disconnected and idled and the revertive path is activated. If the ring timer expires before a supervisory change is detected, a check is made to verify that the call is revertive. If not, the usual called party ringing sequence is provided as shown in Figure 1. If the call is revertive, a check is made to determine if the calling and called parties are rung on the same line side with the same polarity. If this situation exists, normal called party ringing is provided. In this case, both parties hear the ringing code associated with the called party.

4.25 When the ring timer expires for a revertive call where both parties are ***not*** rung on the same line side with the same polarity, the ringer is turned off and a check is made to determine if it is time to ring the A or B party (for both types of ringers). A silent interval is indicated if it is not time to ring either party. In this case, the ring timer is set to provide the next portion of the ringing cycle (based on the type of line, ringing code required, and type of ringer employed). If the 6-second ringing cycle is not completed, the state of the ringing state code is incremented to reflect the portion of the ringing cycle completed, and supervision is maintained until the ring timer expires. At that time, the next portion of the ringing cycle is provided if a supervisory change has not occurred. This process continues until the ringing cycle is completed or until a supervisory change is detected.

4.26 If the ringing cycle reaches completion, a check is made to determine if the 2-minute timer has expired. If ringing has not been provided for 2 or more minutes, additional ringing cycles are provided in the same manner until off-hook is detected. If ringing is provided for 2 or more minutes, a check is made to determine if all ringing circuits are busy. If all circuits are busy, this circuit may be required for another call; therefore, the ringing circuit is disconnected and idled. When ringing has been provided for 5 minutes, the ringing circuit is automatically disconnected and idled, all connections are dropped, and the disconnect procedure is performed.

4.27 When it is determined that it is time to ring the A or B party, the selected ringer is set to ring the appropriate line side with the appropriate polarity. The ringer is then turned on. The ring timer is set to provide the next portion of the ringing code and supervision is maintained until the ring timer expires or until off-hook occurs. When the ring timer expires, the ringer is turned off and another check is made to determine if it is time to ring the A or B party. If not, another silent interval is required as previously described. The process continues through additional ringing cycles with each party hearing the correct ringing code until off-hook occurs or until the ringer is disconnected as a result of the expiration of the 2-minute or 5-minute timer as previsously described.

CHARACTERISTICS

5. FEATURE ASSIGNMENT

5.01 The ringing codes are assigned based on the type of line (individual, 2-party, or multiparty), the party number, and the type of ringing circuits employed. The enhanced ringing features are assigned on a per-line basis as desired by the customer. Further details concerning the assignment of these features may be found in Part 12, DATA ASSIGNMENTS AND RECORDS.

6. LIMITATIONS

6.01 The following limitations apply to the ringing features:

- Single party coded ringing not allowed for coin lines or multiline hunt lines (PBX).
- Regular ringers are always required for ringing single- and 2-party lines.
- Superimposed ringers are required for multiparty lines if 4-party full selective service is desired. A mixture of fully selective and semiselective 4-party service is not provided in the No. 3 ESS.
- Enhanced ringing does not require the superimposed ringer; however, the terminating major class is different if the office is equipped with the superimposed ringer (see Table B).
- Single party lines are not allowed revertive service.
- Lines subscribing to the Two-Party With Coded Ringing features (either feature) are not allowed custom calling.

7. INTERACTIONS

7.01 Lines subscribing to either of the Two-Party With Coded Ringing features are not allowed to have custom calling services. No other interactions exist for these features.

8. RESTRICTION CAPABILITY

8.01 No restrictions are applicable to the Enhanced Ringing features.

INCORPORATION INTO SYSTEM

9. INSTALLATION/ADDITION/DELETION

9.01 In order to install one of these features for a customer, the proper line (single or 2-party) must be provided, the station sets must be properly installed and wired to receive the desired type of ringing, and the appropriate software assignments must be made within the central office.

10. HARDWARE REQUIREMENTS

10.01 The hardware items listed in Table C are associated with but not exclusive to the Enhanced Ringing features. It should be noted that regular ringers are always required and that superimposed ringers are also required if 4-party full selective ringing is desired for multiparty lines. Refer to Section 233-060-210 Network Design Worksheets, No. 3 ESS to determine the required quantities of these circuits. A maximum of 58 regular and superimposed ringers is allowed in any No. 3 ESS office.

