# CUSTOM CALLING (GENERIC 3E3)
# SOFTWARE SUBSYSTEM DESCRIPTION
# NO. 3 ELECTRONIC SWITCHING SYSTEM

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## 1. GENERAL

**1.01** A No. 3 Electronic Switching System (ESS) customer can subscribe to one or a combination of custom calling services. The custom calling services available in the 3E3 generic are:

- Speed Calling
- Call Forwarding
- Call Waiting
- Threeway Calling.

**1.02** ▶This section is being reissued to include the common call store buffer (CCDIGXLA) which allows changes in the structure of the data base without causing user programs to change. Revision arrows are used to emphasize the more significant changes.◀

**1.03** Part 8 consists of a glossary of terms and definitions necessary for comprehension of the information contained in this document.

**1.04** The purpose of this software subsystem description (SSD) is to provide an overview of the software which handles the custom calling features available in a No. 3 ESS using the 3E3 generic program. The acronyms used in this document are listed in Table A. Additional information related to custom calling functions in a No. 3 ESS may be found in the following sections:

| SECTION | TITLE |
|---|---|
| 233-151-125 | Input Processing and Scanning SSD, No. 3 ESS |
| 233-151-130 | Basic Call Processing SSD, No. 3 ESS |
| 233-151-140 | Network Path Hunt SSD, No. 3 ESS |
| 233-151-145 | Digit Processing SSD, No. 3 ESS |
| 233-151-150 | Translations SSD, No. 3 ESS |
| 233-190-105 | Call Forwarding, No. 3 ESS |
| 233-190-107 | Call Waiting, No. 3 ESS |
| 233-190-136 | Speed Calling, No. 3 ESS |

**1.05** Translations data for each customer line indicates the presence of the custom calling features for the given line. The custom calling programs which are speed calling activation and initiation (SPDCAL-PR3H188), call forwarding activation and initiation (CL4WRD-PR3H189), call waiting tone application (CALLW8-PR3H190), stable call waiting monitor (CW8STB-PR3H191), and conference calling (TREWAY-PR3H184) handle the processing of calls for a customer using these features. Control is passed to the custom calling programs from various other call processing programs. These include the digit interpretation program

TABLE A

TABLE of ACRONYMS

| | |
|---|---|
| CF | Call Forwarding |
| CW | Call Waiting |
| CWC | Call Waiting Customer |
| CWG | Call Waiting Group |
| ESS | Electronic Switching System |
| POTS | Plain Old Telephone Service |
| SSD | Software Subsystem Description |
| TCR | Transient Call Record |
| TMR | Terminal Memory Record |
| TTY | Teletypewriter |

(DNTRP), the completion of incoming and intraoffice calls program (TERM), the outgoing call program (OUTCAL), and the disconnect progress marks program (DISCON).

## 2. SPEED CALL—OVERVIEW

**2.01** The speed calling service provides capability for the subscriber to call a number of preselected directory numbers by dialing abbreviated codes of 1 or 2 digits. Subscription to the 1-digit service provides a maximum of 8 stored codes (2-9), and subscription to the 2-digit service provides a maximum of 30 stored codes (20-49). Speed call digits are stored in permanent memory (not call store). Hence, the digits are not lost on a system initialization up to and including a stable clear.

### A. Change or Enter Speed Call

**2.02** (See Fig. 1.) The operating company may optionally allow a customer to change the speed call list (via the RC:SCN message) or to inhibit customer change of the speed call list (via the RC:OFFICE command). Changes and entries to the speed call list are made by dialing one of two access codes ("74" for the 8-code list or "75" for the 30-code list). (See Fig. 2.) When the digit interpretation program (DNTRP) detects the access code, it returns dial tone to the subscriber as a signal to begin the entry update. The 1- or 2-digit code for the particular entry is dialed first and then the complete number (plus area code, if any, and prefix) is dialed. This data (both code and number) is then stored in the transient call record (TCR) digit storage area. (See Fig. 3.) The call is processed like other calls until it reaches the outgoing call program (OUTCAL) or the terminating call program (TERM). A custom calling activation check (CCACTCK in the call forwarding program) is made and control is passed to the speed call change subroutine (SCCNG) in the speed calling activation and initiation program (SPDCAL). After the translation is complete and the number is validated, the subscriber will receive a confirmation tone (see glossary). The number has now been stored in the speed calling list.

**2.03** The TERM or OUTCAL program calls subroutine CCACTCK in the call forwarding

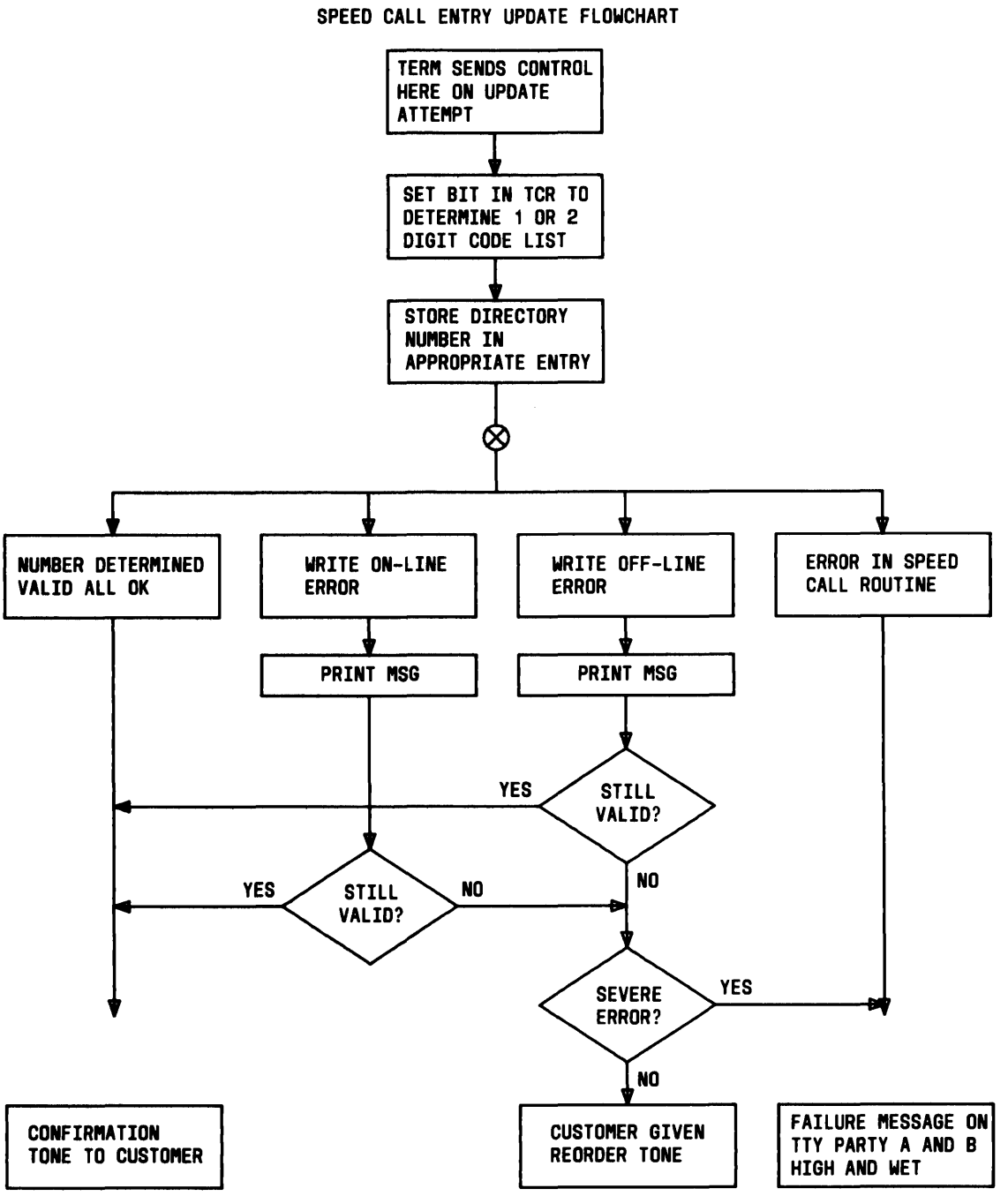


**Fig. 1—Speed Call Entry Update Flowchart**

program. The SCCNG subroutine in SPDCAL is used to change the speed call list. The subroutine tests for a valid code, writes the phone number into the on-line and off-line machine, gives confirmation tone, and reenters the digit interpretation program at the CUSTCHNG entry point. Recent change messages are also available which allow service order access to the speed call list. The recent change message can be used to fill the customer list rather than, or in addition to, optionally allowing the customer to use dial access to change the list.

### B. Possible Errors and Resultant Actions

**2.04** If the attempt to store the number fails, one of several error conditions could exist. Error conditions are passed to the SCCNG routine

