FEATURE DOCUMENT
CENTRALIZED AUTOMATIC MESSAGE ACCOUNTING INTERFACE AND SPECIAL TOLL BILLING
NO. 3 ELECTRONIC SWITCHING SYSTEM

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INTRODUCTION

1. GENERAL INFORMATION

1.01 This section provides a description of the hardware and software arrangements provided to make the No. 3 Electronic Switching System (ESS) compatible with the Centralized Automatic Message Accounting (CAMA) equipment. It also describes the arrangements made to provide Special Toll Billing (formerly known as QZ billing). These arrangements, unless otherwise indicated, are available with all issues of the generic programs for No. 3 ESS.

1.02 This section is reissued to describe changes made to the CAMA and Special Toll Billing feature by the introduction of the 3E3 generic program, and to describe other changes which have been made since the last issue.

1.03 Hardware required for but not exclusive to this feature includes MF transmitters and receivers, outgoing trunk circuits for high-low and reverse battery supervision (CPS-FB399 of SD-3H220), and/or 2-way trunk circuits for E&M supervision (CPS-FB382 of SD-3H220).

2. DEFINITION

2.01 The CAMA system is a centrally located facility that provides automatic billing of customer dialed toll calls (DDD) for nearby local switching offices.

2.02 In the No. 3 ESS, calls may be routed to a nearby CAMA facility for billing. The No. 3 ESS interfaces with CAMA offices both on an Automatic Number Identification (ANI) and on an Operator Number Identification (ONI) basis. Normally, the No. 3 ESS office outpulses the called number and the billing number to the CAMA office. If ONI is required, only the called number is outpulsed and the caller is connected to a CAMA ONI operator.

Special Toll Billing

2.03 Special toll billing (formerly known as QZ billing) is a feature that allows calls from individual lines or multiline hunt group (MLHG) members to be billed to billing numbers that are not automatically identifiable by the No. 3 ESS (eg, customer internal accounting). Billing is accomplished by routing to a CAMA ONI operator who verbally obtains the billing number from the calling party.

2.04 CAMA interface and special toll billing require installation of trunks to the CAMA office. Some software data is also required which may be added via an office data administration (ODA) run (for new installations) or by recent change messages.

DESCRIPTION

3. USER OPERATION

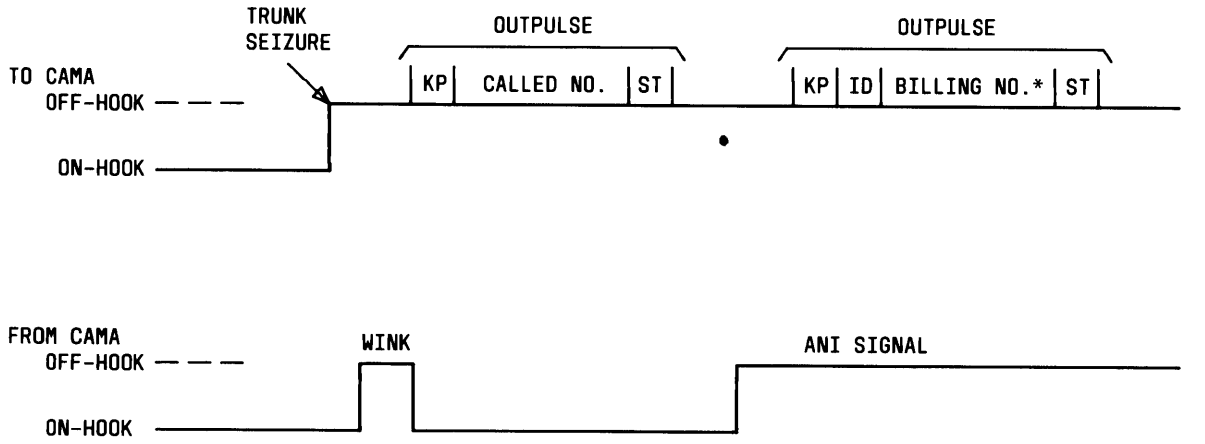
3.01 When a customer's call is routed through a CAMA office and the calling party is automatically identified by the No. 3 ESS, the customer is given no indication of the billing process. However, if the calling party is not identifiable by the No. 3 ESS or if the customer has the Special Toll Billing feature, the customer is connected to a CAMA ONI operator. The operator verbally asks for the calling party identification or billing number and upon receipt of the number, the operator releases and the call is completed in the same manner as any other outgoing call to the CAMA office.