10.02 When the Two-Party With Coded Ringing (each party hears both codes) feature is to be installed, both telephones must have the ringer wired between tip and ground. To bill the correct number for AMARS TSP/TSPS or CAMA-ANI calls, only one telephone is wired to provide the tip identification upon origination.

10.03 When the Two-Party With Coded Ringing (each party hears only one ringing code) feature is to be installed, both telephones must be wired for normal 2-party ringing (party 1 ringer is wired between ring and ground and the party 2 ringer is wired between tip and ground). The standard 2-party configuration is used for originations (the tip party provides a ground when off-hook occurs).

10.04 Each ringing circuit (regular or superimposed) requires one network appearance and each line subscribing to the Enhanced Ringing features (single or 2-party) requires one network appearance. Each regular ringer requires one distributor triplet and each superimposed ringer requires two distributor triplets. A supervisory scan point is required to provide supervision, and a directed scan point is required to perform the ringing continuity test.

TABLE C

HARDWARE ASSOCIATED WITH ENHANCED RINGING FEATURES

HARDWARE ITEM	J NUMBER	SD NUNBER	CP	CKTS PER UNIT	MOUNTING LOCATION
Regular Ringing Unit	J3H001BF	SD-3H410	FB358	7	Control or Network Frame
Superimposed Ringing Unit	J3H001CN	SD-3H406	FB375 FB376	6	Miscellaneous Frame
Ringing and Tone Plant	J87824	SD-82255			Miscellaneous Power Frame

11. SOFTWARE REQUIREMENTS

11.01 The 3E3 generic program provides the necessary software for the Enhanced Ringing features. No additional software or software changes (other than the assignments described in Part 12, DATA ASSIGNMENTS AND RECORDS) are required. However,the following translation words are utilized to provide these features:

Single Party Line

- 2 words in the Line Subtranslator
- 3 words in the Four-Digit Translator

Two-Party Line

- 6 words per line in the Line Subtranslator
- 3 words per telephone number in the Four-Digit Translator

If other features are to be provided, more translation words may be required.

12. DATA ASSIGNMENTS AND RECORDS

12.01 The 4-digit translation provides the information required to provide the appropriate ringing for lines subscribing to the Enhanced Ringing feature. Figure 5 provides a layout of the 4-digit translator. The terminating major class associated with the line indicates the type of ringing required. Basically, the Enhanced Ringing features are provided by assigning multiparty terminating major classes to single and 2-party lines. Table B provides the originating and terminating major classes recommended for lines subscribing to the Enhanced Ringing features. Either 4-party full selective or 4-party semiselective (not both) service may be provided. To provide 4-party full selective service, superimposed ringers must be provided and the superimposed option must be specified. Refer to the RC:OFFICE message in IM-3H300 and use keyword SUP.

12.02 In an existing No. 3 ESS, the line assignments listed in Table B may be made through the use of the following recent change (RC) messages:

RC:LCC - This message is used to define a line class code based on a terminating and originating major class combination (keywords TMAJ and OMAJ, respectively).

RC:LINE - This message is used to associate the line class code (keyword LCC) with a single party line. The appropriate LCC must be used to provide code 1 or code 2 ringing.

RC:TWOPTY - This message is used to make the proper line assignments for 2-party lines. The appropriate LCC must be specified to provide code 1 or code 2 ringing. The party number (keyword PTY) must also be specified.