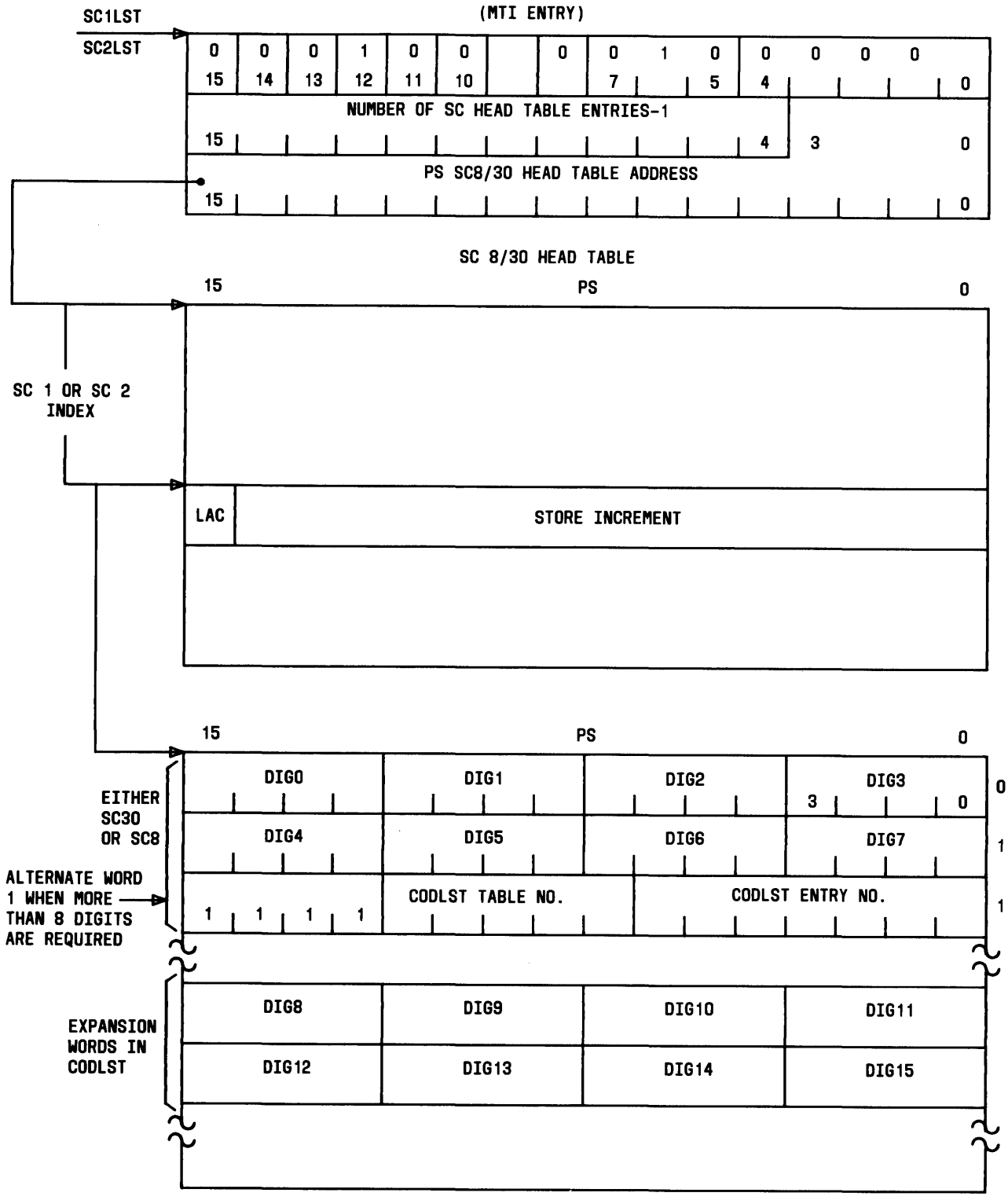


Fig. 2—Speed Call List

| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | ACTIVE | PERTN | PPM<br>PERIPHERAL ORDER PROGRESS MARK | | | | | | | | | | DISCRTN | CUSCALL | INTPM | |
| 01 | SPLTONE | 2NDTRY | SPLAUD | TPTH | BPTH | APTH | BACTION | PERM | BASEPM<br>BASE LEVEL PROGRESS MARK | | | | | | | |
| 02 | TIMER<br>TIMER USED BY TCRSCAN (UNITS = 10 MS) | | | | | | | | | | | | | | | |
| 03 | PRTY | ACTP | | | PECODE<br>PERIPHERAL ERROR CODE | | | | PEDATA<br>PERIPHERAL ERROR DATA | | | | RADO | | | |
| 04 | RAD1<br>LOW ORDER BITS OF THE RETURN ADDRESS | | | | | | | | | | | | | | | |
| 05 | LKSRA | LLA | LINEA | APARTY<br>APARTY TEN. | | | | | | | | | | | | |
| 06 | RVRSA | AJCTR<br>THIS DEFINES THE JUNCTOR USED FOR APTH | | | | | | | ASVC<br>APARTY SERVICE CKT NUMBER (LOW 8 BITS OF SPN) | | | | | | | |
| 07 | LKSRB | LLB | LINEB | BPARTY<br>BPARTY TEN. | | | | | | | | | | | | |
| 08 | RVRSB | BJCTR<br>THIS DEFINES THE JUNCTOR USED FOR BPTH | | | | | | | BSVC<br>BPARTY SERVICE CKT NUMBER (LOW 8 BITS OF SPN) | | | | | | | |
| 09 | RVRST | TJCTR<br>THIS DEFINES THE JUNCTOR USED FOR TPTH | | | | | | | FLAG_AREA | | | | | | | |
| 10 | INCDIGCT<br>INCOMING DIGIT COUNT | | | | SPARE | CDPR_DTA | | | | | | | | | | |
| 11 | OGT_DTA | | | | | | | | | | | | | | | |
| 12 | DIGSTR | | | | DIGSTR | | | | DIGSTR | | | | DIGSTR<br>DIGIT STORAGE AREA | | | |
| 13 | DIGSTR | | | | DIGSTR | | | | DIGSTR | | | | DIGSTR | | | |
| 14 | DIGSTR | | | | DIGSTR | | | | DIGSTR | | | | DIGSTR | | | |
| 15 | DIGIT STORAGE AREA | | | | DIGIT STORAGE AREA | | | | DIGIT STORAGE AREA | | | | SIGDIG | | | |

Fig. 3—Transient Call Record Format

via a call to subroutine SPCL_PUT in the customer-dialed change program (CDCHG). These possible errors and their resultant actions are:

(a) Error in SCCNG on SPDCL:

- All paths are torn down
- Customer is given reorder tone.

(b) Possible Errors in Write On-Line Store:

- Write error, on-line store, attempted to restore "old" data
- Data base may be contaminated
- Failure message on TTY
- Control returned to calling program
- Party A and B placed in high and wet state
- 5-Second delay and TCR cleared.

(c) Possible errors in write off-line store:

- A second try was necessary to write digits into the off-line store
- Confirmation tone error
- A second try to write in off-line data is not possible; data base may be contaminated
- Failure message on TTY
- Control returned to calling program
- Party A and B placed in high and wet state
- 5-second delay and TCR cleared.

(d) Preempted by high priority system function or action (system initializations, memory reloads, manual TTY request, speed call reallocation, call forwarding reallocation, off-line boot, or backdate [past office data lamps are on]).

- Failure message on TTY
- Control returned to calling program
- Party A and B are placed in high and wet state
- 5-Second delay and TCR cleared.

### C. Processing Speed Call

**2.05** (See Fig. 4.) The customer goes off-hook, hears dial tone, and dials the 1- or 2-digit code which is followed by a 4-second timeout (when using a rotary dial handset); or when using a TOUCH-TONE® phone, the pound sign (#) is depressed. The digit interpretation program (DNTRP) determines if the customer has the speed calling feature. Control is given to DOSC1 (speed call list 8) or DOSC2 (speed call list 30) subroutine so that the list can be accessed and the full number can be loaded into the transient call record. The subroutines convert the 1- or 2-speed call code dialed by the customer into the directory number it represents. The translation is handled by the SPCL_GET subroutine in the customer-dialed change program (CDCHG). The SPCL_GET subroutine loads the number into a call store buffer (CCDIGXLA—See Fig. 5) and returns control to SPDCAL. The number is inserted into the TCR and control is returned to DNTRP (at SPEEDIN_) for continuation of call processing.

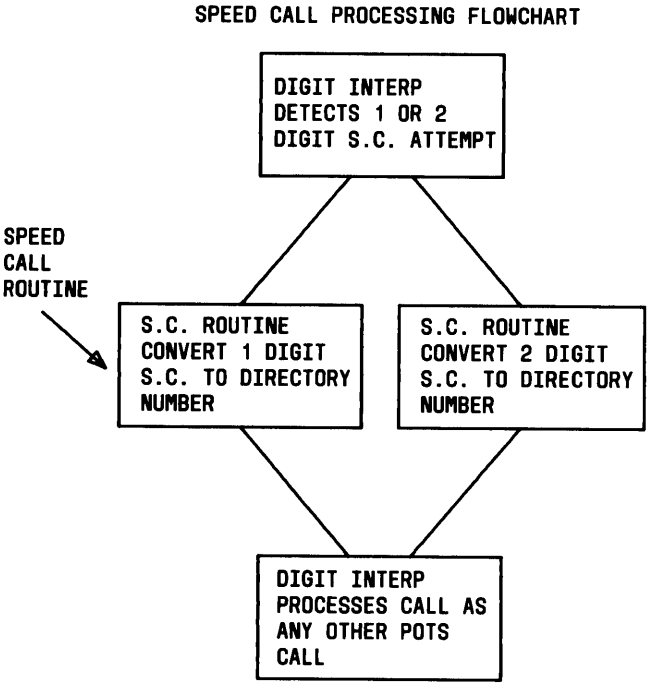


**Fig. 4—Speed Call Processing Flowchart**

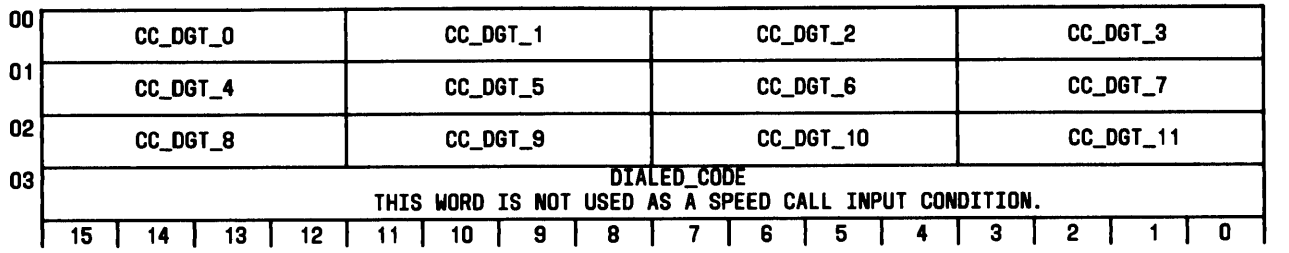


**Fig. 5—Temporary Speed Call Storage Buffer (CCDIGXLA)**

**2.06** When there is a speed call error (cannot load speed call list into buffer), subroutine FAILSUB in the call failure program (FALTCR) prints a failure message on the TTY.

## 3. CALL FORWARDING-OVERVIEW

**3.01** The Call Forwarding Activation and Initiation Listing (CL4WRD) contains the bulk of the call processing code that is used to implement the call forwarding (CF) feature. The CF feature provides capability for the subscriber to have calls transferred to another number by requesting the operating telephone company to assign the number via the recent change facilities, or by the customer dialing the change. Once activated, an incoming call will result in a single burst of ringing at the CF customer phone and then the call being sent to the forwarded number. The CF customer phone can be used for outgoing calls when CF is activated. Only a no-test operator can terminate to the customer phone during CF activation. The CF feature can be deactivated by recent change messages or by the customer dialing a special access code. If the CF customer chooses to forward the directory number to one associated with a toll charge, then the user will be billed for that leg of the call every time the call is answered. ▶All input and output of digits is accomplished via a temporary call forwarding storage buffer (CCDIGXLA—See Fig. 6). Program store is loaded with the digits from CCDIGXLA.◀ Hence, the digits are not lost on a system initialization up to and including a stable clear.

### A. Activation—Call Forwarding

**3.02** (See Fig. 7) To activate CF service, the subscriber dials the special access code "72" and presses the pound sign (#) or waits 4 seconds. The digit interpretation program (DNTRP) sets the CF bit and gives a second dial tone to the CF customer. Now the CF customer dials the directory number to which the calls are to be forwarded. The call proceeds as an ordinary call until the termination program (TERM) calls the CCACTCKI subroutine in CL4WRD. The CCACTCK (called by the outgoing call program) and CCACTCKI (called by TERM) subroutines are the entry points to the custom calling activation check subroutine. Two entry points are needed because different transient call records (TCRs) are given to the subroutine. The CCACTCK differentiates between a speed call or call forward attempt.