3.02 No actions are required of the No. 3 ESS personnel for CAMA interface.

4. SYSTEM OPERATION

4.01 An outgoing call to a CAMA office is handled in the same manner as a normal outgoing call except both the called party number and the billing number must be outpulsed. The 3-digit translation yields a route index that points to a CAMA trunk group. After all digits have been received, a trunk is selected and seized as with any outgoing call. After a wink signal is received from the CAMA office, the called number is outpulsed to the CAMA office. The No. 3 ESS sends a keypulse (KP) signal plus the called number followed by a start (ST) signal (Figure 1).

4.02 At this point, the No. 3 ESS waits for an ANI signal (off-hook) from the CAMA office. If no signal is received within 2 seconds, the call times out and reorder tone is returned to the calling party. If the signal is received, the No. 3 ESS prepares to outpulse the billing number.



ANI - AUTOMATIC NUMBER IDENTIFICATION
ID - INFORMATION DIGIT (SEE TABLE A)
KP - KEYPULSE SIGNAL
ST - START CODE (MF SIGNAL = 1500 AND 1700 HZ)
WINK - START SENDING SIGNAL
* - BILLING NUMBER NOT SENT WHEN ID = 1, 2, 4 OR 5

Fig. 1—Information Outpulsed to CAMA Office

4.03 The billing number normally is obtained from the calling party originating translation. The billing number is outpulsed preceded by the KP signal and an identification digit (ID) and followed by the ST signal. The ID digit is transmitted to the CAMA office to indicate various information about the identity of the calling party. Table A describes the information digits which may be outpulsed to the CAMA office.

4.04 In the normal case where the billing number is automatically identified, the billing number is outpulsed to the CAMA office preceded by the KP signal and information digit 0 or 3 and followed by the ST digit. The call is made stable within the No. 3 ESS office and the CAMA processes the call to completion. Figure 2 provides a flow diagram of calls to a CAMA office.

4.05 If the calling party is normally identifiable, but due to some difficulty with the translation the billing number cannot be obtained, information digit 2 or 5 is outpulsed to the CAMA office. This digit tells the CAMA that because of some difficulty at the No. 3 ESS, the calling party was not identified. Only the KP signal, information digit, and the ST signal are outpulsed to the CAMA in this case. The calling party is connected to a CAMA ONI operator who verbally obtains the billing information. The call is then made stable to the CAMA office.

4.06 If the calling party is not normally identifiable (a multiparty line, PBX line, or MLHG), information digit 1 or 4 is outpulsed to the CAMA office. This causes the CAMA ONI operator to be connected with the calling party in order to verbally obtain the billing number. The call is then made stable to the CAMA office.

4.07 Upon completion of a CAMA-involved call, the CAMA operator may recall the calling party (eg, to provide billing information if previously requested). In the SO-2 generic program, if the calling party is a 2-party or multiparty line, the ringback initiated by the operator causes all parties to be rung. The 3E3 generic program has no provision for applying ringback to multiparty lines (with the exception of calls involving the 911 feature); however, the party number for 2-party customers is remembered in case a ringback is required. In this case, only the appropriate party is rung. It should be noted that if an attempt is made to ring back a multiparty line, the operator receives no indication that the line is not being rung (3E3 generic only).

TABLE A

INFORMATION DIGIT DESCRIPTION

INFO DIGIT	MULTIFREQUENCY SIGNAL (HZ)		DESCRIPTION
0	1300	1500	Calling party is identified
1	700	900	Calling party not identifiable (trunk, PBX or multiparty line, Special Toll Billing, etc)
2	700	1100	Calling party not identified due to a trouble
3	900	1100	Calling party identified and service observed
4	700	1300	Calling party not identifiable — service observed
5	900	1300	Calling party not identified due to trouble — service observed

Special Toll Billing

4.08 Individual lines or members of multiline hunt groups may require billing to a number that cannot be identified by the No. 3 ESS. In this case, a bit (BLN) is set in the line's translations to indicate special toll billing is required. For special toll billing, information digit 1 or 4 is outpulsed to the CAMA office and the call is completed as described in paragraph 4.06.

