

FEATURE DOCUMENT
PERMANENT SIGNAL AND PARTIAL DIAL TREATMENT
NO. 3 ELECTRONIC SWITCHING SYSTEM

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NOTICE

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INTRODUCTION

1. GENERAL INFORMATION

1.01 Permanent signal and partial dial treatment is given when a customer's line or a trunk does not respond as expected when originating or terminating a call. The following paragraphs provide a general description of permanent signal and partial dial and how it is tested.

(a) If the customer fails to start dialing within a certain interval from the start of dial tone, or fails to go on-hook after the other party of a call has disconnected, the customer's line is considered to be in permanent signal condition. This also holds true for a trunk that fails to disconnect or to transmit digits. Similarly, after the customer dials the first digit, but fails to dial an accepted number of digits in the time allotted for completing a call, the customer's line is considered to be in a partial dial condition. This is also true for a trunk.

(b) When a customer's line or a trunk is either in a permanent signal or partial dial condition, service will be restored within a reasonable period of time after the customer or trunk goes back on-hook. Otherwise, if a customer fails to go back on-hook, the treatment of a permanent signal or partial dial condition can optionally include any or all of the following: a permanent signal announcement, a permanent signal tone [usually receiver off-hook (ROH) tone or in the case of a coin line, a coin return], and the line placed in the high and wet state. If the customer is using a coin line, an attempt to return the coin is made after the announcement, if provided. The treatment for a trunk does not go through the same steps as a customer line. If the trunk is from a step-by-step office, it is given 30 seconds of reorder and then set to high and wet. Any other type of trunk is immediately set to high and wet.

1.02 This document is being reissued to include new and other not previously included information provided in the SO-2 and 3E3 generic programs. Since this is a general reissue, no revision arrows will be shown.

1.03 This feature is available to all lines and trunks in the No. 3 ESS office and can be provided with all issues of the generic program.

No special hardware is required to provide this feature.

2. DEFINITION

2.01 Permanent signal and partial dial treatment is a means of treating lines and trunks which fail to disconnect after a call or to transmit a digit after receiving dial tone within a prescribed time period. The type of treatment may be at the operating company's option and depends on the type of line or trunk involved.

DESCRIPTION

3. USER OPERATION

Permanent Signal

3.01 Permanent signal treatment is given to a line or a trunk which fails to disconnect after the called or calling party has disconnected, or, if originating a new call, remains off-hook for 30 seconds after receiving dial tone without transmitting digits. This time is reduced to 10 seconds during periods of heavy traffic.

3.02 If no digits have been received before the time runs out, the line or trunk is given permanent signal treatment. A sequence of actions may then occur which, if the line or trunk has not gone on-hook, concludes with the line or trunk being disconnected from the switching network and monitored for an on-hook condition only (ie, high and wet state). If the line or trunk should go on-hook during permanent signal treatment, the treatment is stopped. If the line or trunk is already high and wet, it is placed in the normal idle state.

3.03 The permanent signal treatment received depends on the type of line or trunk involved. The following treatment is provided for a permanent signal condition.

(a) If a line is not a private branch exchange (PBX) line or a coin line, it may be routed, at the operating company's option, through several steps of permanent signal treatment. The following sequence is provided:

(1) An announcement (optional)

(2) One second of open interval

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(3) Thirty seconds of receiver off-hook (ROH) tone (optional)

(4) Set high and wet.

Reorder (120 ipm) may be substituted for (1) or (3).

(b) If the line is a PBX line, it may receive an announcement, if provided. One second of open interval is then given. If the line is still off-hook after the open interval, it is set high and wet.

(c) If the line is a coin line, it can receive only one step of permanent signal treatment. An announcement is suggested. If the treatment fails or no treatment is given, the coin will be returned before the line is set high and wet.

(d) If the trunk is from a step-by-step office, it will be given 30 seconds of reorder tone. If the tone fails to get an on-hook signal, the trunk is set high and wet.

