

FEATURE DOCUMENT
CALL FORWARDING
NO. 3 ELECTRONIC SWITCHING SYSTEM

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NOTICE

Not for use or disclosure outside the
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INTRODUCTION

1. GENERAL INFORMATION

1.01 Call forwarding is an arrangement that allows a local office customer to redirect calls intended for his telephone to another telephone. The customer can activate or deactivate the service at any time.

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

FEATURE AVAILABILITY

1.03 The Call Forwarding feature is available to the free calling area or to toll areas. The latter requires use of the Automatic Message Accounting Recording Systems (AMARS) feature.

1.04 ♦Unless otherwise stated, the information in this document applies equally to the SO-2, Issue 4A generic and the 3E3 and later generics.♦

2. DEFINITION

2.01 Call Forwarding is a feature that allows a customer to redirect incoming calls intended for the customer's telephone to another telephone. The customer initiates call forwarding by dialing the call forward activate code followed by the directory number to which calls are to be forwarded. The customer cancels call forwarding by dialing the call forward cancel code.

DESCRIPTION

3. USER OPERATION

3.01 To activate the Call Forwarding feature, the customer, using a TOUCH-TONE® instrument supplied with the number sign (#) button, dials the digits 72 plus the number sign (#). If the customer is using a dial-type or TOUCH-TONE instrument without the number sign button, the digits 72 are dialed and a 4-second time-out is used in lieu of the number sign. The 4-second time-out signifies the completion of the access code for call forwarding.

3.02 After completion of the access code, the customer receives a second dial tone and

dials the directory number (either 7 or 10 digits) to which calls are to be forwarded. If the "forward-to" number is answered, call forwarding is activated.

3.03 If the "forward-to" number does not answer, the customer can activate the transfer by redialing the call forward activate code and the same directory number within 2 minutes. On the second attempt, confirmation tone is returned to the customer indicating that call forwarding is activated.

3.04 When a customer has the Call Forwarding feature activated and receives a call, a short ring is given to indicate that a call has been received and call forwarding has been activated.

3.05 To deactivate call forwarding, the customer dials a cancellation code consisting of the digits 73 plus the number sign (#) or 73 plus a 4-second time-out. Confirmation tone is returned to the customer indicating that call forwarding has been cancelled.

4. SYSTEM OPERATION

4.01 The user first dials the access code (72# or 72 plus time-out), then on receipt of the second dial tone, dials the directory number (either 7 or 10 digits) to which calls are to be forwarded. The customer's call forwarding entry is marked "in-progress" in the temporary store and a connection is completed to the "forwarded-to" directory number. If answer supervision is received from the called party, the call forwarding entry is activated. In the case of an outgoing call, the entry is activated when the call is set stable to wait for answer. The calling party may now verify the correctness of the "forwarded-to" directory number and alert the "forwarded-to" party of his intentions.

4.02 If answer supervision is not received for an intraoffice call, the inactive call forwarding entry remains in temporary store for 2 minutes, after which it is cleared. If the user redials the access code 72 followed by the same directory number within 2 minutes, confirmation tone is returned, indicating the entry has been activated.

4.03 Each time a party with call forwarding activated is dialed, the call forwarded line is given a short ring to indicate that a call has been forwarded. The call is then completed to

the "forwarded-to" directory number as though it had been dialed.

4.04 If the customer attempts to forward calls when the service is already active, the attempt will be routed to reorder.

4.05 If, in a second attempt, the two directory numbers do not match, this second attempt is handled as a first attempt. The old call forward entry is cleared, and an inactive entry is set up using the new directory number and a ringing connection is established.

4.06 On outgoing calls, the call forwarding entry is marked active on the first attempt regardless of the final disposition of the call. During the timing that this feature is active, the station using the Call Forwarding feature may still be used in the normal manner.

4.07 The user may terminate call forwarding by dialing a cancellation code (73# or 73 plus time-out). Confirmation tone is returned indicating that the call forwarding entry has been cleared.

4.08 Each forwarding attempt is handled independently. Thus, if station "A", for example, forwards to station "B" who in turn forwards to station "C", a new incoming call destined for station "A" would be forwarded to station "B" and then on to station "C".

