

FEATURE DOCUMENT  
TOLL RESTRICTION AND TOLL DIVERSION  
NO. 2 ELECTRONIC SWITCHING SYSTEM

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**FEATURE DEFINITION AND DESCRIPTION****1. DEFINITION/INTRODUCTION****TOLL RESTRICTION**

**1.01** Toll restriction is generally defined as the action of preventing stations from making calls to toll or any other restricted points. The calling line is usually directed to a recorded announcement or given a tone (reorder) when restricted calls are dialed.

**1.02** The No. 2 Electronic Switching System (ESS) toll restriction feature is implemented by telephone company inputs to the 3-digit translation. This feature applies to all lines and trunks when they use the 3-digit translator. When a call is originated from a No. 2 ESS line, the program determines from the 3-digit screening tables, by use of the route index, where the call is to be routed. The route index can route the call to its dialed destination or to a recorded announcement or reorder, hence it is "restricted."

**1.03** This restriction provides a general restriction capability, even though the official name is "toll" restriction.

**TOLL DIVERSION**

**1.04** The No. 2 ESS toll diversion feature is normally used by private branch exchange (PBX) lines. If toll diversion applies to a call that is placed from a PBX line, No. 2 ESS reverses battery on the line to it from the PBX. If the PBX determines that the call should not be allowed, then the PBX trunk circuit indicates on-hook to the No. 2 ESS, whereupon the No. 2 ESS disconnects the call. The PBX then directs the calling station to a recorded announcement, an attendant, or reorder.

**1.05** If the PBX determines that the call should not be diverted, then the PBX trunk does not indicate on-hook to the No. 2 ESS after the battery reversal. In this case, the call is completed by the No. 2 ESS.

**1.06** In No. 2 ESS, toll diversion can only be implemented on multiline hunt group (MLHG) translations. Either a group of lines or PBXs can use MLHG translations. Lines with this feature

must be equipped with detection devices and must be capable of rerouting the call.

**2. USER PERSPECTIVE****CUSTOMER****Toll Restriction**

**2.01** The No. 2 ESS toll restriction feature allows customers to restrict stations from making calls to toll or any other restricted point. The feature is implemented by the telephone company at the request of the customer. A customer with this feature is usually a business customer with centrex service; however, any No. 2 ESS line or trunk can be restricted. Examples are:

- noncentrex line placing call
- centrex line placing "dial 9" call
- incoming trunk call
- any business customer call.

**2.02** Toll restriction is a general type of restriction and any combination of calling party and dialed destination can be restricted.

**Toll Diversion**

**2.03** The toll diversion feature allows customers to determine what type of calls will be completed when the calls are originated from their lines. A customer with this feature is usually a business customer with PBX service, but the feature can be implemented for other types of lines provided the lines are associated with MLHGs. In response to battery reversal from No. 2 ESS, the PBX can direct the calling PBX station to a recorded announcement, to an attendant, or to reorder.

**2.04** Toll diversion is a general type of restriction and any combination of calling party and dialed destination can be restricted if the calling party line is associated with a MLHG.

**TELEPHONE COMPANY****Toll Restriction**

**2.05** The No. 2 ESS toll restriction feature is implemented completely by telephone company

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inputs to the 3-digit translation. Based on the calling line and the called directory number, the route index derived is used to route restricted calls to a recorded announcement, reorder, etc. Nonrestricted calls are routed to their dialed destination.

### Toll Diversion

**3.06** The toll diversion feature is implemented by use of a toll diversion bit in the 3-digit screening tables only on MLHG's.

## 3. SYSTEM PERSPECTIVE

**3.01** The No. 2 ESS Toll Restriction and Toll Diversion features are very closely related. They differ only in their end result. Although the official names for these features are "toll" restriction and "toll" diversion, either feature can divert any call that is to be denied, even local calls.

**3.02** The No. 2 ESS program uses the 3-digit translation to accomplish both toll restriction and toll diversion. For most calls processed by No. 2 ESS, including centrex dial 9 calls, the 3-digit translator is used to determine how to route and charge the call. The 3-digit translator includes the code point translator, code index translator, screening tables, route index tables, and charge index tables.

**3.03** There are two inputs for every call processed through the 3-digit translator. These inputs are the calling party's screening class and the called directory number.

**3.04** The screening class is derived from the calling party's originating translation. The screening class is entered into the translation by one of the following telephone company inputs:

- (a) The line class code if the calling party is a line
- (b) The trunk group data or one-digit translator if the calling party is connected to No. 2 ESS by a trunk
- (c) One of the four screening classes (SCRs) of centrex group data if the calling party is a centrex attendant or station.