(e) Any other type of trunk receives no special treatment and is immediately set high and wet.

3.04 If all permanent signal treatment fails, the line or trunk is immediately set high and wet. All previously assigned switching network paths and memory areas are released and the line or trunk is scanned for an on-hook condition only. Service is returned automatically when the customer goes on-hook.

Partial Dial

3.05 Partial dial treatment is given when at least one valid digit has been received and 15 seconds have passed without reception of another digit. This time is reduced to 8 seconds during periods of heavy traffic.

3.06 The type of partial dial treatment depends on the type of line or trunk involved. For lines, the first step of partial dial treatment is different from permanent signal treatment. A partial dial announcement is used. The rest of the treatment is the same as that specified by the operating company for a permanent signal condition. The partial dial treatment for a trunk is the same as that for a permanent signal condition.

Overload Conditions

3.07 Under overload conditions or if a cable cut occurs, equipment blockage occurs when the circuits required for permanent signal/partial dial treatment are selected. In this case, treatment is speeded up by skipping any step that requires a nonavailable circuit and placing the line or trunk high and wet as quickly as possible.

4. SYSTEM OPERATION

Permanent Signal

4.01 Permanent signal treatment is given to any line or trunk which fails to have any digits transmitted over it within 30 seconds after being given dial tone. A 10-second time interval is used during periods of heavy traffic or system overload conditions.

4.02 The following sequence of actions is used to identify a permanent signal condition and select the treatment needed to remove it. If an on-hook condition occurs while a line or trunk is being given permanent signal treatment, the treatment is abandoned and normal disconnect procedures are used.

4.03 A timer is used with a transient call record (TCR) to time the 10- or 30-second interval allowed for the start of dialing. Upon time-out, the line or trunk is marked in the TCR as having a permanent signal condition. Control of the call is then passed to the Customer Error program (CUSTER). Any paths, circuits, or other registers that may have been assigned to the call are released. If the call is on a trunk, the trunk is idled. The terminal equipment number (TEN) is used to get the trunk supervisory scan point number (SSPN) which is then used to busy the trunk. If the call is on a line, the line is idled and then is set busy to prevent it from dropping back to dial tone.

4.04 A check is then made to see if it is a line or a trunk that is to receive permanent signal treatment. If it is a trunk, the TEN is used to get the SSPN. From this, the group data is obtained and checked by a bylink bit. The presence of a bylink bit indicates a step-by-step trunk which is given 30 seconds of reorder tone. If the trunk is not on-hook at time-out, it is placed

high and wet. Any other type of trunk is just set high and wet.

4.05 If a line is to receive permanent signal treatment, the appropriate route index (RI) is used to set up the path and circuit for a permanent signal announcement. If the announcement is unsuccessful in obtaining an on-hook, tests are made to determine the type of line involved.

4.06 If the line is a ground start coin line, an announcement may be given, the call is failed, the coin returned, and the line is set idle. If the coin is stuck, a stuck coin message will be printed on the maintenance TTY (refer to paragraph 4.12).

4.07 If the line was not a coin line, 1 second of open interval is given to allow a PBX line to drop off. The open interval releases the holding bridge equipment of the customer key telephone station. If the PBX line is still off-hook after the open interval, it is set high and wet.

4.08 After 1 second of open interval, if the line is an individual or multiparty, it is routed by the appropriate RI to ROH for 30 seconds. If the line is still off-hook at the time-out of the tone, the line is set high and wet.