4.09 Call forwarding service produces some unique situations with respect to charging. Suppose, for instance, that A, B, and C are customers in a No. 3 ESS office and that calls from "A" to "B" and from "C" to "A" are message register calls. Also, that "A" (who has call forwarding service) forwards calls to "B" and that "C" calls "A" while the forwarding option is activated. The call is completed as though "C" had dialed B's directory number, and when "B" answers, a stable talking connection is established between C and B. Party C is to be charged for a call to "A", and party "A" is to be charged for a call to "B". However, it cannot be determined from information about the stable connection that "A" was ever involved in the call. Hence, special provisions are made in the No. 3 ESS so that "A" will be properly charged for A's leg of the call.

4.10 The Call Forwarding feature for any customer can be activated or deactivated by the No. 3 ESS local test desk.

Calls to a Forwarded Line

4.11 When a party with the Call Forwarding feature is dialed, the customer's call forwarding entry is examined to determine if the feature is activated. If the entry is not active, control passes back to normal call processing for completion.

4.12 If the entry for the called line is active, the "forward-to" number is inserted into the Transient Call Record (TCR) digit storage area associated with the call, which is otherwise initialized to appear as if that number had actually been dialed. Any subsequent calls to the forwarded line during the next minute will receive busy tone. This timing prevents the call from being routed back to the original station and getting into an endless loop due to two stations being "call forwarded" to each other. The calling party may still receive busy tone if the "forward-to" line is actually busy.

4.13 If the original called line is idle at the time a call is forwarded, a short ringing sequence is also executed. This is an entirely independent action. The sequence consists of connecting the line whose calls are forwarded to a regular ringer and giving it a 0.5-second burst of ringing. All supervision is ignored. An off-hook by the customer at this time is not regarded as an answer but as an origination. The ring burst is intended to remind the customer that the call forwarding service is active.

4.14 The feature flow diagram illustrated in Figure 1 is a graphical representation of the Call Forwarding feature.

CHARACTERISTICS

5. FEATURE ASSIGNMENT

5.01 The Call Forwarding feature described in this document is provided on a station basis and is available for use to free calling areas, and to toll area if the AMARS feature is provided.