CHARACTERISTICS

5. FEATURE ASSIGNMENT

5.01 The CAMA feature is assigned on a per-office basis and the number of CAMA trunks assigned is based on the amount of traffic expected to be routed to CAMA.

5.02 The ONI feature is independent of the No. 3 ESS and is a default arrangement in cases when the No. 3 ESS fails to identify the calling party.

5.03 The Special Toll Billing feature may be assigned to lines, multiline hunt groups, or individual members of multiline hunt groups.

6. LIMITATIONS

6.01 The CAMA requires that outpulsing from the No. 3 ESS be in the form of multifrequency (MF) encoded digits.

6.02 A maximum of 15 digits for the called number and 7 digits for the billing number may be outpulsed to the CAMA office.

6.03 During heavy traffic periods when MF transmitters are in great demand, the No. 3 ESS waits a maximum of 4 seconds for the wink start signal to be returned from the CAMA office. During light traffic periods, the No. 3 ESS may wait up to 10 seconds. The ANI signal must be returned from the CAMA office within 2 seconds. Reorder tone is returned to the customer if these signals are not received within the allotted time intervals.

7. INTERACTIONS

7.01 The CAMA and Special Toll Billing features operate independently of other features, except that calls may not be forwarded through a CAMA office via the call forwarding feature. When a call is outpulsed to a CAMA office, the No. 3 ESS does not receive answer supervision and, therefore, sets the call stable as soon as the outpulsing is completed. The CAMA office is then responsible for computing the charges after the called party answers. If an incoming toll call was allowed to be forwarded through a CAMA office, the originating office would not receive answer supervision and, therefore, could not provide the necessary charging information.

7.02 During the progress of a normal 2-party call, either party may flash to recall the operator (eg, to obtain billing information for the

