FEATURE DOCUMENT

CALL WAITING

NO. 3 ELECTRONIC SWITCHING SYSTEM

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NOTICE
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INTRODUCTION

1. GENERAL INFORMATION

1.01 This document covers the Call Waiting feature which allows a customer already involved in a conversation to know by means of a tone when another call is attempting to complete to that station. The call waiting customer can retrieve the calling party by hanging up and being rung back or by depressing the switchhook momentarily (flashing) placing the existing call on hold, and answering the waiting call.

1.02 This section is being reissued to include the 3E3 generic program information. Revision arrows are being used to emphasize the more significant changes.

1.03 Unless otherwise stated, the information contained in this document applies to all No. 3 ESS generic programs.

FEATURE AVAILABILITY

1.04 Call Waiting is a software feature and is made available in any No. 3 Electronic Switching System (ESS) office. Since this is a software feature, no additional hardware is required. Call waiting is implemented into the No. 3 ESS via an office data administration (ODA) run or by recent change.

2. DEFINITION

2.01 Call waiting is an arrangement that allows a customer already involved in a conversation to know by means of a call waiting tone when another call is attempting to complete to that station. The called station, by depressing the switchhook momentarily, can place the existing connection on hold, connect to the calling party, then by repeating the procedure, reestablish the original connection. This procedure can be repeated indefinitely.

DESCRIPTION

3. USER OPERATION

3.01 Call waiting is a feature that allows a calling station to be held waiting while a burst of tone is directed to the busy called station and is repeated once in 10 seconds if the called station user does not retrieve the waiting call. In this feature document, the call waiting (CW) station refers to the station that is provided with the Call Waiting feature and has a call held waiting. The calling station refers to the calling station being held waiting. Similarly, the original station refers to the station that was originally connected to the CW station.

3.02 The calling station user dials a station that is provided with the Call Waiting feature in the normal manner. If the CW station is not busy, the call completes in the normal manner. However, if the CW station is busy, the calling station user receives audible ring and the CW station user receives call waiting tone indicating that another call is held waiting. Call waiting tone is a burst of 440-Hz tone lasting for 300 milliseconds. This tone is repeated once after 10 seconds if the CW station does not retrieve the waiting call. The CW station user can perform any of the following actions:

- Hold the existing call and pick up the new call by flashing the switchhook.
- Hang up on the existing call. The new call rings the CW station, whereupon, the CW station user may answer as with a normal call.
- Ignore the held waiting call and continue with the existing call.

3.03 ***Hold the Existing Call and Pick Up the New Call***—If the CW station user flashes, the original party is put on hold, and the CW station is connected to the calling station. If the CW station user wishes to return to the original call, the CW station user flashes again, placing the calling party on hold and retrieving the original call. Note that all three parties cannot be brought together in a conference state; however, the CW party can alternate between talking to the calling party and the original party as many times as desired by flashing the switchhook each time. Other possible actions and responses are as follows:

(a) If the party talking to the CW party hangs up while another party is being held, then the CW party can retrieve the held party by flashing.

(b) If the held party hangs up, the remaining connection is retained as is. If the CW party flashes again and if the CW party was the calling party in the original 2-way connection, then the flash is treated as a disconnect and reorigination. If the CW party was originally the called party, the flash is ignored.

(c) If the CW party hangs up, the entire call is idled (torn down).

3.04 ***Hang Up on the Existing Call***—After the CW station receives the call waiting tone, the original call can now be disconnected by going on-hook. The CW station is then automatically rung back and, upon answer, is connected to the calling station.

3.05 ***Ignore the Held Waiting Call and Continue With Existing Call***—The CW station is given the call waiting tone and the tone is repeated once in 10 seconds if the CW station user does not retrieve the waiting call. The CW station user can ignore the waiting call and complete the original call. After the CW station user completes the original call, if the calling station is still waiting, the CW station is rung back and, upon answer, is connected to the calling party.

4. •SYSTEM OPERATION

4.01 The flow diagram, illustrated in Figure 1, is a graphical representation of the Call Waiting feature. ⧫Sheets 1 and 3 apply when the office is equipped with the SO-2, Issue 4A generic. Sheets 2 and 3 apply when the office is equipped with the 3E3 generic.⧫

4.02 When a calling party (C party) dials a called party (A party), the call is a candidate for call waiting treatment only if the A party line is busy and A party subscribes to call waiting service. If the A party line is idle, the call is completed in the normal manner (without call waiting treatment). If the A party line is busy but does not have call waiting service, the C party is given busy tone in the normal manner.