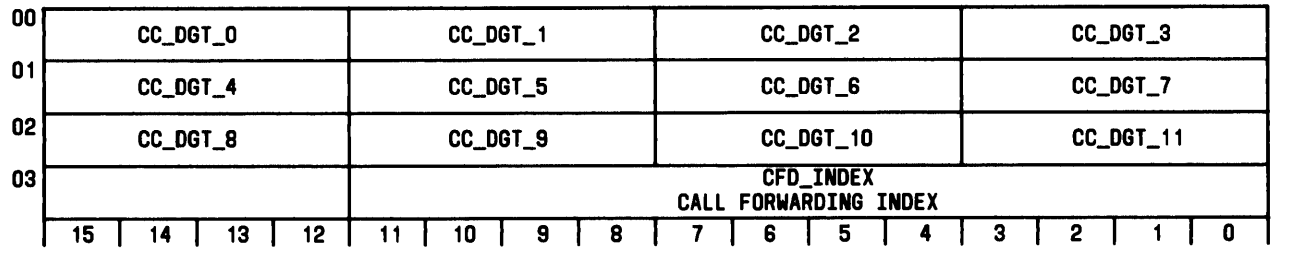


**Fig. 6—Temporary Call Forward Storage Buffer (CCDIGXLA)**

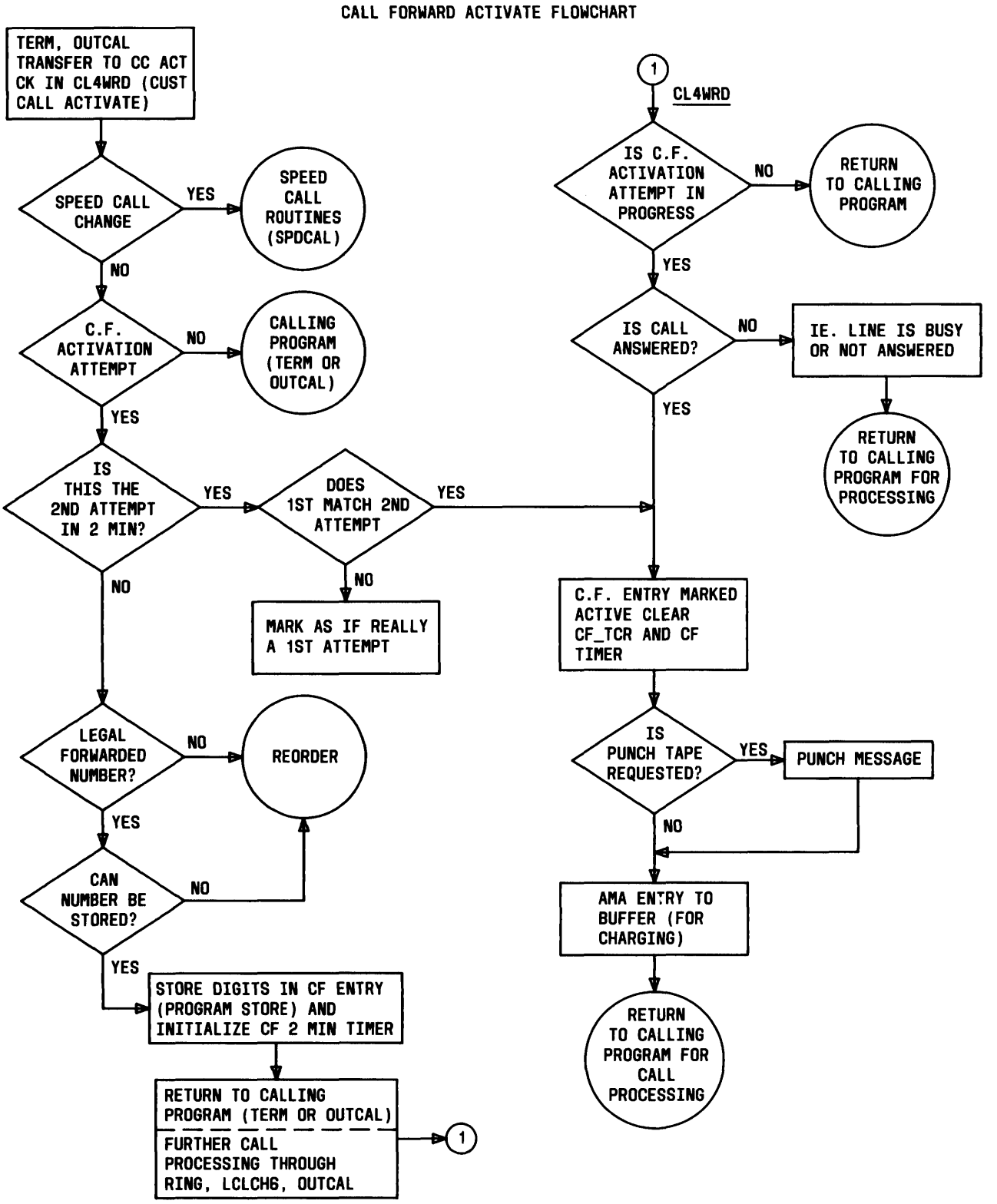


Fig. 7—Call Forward Activate Flowchart

**3.03** Now one of three things can happen:

(1) The second dialed number is answered. Subroutine CFSTBL is called by OUTCAL, ring and answer—completion of interoffice calls (RING), or local charging—coin and message register (LCLCHG). The CFSTBL subroutine, which is in the CL4WRD program, checks for a call forwarding activation attempt in progress. If the INPROG bit is set, the CF service is activated by clearing the CF timer, TCR number, and INPROG bit, and setting the ACTENT bit.

(2) The second dialed number is not answered or is busy. The call forwarding service is not activated. However, the subscriber may still activate the call forward service to the dialed number by hanging up and repeating the procedure above within 2 minutes. In this case, if the second dialing matches the first and is still not answered or is busy, the subscriber will receive a confirmation tone. However, when the second dialing does not match the first dialing, then the first dialing is ignored and the second is treated as another first activation attempt.

**3.04** ▶Subroutine CHECK_CF is given control by either CCACTCKI or CCACTCK for CF attempts. The CF bit is tested to determine if there is a CF activation attempt. When set, subroutine CFV_GET (Call Forward Variable Get) in the Customer Dialed Change Program (CDCHG) is called to retrieve the CF digits and index. The CF index is retrieved by Scan Point Number Translation Program subroutines CLFRD, LNDATA, and CF_EXP. Logic at DGTS_GET in CDCHG then obtains the call forwarding digits from the customers originating translations. The call forward index and digits are loaded in the call store buffer (CCDIGXLA—See Fig. 6). If the CF digits and index are not retrieved, control is passed to logic beginning at CFADDROK. The CF entry status is now checked to determine if this is the first, second, or an invalid activation. Upon entry to the logic beginning at CFADDROK, subroutine CLFTS (Call Forwarding Temporary Store Access) in program CDCHG is called. The CLFTS subroutine obtains the contents of the temporary store timer word (CFTIM) and the address of the CF entry. (See Fig. 8.) The temporary CF digit storage area (CCDIGXLA) is tested for an all-zero condition. The first attempt subroutine (1STATT) is given control when the CF entry is inactive (the all-zero condition). When the all-zero condition does not exist, the INPROG bit in the CF entry is tested to determine if the call forwarding entry is in the process of activation. If set, control branches to the 2NDATT subroutine. If INPROG is not set, the CF entry is zeroed. The ACTENT bit is set, and the customer is given reorder.◀

**3.05** ▶The 1STATT subroutine determines if the CF attempt is valid. An intraoffice call from a trunk or a line test panel access trunk is invalid. Trunk calls to a local test desk, a trunk that does not return answer, or a trunk that requires automatic number identification pulsing are also invalid. The CF customer is given a reorder tone when invalid attempts occur. The 1STATT subroutine can be called (via the 2NDATT subroutine) when the second number dialed does not equal the first attempted number. For valid attempts control is given to subroutine SET_UP_1ST_ATTEMPT. The dialed digits are obtained from the TCR and moved to the temporary store buffer CCDIGXLA (via DIG_ST in the Speed Calling Activation and Initiation Program). The maximum number of digits to be stored is retrieved from the TCR. After the maximum number of digits to be stored is exceeded, zeroes are stored in the remaining digit locations of CCDIGXLA. The CFV_PUT subroutine in CDCHG is called to retrieve (from CCDIGXLA), format, and store the digits in the associated call forward entry. The CF entry is initialized with the TCR number for call forwarding activation. The INPROG bit is set. The CFTIM is set to 2 minutes. Call forwarding is activated if an answer is received from the "forward to" number. The customer can continue to complete the call by dialing

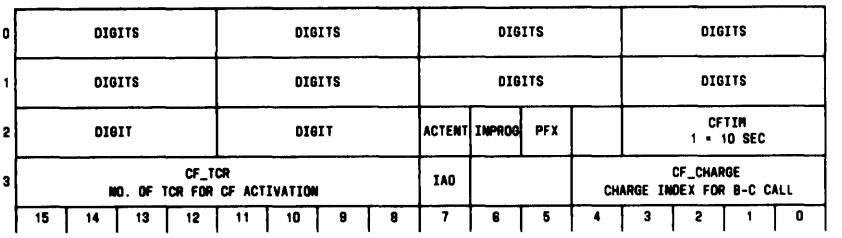


**Fig. 8—Call Forward Entry (Temporary Store)**

the number to be forwarded again. The second attempt to the same number within 2 minutes (CF TIMER=2 minutes) results in successful activation.◀

**3.06** ▶The 2NDATT subroutine compares the two phone numbers attempted. Control is passed to 2NDATT when the in-progress bit (INPROG) is set. When the first attempt phone number does not equal the second attempt, the old CF entry is cleared (via CLEAR_OLD_CF). External subroutine CFV_ZRO in CDCHG is called to zero the temporary store buffer CCDIGXLA. The 1STATT subroutine is then given control. If the phone numbers were equal, the active entry bit (ACTENT) in the CF entry is set. The remainder of the CF entry is zeroed (cleared). Each time CF activation is successfully completed, the telephone number of the caller and the number to be forwarded to is printed on the maintenance TTY. The activation message is printed by calling CFU_MSG in CDCHG. Confirmation tone is given, and the call is allowed to complete. On a system initialization involving a memory reload, the call forward information is brought up-to-date by inputting CF activations since the last OPDATA (data base tape update process). Typically this is not more than a 24-hour period. Possible errors and resultant actions are the same as those in paragraph 2.04 [except for part (a)].◀

**3.07** ▶The CONFTONE subroutine gives confirmation tone to the CF customer when call forwarding is deactivated (by dialing 73) or activation occurs on the second attempt. The confirmation tone is given by overriding the timer (by setting BACTION bit in TCR) in order to apply or remove dial tone. Confirmation tone is 100 ms of dial tone followed by 100 ms of silence which is then followed by another 300 ms of dial tone. Subroutine IS_CF is given control when the second attempt to activate call forwarding is successful. The TCR is loaded with data necessary to complete the call. The Completion of Incoming and Intraoffice Calls Program (TERM) and the Outgoing Call Program (OUTCAL) use different TCR configurations. Before control is returned to the calling program (via (GOTORA), the appropriate TCR configuration must be generated.◀

### B. Processing—Call Forwarding

**3.08** (See Fig. 9) Once the termination program (TERM) recognizes that the called party (B) is a line with call forwarding service, CFACTCK in CL4WRD is entered. If the calling party is an operator (no-test trunk), the call is completed normally regardless of whether call forwarding is active. Normal completion is handled through LBT in TERM.

**3.09** ▶The CFACTCK subroutine determines if the CF entry is active. The digits are retrieved (via CFV_GET) and stored in CCDIGXLA. When an all-zero condition exists in CCDIGXLA, the CF entry is not active. The call is then terminated in the normal manner by branching to the line busy test (LBT) in TERM. When CCDIGXLA contains digits, control is given to subroutine AGREEMENT_TEST. The data in the write protected store (CCDIGXLA) is compared to the data stored in writable store (CF entry). If the data agrees, control is passed to the SET_ACTIVE subroutine. If not, the ACTENT bit in the CF entry is tested. When ACTENT is not set, the call is terminated (via LBT in TERM). Control is given to subroutine IT_IS_ACTIVE when the ACTENT bit is set. The call will now be forwarded unless a CF chain has looped back. If the loop type of call were allowed to complete, it would continue to loop until all existing facilities (lines and/or trunks) over a given route were exhausted. To prevent the CF chain from looping back, no other call is allowed to be forwarded through a CF entry unless the timer equals zero. Therefore, the CF entry timers for completed CF calls are set to 1 minute. Further, when the timer has not timed out, busy tone is returned to the caller and control passes to the tone subroutine, ANTON.◀

**3.10** The actual forwarding leg of the call proceeds after a check on the charge index (via CFV_CI) is made. If a toll is required, subroutine AOK in CL4WRD selects, idles, and initializes another terminal memory record (TMR). The secondary TMR is used purely for storing the charge data from the forwarded leg of the call so that the CF subscriber can be billed.