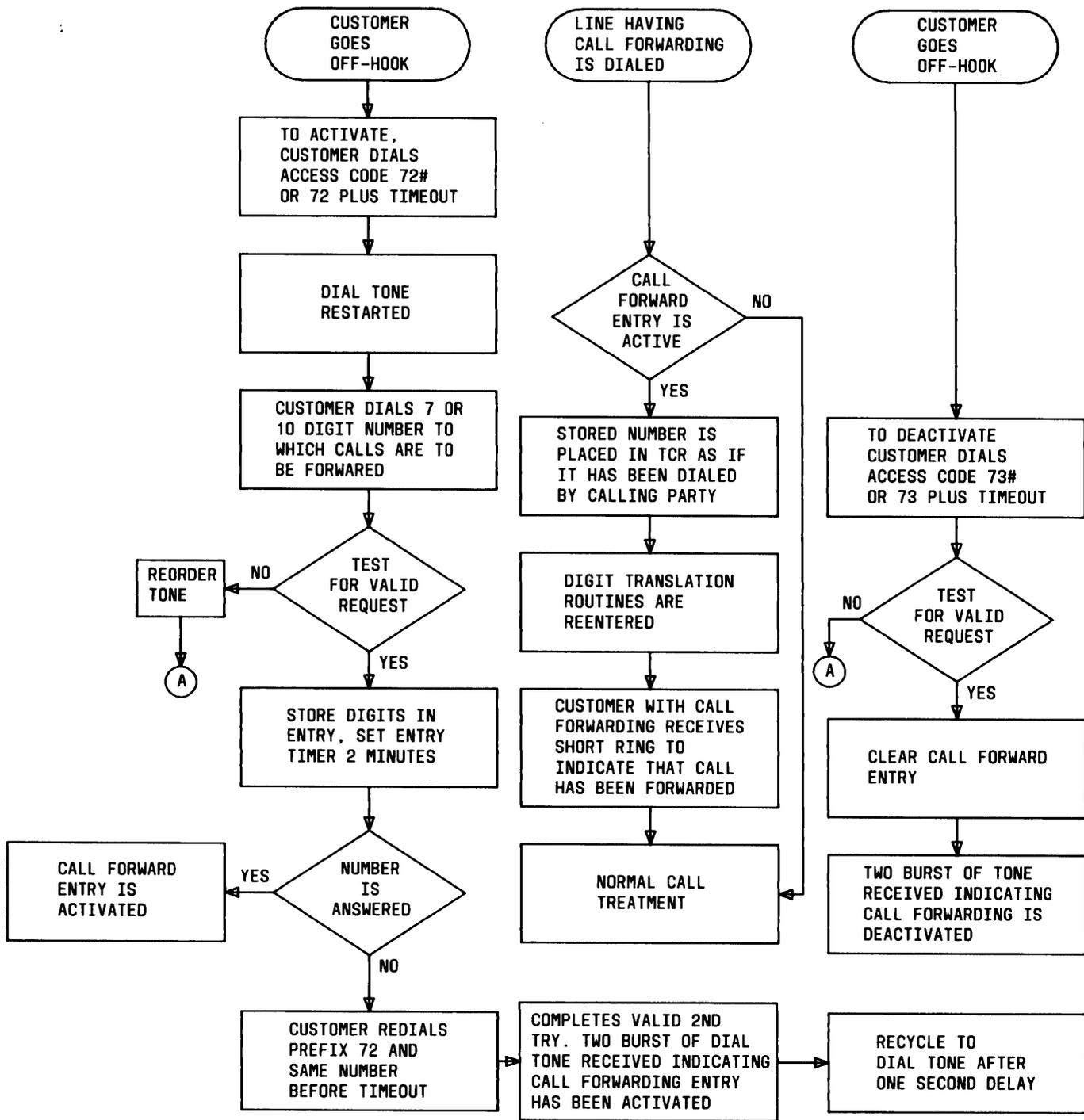


Fig. 1—Feature Flow Diagram—Call Forwarding

6. LIMITATIONS

6.01 Reorder tone may be reached while attempting to activate the Call Forwarding feature if it is already activated. In this case, if the "forward-to" number is to be changed, the feature must first be deactivated before the new "forward-to" number can be activated.

6.02 Series completion lists should not have the Call Forwarding feature, as the activation of this feature will end the hunting of the series. This could result in customer confusion and should be thoroughly explained to the customer.

6.03 The use of the Call Forwarding feature is limited to individual residence, business, teletypewriter service (TWX), and mobile radio lines.

6.04 Call forwarding is not permitted to the operator (0), dial directory assistance (411), emergency number (911), repair service bureau (611), or through centralized automatic message accounting (CAMA), traffic service position (TSP), or Traffic Service Position System (TSPS) offices.

6.05 Call forwarding is not permitted to be activated through the speed calling list. However, calls may be forwarded to a speed calling number.

6.06 The number of stations with call forwarding service allowed at any one time is based on the number of call forward entries provided by the operating company (No. 3 ESS gives a dedicated entry to each subscriber for call forwarding). ♦The maximum number of lines with call forwarding is 4096. This maximum could be reached in the 3E3 and later generic.♦ The number of lines that can have the Call Forwarding feature, or any other feature that requires temporary store, is limited by the amount of temporary store available. A fixed area of temporary store is reserved for AMA buffer, software, message registers, group data, and call forwarding.

6.07 ♦For the SO-2, Issue 4 generic, there are 5700 words available and for the 3E3 generic, there are 7168 words available.♦ If AMARS is provided, then only 2900 words are available ♦for the SO-2, Issue 4A generic and 4368 words are available for the 3E3 generic♦ (AMARS requires 2800 words). Software message registers require

one word per register. Service circuit groups, PBX groups, multiline hunt groups, and trunk groups require four words per group plus the total of all members in all groups divided by 16 (and rounded up) words. Coin circuits require the number of circuits divided by 12 (and rounded up) number of words. ♦The call forwarding list requires four temporary store words per entry with the SO-2, Issue 4A generic and one word with the 3E3 generic per entry.