4.03 ⧫If program "TERM" determines that the call is a candidate for call waiting treatment, then control is passed to the call waiting routines in the Custom Calling Programs when the office is equipped with the SO-2, Issue 4A generic and is passed to the call waiting routines in CALLW8 when the office is equipped with the 3E3 generic.

4.04 At this time, if the office is equipped with the SO-2, Issue 4A generic, a traffic register is pegged, and another transient call record (TCR) is selected to record the original stable connection.⧫ If an idle TCR is not available, then C party is given busy tone. If an idle TCR is available, then a C party to A party talk path is selected. If a C party to A party talk path is not available, after 1 second another attempt is made to set up the talk path. If a path is still not available, then the A party to B party (B party refers to the original station user) call is returned to the normal stable state, and C party is given reorder.

4.05 ⧫Similarly, if the office is equipped with the 3E3 and later generics, a traffic register is pegged and then a C party to A party talk path is selected. If a C party to A party talk path is not available, after 2 seconds another attempt is made to set up the talk path. If a path is still not available, then the A party to B party (B party refers to the original station user) call is returned to the normal stable state, and C party is given reorder.⧫

4.06 If an A party to C party talk path is established, a call waiting tone circuit is selected if one is idle. ⧫If a call waiting tone circuit is not available, a second attempt is made in 1 second with the SO-2, Issue 4A, and 2 seconds with the 3E3 and later generics.⧫ If a call waiting tone circuit is still not available, then the A party to B party call is returned to the normal stable state and C party is given reorder.

4.07 ⧫When the office is equipped with the SO-2, Issue 4A generic, if a call waiting tone circuit was available, then the TCR is set up for giving tone to A party.⧫ The TCR now becomes a permanent call record (PCR). Subroutine NT_CONN selects a no-test vertical connection to give call waiting tone to A party. If a no-test vertical connection is not available, then the A party to B party call is returned to the normal stable state and C party is given reorder.

4.08 ⧫When the office is equipped with the 3E3 and later generics, if a call waiting tone circuit was available, then the TCR is set up for giving tone to A party. The CWAIT2 peripheral sequence is used to connect the call waiting party