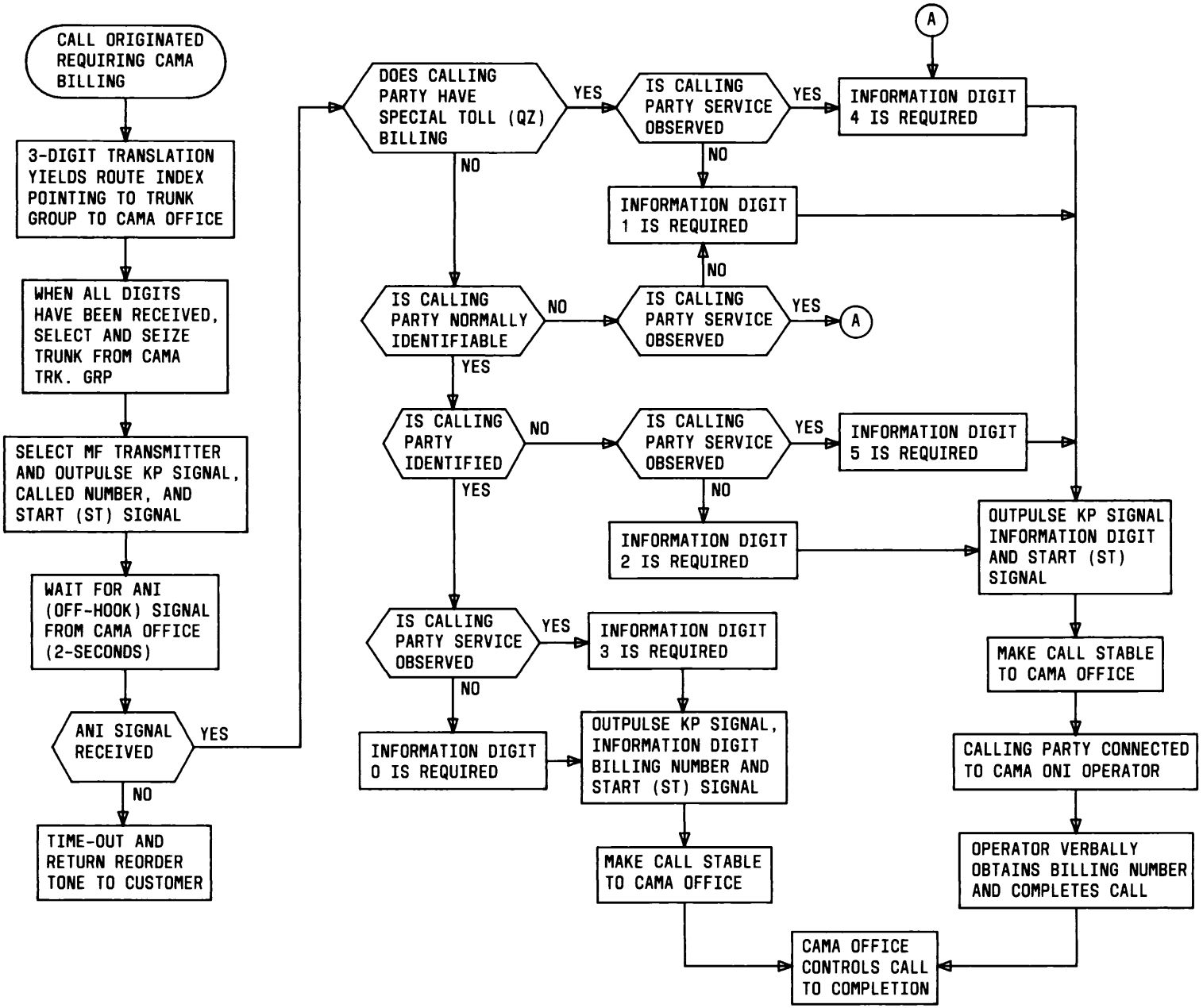


Fig. 2—Flow Diagram for Calls Routed to a CAMA Office

call in progress). In the SO-2 generic program, if a Threeway Calling customer flashes to recall the operator, a connection to a conference circuit is established instead of to the operator. The 3E3 generic program provides a special dialing code to resolve this problem. In this case, the Threeway Calling customer flashes, receives the special dial tone (indicating a successful seizure of a conference circuit), and dials 110. The No. 3 ESS then checks to see if the other party is a trunk (indicating that the call involves CAMA or some other toll facility). If not, operator recall is not possible and the customer is given a custom calling error announcement. If the other party is a trunk, the No. 3 ESS transmits a flash of 500 ms over the trunk to the CAMA office. The conference circuit, associated paths, and the flasher-to-CDPR connection are idled and the original talk path is restored. At this point, the Threeway Calling customer may talk to the other party and the operator position is either already attached to the connection or is still being rung. The Threeway Calling customer is not allowed to use this procedure to recall the operator while involved in a conference call.

7.03 A unique arrangement is provided by the 3E3 generic to interface the No. 3 ESS with a step-by-step (SXS) CAMA office. The No. 3 ESS selects the trunk to the SXS CAMA office in the usual manner, reserves an MF transmitter, and performs the usual digit prefixing or deleting as required. The called telephone number is then outpulsed directly from the E&M trunk circuit in the form of dial pulsing. When an ANI signal is received from the SXS CAMA office, the generic program changes the outpulsing indicator from dial pulsing to MF. The reserved MF transmitter is then connected to the trunk and the billing number is outpulsed in the form of MF digits.

7.04 In order to provide the SXS CAMA interface, dial pulsing must be specified for the CAMA trunk group. This identifies a SXS CAMA trunk group since other CAMA offices require MF only. Immediate start and E&M must also be specified. The trunk group may be either 1-way or 2-way and overlap outpulsing may be specified if required. It should be noted that overlap outpulsing prolongs the MF transmitter holding time, thereby increasing the demand for MF transmitters. These assignment indicators are shown in Figure 3.

8. RESTRICTION CAPABILITY

8.01 Not applicable.

INCORPORATION INTO SYSTEM

9. COST FACTORS

A. Hardware

9.01 The CAMA feature requires trunks to be provided between the No. 3 ESS and the CAMA office. The SD-3H220 (CPS-FB382 and CPS-FB399) trunks are specified for use with CAMA. Traffic considerations will determine the number of trunks and trunk groups required. The Special Toll Billing and ONI features require no additional No. 3 ESS equipment.

9.02 Although MF receivers and transmitters are not exclusive to this feature, they are required and must be considered in the overall composition of the No. 3 ESS office. Additional traffic resulting from CAMA calls may require additional MF transmitters and receivers. One MF receiver is required to test the MF transmitters. If MF receivers are provided for other uses within the office (such as inband MF signaling), no additional receivers are required. Refer to Section 233-060-210—Network Design Worksheets, Service Circuits, No. 3 ESS to determine the necessary quantities of MF transmitters and receivers.