6.08 As an example, for a 1200-line central office using the SO-2, Issue 4A generic and with the AMARS feature and 170 trunk and service circuits with 40 groups and 25 coin stations (no software message register or PBX or multiline hunt groups), there is temporary store space for 681 call forwarding entries. In addition, when using the 3E3 generic, a 1200-line central office with the AMARS feature and 170 trunk and service circuits with 40 groups and 25 coin stations (no software message register or PBX or multiline hunt groups), there is temporary store space for 4195 call forwarding entries; but the maximum number of entries allowed is 4096.♦

$$\blacklozenge \frac{1}{4} \left[\frac{2900 - (4 \times 40) - \left(\frac{170}{16}\right) - \left(\frac{25}{16}\right)}{4} \right] = 681$$

$$\left[4368 - (4 \times 40) - \left(\frac{170}{16}\right) - \left(\frac{25}{16}\right) \right] = 4195 \blacklozenge$$

6.09 Call forwarding outside the free calling area cannot be provided without the AMARS feature.

6.10 The maximum number of chargeable legs active at any one time is limited to 32.

7. INTERACTIONS

7.01 Activated call forwarding does not interact with normal use of the station for originating calls. Calls will be completed to the "forwarded-to" station even if the call forwarded station is busy.

SECTION 233-199-105

7.02 If a normal call from the forwarded line to the "forwarded-to" station is a charge call, every call forwarded will be billed to the call forwarded line for that leg of the call.

7.03 The Call Forwarding feature described in this document has precedence over the night stop feature.

7.04 Call forwarding may be assigned on an individual basis to members of a multiline hunt group (MLHG). When a call is placed to a member with call forwarding activated, normal hunting is ignored and the call is forwarded. Reaching a forwarded member via the hunt process will not forward the call and normal hunting continues.

7.05 Lines with series completion may be assigned the Call Forwarding feature; however, when call forwarding is activated, the series completion number is ignored and the call is forwarded. See paragraph 6.02.

8. RESTRICTION CAPABILITY

8.01 If two or more call forwarding customers forward calls in a closed loop (eg, "A" forwards to "B", and "B" forwards to "A"), then customers who attempt to call any party involved in the loop will receive busy tone. Unless at least one of the customers deactivates his call forwarding service, calls to any of them will not be completed.

8.02 Stations are provided with the ability to call forward by translators on a per-directory number basis. Either a recent change input message, or an office data administration (ODA) run must be provided in order to allow or deny call forwarding for each station.

INCORPORATION INTO SYSTEM

9. INSTALLATION/ADDITION/DELETION

9.01 The Call Forwarding feature described in this document may be implemented into any No. 3 ESS office by using a recent change input message or an ODA run to assign this feature.

10. HARDWARE REQUIREMENTS

10.01 There are no hardware requirements that apply to the feature described in this document.

11. SOFTWARE REQUIREMENTS

11.01 ♦*Generic Program*—Call forwarding requires approximately 450 words when the office is equipped with the SO-2, Issue 4A generic and 1200 words when equipped with the 3E3 generic.♦

11.02 ♦*Translation Memory*—♦In SO-2, Issue 4A only, one bit in each line♦ is required to define whether the line has call forwarding or not.

11.03 ♦Six♦ words are required for the ♦two♦ Master Table Index (MTI) entries.

11.04 ♦One word (two words if call forwarding is the only feature the line has) is required for each line with the call forwarding feature. In addition, with the 3E3 generic, two words per line are required to store up to eight digits.