**3.11** ▶The number to be forwarded is stored in the CF entry (via CFV_PUT). Subroutine CFV_GET then retrieves the digits from the CF entry and stores the digits in the temporary store buffer CCDIGXLA. The digits are copied from CCDIGXLA into words 12 through 14 of the TCR.◀ If a CF subscriber charge is not necessary, CL4WRD branches to the PEGREG subroutine which handles the storage. The PEGREG subroutine also initializes the TCR (of terminating call) with

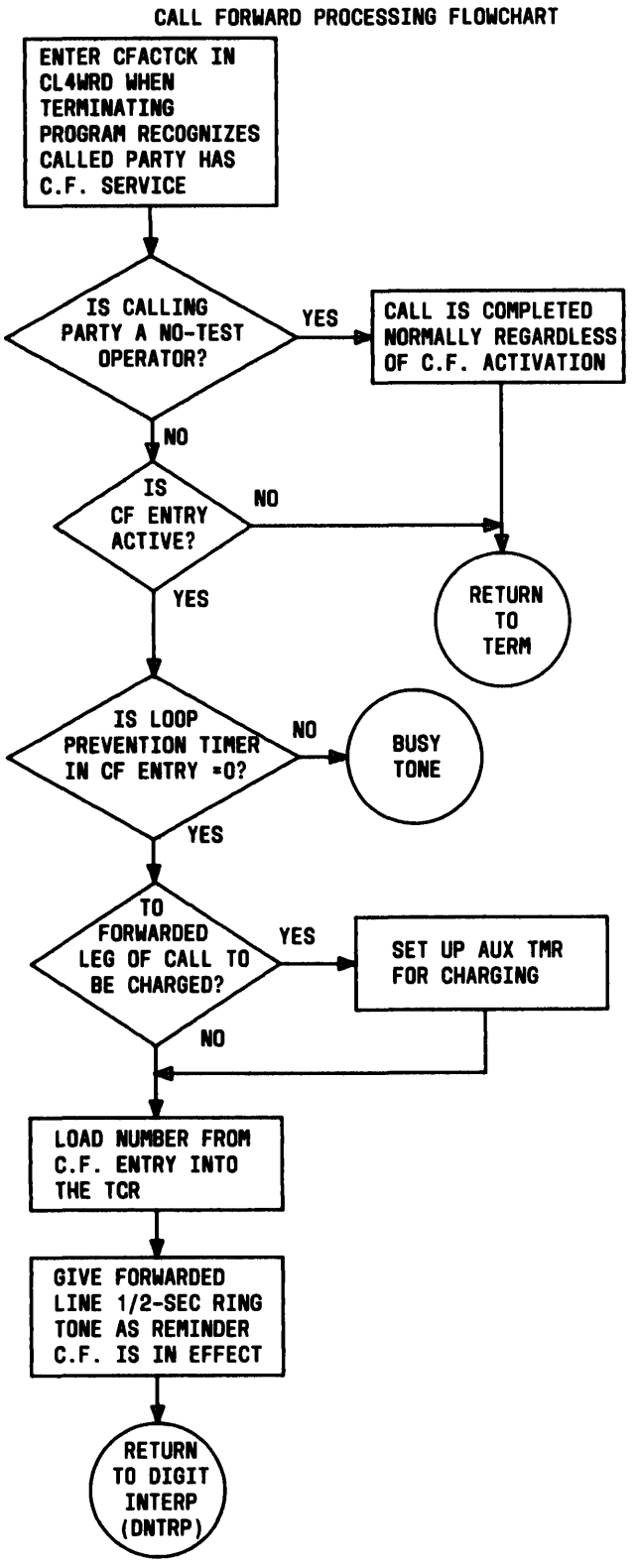


**Fig. 9—Call Forward Processing Flowchart**

other data which is needed by DNTRP. The entry timer is set to 60 seconds to prevent a loop. The charge index, toll diversion bit, and possible incoming trunk flags are stored in the TCR. Subroutine FAILSUB in the call failure program (FALTCR) prints a failure message on the TTY when blank digits in an active CF entry are detected.

**3.12** After the call has been set up to be forwarded, the normal call processing programs handle the remainder of the call. The last task to be completed before the call is set up is the momentary ringing of the CF customer. CL4WRD now rings the CF subscriber base phone for 1/2 second as a reminder that the CF option is in effect. This is done by the following programs: TCRSEL and TRKSEL subroutines in the equipment selection subroutines program (EQPSEL); subroutine PATHST in network path hunt, busy, and idle program (PATHNT); and the CONNECT subroutine in the peripheral operation subroutines program (POPS). Ringer path, CF lines, and the TCR used for the 1/2 second ring are idled upon completion of the ring and control returns to the base level monitor.

**3.13** It should be noted that if TCRSEL fails to locate an idle TCR, or if TRKSEL fails to find an idle ringer, the (1/2 second ring) associated line and TCR are idled, the 1/2 second ring is skipped, and control returns to the base level monitor.

### C. Deactivate—Call Forwarding

**3.14** (See Fig. 10) Since the forwarding service remains activated for an unspecified time, a deactivation process is necessary. Therefore, to deactivate the service, "73" is dialed. DNTRP detects and interprets this cancellation code and control is passed to subroutine CFOFF in CL4WRD. If the CF entry is not active, the customer receives the custom calling error treatment (a special announcement). ▶Otherwise, the CF entry is deactivated. Deactivation is recorded (via the AMA_CFD entry). The CFV_ZRO subroutine clears the customer CF entry in program store CCDIGXLA. Subroutine CFV_MSG prints the deactivation. Finally, the customer is given a confirmation tone (via CONFTONE). After the confirmation tone has been given, deactivation is complete. The customer is returned to a normal dial tone.◀ The CF customer gets the custom calling error announcement or reorder upon trying to deactivate CF when the

feature is not active. The ANTON subroutine in CUSTER handles the announcement.

CALL FORWARD DEACTIVATE FLOWCHART

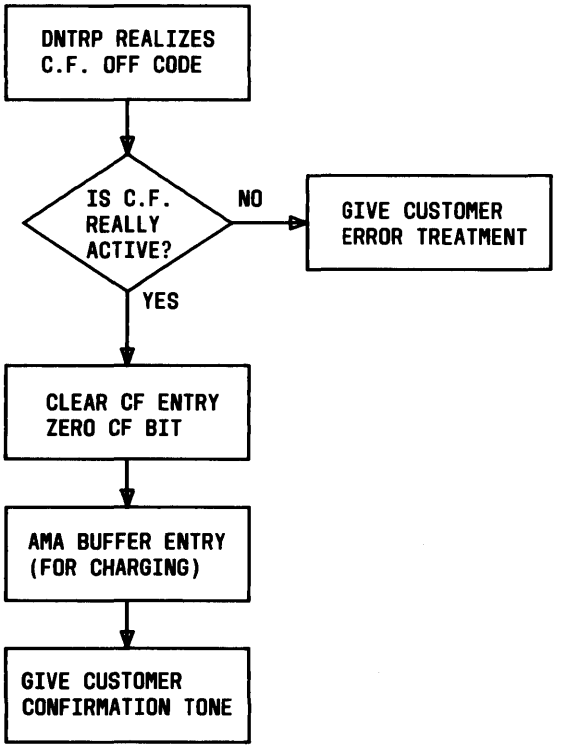


**Fig. 10—Call Forward Deactivate Flowchart**

### D. Special Cases—Call Forwarding

**3.15** The customer can determine whether call forwarding is active by dialing his own number. If the service is not active the customer hears busy tone. If the service is active and the forward-to line is not busy, an audible ring will be heard when the forward-to station is rung.

**3.16** If two or more call forwarding customers forward calls to each other forming 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. Therefore, no calls will be completed to any customer unless at least one of the customers deactivates the call forwarding service. This loop is assumed to be in a No. 3 ESS office. If A or B is a non-No. 3 ESS customer, then the attempted call to that party may be handled differently.

**3.17** A customer who attempts to activate call forwarding when it is already active will receive reorder tone.

**3.18** Calls cannot be forwarded to n11 codes, 11n codes, a number involving an operator, or a number involving an announcement.

**3.19** An attempt by the no-test operator to verify a forwarded line will result in a busy tone.

**3.20** Call forwarding service for any customer can be activated or deactivated by the local test desk.

## 4. CALL WAITING—OVERVIEW

**4.01** (See Fig. 11.) The call waiting (CW) feature allows a customer already involved in a conversation to know by means of a CW tone when another call is attempting completion to that station. Once the second call is answered, the customer may alternate between parties as necessary by flashing the switchhook (one party is in a hold state). The service is in effect regardless of whether the customer was the calling or called party in the original connection. Once the called customer is determined to be in a stable connection, a call waiting group (CWG) is established. The original call (A-B) and the new call (C-A) are the call waiting group. Party A is either connected to B or C, but not both at the same time.

### A. Processing—Call Waiting

**4.02** When the completion of incoming and intraoffice calls program (TERM) finds that the line being accessed is busy, control is given to the CWACTV subroutine in the call waiting tone application program (CALLW8) if the following conditions are met:

- The called party is a line.
- The called customer subscribes to CW service.
- The called line is not idle.

Certain terminating functions skipped by TERM when the called party was found to be busy are now done. Various tests are performed that are also performed for normal calls. If the calling party is a coin line, a coin-presence test is performed.

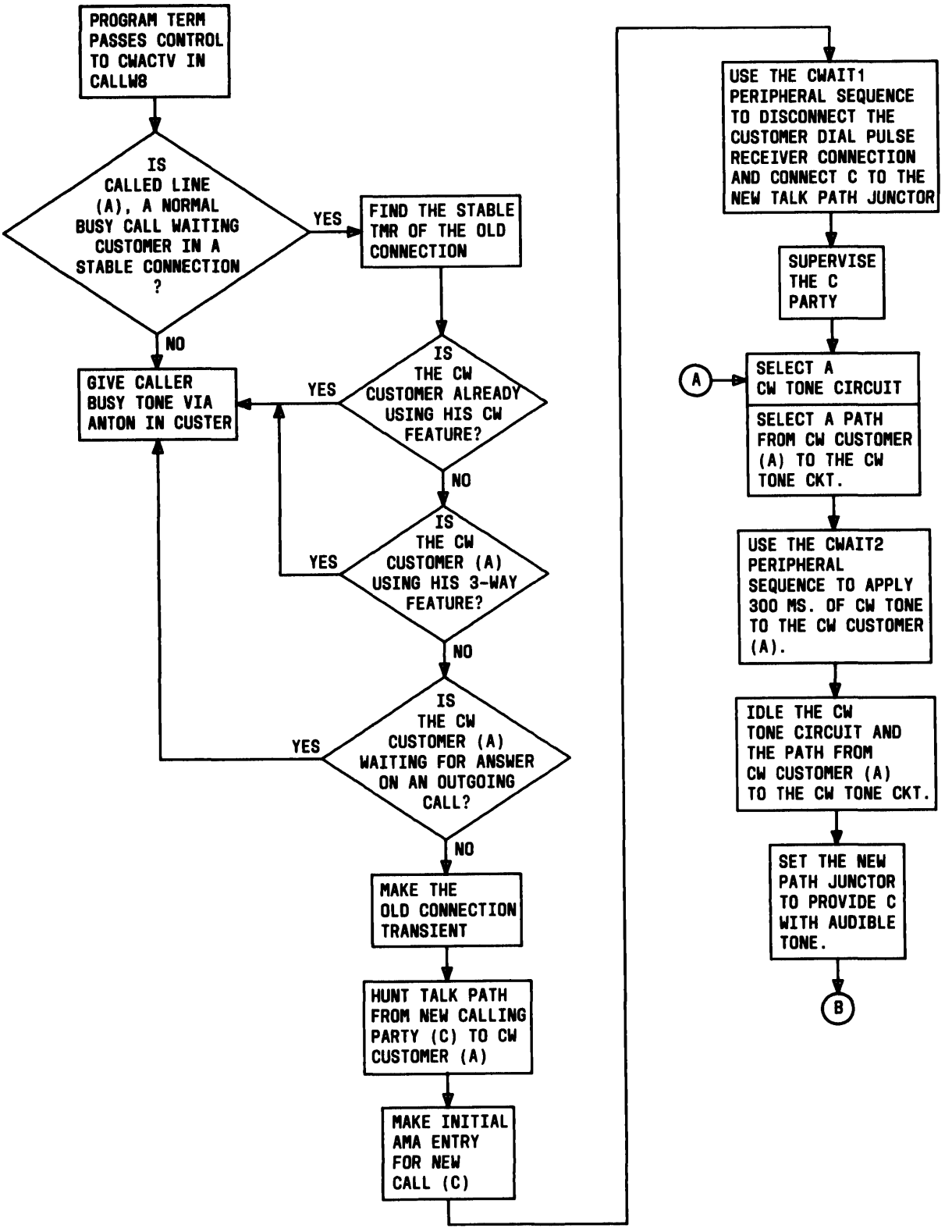


Fig. 11—Call Waiting Flowchart (Sheet 1 of 2)