**3.05** The direct route index is originally derived from the code index translator based on the dialed directory number, but this route index can be overridden if a different route index is derived from the screening tables.

**3.06** The No. 2 ESS program decodes the route index and routes the call as indicated. The call may be routed to a line, trunk, recorded announcement, reorder, test circuit, etc. The provision of routing the call to a tone or an announcement is generally called "toll restriction."

### TOLL RESTRICTION

**3.07** The No. 2 ESS toll restriction feature is completely accomplished by telephone company inputs to the 3-digit translation. If a particular dialed code from a station with a particular screening class should be restricted, then telephone company personnel should enter a route index to accomplish this restriction. The call can be routed to an announcement, reorder, etc.

**3.08** There is no bit or indicator in the 3-digit translation to indicate toll restriction. The override route index, which is derived from the screening tables, provides the telephone company personnel an easy way to accomplish toll restriction. Since most 3-digit codes are permitted from most screening classes, the direct route index, from the code index translator, routes the call to completion. The call may be routed to a line, an outgoing trunk, an announcement, a tone, a test circuit, etc. If a call from a particular screening class should not complete as indicated by the direct route index, the override route index then routes the call somewhere else and the call is restricted. See Figure 1.

### TOLL DIVERSION

**3.09** When a call is originated from a No. 2 ESS line, the program determines from the 3-digit translation screening tables if the calling line has the toll diversion feature. Refer to Figures 2 and 3.

**3.10** If it is determined that toll diversion applies to the call, then this information is saved in the transient call register (TCR) for later use.

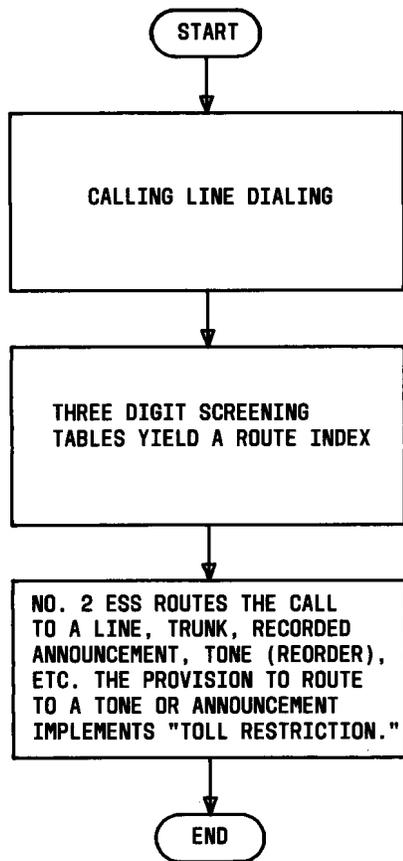


Fig. 1—Toll Restriction—Feature Flow Diagram

3.11 After all the dialed digits are received, the program determines if toll diversion applies to the call. This is done by consulting the toll diversion bit which was stored in the TCR. If toll diversion applies to the call, then the customer dial pulse receiver (CDPR) reverses battery on the line from the No. 2 ESS to the PBX. Reverse battery is maintained for 100 milliseconds (nominal). The battery reversal is a signal to the PBX, so that it may determine if the call should be allowed.

3.12 If the PBX determines that the call should be diverted within the PBX, then the PBX trunk circuit indicates on-hook to the No. 2 ESS CDPR within 400 milliseconds after the battery reversal. When the on-hook is received by the CDPR, the No. 2 ESS program disconnects the call. The PBX may then take one of the following actions:

- (a) Connect the calling line to a recorded announcement
- (b) Connect the calling line to an attendant
- (c) Connect the calling line to reorder (fast busy).

The PBX actions to implement toll diversion are independent of No. 2 ESS actions.