4.09 In those offices with 3E3 and later generic programs, the option to supply 30 seconds of ROH tone to alert a customer of an off-hook condition has been changed. On carrier lines, ROH tone will be replaced by high tone. This has been done because the high level of ROH tone (approximately +6 dBm) can cause interference on trunk carrier and loop carrier systems. This is done in the following manner. In ANTON, the announcement and tone section of CUSTER, a test is made to separate announcements and tones. If this call, by testing its destination code, is being sent to an announcement, everything can proceed normally; if it is found that the call is being sent to a tone, it must be determined if the tone is a receiver off-hook tone. This is done by comparing the trunk group number, defined in the route index expansion, to the symbolic for ROH tone, defined in the Translation Data Area Definition (TDATA) as receiver off-hook tone. If this tone is not ROH, the call can proceed normally. In the case of the tone being ROH, the line will be tested to find out if it is a carrier line. This is accomplished by retrieving the line data for this call, storing it in scratch, and testing bit 1 of word

11, defined as INHROH (Inhibit Receiver Off-Hook tone). With all these conditions met, ROH tone will be inhibited on this line by substituting high tone, also defined in TDATA. This is done by exchanging the trunk group number for ROH tone with the trunk group number of high tone, this number being stored in the TCR. The new trunk group number will now be picked up, and this call routed to high tone rather than ROH tone. The call is then allowed to proceed and receive the appropriate treatment that was originally intended for it.

4.10 When a call is failed, all lines and trunks are set high and wet. This releases the TCR, clears any paths which may have been set up, and prints a translation error message (refer to the following paragraph). The last look bits for the associated scan point are set to a form of busy (11 instead of 01 to 10) which prevents any terminations to that line or trunk while the permanent signal exists. The high and wet line or trunk is scanned for an on-hook approximately every 100 ms. When an on-hook is detected, the line or trunk is set to normal idle.

4.11 The following TTY printouts are provided as a part of permanent signal and partial dial treatment. Refer to the Output Message Manual, OM-3H300, for other details of these messages.

- Failed calls cause the following translation error message to be printed on the maintenance TTY: REPT PROG TBL XXX (XXX being a decimal, 3-digit, trouble code).

The contents of the associated TCR are also printed out.

- Stuck coins result in a failed call and are reported the same as any other failed call.

The following printout is also made on the Repair Service Bureau (RSB) teletypewriter (TTY):

```
tt REPT LINE a bcde TN f g TRBL STUCK
COIN
```

The tt designates the time past the hour in which the alarm occurred, a bcde is the office equipment number of the line, and f g is the telephone number of the line.

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- Lines set high and wet are reported once each 24-hour period (unless specified otherwise) by a printout of the affected TNs on RSB TTY.
- Trunks set high and wet are reported once each 24-hour period (unless specified otherwise) by a printout on the maintenance TTY which lists the affected trunks by terminal equipment number, group number, and member number.

4.12 Whenever the Call Completing program finds a line set high and wet, a look is taken at the plug-up list. This list usually contains emergency or certain high priority lines. If the line appears on this list, a call to that line will not be given busy, but routed to an alternate line or an announcement. If the alternate line or announcement is busy, the caller is given a busy signal.

Partial Dial

4.13 Partial dial treatment is given to calls that are not completely dialed. After the first digit has been dialed, the interval between digits is timed. If the interval exceeds the allowable 15-second limit, the call is given partial dial treatment. This time interval is reduced to 8 seconds during heavy traffic periods or system overload conditions.

4.14 Partial dial treatment is similar to and in most cases the same as that described for permanent signal treatment. The differences are the TCR time-out interval (8 or 15 seconds instead of 10 or 30 seconds) and the RI used to route the call to a partial dial announcement.

Permanent Signal/Partial Dial Treatment During Overload Conditions

4.15 With an overload condition, or if a cable cut occurs, blockage will occur when the circuits required for an announcement or tone are selected. If an attempt to select an announcement or tone circuit fails, that step is skipped. If no circuits of the required type are available, 1 second of open interval is given and the line or trunk is set high and wet.