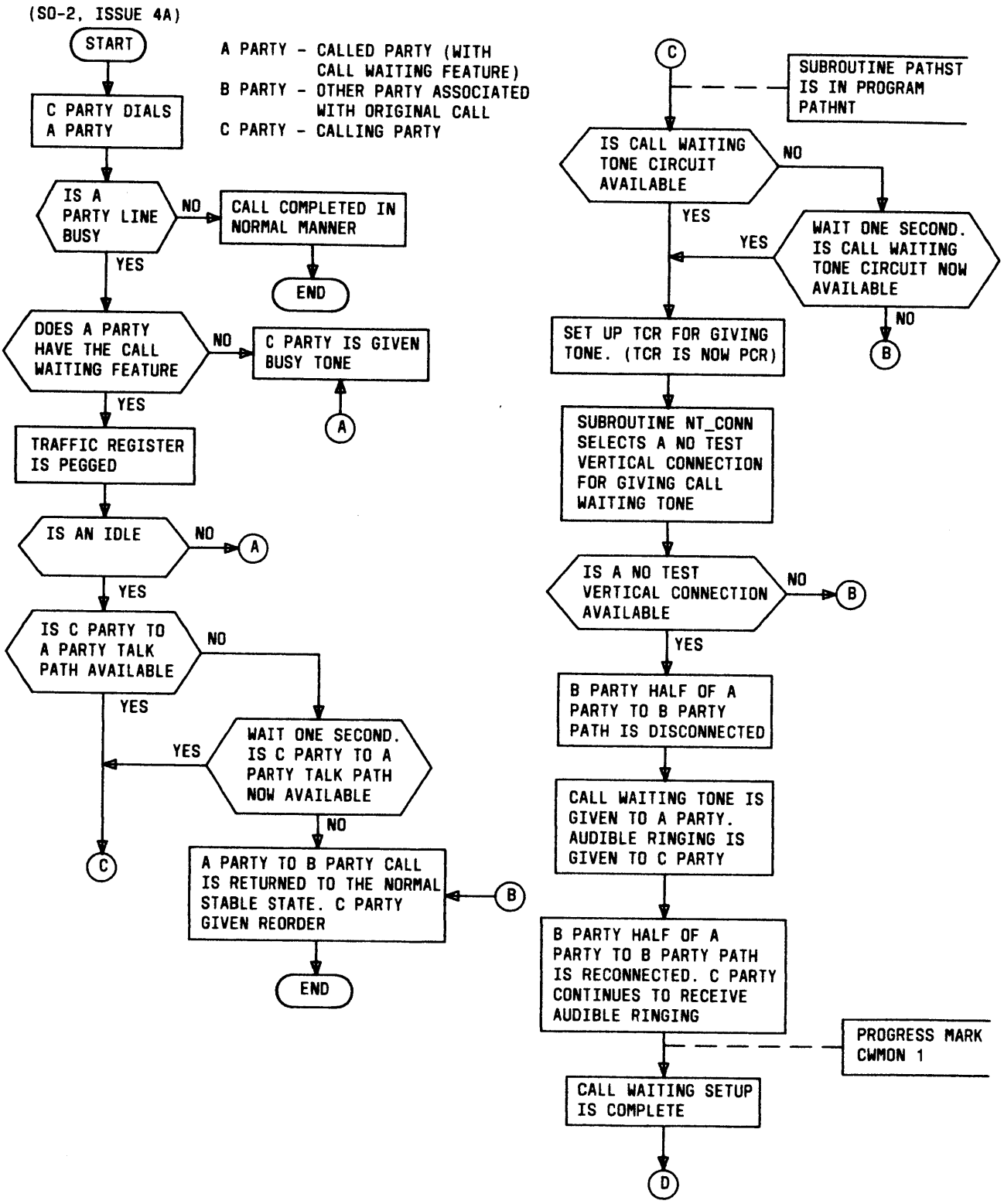

Fig. 1—Call Waiting—Feature Flow Diagram (Sheet 1 of 3)