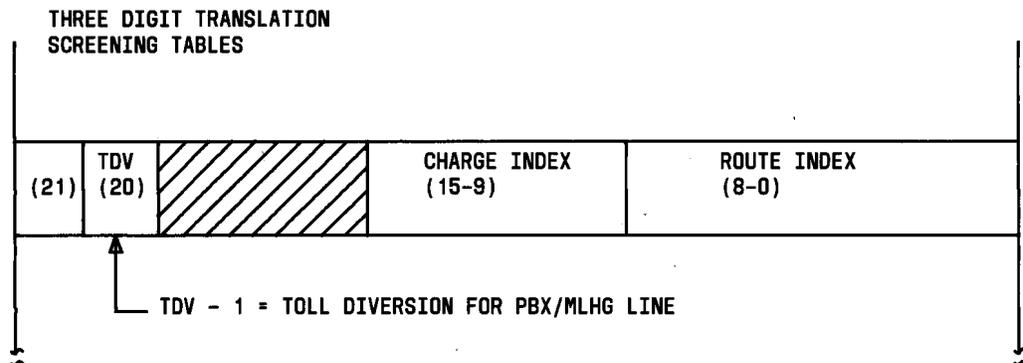


Fig. 2—Screening Tables Translation Expansion

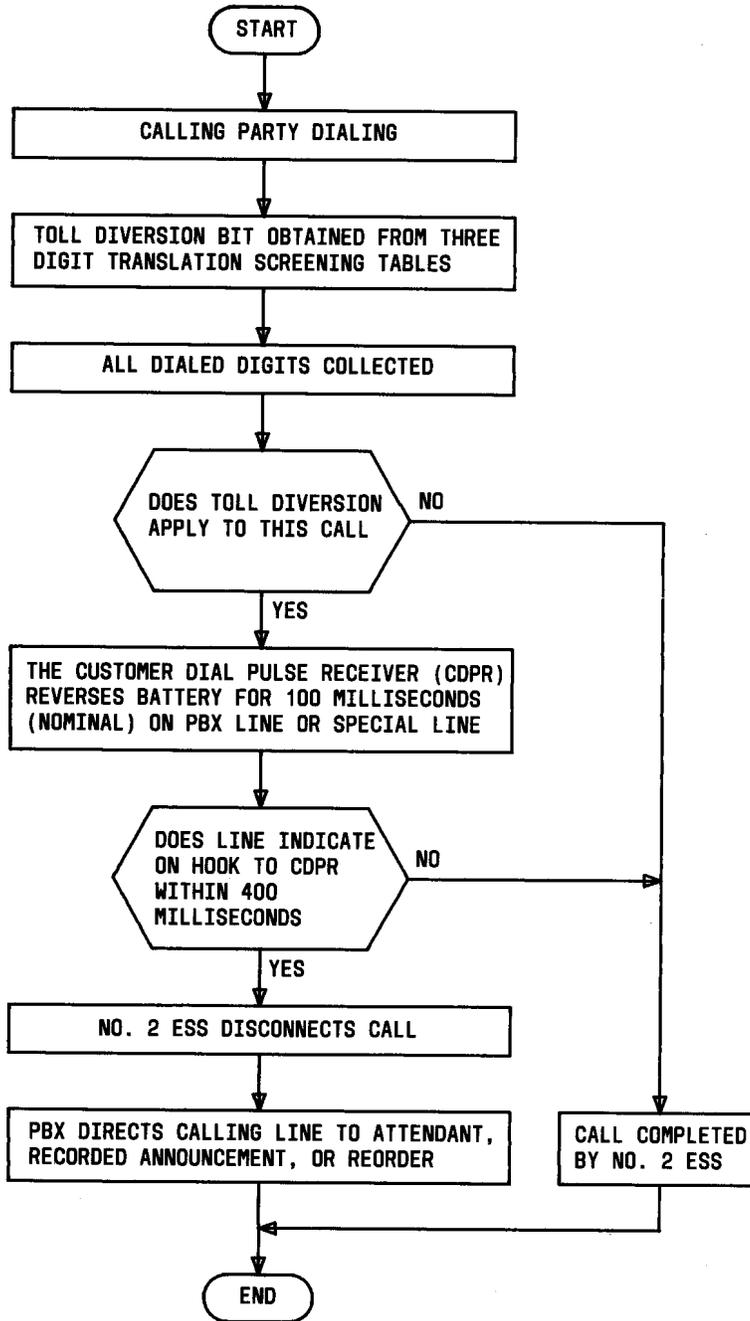


Fig. 3—Toll Diversion—Feature Flow Diagram

**3.13** If the CDPR does not receive on-hook from the PBX line within 400 milliseconds after the battery reversal, then the call is completed by the No. 2 ESS program.

### ***FEATURE ATTRIBUTES***

#### **4. APPLICABILITY**

##### **TOLL RESTRICTION**

**4.01** The No. 2 ESS toll restriction feature normally applies to all lines and trunks. Wide area telecommunication service (WATS) is an example of toll restriction, where the customer is restricted from certain bands. See 2.01 for a list of calling parties that can have toll restriction.