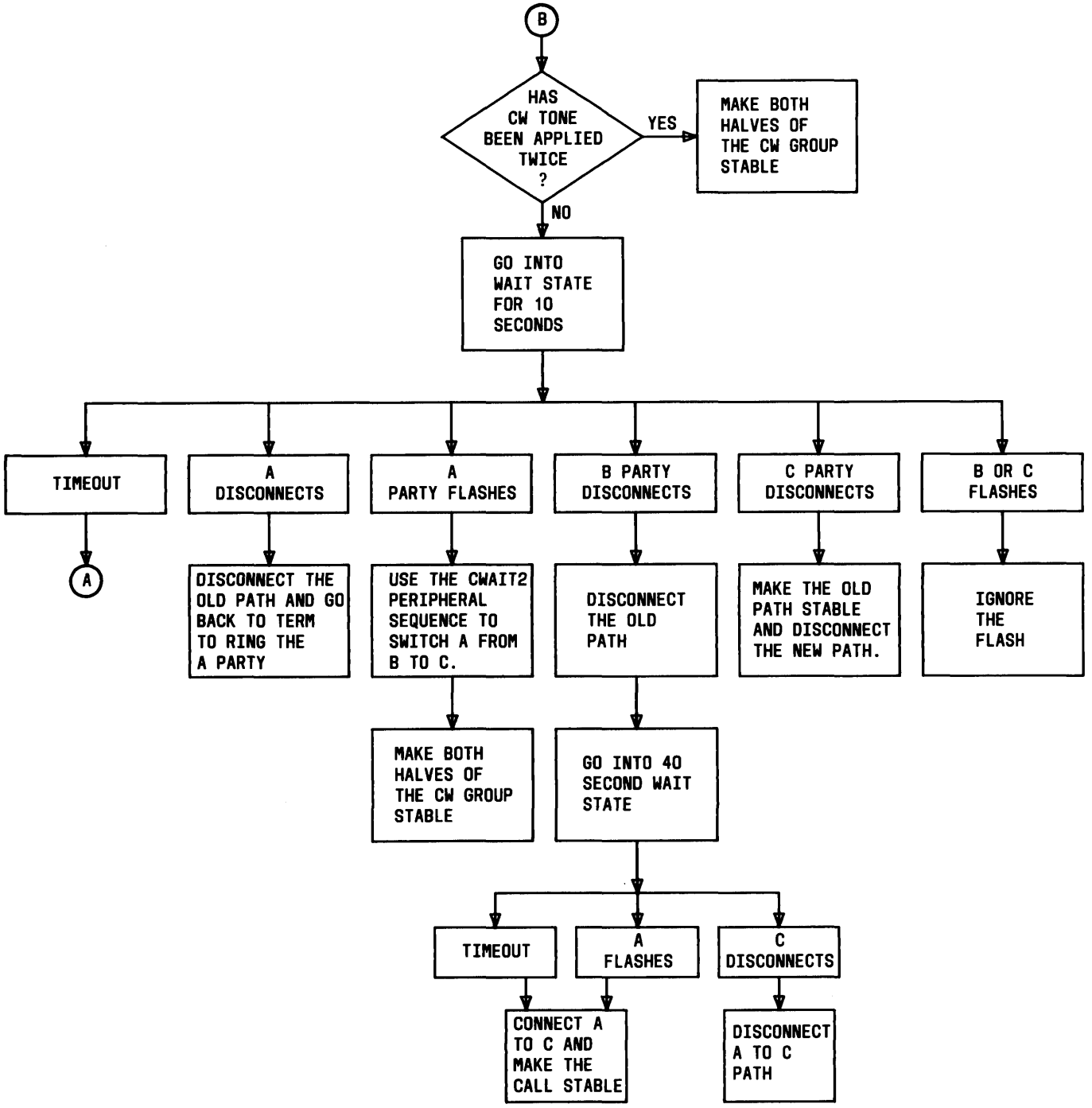


**Fig. 11—Call Waiting Flowchart (Sheet 2 of 2)**

If the calling party is a two-party line, a second party test is performed and the call is failed (failure message on TTY, both parties high and wet) if results of the second party test disagree. If the called line is being traced, a trace message is printed from ICT in the resident call trace program (CTRACR).

**4.03** The next task is to determine the state of the called line. Subroutine LINE TEST in the basic translation subroutines program (XSLSUB) determines the status of the called line. If the line is idle, subroutine FAILSUB in the call failure program (FALTCR) prints a failure message on the TTY. If the line is in a maintenance busy or

permanent signal state, busy tone is returned to the caller via ANTON subroutine in CUSTER.

**4.04** If the called line was found to be in the normal busy state, CALLW8 branches to FIND_STBL_TMR. The TMRs are scanned by subroutine TMRSCAN in the trunk/junctor/service input processing program (TKPROC). The called line scan point number is found in a TMR. (See Fig. 12.) The TMR stable bit is checked. The caller is then given busy tone under the following conditions:

- The original call is not stable or has not received answer (ANSW bit is tested).
- The called party is already using CW service.
- The talk party is using CW service and answer has occurred.
- The CWC is connected to an outgoing trunk that has not answered.

If A-party can receive a C-party call, the talk path is selected. Subroutine GET_TMR_DATA initializes the Call Waiting TCR (Fig. 13) with the new and old path data. Then, the bulk of the charge data is stored in the automatic message accounting initial entry by subroutine AMA_INI in the AMA program. The CWAIT1 peripheral sequence is now given control to disconnect receiver path (if a path exists) and connect the half-path from the new party (C) to the new talk path junctor. Subroutine CUTSEL_PREP sets up the TCR with the split path data while JCTRPNTT stores the talk path junctor data.

### B. Call Waiting Tone Application

**4.05** The calling station user dials a station that is provided with the CW feature. If the CW station is busy, the calling station (C) receives audible ring while the CW station receives CW tone. The CWAIT2 peripheral sequence is then used to (1) disconnect party A from the original call, (2) connect the CW tone to A for 300ms, and (3) restore the original talk connection. The talk path and CW tone circuit are hunted (via PATHUNT). If either is unavailable, one retry is made before giving C the reorder tone (via TCRDSC program). The HALF1ST peripheral sequence is called to connect tone circuit to the tone path junctor. The old path is left in the talk state with normal talk supervision in effect. The new path is now put into the audible state and the 10-second intertone period begins.

**4.06** Charging conditions are initialized via a call to AMA. The AMA is called to record the number of times CW utilized. When parties disconnect, entries are also made to AMA for end-of-time charging.

**4.07** Once the CW tone has been issued, A-party has up to 10 seconds of response time available for either going on-hook or flashing the switchhook. If no response is detected (progress mark in call waiting), then a second burst of CW tone is issued. Now A can go on-hook or flash unless C-party abandons first.

### C. Response to Call Waiting Tone

**4.08** As mentioned previously, the called customer (A-party) may respond to the call waiting tone by either flashing the switchhook or by going on-hook. Flashes and disconnects (on-hooks) are detected by the scanning routines (SCANS). Control returns to CUTMR progress mark in CW8STB. Now, the on-hook is timed for differentiation between a flash (less than 1.2 seconds) and a disconnect (greater than 1.2 seconds).

#### A-Party Responds Via Hang Up

**4.09** If the A-party response is a disconnect, the A-B path and B-party are idled. The TCR is set as for a normal C-A call. A ringing circuit and a path from A to the ringer are hunted via PATHUNT. The TCR is passed to the call waiting ringing routine to ring A. The remainder of the call is passed to base level call processing programs for completion.

#### A-Party Responds Via Flash

**4.10** A-party may respond to the CW tone with a flash instead of on-hook. In this case, audible ring is removed from C-party, B-party is placed on silent termination (split-party), and A-party and C-party are connected with a talk path.

### D. Monitoring of Split Party (CWG is Transient)

**4.11** The B-party (talk party) is monitored by the transient call record (TCR) of the CW group until the second CW tone occurs. During

STABLE

| WORD | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | ACTIVE 1 | ANI OR MB | LINE A | CALLING CALLING-PARTY SCAN POINT NUMBER | | | | | | | | | | | | |
| 1 | RVRS | STABL 1 | LINE B | CALLED CALLED-PARTY SCAN POINT NUMBER | | | | | | | | | | | | |
| 2 | TIM | TIPTY | CHARGE INDEX (CHARG I) | | | | | TIMER (IF TIM = 1) | | | | | | | | |
| 3 | TMRPM | CALL4 | CWA | ASPLIT | CWB | BSPLIT | ANSW * | AMAINIT * | CONHOOK * | CCPM | | | APORT | | BPORT | | CUSTOM CALLING INFORMATION |

TRANSIENT

| WORD | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | ACTIVE 1 | ANI OR MB | LINE A | CALLING CALLING-PARTY SCAN POINT NUMBER | | | | | | | | | | | | |
| 1 | RVRS | STABL 0 | LINE B | CALLED CALLED-PARTY SCAN POINT NUMBER | | | | | | | | | | | | |
| 2 | | | CHARG I | | | | | 2PTSVC | TCR NUMBER | | | | | | | |
| 3 | TMRPM | CALL4 | CWA | ASPLIT | CWB | BSPLIT | ANSW * | AMAINIT * | CONHOOK * | CCPM | | | APORT | | BPORT | | CUSTOM CALLING INFORMATION |

* 3E3 GENERIC ONLY

Fig. 12—Stable and Transient TMRs

| | | |
|---|---|---|
| 5 | CW TONE OR NEW PARTY TEN | |
| 6 | NEW PATH DATA SAVE | FLAG AREA |
| 7 | CWC TEN | |
| 8 | OLD PATH DATA | |
| 9 | NEW PATH DATA | |
| 10 | NEW PARTY TEN SAVE OR RECEIVER DATA | |
| 11 | OLD PARTY TEN SAVE | |
| 12 | OLD JUNCTOR DATA | |
| 13 | NEW JUNCTOR DATA | |
| 14 | OLD TMR CHARGE DATA | |
| 15 | NEW TMR CHARGE DATA | |

**Fig. 13—Call Waiting Transient Call Record**

this monitoring period, a flash by B is ignored because the call is transient. A disconnect by B during this period results in the old connection being torn down and the CW customer being rung.

### E. Monitoring the Stable Call Waiting Group

**4.12** After the second CW tone is given, the entire CWG is made stable. All supervision is now reported to the CWTMR_ progress mark in the stable call waiting monitor program (CW8STB). Following is a list of possible events and resulting tasks which CW8STB performs:

- B (talk party) flashed—The talk path is made transient and subroutine ADDONJOB in the conference calling program (TREWAY) is begun.
- B (talk party) disconnected—Tear down the talk path and wait for A (controlling party) to flash. If A flashes, C (split party) and A become a normal plain old telephone service (POTS) call.
- C (split party) flashed—Make the split path transient and begin the ADDONJOB subroutine in TREWAY.
- C (split party) disconnected—Tear down the split path and leave the talk path as a normal stable POTS call.
- A (controlling party) disconnected—Tear down entire CWG if A has answered the C to A call (CWG has been established). If an answer has not occurred, tear down the old (A to B) connection and ring A via the TERM program.
- A (controlling party) flashed—Use the CWAIT2 peripheral sequence to switch (TOGGLE) from one party to the other (B and C do not disconnect).

***Note:*** A-party (controller) is the only one of the three parties involved which may switch calls.

**4.13** When an action ends the intertone period, either the call becomes a normal 2-way connection, tone is reapplied, or the CWG is passed to the CW8STB program. The three major entry points to CW8STB are subroutines STB_CW, CWTOGGLE, and CWTMR.

### F. Errors—Call Waiting

**4.14** When an error in call waiting occurs, the talk path (whenever possible) is preserved by returning it to a normal stable state. The offending party is failed or sent to the disconnect program (DISCON) for reorder. A 2-bit code is maintained in each TCR so that in the event of failure, determination of that type of error is possible. Some errors that generate TTY messages are:

- Subroutine CWTMR supervision did not match TMRs.
- A CW attempt is made, and the original connection is not found in the TMR.
- Incorrect CW flash timing supervision.
- C (split party) of a CW call failed the party test.
- Impossible supervisory report during the split party flash timing period.

- B (talk party) was found to be idle by subroutine LINETEST in CALLW8 (call waiting tone application program).

- Improper supervisory report during talk party flash timing subroutines.

- Peripheral error during the CWTOGGLE subroutine in CW8STB.

- The IGNOREM subroutine in CALLW8 receives incorrect data.