B. Software

9.03 Each trunk group designated for CAMA requires two bits (OTYP) in the trunk and service circuit group data of the trunk group translator. These two bits are indicated in Figure 3.

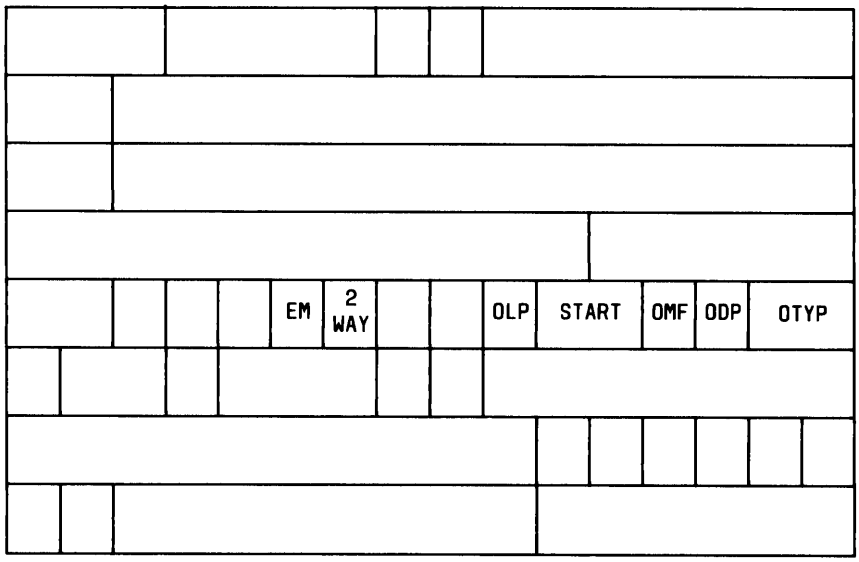
9.04 The Special Toll Billing feature requires one bit (BLN) in the lines originating translations (shown in Figure 4) for each line or multiline hunt group requiring special toll billing.

10. DATA ASSIGNMENTS AND RECORDS

10.01 The software for CAMA and Special Toll Billing features may be installed through the use of recent change messages. In the case of the initial installation, the ODA run may be employed.

10.02 If the ODA run is used to incorporate the CAMA feature, the following input forms must be completed and sent to the Western Electric Regional Data Center for processing. Refer to

TRUNK GROUP TABLE



LEGEND:

EM = 0, LOOP SUPERVISION IS USED.
EM = 1, E & M SUPERVISION IS USED.
2WAY = 0, THE TRAFFIC ON THE TRUNK IS IN ONE DIRECTION ONLY.
= 1, THE TRAFFIC ON THE TRUNK IS IN BOTH DIRECTIONS.
ODP = 1, DP OUTPULSING IS REQUIRED AND OMF MUST BE ZERO.
OLP = 1, OVERLAP OUTPULSING IS PERMITTED.
OMF = 1, MF OUTPULSING IS REQUIRED AND ODP MUST BE ZERO.
OTYP = 00: REGULAR TRUNK GROUP.
= 01: CAMA TRUNK GROUP.
= 10: TSP TRUNK GROUP OR DAC ON TSPS TRUNK GROUP.
= 11: TSPS TRUNK GROUP.
START = 00: IMMEDIATE START (BYLINK) - SPECIFIES THAT OUTPULSING IS TO BEGIN AFTER THE TRUNK IS SEIZED, OR NO OUTPULSING IS REQUIRED.
= 01: DELAY DIAL - SPECIFIES THAT OUTPULSING IS TO BE DELAYED UNTIL THE SIGNAL WHICH IS RECEIVED FROM THE DISTANT OFFICE AT SEIZURE TIME, CHANGES TO ON-HOOK.
= 10: WINK START - WAIT 350 MSEC FOR END OF WINK. IF A 2-WAY TRUNK, A WINK DURATION OF GREATER THAN 350 MSEC ASSUMES A GLARE SITUATION AND TO LET THE OTHER OFFICE WIN.
= 11: WINK START (2-WAY ONLY) - WAIT 1000 MSEC FOR END OF WINK.

Fig. 3—Trunk Group Layout for a CAMA Trunk Group

Translation Guide TG-3 for details concerning the completion of these forms.