4.16 When the T-carrier fails, it will create massive off-hooks; frequently, it will follow with subsequent on-hooks and off-hooks (bouncing). For the incoming trunks, the trunks are treated as normal originations and will be disposed of

eventually as a normal partial dial time-out, permanent signal time-out, or abandon. For the outgoing trunk off-hooks, large numbers of high and wet message pairs (in and out of the high and wet state) and the trunk limit messages will congest the maintenance TTY. Consequently, the carrier failure compounded with the high and wet printouts can create serious problems in a No. 3 ESS office. In the 3E3 generic program, a 10-second "cooling" period is used to avoid this. During the 10-second duration, direct scan is performed on the trunk. If the trunk goes on-hook within the 10-second period, the trunk will be restored to service. Only a time-out will cause the trunk to go through the high and wet treatment. During the holding period, a TCR is used to monitor the trunk.

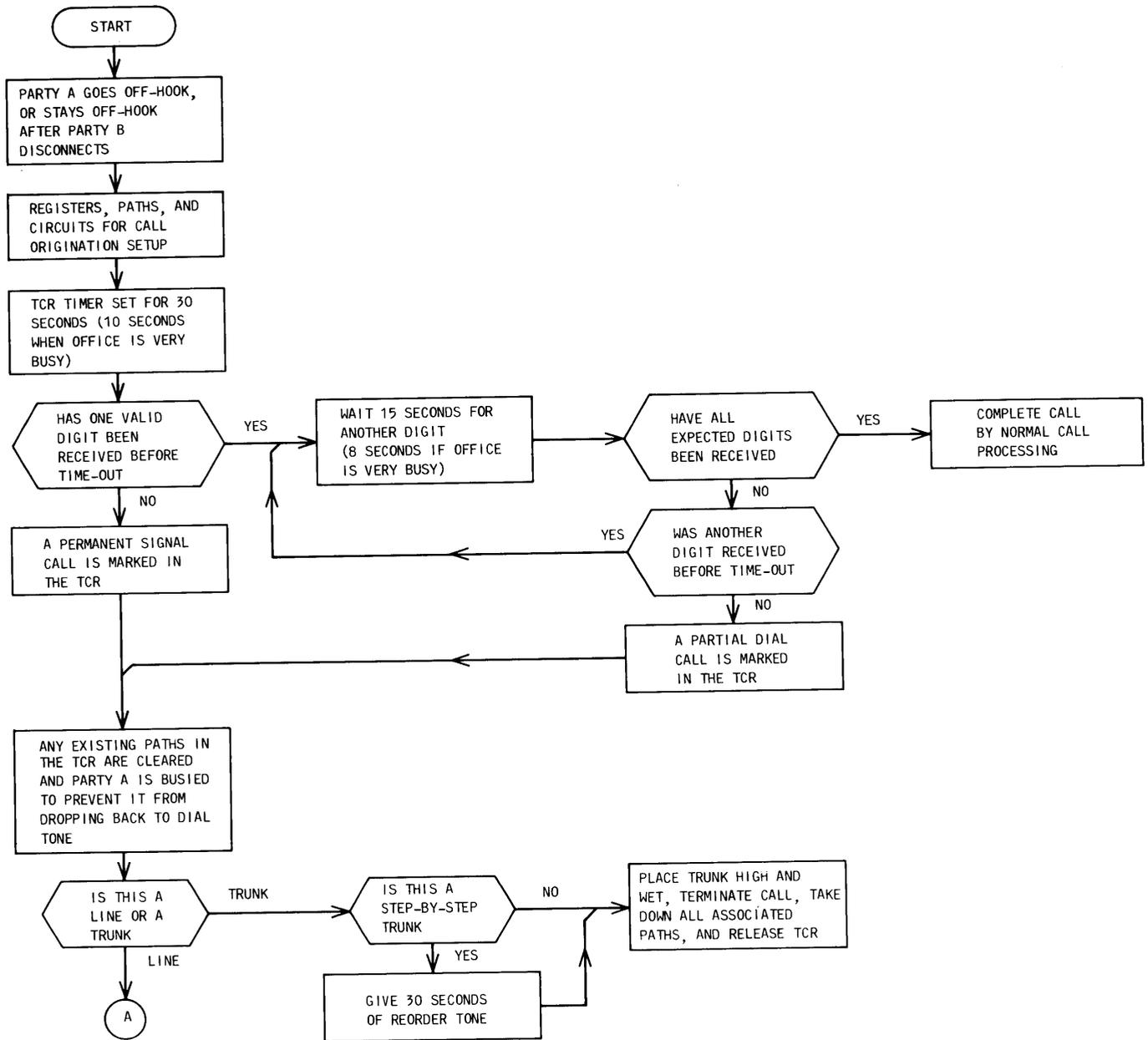
Conversion of High and Wet Lines to High and Dry