## 5. STABLE CALL WAITING MONITOR—OVERVIEW

**5.01** The stable call waiting monitor (CW8STB) program controls the call waiting group (CWG) while it is in the stable state. The stable state begins after the second CW tone has been given to the call waiting customer (CWC) or after the CWC has flashed to answer. The main task of CW8STB is handling supervisory changes. Rather than duplicate code which is common to the call waiting tone application (CALLW8) and CW8STB programs, entry points STB_CW, CWTOGGLE, and FIN_DISC are used as links. Entry points (CWMON_and CW3WAY) are used to pass control from the conference calling program (TREWAY) to CW8STB when a CWG member disconnects or flashes while in a 3-way connection.

### A. Main Entry Point

**5.02** The CWTMR subroutine is the main entry point to the CW8STB program. The CWG is in a stable state. If a supervisory change occurs (see Fig. 14), the trunk/junctor/service circuit input processing program (TKPROC) hunts for the controlling terminal memory record (TMR). A TMR progress mark (TMRPM) controls the connection when the TMRPM is set. Any input monitor report is given to subroutine CCTASK, which is the TMRPM distributor in the TREWAY program. Supervisory changes are reported to the CWTMR subroutine in CW8STB by a branch from TREWAY. The TCRSEL subroutine in the equipment selection subroutines (EQPSEL) program then selects a TCR. The other half of the CWG is hunted by scanning the TMRs looking for the CW party in another TMR. If the other half is not found, the CW indication is deleted from the TMR and the call is disconnected. If the other half is found, the CWG is made transient, subroutine CW_TRAN in CW8STB copies the data of the two stable TMRs into a standard CW TCR. The split and talk TMR is made transient. The ANALYSE subroutine (in CW8STB) is used next to determine the type of supervisory change that occurred. A list of valid changes and the resulting tasks that CW8STB performs follows:

- CWC disconnects—If an answer occurred previously, complete disconnect is the result. Otherwise, the CWC is rung.

- CWC flashes—A flash results in CWTOGGLE being accessed to switch connections.

- Talk party disconnects—The talk path is released via TALKDISC in CALLW8. The CWC is monitored for a flash or disconnect. The split connection is reconstructed and made stable if CWC flashes. If the CWC disconnects, the split path is disconnected unless the split connection has never been answered (in which case the CWC is given normal ring treatment).

- Split or talk party flashes—A valid 3-way or CW flash is reported to ADDONJOB in TREWAY.

- Split party disconnects—The split connection is released and the talk connection goes back to a normal stable condition.

The final result of the CWTMR action is either a complete disconnect, a single path remaining stable, or the CWG being made stable again (possibly toggled).

### B. Path Switching

**5.03** The CWTOGGLE subroutine is used to switch between paths in a CWG. The subroutine is accessed when the CALLW8 program or the CWTMR_progress mark detects a flash by the CWC. The CWAIT2 peripheral sequence is used to switch the talk and split paths so that the CWC can now talk to the party previously on hold. After the switch is complete, control is passed to STB_CW, and the CWG is made stable.

### C. Stabilize the Call Waiting Group

**5.04** Subroutine STB_CW is used by both CALLW8 and the CWTMR progress mark to take a TCR containing both paths of the CWG and make

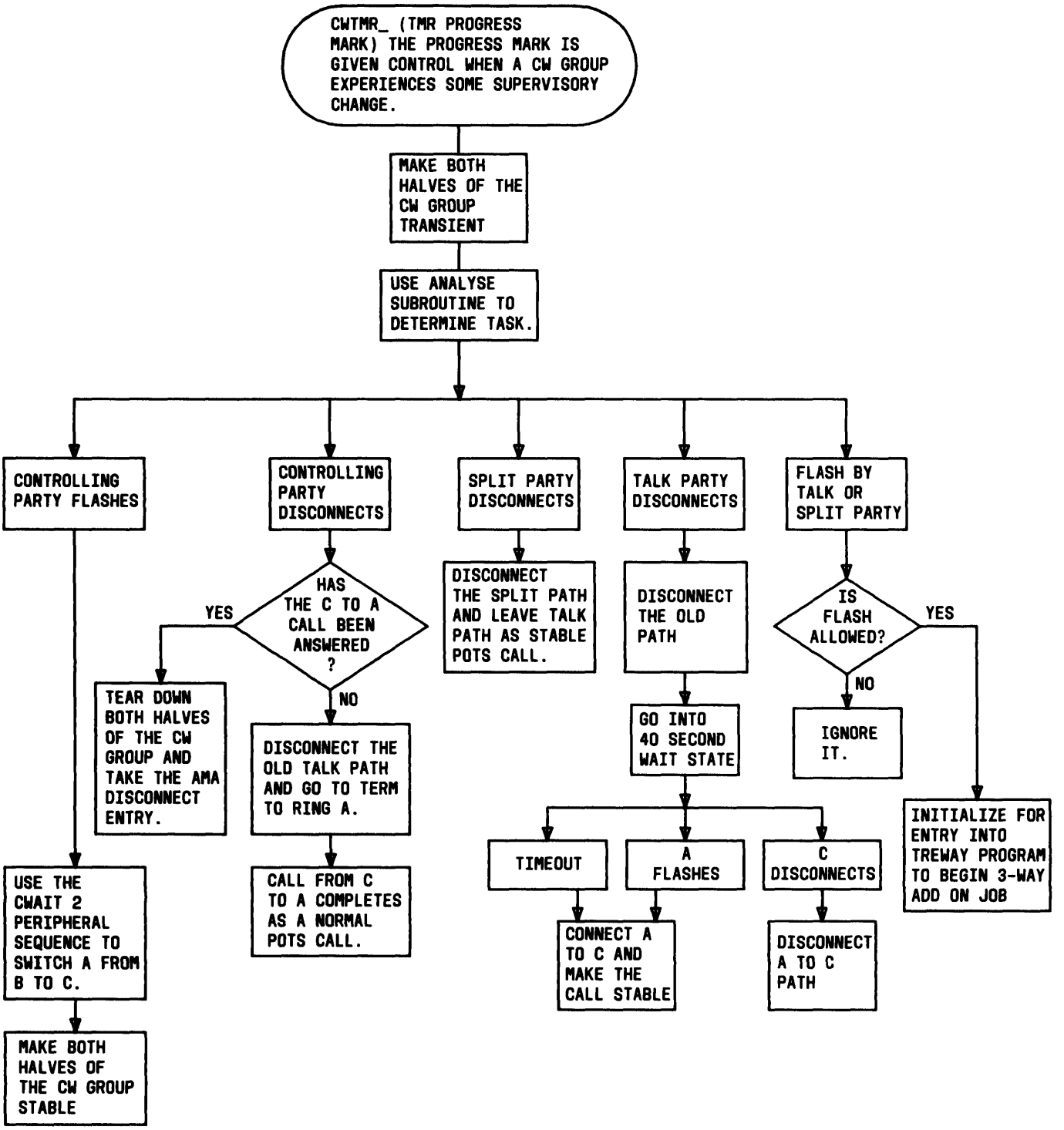


Fig. 14—Flowchart of Supervisory Report Handling in CW8STB

the talk and split TMR stable. The split path is distinguished from the talk path by setting the ASPLIT or BSPLIT bit in the split path TMR. Supervision is set so that the CWG is supervised by the talk path junctor and the trunk or junctor scan point number, as required. The CW connection is stablized by the following:

(1) The SPLIT and CW bits are set or cleared so that the given TCR shows the split path as the working talk path.

(2) The two paths are supervised except for the CW party in the split connection.

(3) Both CCPMs are set to 3 for the CW TMR progress mark.

(4) Both TMR STABLE and TMRPM bits are set.

(5) Both sets of charge data are restored to the corresponding TMR.

(6) The TCR is cleared and control is returned to base level or the CHRG_TST subroutine is given control for charge processing.

## 6. THREEWAY CALLING—OVERVIEW

**6.01** Threeway calling service (Fig. 15) enables a customer to add a third party into an existing connection, thereby creating a connection in which the three parties can converse at once. The operating procedure for establishing a 3-way call follows. (See Fig. 16.)

**6.02** The customer with threeway calling service (party A) is engaged in a telephone conversation with another customer (party B). To add on a third party, A flashes the switchhook. (Note that if B is in another central office, A may flash to add on before B answers.) B is then held on a silent termination (the "consultation hold" feature) until A flashes again, and A receives special dial tone. Party A may flash either before or after C answers, establishing a 3-way connection.

**6.03** If C does not answer and A wishes to reestablish the 2-way connection with B, A must flash once more. When A flashes the second time, party C is dropped whether or not C has answered, and only A and B remain as in the original connection. If A goes on-hook at any point,