RC:OFFICE - This message is used to set the superimposed ringing (full selective

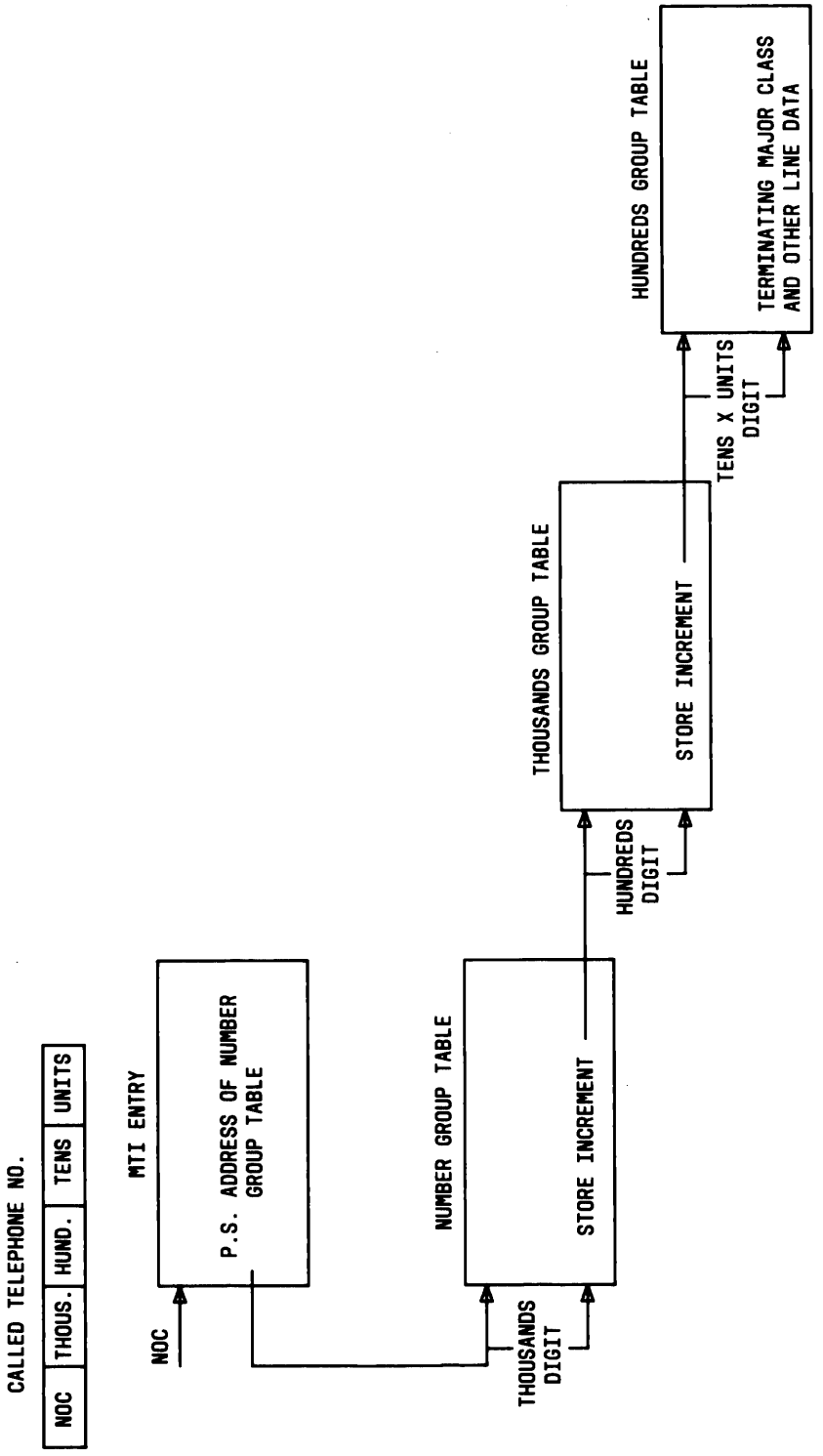


Fig. 5—Four-Digit Translation for Ringing Features

service) option for ringing multiparty lines. The SUP keyword is provided for this purpose.

The following examples show how a line class code may be defined for Enhanced Ringing features.

Single Party With Coded Ringing

RC:LCC/
TYP NEW/ (a new line class code is being defined)
LCI XXX/ (line class index to be used)
LCC 1FS/ (arbitrary line class code assigned by TELCO)
RAX 0/ (rate area)
OMAJ 8/ (originating major class, single party line, in this case)
TMAJ 18/ (or 20 if superimposed ringers are used) (terminating major class)
SCR XX/ (screening class)
END!

2-Party With Coded Ringing (Each party hears both codes)

RC:LCC/
TYP NEW/
LCI XXX/
LCC 2FS/
RAX 0/
PTY 1/ or 2
OMAJ 4/ or 5
TMAJ 17/ or 19 or 21
SCR XX/
END!

2-Party With Coded Ringing (Each party hears only one code)

RC:LCC/
TYP NEW/
LCI XXX/
LCC 2FC/
RAX 0/
PTY 2/ Refer to Table B for other possible combinations.
OMAJ 5/
TMAJ 19/
SCR XX/
END!