4.17 When a line is put in the permanent signal state, the line is put on a list called a high and wet list. That list contains ten members and is a first-in first-out type of list. When the list is filled and an eleventh member occurs, it pushes out the first one that was put on the list and this pushed-out member becomes high and dry. Also, every 10 minutes, a timed routine pushes out the first entry in the list so that no entry stops on the list for more than 100 minutes. Since the normal line scan now only scans for originations, the only way to find a permanent signal line going to idle is:

- (a) For it to be on the high and wet list and scanned at a 100-millisecond scan rate. If it goes on-hook, it is changed to normal idle.
- (b) Or, by a routine which every 2 minutes will go through and scan every line that is in the permanent signal state and not on the high and wet list (ie, high and dry). If it is on-hook at that 2-minute scan, it will be put idle. Once a line becomes high and dry, it only gets a chance every 2 minutes to be put in the normal idle state. This could keep the customer out of service for a much longer period than desired.

Feature Flow Diagram

4.18 A feature flow diagram giving the functional operation of the Permanent Signal and Partial Dial Treatment feature is shown in Figure 1.



NOTE:
 THE CALLING AND CALLED PARTIES WILL BE REFERRED TO AS PARTY A AND PARTY B RESPECTIVELY.

Fig. 1—Permanent Signal and Partial Dial Treatment Feature Flow Diagram (Sheet 1 of 2)