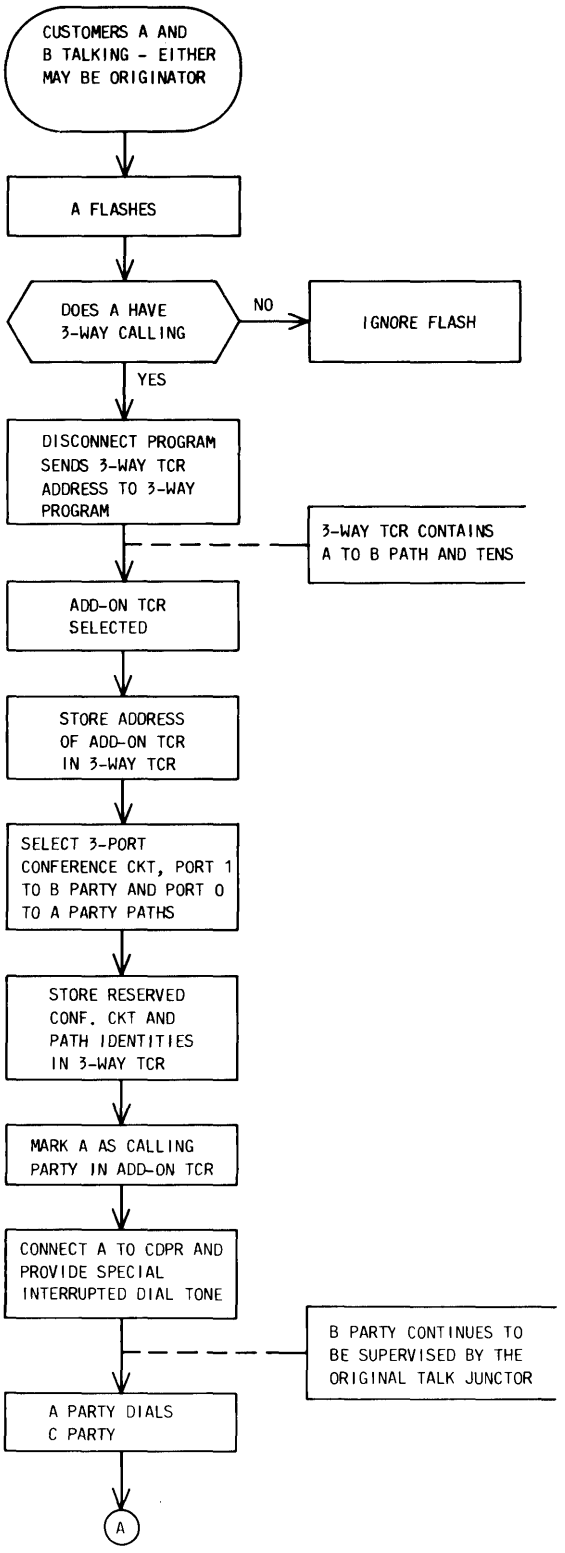


**Fig. 15—Threeway Calling Flowchart (Sheet 1 of 3)**

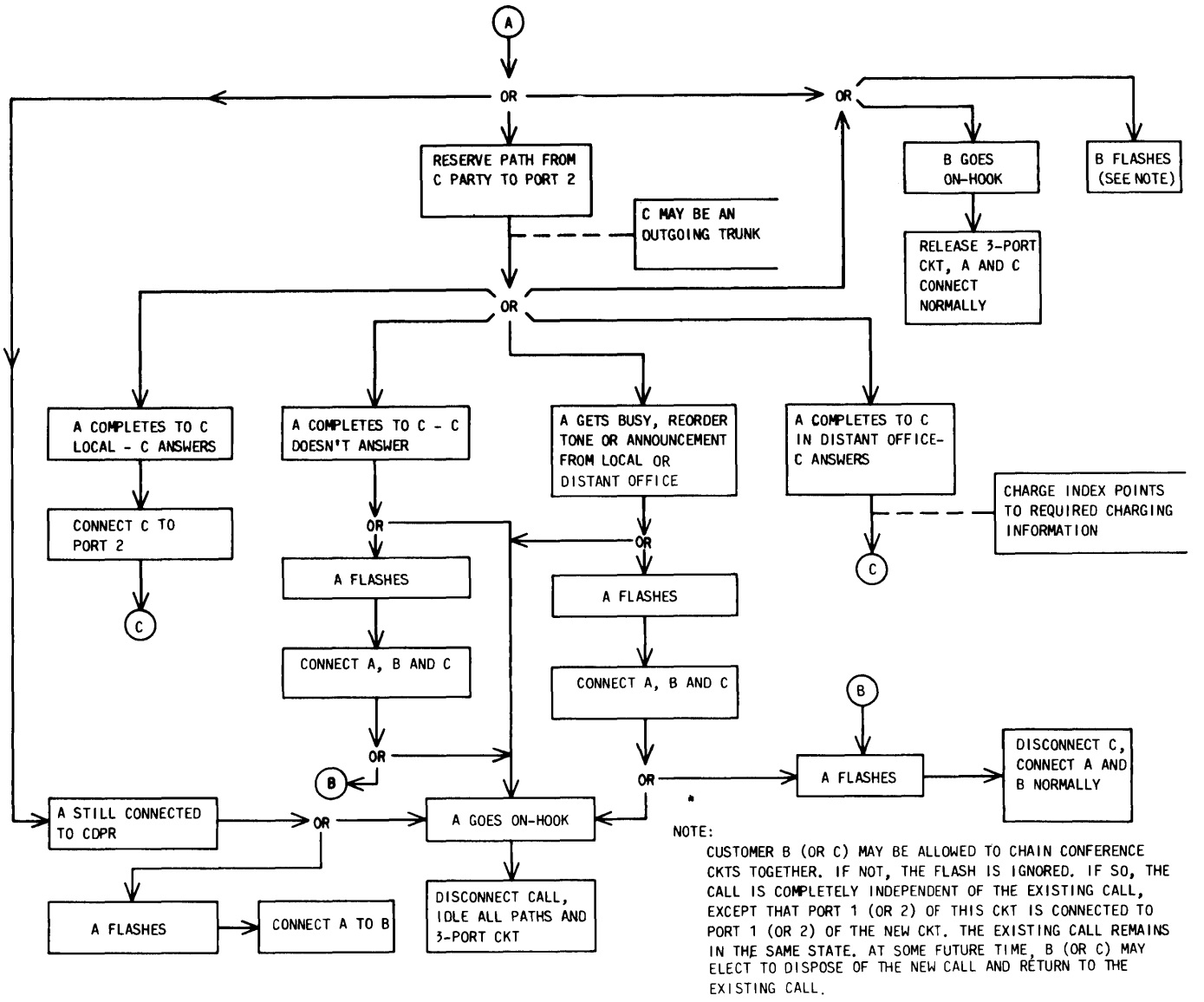


**Fig. 15—Threeway Calling Flowchart (Sheet 2 of 3)**

all connections associated with the call are released. If B or C hangs up after the 3-way connection is established, the remaining parties are retained in a 2-way connection. Note that either B or C could be an operator, a tone or announcement from a distant office, etc, as well as another customer.

### A. Processing—Threeway

**6.04** The original parties will be designated A and B with A having threeway calling service. The A-B path is stable. A flash from A is detected by DISCON. Control of the call and a TCR that contains the A-B path is passed to the ADDONJOB subroutine in the conference calling program (TREWAY).

**6.05** The ADDONJOB subroutine selects a new transient call record (TCR) for the add-on call by branching to the TCRSEL subroutine in the equipment selection subroutines program (EQPSEL). ADDONJOB selects a conference circuit by branching to the TRKSEL subroutine in EQPSEL. A port 1-to-B party path and an A-party-to-port-0 path are selected by subroutine ADDONJOB (via the network pathhunt, busy, and idle program).

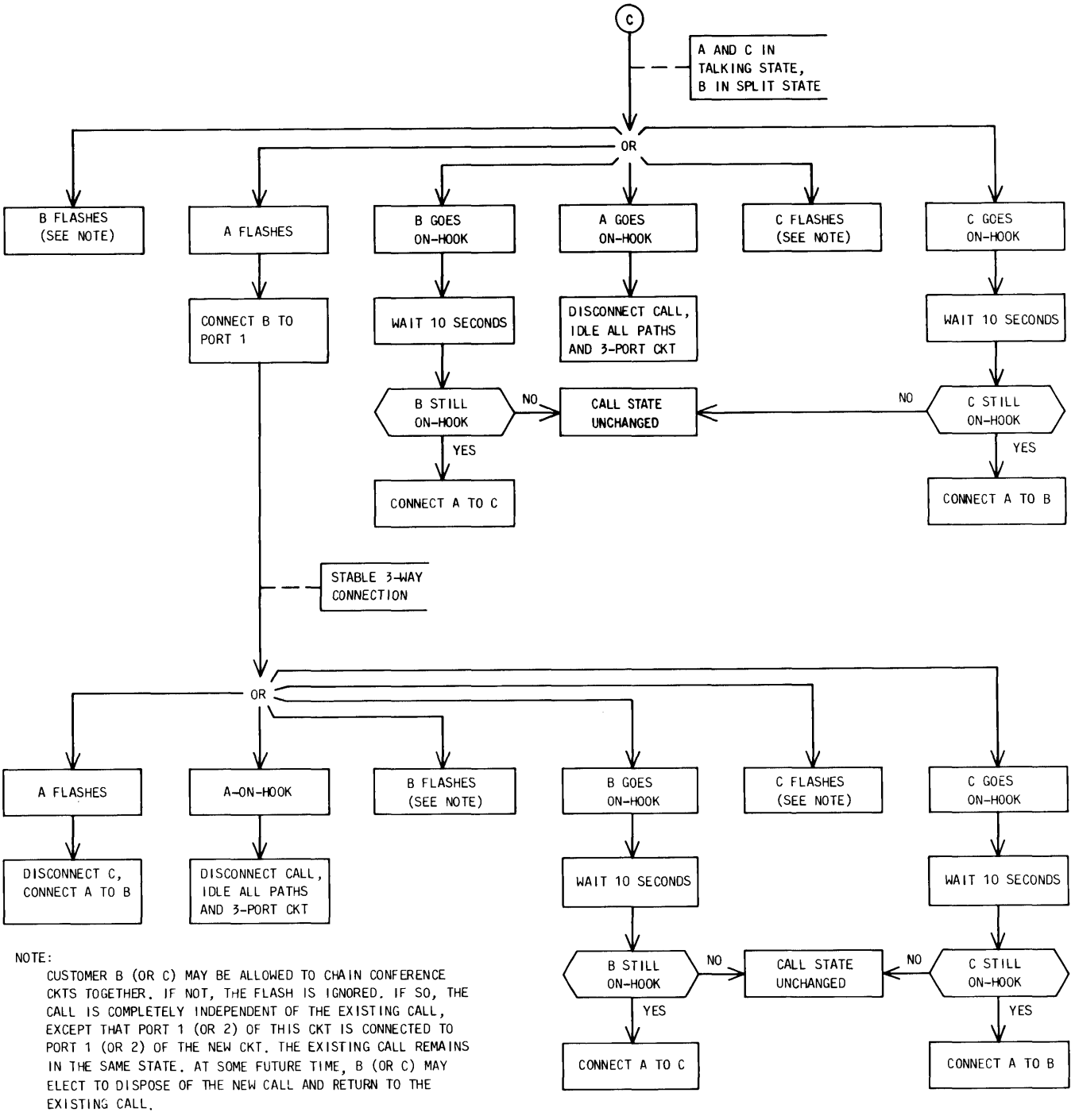


**Fig. 15—Threeway Calling Flowchart (Sheet 3 of 3)**

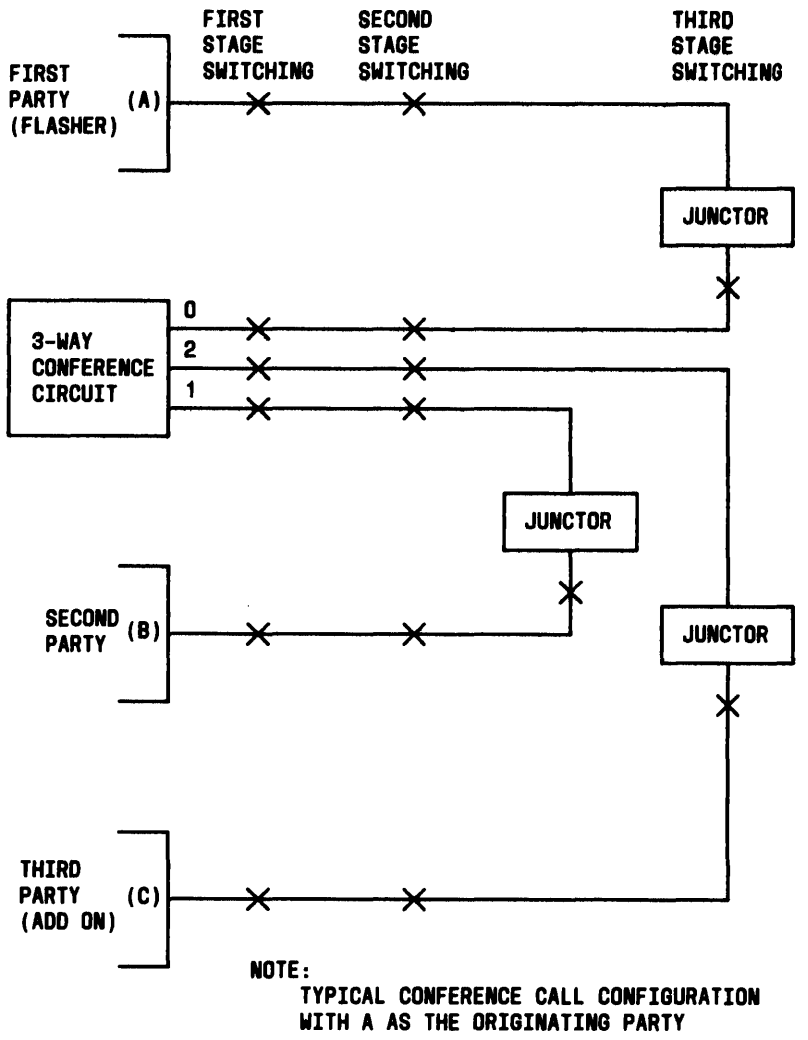


**Fig. 16—Threeway Conference Call**

The A-party half of the original talk path is disconnected, thus leaving B supervised in the original talk path junctor. The 3-way TCR is filled with the original talk path, conference circuit, ports 0 and 1 paths, and the add-on 0 monitor (AD0MON) progress mark. A line origination hopper entry is filled and control then passes to the 3_WAY_ORIG in the line origination program (LNORIG).

**6.06** Once LNORIG connects the CDPR to the flashing line, control is passed to CDRCON in TREWAY for the three bursts of dial tone that distinguish special dial tone from normal dial tone. Upon completion of dial tone, the add-on call is transferred to the digit interpretation program (DNTRP) and is processed as a normal call while digits are received and the final route is determined.

**6.07** After the final route is determined (trunk, line in office, reorder, busy tone, announcement, etc), OUTCAL or TERM calls CCHOOK in TREWAY. CCHOOK is informed that the final talk path from A to C has been selected for the add-on call. CCHOOK now searches for the 3-way TCR (via FIND_3WAY_TCR_FROM_TMR), hunts a path from Port 2 to the C-party (via PATHUNT), and stores that path in the 3-way TCR. Finally, CCHOOK updates the TCR progress mark to AD1MON and loads the special add-on-TMR progress mark into the A-to-C TMR.

**6.08** Ringing (or outpulsing) now occurs. The AD1MON progress mark is checking for 1 of 2 conditions:

(a) The outgoing call becoming stable

(b) The IAO call going into the RRING progress mark for timing of the ringing cycle or a flash from the A-party. When one of these conditions exists, both the add-on (A to C) connection and the original (A to B) connection are disconnected (via DISC in POPS) and the 3-way connections are established from A to Port 0, Port 2 to C, and from Port 1 to its junctor (via CONNECT in POPS). The B-Party remains split from the conference connection.