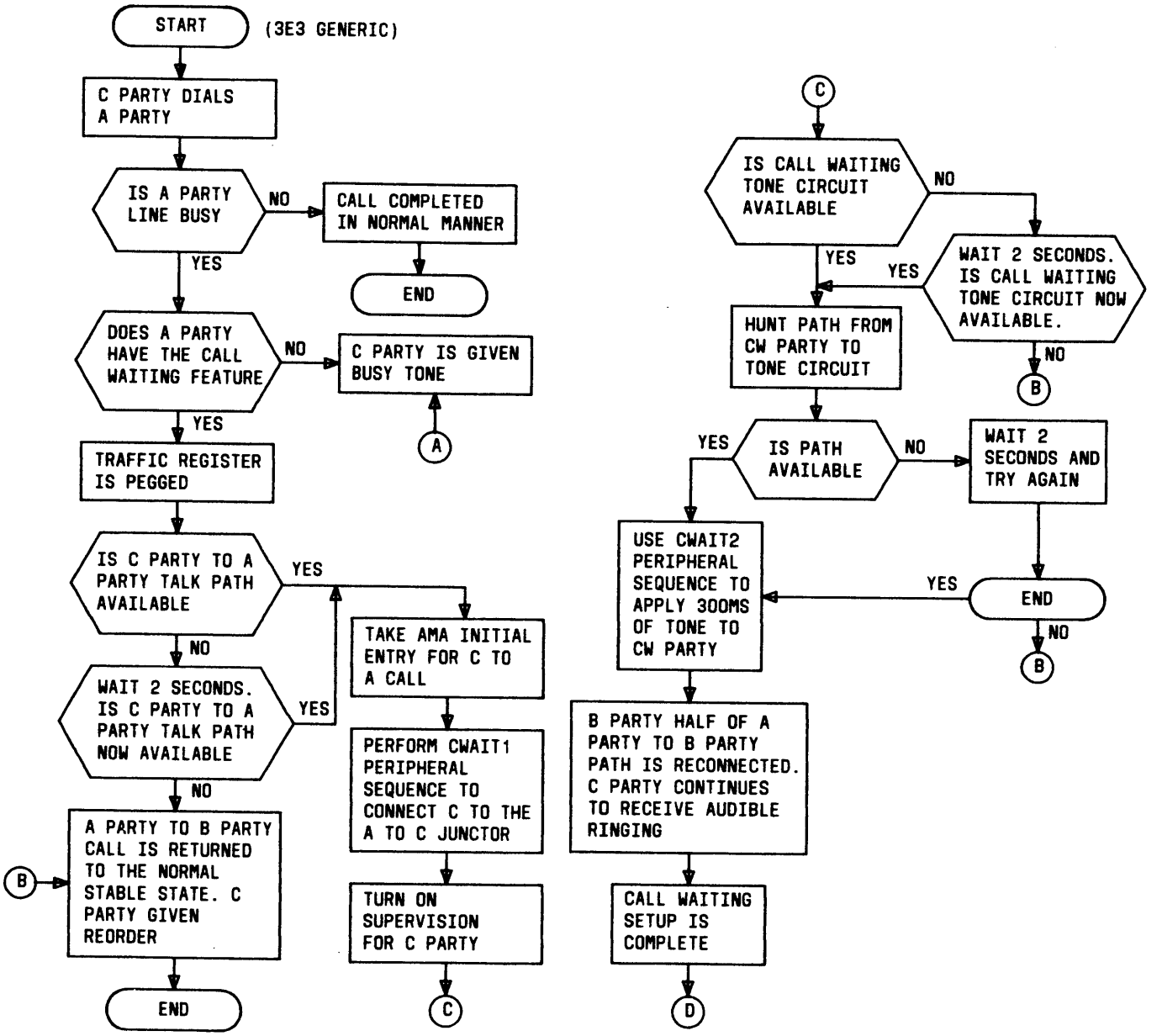

Fig. 1—Call Waiting—Feature Flow Diagram (Sheet 2 of 3)