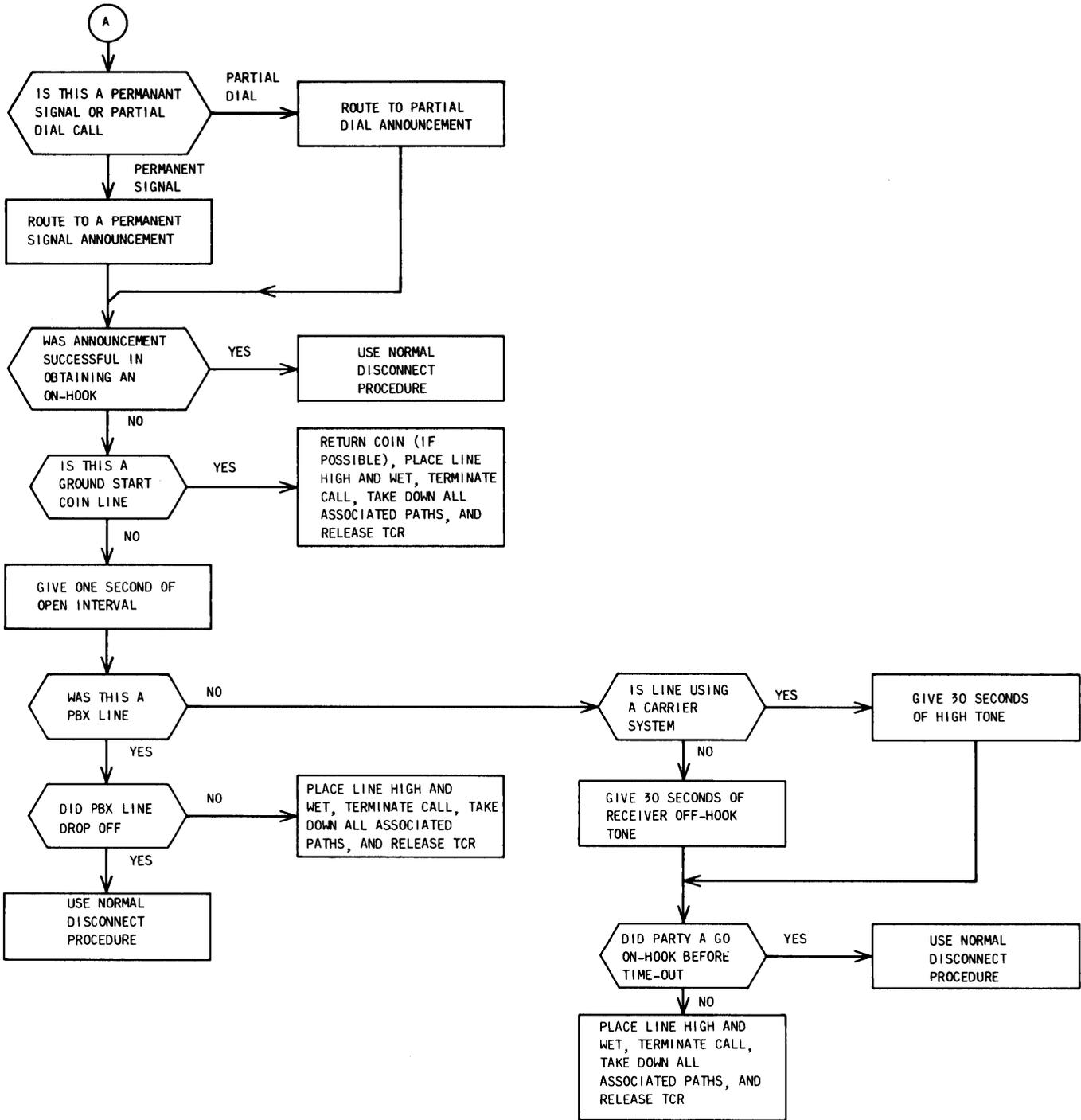


Fig. 1—Permanent Signal and Partial Dial Treatment Feature Flow Diagram (Sheet 2 of 2)

CHARACTERISTICS**5. FEATURE ASSIGNMENT**

5.01 The Permanent Signal and Partial Dial feature is provided on a per-system basis in every No. 3 ESS and is available to every line and trunk in an office.

6. LIMITATIONS

6.01 There is no limitation on the number or type of lines that can receive permanent signal and partial dial treatment.

7. INTERACTIONS

7.01 The Permanent Signal and Partial Dial feature interacts with the plug-up list feature as described in paragraph 4.12.

8. RESTRICTION CAPABILITY

8.01 There are no restrictions that apply to this feature.

INCORPORATION INTO SYSTEM**9. INSTALLATION/ADDITION/DELETION**

9.01 The Permanent Signal and Partial Dial feature is an inherent feature in all generic programs of the No. 3 ESS.

10. HARDWARE REQUIREMENTS

10.01 There are two optional announcements and one tone that may be used with this feature. One announcement for partial dial can be used or, if desired, the same announcement can be provided for both. The optional tone can be ROH tone or some other tone.

10.02 Information necessary to engineer the Permanent Signal and Partial Dial feature in the No. 3 ESS is covered in the Network Design Sections 233-060-210, Service Circuits, and 233-060-820, Network Design Worksheets, Service Circuits.

11. SOFTWARE REQUIREMENTS

11.01 Program requirements for permanent signal and partial dial consist of 200 main store words.

11.02 Call store (CS) requirements for permanent signal and partial dial are one 16-word TCR for each line or trunk that is given permanent signal or partial dial treatment. The TCR is held until such time as the line or trunk being given treatment is set high and wet. Refer to the PA-3H3XX for specific TCR word layouts.