Refer to Input Message Manual IM-3H300 for further details concerning the use of these messages.

12.03 Additional software assignments must be made in order to assign the regular and superimposed ringers. The following messages are used for this purpose:

RC:GRP - This message is used to define the ringer groups. Regular ringers are assigned to group 69 and circuit code 13 must be specified; superimposed ringers are assigned to group 70 and circuit code 14 must be specified.

RC:CKT - This message is used to assign members to the ringer groups. A maximum of 127 members are allowed in each group.

RC:OFFICE - This message is required only when superimposed ringers are to be utilized to provide 4-party full selective service. Keyword SUP is used to specify superimposed ringers.

Refer to Input Message Manual IM-3H300 for further details concerning the use of these messages.

12.04 If the Enhanced Ringing features are to be implemented during the initial installation of the No. 3 ESS, the following forms must be completed and submitted to the WECo Regional Data Center as a part of the Office Data Administration (ODA) run.

- Form ESS 3100 Telephone Number Table—This table is used to list the telephone number, terminal equipment number, and line class code associated with lines subscribing to the Enhanced Ringing features.

- Form ESS 3306 Line Class Code Table—This table is used to define the line class codes associated with the Enhanced Ringing features.

- Form ESS 3201—This table is used to assign members to the ringer groups.

- Form ESS 3202—This form is used to define the group for regular and superimposed ringers (groups 69 and 70, respectively).

The highest member number must be specified, circuit code 13 must be specified for regular ringers, and circuit code 14 is used for superimposed ringers.

- Form ESS 3500—This form is used to indicate that superimposed ringers are provided for 4-party full selective service.

Refer to Translation Guide TG-3 for further details concerning the use of these input forms.

13. TESTING

13.01 The Enhanced Ringing features may be tested by making the appropriate station ringer test calls to verify the ringing codes.

14. OTHER PLANNING TOPICS

14.01 No other special planning is required for this feature.

ADMINISTRATION

15. MEASUREMENTS

15.01 The measurements required for this feature are the group traffic measurements consisting of peg, usage, and overflow counts. These measurements are requested generally by an autoconnect arrangement which is used to report measurements as described in Dial Facilities Management Practices Section 233-020-020.

16. CHARGING

16.01 Not applicable.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

17.01 The following list identifies terms used in this document.

- AC-DC Ringing—20 Hz of 86 ±2 Vac in series with -42.75 to 52.5 Vdc.
- AMARS—Automatic Message Accounting Recording Service
- ANI—Automatic Number Identification
- CAMA—Centralized Automatic Message Accounting
- CDPR—Customer Dial Pulse Receiver
- Reorder Tone—An audible signal (interrupted at a rate of 120 IPM) sent to the calling party to indicate that the call cannot be completed due to busy or unavailable equipment.
- Revertive Calling—A calling arrangement by which 2- and 4-party flat-rate customers (if there are no message rate customers on the line) on the same line may call each other without the assistance of an operator.
- Superimposed Ringing—A ringing method which utilizes a combination of ac voltage and either positive or negative dc voltage to obtain ringing selectivity on multiparty lines.
- TCR—Transient Call Record
- TEN—Terminal Equipment Number
- TSPS—Traffic Service Position System.

18. REFERENCES

18.01 The following documents may be referred to for information related to the Enhanced Ringing features.

- Section 233-060-210—Network Design Worksheets, Service Circuits, No. 3 ESS
- Section 233-190-107—Call Waiting Feature, No. 3 ESS
- Section 233-190-126—Multiparty Service, No. 3 ESS
- Section 233-190-203—Universal Emergency Service Number 911, No. 3 ESS
- Input Message Manual IM-3H300
- Output Message Manual OM-3H300
- Translation Guide TG-3
- Translation Layout Specification PA-3H300

- Recent Change Users Guide 233-154-130
- 502-000-000 Common Battery Station Sets
- CD and SD-3H406—Superimposed Ringing Circuit, No. 3 ESS
- CD and SD-3H410—Customer Dial Pulse Receiver and Regular Ringing Circuit, No. 3 ESS
- CD and SD-3H912—Scanner, Peripheral Pulse Distributor, and Peripheral Decoder Assignment Rules, No. 3 ESS
- CD and SD-82255—Ringing and Tone Plant