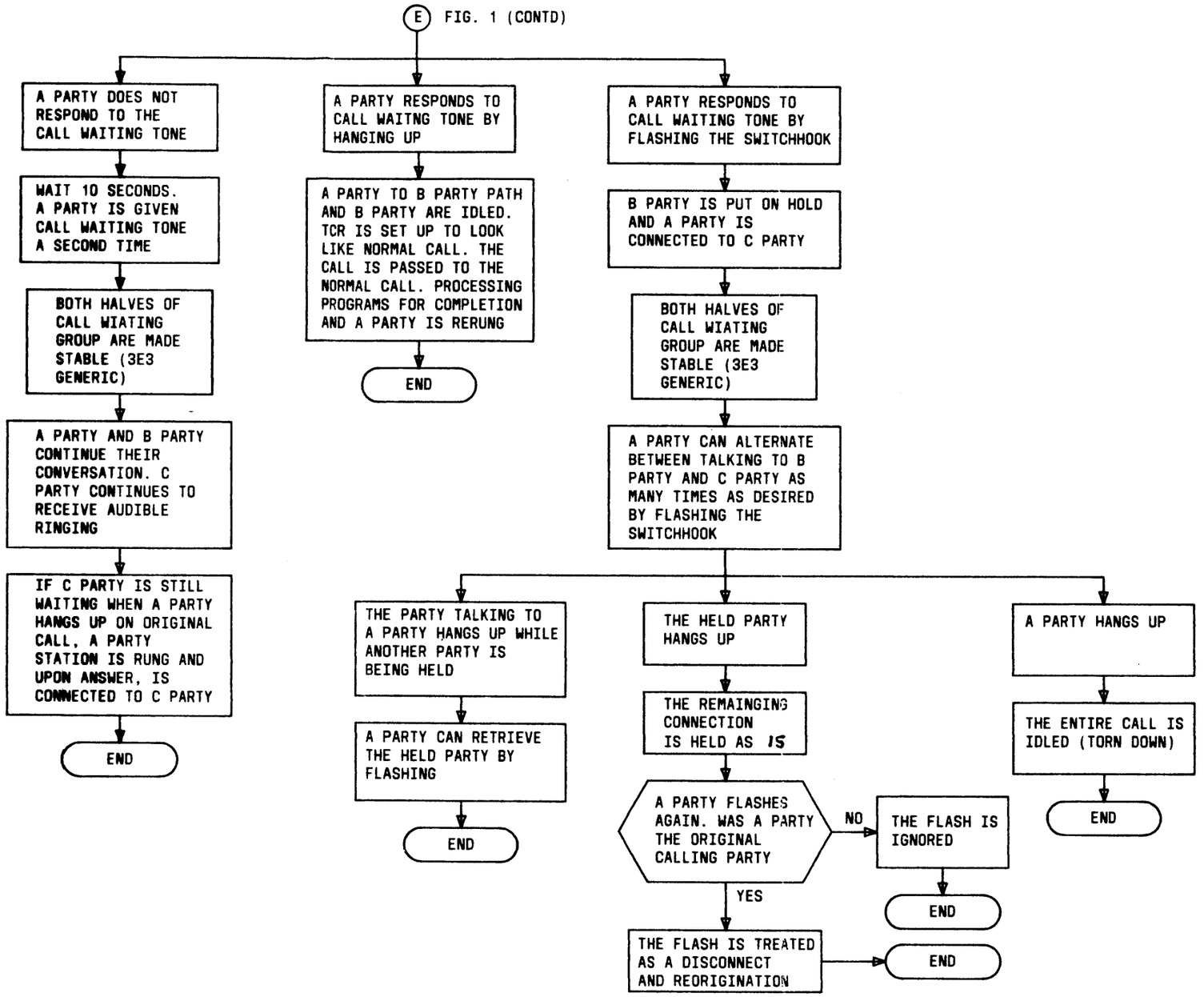

Fig. 1—Call Waiting—Feature Flow Diagram (Sheet 3 of 3)

to the call waiting tone circuit. CWAIT2 times for 300 ms while tone is applied. Then CWAIT2 reconnects A party to B party. A party can now take any one of the actions shown in paragraph 4.09.

4.09 When the office is equipped with the SO-2, Issue 4A generic, if a no-test vertical connection was made, the B party half of the A party to B party path is disconnected, and call waiting tone is given to A party.◀ The B party half of the A party to B party path is then reconnected, and the call waiting setup is complete. A party can now take any one of the following actions:

- A party does not respond to the call waiting tone.
- A party responds to the call waiting tone by hanging up.
- A party responds to the call waiting tone by flashing the switchhook.

4.10 ***A Party Does Not Respond to the Call Waiting Tone***—If A party does not respond to the call waiting tone within 10 seconds, then A party is given call waiting tone a second time. If A party still does not respond to the call waiting tone, then A party and B party may continue their conversation as C party continues to receive audible ringing. If C party is still waiting when A party completes the original call with B party, the A party station is rung and, upon answer, is connected to C party.

4.11 ***A Party Responds to Call Waiting Tone by Hanging Up***—If A party responds to the call waiting tone by hanging up, the A party to B party path and B party are idled. The TCR is set up to look like a normal call from C party to A party, and the call is passed to the normal call processing programs for completion and A party is rung.

4.12 ***A Party Responds to Call Waiting Tone by Flashing the Switchhook***—If A party responds to the call waiting tone by flashing the switchhook, then B party is put on hold and A party is connected to C party. A party can alternate between talking to B party and C party as many times as desired by flashing the switchhook each time.

4.13 If the party talking to A party hangs up while another party is being held, A party can retrieve the held party by flashing the switchhook.

4.14 If the held party hangs up, the remaining connection is retained as is; however, service parameters are reset to normal service so that A party can use any other service (ie, originate a threeway call or accept another call waiting call). If A party flashes again and if A party was the original calling party (in the original 2-way connection), the flash is treated as a disconnect and reorigination. If A party was originally the called party, the flash is ignored.

CHARACTERISTICS

5. FEATURE ASSIGNMENT

5.01 The Call Waiting feature is provided on a per-line basis.

6. LIMITATIONS

6.01 Only individual lines are permitted to have the Call Waiting feature.

6.02 Coin lines are denied custom calling services (including call waiting) because they cannot be charged for two calls at once, a situation which could arise for a line with call forwarding.

6.03 Call waiting is not applied to incoming calls involving the no-test operator. In calls involving a TSPS, CAMA, or recording completing operator, a flash to the operator is treated as such only if no call is waiting or being held.

6.04 ▶Series completion and call waiting are mutually exclusive custom calling features.◀

7. INTERACTIONS

7.01 ▶Call waiting is disabled when a call waiting customer with threeway calling service is using the threeway feature.

7.02 When a call waiting call involves a service hold trunk, the service hold feature is not used.◀

8. RESTRICTION CAPABILITY

8.01 Recent change methods may be used to add or delete the feature.

INCORPORATION INTO SYSTEM

9. INSTALLATION/ADDITION/DELETION

9.01 An office data administration (ODA) run is used to implement this feature for the initial office run.

9.02 Once implemented, recent change methods may be used to add or delete the feature for No. 3 ESS lines.

10. HARDWARE REQUIREMENTS

10.01 Ordering of SD-3H411 (J3H001CH, Trunk Order Code 60911) tone circuits to accommodate the anticipated number of call waiting calls is required. The circuit requires 4 inches of mounting space per unit. Refer to Section 233-060-210 for additional information.