11.05 For those lines that forward to more than eight digits, an additional 2-word expansion is needed.

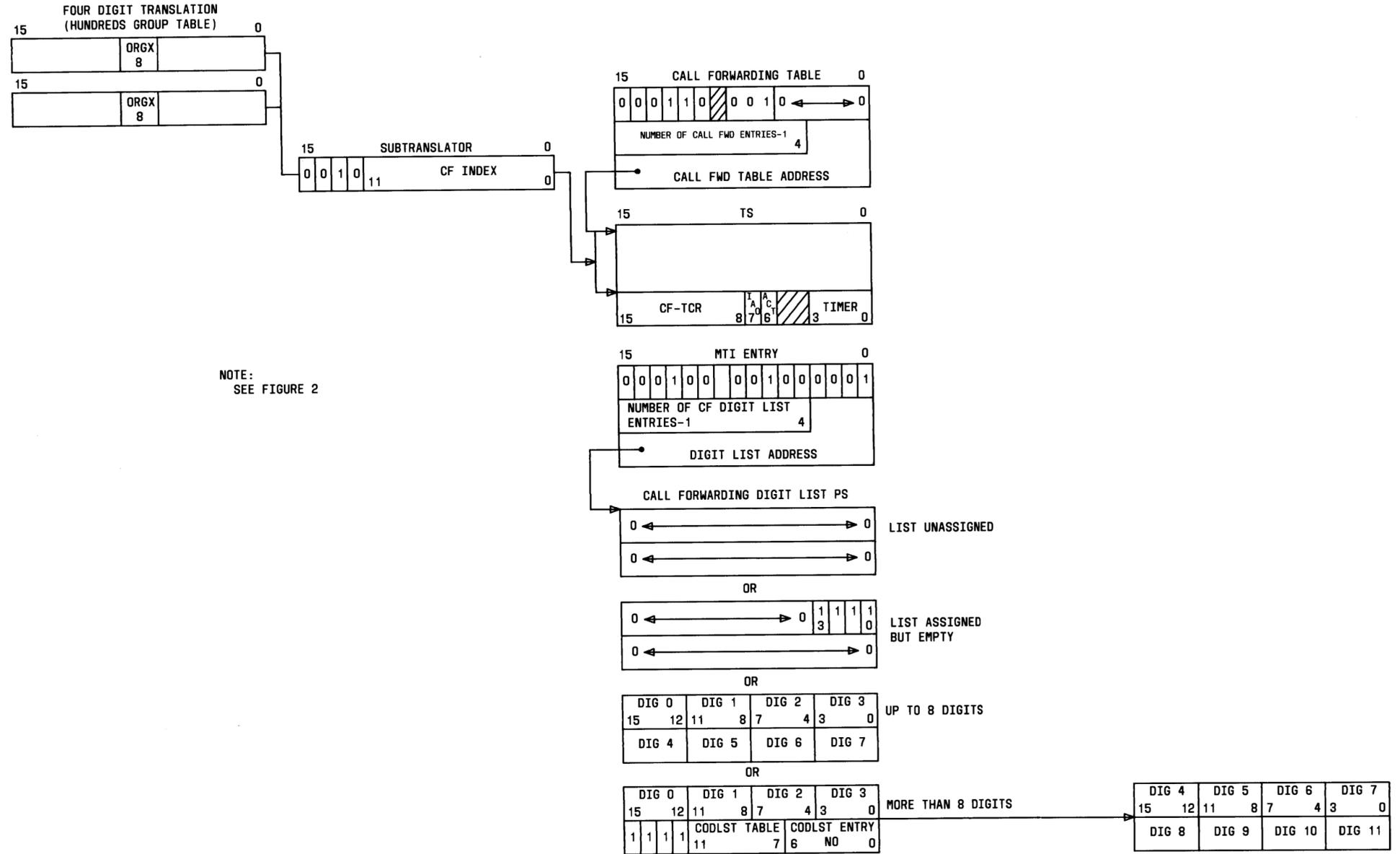
11.06 ♦*Temporary Store*—Each entry requires four words in the call forwarding table when the office is equipped with the SO-2, Issue 4A generic and one word when the office is equipped with the 3E3 generic.♦

11.07 Refer to Network Design Section 233-060-450 for information concerning determination of software requirements.

12. DATA ASSIGNMENTS AND RECORDS

12.01 Figures 2 and 3 contain a simplified version of the translation layout of the Call Forwarding feature described in this document.