##### **TOLL DIVERSION**

**4.02** The No. 2 ESS toll diversion feature normally applies to PBX lines, but it can be implemented for other MLHG lines, which are equipped with detection devices and which are capable of rerouting the call.

#### **5. LIMITATIONS AND RESTRICTIONS**

**5.01** The toll diversion feature can only be implemented for multiline hunt members. The MLHG is normally the PBX type, but can be just a collection of lines if equipped with detection hardware.

**5.02** The PBX must route diverted calls to a recorded announcement, an attendant, or reorder.

**5.03** Toll diversion cannot apply to centrex lines, since centrex lines cannot be associated with a MLHG.

#### **6. COMPATIBILITY AND INTERACTIONS**

**6.01** The hardware associated with PBX/MLHG lines which are subject to toll diversion must be capable of recognizing and interpreting the toll diversion battery reversal signal.

**6.02** Refer to Table A for a listing of calls that cannot be toll diverted.

**TABLE A**  
**CALLS THAT CANNOT BE TOLL DIVERTED**

TYPE OF CALL		LO-1 GENERIC	EF-1 GENERIC
CALLS TO 3-DIGIT TEST OR SERVICE CODES		X	√
CALLS TO 3-DIGIT TEST OR SERVICE CODES THAT RESULT FROM FOREIGN AREA TRANSLATION (FAT) OR AREA/OFFICE CODE RESOLUTION		X	X
CALLS TO LINES WITH THE FOLLOWING TERMINATING CLASSES:			
TERMINATING CLASS	DESCRIPTION		
00	UNASSIGNED	X	X
01	DENIED	X	X
09	AIOD-PBX OR CENTREX CU MLHG	X	X
32	SPECIAL ROUTING	X	X
34	HOTEL, MOTEL PBX/MLHG	X	X
35	INTERNAL	X	X
36	SPARE	X	X
40	HOTEL INDIVIDUAL	X	X

X CALLS CANNOT BE TOLL DIVERTED  
√ CALLS CAN BE TOLL DIVERTED

## 7. COST FACTORS

7.01 Program store translation requirements for toll diversion include one bit per PBX screening table.

## 8. AVAILABILITY

8.01 Both toll restriction and toll diversion are available as a standard part of all generic programs.

## *CONSIDERATIONS FOR INCORPORATION OF FEATURE INTO SYSTEM*

### 9. PLANNING

#### TOLL RESTRICTION

9.01 Toll restriction requires planning a translation that accomplishes the desired results. Toll restriction is accomplished by how the telephone company personnel creates the 3-digit translation.

#### TOLL DIVERSION

9.02 Toll diversion requires planning of PBX facilities and line hardware.

**10. HARDWARE****TOLL RESTRICTION**

**10.01** Since toll restriction is a software feature, no special hardware is required.

**TOLL DIVERSION**

**10.02** Lines with the toll diversion feature must be equipped with detection devices and be associated with MLHGs.

**11. DETERMINATION OF QUANTITIES**

**11.01** Not applicable.

**12. ASSIGNMENT OF RECORDS**

**12.01** ESS 2301-2 form applies to line class codes assigned to MLHG/PBX groups. Data on this form causes battery reversal to be returned to the originating PBX when the screening tables encounter the toll diversion bit. See Figure 2 for screening tables translation expansion.

**13. NEW INSTALLATION AND GROWTH**

**13.01** Not applicable.

**14. TESTING**

**14.01** Suitable test calls should be made from lines with toll restriction or toll diversion to determine if the features are working properly.

**15. MEASUREMENTS**

**15.01** Not applicable.

**16. CHARGING**

**16.01** Not applicable.

**SUPPLEMENTARY INFORMATION****17. GLOSSARY**

**17.01** Refer to Section 232-190-003.

**18. REASONS FOR REISSUE**

**18.01** This is the initial issue of this document.

**19. REFERENCES**

**19.01** The following documentation contains information pertaining to or affected by the Toll Restriction and Toll Diversion features.

**Feature Documents**

232-190-320      Centrex Calling Restrictions

**Other References**

IM-2H200      Input Message Manual

PD-2H204      Digit Interpretation Program

PD-2H209      Outgoing Operator Trunk Program

PA-2H2XX      ESS No. 2 Office Data Tables  
Layout Specification

TG-2H      Translation Guide