11. SOFTWARE REQUIREMENTS

11.01 ◗When the office is equipped with the SO-2, Issue 4A generic, there are 3130 words attributable to the call waiting portion of the Custom Calling Programs.

11.02 When the office is equipped with the 3E3 generic, there are 1709 words in the two call waiting programs (CALLW8 and CW8STB).◖

11.03 The Call Waiting feature requires one translation bit per customer line.

12. DATA ASSIGNMENTS AND RECORDS

12.01 Figures 2 and 3 illustrate the translation layout for lines with the Call Waiting feature.

12.02 To provide the Call Waiting feature for the initial ODA run, the following forms should be completed. Refer to TG-3 for details and other information required to complete these forms.

FORMS	TITLE
3100	Telephone Number Table
3201	Trunk Assignment Table
3202	Trunk Group Table
3500-2	General Information Table.

12.03 The following RC messages are associated with the Call Waiting feature. Refer to No. 3 ESS Input Message Manual IM-3H300 for

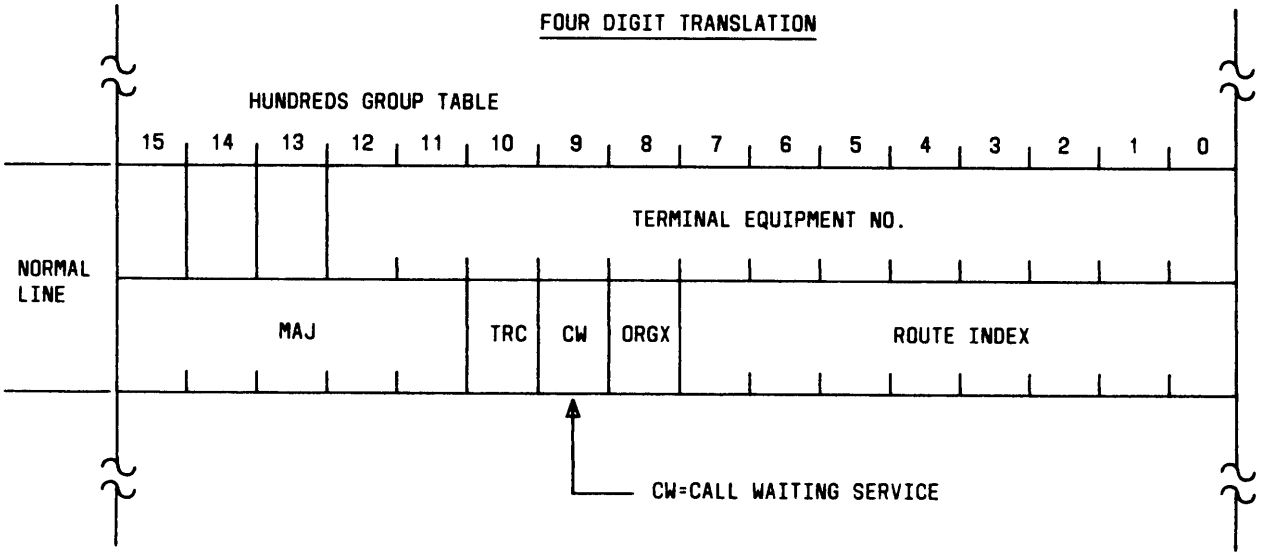

Fig. 2—Call Waiting—Translation Expansion (SO-2, Issue 4A Generic)