11.03 Processor real-time data required by this feature will be supplied when the data becomes available.

12. DATA ASSIGNMENTS AND RECORDS

12.01 Lines and trunks that are determined to require permanent signal or partial dial treatment are routed via a route index (RI) to the appropriate treatment. These route indexes are dedicated and must be defined by the operating company to give the treatment desired in each case. These route indexes are listed in TG-3, Division 5, Section 3d.

12.02 The trunk groups required to provide a permanent signal/partial dial announcement are also preassigned and are listed in TG-3, Division 5, Section 2b.

12.03 The following Translation Input Forms must be completed and submitted to the WEC Co Regional Center using normal schedule procedures for the initial office data administration (ODA) run. Refer to TG-3 for details and other information required to complete these forms. A copy of these forms should be maintained for office records.

FORMS	TITLE
3202	Trunk Group Table
3303	Route Index Expansion Table

12.04 The following RC message is used to add or change translations required for this feature. Refer to the Input Message Manual, IM-3H300, for details of the message and associated keywords.

RC MESSAGE	EXPLANATION OF MESSAGE
RC:RTI/	Adds, changes, or deletes a route index expansion entry and its

alternate route index expansion entry.

13. TESTING

13.01 Tests may be performed on a trunk or line that is in the high and wet state by using the trunk and line test panel (TLTP). Refer to Section 233-135-105 for trunk and line test panel operating and testing methods.

14. OTHER PLANNING TOPICS

14.01 No planning is required other than which optional permanent signal/partial dial treatments are required for each central office.

ADMINISTRATION

15. MEASUREMENTS

15.01 The following traffic measurements are made for the Permanent Signal and Partial Dial feature:

- Originating permanent signals
- Partial dial time-outs—originating and incoming.

Refer to Section 233-152-135 for the applicable register.

16. CHARGING

16.01 There is no charging for this feature.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

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

- Hundred Call Seconds (CCS)—A measure of telephone traffic load obtained by multiplying the number of calls in an hour by the average holding time per call in seconds and dividing the product by one hundred.
- Call Store (CS)—That part of the No. 3 ESS which provides temporary memory storage of information pertaining to call processing, maintenance, and traffic measurement data.

- High and Wet—The state in which trunks and lines are placed after all other permanent signal or partial dial treatment has failed. All switching network connections are released and the trunk or line is monitored for an on-hook condition only. The rate of the monitoring is the same as that of the base level loop (approximately 100 ms between scans).

- High and Dry—The state in which lines are placed after they have been bumped off the high and wet list. They are only looked at every 2 minutes with a scan for on-hook. If on-hook at the time of the scan, the line is returned to normal idle.

- Off-Hook—The condition that indicates the active state (closed loop) of a line, trunk, or service circuit.

- On-Hook—The condition that indicates the idle state (open loop) of a line, trunk, or service circuit.

- Private Branch Exchange (PBX)—A switching system which provides internal telephone communications between stations located on customer premises as well as between these stations and exterior networks.

- Receiver Off-Hook (ROH) Tone—An audible, steady signal sent over the customer line to attract attention when there is a continuing off-hook condition but the station is not in use.

- Transient Call Record (TCR)—A call store register designated for storage of information concerning calls in progress.

- Trunk and Line Test Panel (TLTP)—The equipment unit of the No. 3 ESS used for making normal transmission and operational test on trunks and lines.

18. REFERENCES

18.01 The following documents may be referred to for supplementary information pertaining to the Permanent Signal and Partial Dial feature:

- PD-3H151—Customer Error Program (CUSTER)

- TG-3—Translation Guide
- IM-3H300—Input Message Manual
- OM-3H300—Output Message Manual
- PA-3H3XX—No. 3 ESS Office Data Tables Layout Specification
- Section 233-152-135—Traffic and Plant Measurements
- Section 233-135-105—Trunk and Test Line Panel
- Section 233-060-210—Network Design, Service Circuits
- Section 233-060-820—Network Design Worksheets, Service Circuits