**6.09** Now a flash by A will complete the 3-way connection by cutting B through to the conference circuit. Note that it is not necessary for C to answer prior to B being cut through.

### B. Threeway Call Established

**6.10** The 3-way conference call is now established and the three parties may talk as long as desired. A is charged for the Port 2 connection and either A or B is charged for the Port 1 connection (original caller is always charged).

### C. Flashes

**6.11** Flashes may occur from any of the three parties engaged in a stable 3-way connection. However, for this immediate connection, a flash from controller (A) or a customer with 3-way calling feature are the only flashes normally expected.

**6.12** The first flash from A (controlling party), after the A-party 3-way conference connection is set stable, is detected by the TREWAY reconfigure progress mark. The result is that the add-on party is disconnected and the original talk connection between A and B is reconfigured as a normal connection through a junctor. This is accomplished by the equipment selection program (EQPSEL) (IDLECKT subroutine) initiating a reconfiguration task by calling the reconfigure subroutine RECONINIT in TREWAY. See paragraph 6.17 (Reconfigure).

### D. Disconnects

**6.13** Disconnects (on-hooks) may occur before or after establishment of the 3-way conference circuit. In either case, a disconnect by the flasher (A) causes all circuit and paths to be idled (via DISCON and IDLECKT). Also in either case, a disconnect by the add-on party (C) or the original stable party (B) causes the call to be reconfigured to a normal call between A and the remaining party (B or C).

#### Before Threeway Circuit Established

**6.14** If the disconnect occurs before the 3-way circuit is completed, the various monitor progress marks of TREWAY detect the disconnection. If the disconnect is made by the noncontrolling party (B), it results in the original talk path being disconnected (DISCON), the 3-way conference port path being idled, and the add-on call being normalized (Custom Call bit cleared). If the disconnect is made by the add-on party (before A flashes for 3-way connection), the original call is reestablished.

#### After Threeway Circuit Established

**6.15** Once the 3-way conference call is established, a different set of progress marks monitor the call. If a disconnect now occurs from either noncontrolling party (B or C), 10-second disconnect timing is performed. (Note: To eliminate annoying oscillations, the conference circuit gain must be lowered within 800 ms of on-hook). After 10 seconds, the disconnect is processed by providing DISCON with an input monitor report marking the port (1 or 2) which went on-hook.

**6.16** Immediate disconnect is called for by DISCON. IDLECKT in EQPSEL is called for the proper port. IDLECKT verifies that the proper first port is idled and initiates a reconfiguration task by calling the reconfiguration initialization subroutine (RCONINIT) in TREWAY. This reconfigures the two remaining parties of the now defunct 3-way call into a POTS call.

### E. Reconfigure

**6.17** A TCR is selected by RCONINIT (via TCRSEL in EQPSEL). It then finds the A-party-to-Port-0 path and makes it the transient talk path. Next, the Port-2-to-C party TMR is located (via TMRSCAN in TKPROC) and its address is loaded into the TCR. Finally, the reconfigure progress mark is loaded into the TCR so that reconfiguration can begin during the next base level loop.

**6.18** The reconfigure progress mark, when invoked during the next TCR scan, proceeds to reconfigure the A to B (or C) connection. To do this, it verifies that the port (1 or 2) to (B or C)

party path is stable, finds a path from A to B (or C) (via PATHUNT), disconnects and idles the port (2 or 1) and 0 paths, idles the conference circuit, and connects the A to B (or C) path leaving it stable as a normal POTS connection.

> ***Note:*** The A-party is free to add on again or to allow the call to proceed normally. Note also that either party is free to expand this POTS connection by using other available features such as call waiting or chaining of 3-way connection.

**6.19** A customer having the threeway calling feature may be the noncontrolling party of one call and simultaneously be the controlling party of another call. This allows conference circuits to be connected in tandem so that additional parties may be added to the 3-way connection by either or both of the noncontrolling parties of the original 3-way connection.

**6.20** The noncontrolling parties of a 3-way connection may flash to answer a call-waiting call. Subsequent flashes allow the customer to alternate between the 3-way connection and the waiting call.

### F. Operator Recall Feature

**6.21** (See Fig. 17.) The 3-way operator 110 recall feature allows customers with 3-way calling service to recall the operator by flashing and dialing 110. To invoke the feature, the 3-way customer must be in a stable line-to-trunk connection. Digit reception is stopped and a check is made to see if the nonflasher is a trunk. A legitimate recall attempt is denoted by the 3-way customer being one of the parties in another transient call and containing an add-on progress mark in the TCR. If these conditions are not met, the customer is given a reorder tone. If the customer is in a line-to-line connection, operator recall is not possible, and the flasher is given a custom-calling error announcement. Having passed the conditions above, the 3-way customer flashes the switchhook and receives a second dial tone. The 3-way subroutines split the flashing party from the original connection and connect the customer to a customer dial pulse receiver. The 3-way conference circuit and path from the flasher to port 0 are reserved. The other party is now in a silent termination state. When the 3-way customer dials the 110 escape code, the escape sequence is begun. The call is made transient. The caller TCR contains the original talk path data, paths between ports 0 and 1 and the original parties, and the AD0MON progress mark. The add-on call has a separate TCR. Otherwise, the call is treated like a normal add-on attempt when the escape code is not dialed. The No. 3 ESS generates a flash which the serving operator system interprets as a recall attempt. The operator is brought onto the call after the original connection is restored. A 500 ms flash is sent over the trunk, the original talk connection is reestablished, and the call is marked stable. Subroutine 3WOPR in the TREWAY program handles the operator recall feature.

## 7. RESTRICTIONS ON CUSTOM CALLING SERVICES

**7.01** All four custom calling services are denied, as a group, to certain types of lines.

(a) Only individual lines will be permitted to have custom calling. On a party line with parties A and B, an on-hook from A followed by an off-hook from B would be erroneously interpreted as a flash from A if the interval between the on-hook and off-hook were between 0.2 and 1.2 seconds.

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

## 8. GLOSSARY

**8.01** The following list identifies terms and abbreviations used in this document which may not be familiar to the reader.

> ***Base Level***—major software loop including all functions not completed during interrupt level.
>
> ***Call Forwarding***—when activated by a station user, this feature automatically routes calls intended for the in-service station line to another station line that has been previously designated.
>
> ***Call Waiting***—permits a customer in the talking state of an established call to be notified of an incoming call. The customer may then elect to receive the second call,

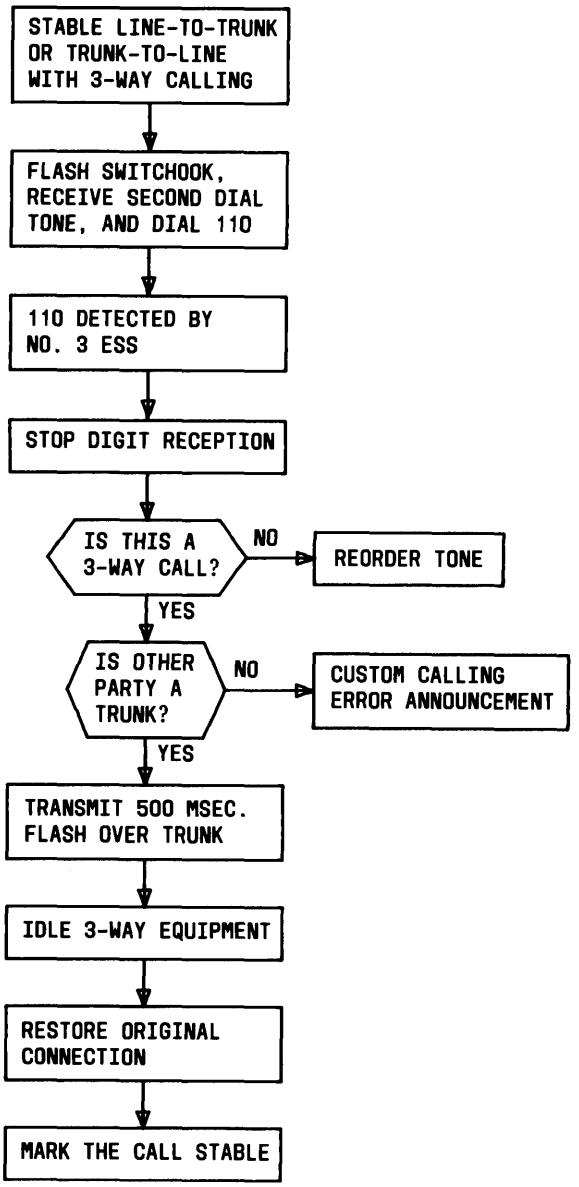


**Fig. 17—Flowchart of Operator Recall**

via switchhook flash, without abandoning the existing connection.

***Call Waiting Group***—for ease of reading the three parties associated with the established call waiting group will be labeled A-, B-, and C-parties. The A-party is the called party of the incoming call, ie, the party which program TERM found to be busy and to have the call waiting feature. Hence, A-party is the controlling party of the group; B-party is the party to which A was talking when the tone was given, and C is the party trying to call A. Thus, B- and C-parties are the noncontrolling parties of the group.

***Call Waiting Tone***—a burst of 440 Hz tone lasting 300 ms 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.

***Clear***—to restore a storage device to the "zero" state.

***Confirmation Tone***—two bursts of dial tone, 100 ms on, 100 ms off, and 300 ms on. After 1 second, a steady dial tone then follows. This tone is used to indicate to the customer that his speed call repertory charge or call forwarding activation attempt was successful.

***Customer Dial Pulse Receiver***—a circuit that provides dial tone to the customer and detects the dialed digits.

***Flash***—see switchhook flash.

***High and Wet***—the state in which the trunk or line is monitored for an on-hook only.

***Junctor***—a circuit associated with the switching network which provides a path for a call through the network.

***No Test Trunk***—circuitry allowing access to a party regardless of busy state.

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

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

***Outpulsing***—generation of pulses to match the stored digit information and of the proper type to be used by the distant switching office.

***Program***—a set of instructions assembled as one unit under a program name.

***Progress Marks***—areas in the TCR which indicate next software routines to be executed for the call.

***Real-Time Break***—when a task is of such a nature that it causes the call to wait for its completion (digit reception, network connection, etc) the call is said to take a "real-time break".

***Reorder Tone***—an audible signal (interrrupted 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 interrupted at a 120-IPM rate and is sometimes called fast busy.

***Special Dial Tone***—three bursts of dial tone, 100 ms on, 100 ms off, followed by a steady dial tone. This tone is issued to a threeway calling customer who has flashed to add on a third party.

***Speed Calling***—permits a station user to originate calls to frequently called numbers by dialing predesignated codes consisting of fewer digits than normally required. Speed call lists may contain 8 or 30 entries. Optionally, individual entries may be changed by the subscriber.

***Split Party***—a party in silent hold, the waiting party in a call waiting group or the Port 1 party in a 3-way connection that has not been completed.

***Stable Party***—a party engaged in an active connection of a multiparty group, such as call waiting or threeway.

***Switchhook Flash***—a depression of the switchhook lasting for a minimum of 200 ms and a maximum of 1.2 seconds.

***Three-Way Calling***—the feature allowing a station user to add a third party to any established call for a 3-party conference without the assistance of an operator.

***Threeway Conference Circuit***—a hardware circuit which allows 3 parties to join into one conversation.

***Threeway Conference Group***—Consists of 3 parties: A, B, C. For consistency of reading, A is designated the controlling party (the one attempting 3-way service), B is designated the party with whom A had a stable connection prior to flashing, and C is designated the third party which A is attempting to add to a conference circuit.

***Time Out***—Critical Timing—a nominal 4-second period. If no customer action occurs during this period and the correct number of digits were dialed, end of dialing is assumed. The '#' on a TOUCH-TONE® handset serves the same purpose when it is used as an end-of-dialing signal.

***TMR***—Terminal Memory Record; temporary store block assigned to each junctor. The TMR is used whenever a path is connected through the associated junctor.

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