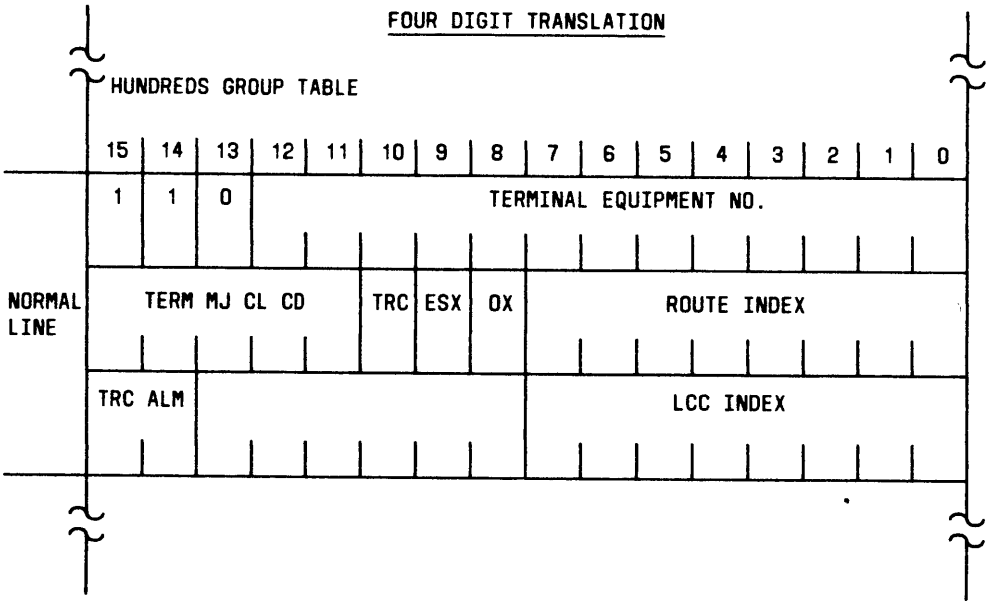

Fig. 3—Call Waiting—Translation Expansion (3E3 Generic)

details of these messages and their associated keywords.

RC	EXPLANATION OF MESSAGE
RC:LINE/	This RC message is used to add or delete the Call Waiting feature for a line.
RC:CKT/	This message is used to assign particular tone circuits (SD-3H411) to provide CW tone.
DIST:GRP/	This message is used to define the group if reallocation is necessary.

13. TESTING

13.01 No special testing is required for this feature other than placement of a test call to verify that the Call Waiting feature is operating correctly.

14. OTHER PLANNING TOPICS

14.01 In planning for this feature, completion of certain translation input forms is required to indicate whether or not each customer line is allowed this feature.

ADMINISTRATION

15. MEASUREMENTS

15.01 The following traffic and plant measurement is available for the Call Waiting feature. Refer to Section 233-152-135 for additional details.

OFT51—This count is pegged each time an attempt is made to complete a call to a busy line which has the Call Waiting feature.

16. CHARGING

16.01 There are no special charging requirements for the Call Waiting feature.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

17.01 The following list identifies terms used in this feature document.

- Call Waiting Tone—A burst of 440-Hz tone lasting for 300 milliseconds. It is used to inform a call waiting customer involved in a stable connection that another party is calling. The tone is heard only by the call waiting customer.

- Centralized Automatic Message Accounting (CAMA)—A centralized system for automatically recording the required billing data for toll calls. Calls from a number of offices may be concentrated and recorded there.

- Off-Hook—A condition indicating that a station is in use (line loop closed).

- Office Data Administration (ODA) Run—Mechanism by which translation information may be assembled or changed for a No. 3 ESS. Information from the ESS input forms is inputted into the regional ODA computer, assembled, then sent to the No. 3 ESS.

- On-Hook—The condition indicating that a station is idle (line loop open).

- Permanent Call Record (PCR)—A term that is used to refer to the transient call record that is being used to provide the call waiting tone.

- Reorder Tone—An audible signal (interrupted tone) sent back to the calling party to indicate that the call cannot be completed. It says that equipment between the calling and called parties is busy. It is usually interrupted at a 120-ipm rate and is sometimes called fast busy.

- Switchhook Flash—A depression of the switchhook lasting for a minimum of 200 milliseconds and a maximum of 1.2 seconds.

- Traffic Service Position System (TSPS)—An electronic system to provide a means for extending customer direct distance dialing to include person-to-person, collect, credit card, charge to a third party, and coin service.

- Transient Call Record (TCR)—A 16-word block of temporary store assigned to monitor calls in a transient state.

18. REFERENCES

18.01 The following documents provide supplementary information concerning the Call Waiting feature described in this document.

- PR-3H152—Custom Calling Programs

- ⧫PR-3H190—Call Waiting Program (CALLW8)

- PR-3H191—Stable Call Waiting Program (CW8STB)⧫

- PA-3H3XX—Office Data Tables Layout Specification, No. 3 ESS

- OM-3H300—Output Message Manual, No. 3 ESS

- Section 233-150-130—Recent Change Users Guide

- TG-3, Translation Guide

- Section 233-060-XXX Series—Network Design Engineering Practices