12.02 In order to incorporate the Call Forwarding feature in a new No. 3 ESS office, an ODA run is utilized. ♦To incorporate Call Forwarding into an existing office, a reallocation may be needed.♦ When an ODA run is needed, the following input forms should be prepared and submitted to



NOTE:
SEE FIGURE 2

Fig. 3—Translation of Call Forwarding (3E3 Generic)

the WECo Regional Center. Normal scheduling procedures should be observed in preparing these input forms.

- **ESS-3100—Telephone Number Table**—This form is used to define the directory numbers (DN) that may have the feature described by this document. The Call Forwarding feature must be indicated in the Equipment and Features portion for each line to be assigned this feature.

- **ESS-3500—General Information Table**—This form is used to define the number of call forwarding lists which will be required (see paragraph 6.06).

12.03 For additional information and copies of reproducible forms, see Division 5 of the Translation Guide, No. 3 ESS, TG-3.

12.04 Recent change messages are available for adding and deleting the Call Forwarding feature for a main station.

RC MESSAGE	FUNCTION
RC:LINE/	To add or delete individual line information. ESM is the keyword for call forwarding and is used with either YES or NO.
RC:MTL/	To add or delete line information for multiline hunt groups. ESM is the keyword for call forwarding and is used with either YES or NO.
VER:CFN:TN/	To verify the call forwarding number associated with a customer number.
OP:FEA/	When used with the keyword ESM, this message is used to count and print the number of lines equipped with call forwarding. (Available with the 3E3 and later generic program.)

◆DIST:CF◆ This message adds or deletes call forwarding entries to the CFTBL and CFLST translators.

◆DIST:COD2 This message adds or deletes two word code list expansion blocks. Used for call forwarding to a number greater than eight digits.◆

13. TESTING

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

14. OTHER PLANNING TOPICS

14.01 In order to add, change, or delete the Call Forwarding feature, the appropriate recent change messages described in DATA ASSIGNMENTS AND RECORDS must be employed. The ESS forms should be completed only in the case of the initial ODA run.

ADMINISTRATION

15. MEASUREMENTS

15.01 The following traffic measurements are available in the standard form of a peg count. For additional details concerning the measurements available for the Call Forwarding feature, refer to Division 8 of the No. 3 ESS Translation Guide, TG-3.

- **OFT48** Number of times customers with the Call Forwarding feature dial the call forwarding activation code.
- **OFT49** A 100-second usage measurement on all call forwarding registers which are in use.
- **OFT50** Number of calls for which a forwarding attempt was made.

16. CHARGING

16.01 See SYSTEM OPERATION, paragraph 4.10, and INTERACTIONS, paragraph 7.02, for information applicable to charging.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

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

- **Centralized Automatic Message Accounting (CAMA) System**—A centrally located facility that provides automatic billing of toll calls for nearby local switching offices.
- **Multiline Hunt Group (MLHG)**—A customer optional feature which allows calls to hunt over a group of customer facilities in order to connect a calling party with an idle facility within the group.
- **Office Data Administration (ODA)**—Mechanism by which translation 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.
- **Recent Change (RC) Message**—The ability to change certain translations within the No. 3 ESS via teletypewriter input.
- **Time-Out**—A nominal 4-second period. If no customer action occurs during this period

and the correct number of digits was dialed, end of dialing is assumed.

- **Number Sign (#)**—The # is the twelfth digit on a TOUCH-TONE telephone and is used in the same way that time-out is used.
- **Confirmation Tone**—Two bursts of dial tone, 100 ms on, 100 ms off, and 300 ms on. After 1 second, steady dial tone then follows. This tone is used to indicate to the customer that a call forwarding activation attempt was successful.

18. REFERENCES

18.01 The following documents may be referenced for supplementary information concerning operations related to the Call Forwarding feature.

- IM-3H300—Input Message Manual No. 3 ESS
- PA-3H3XX—Office Data Tables Layout Specification No. 3 ESS
- OM-3H300—Output Message Manual No. 3 ESS
- Section 233-154-130—Recent Change Users Guide
- TG-3, Translation Guide