- ***ESS 3201 - Trunk Assignment Table***—Used to assign scan points and distributor triplets for individual trunks
- ***ESS 3202 - Trunk Group Table***—Used to assign trunk groups for a particular use
- ***ESS 3204 - Trunk Feature Table***—Used to specify a CAMA trunk group
- ***ESS 3300 - Three- and Six-Digit Translations***—Used to assign code groups for all NNX and NPA codes that are to be routed to CAMA
- ***ESS 3303 - Route Index Expansion Table***—Used to assign a CAMA route index

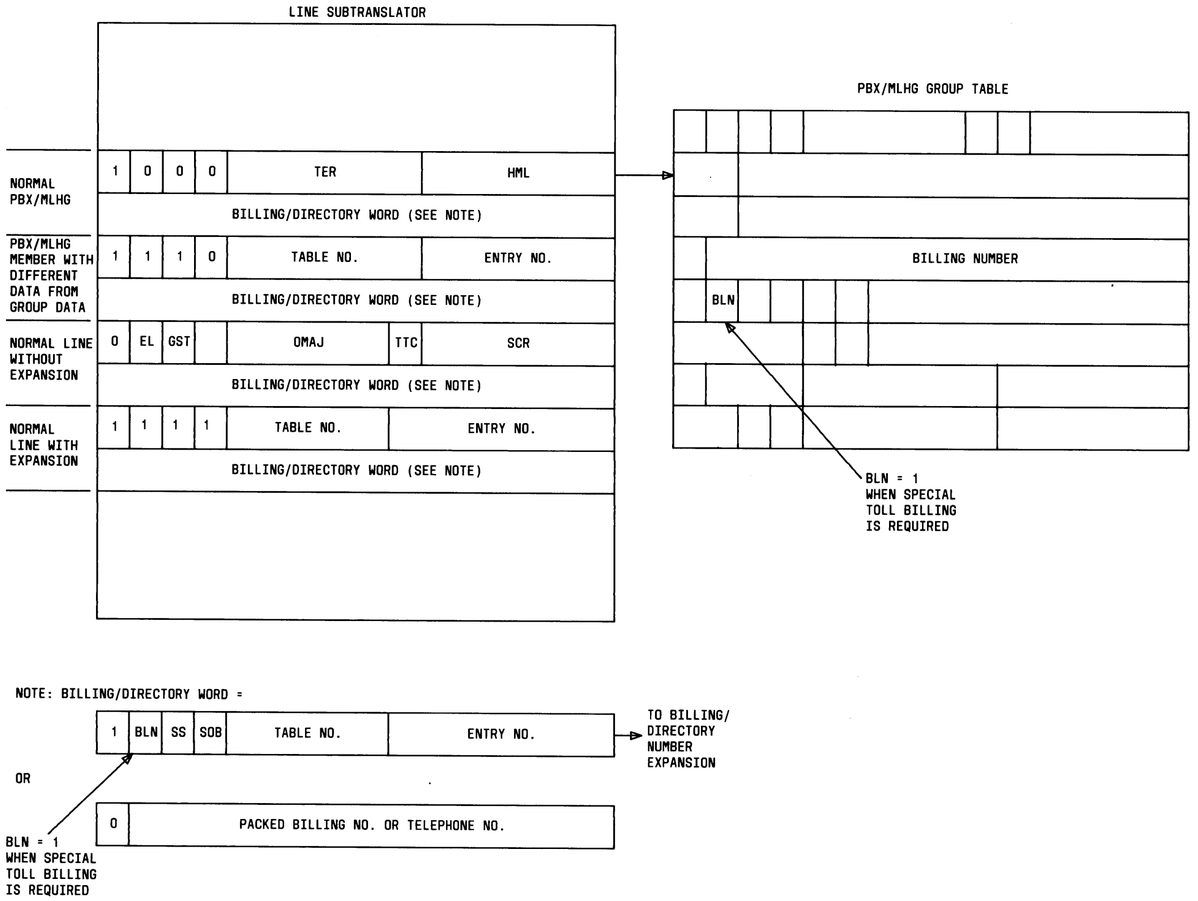


Fig. 4—Translation Layout for Line With Special Toll Billing

and to associate the route index with CAMA trunk groups

- ***ESS 3304 - Code Index Table***—Used to associate a route index and a screening table with a code index.

10.03 For assigning special toll billing, the following forms are used.

- ***ESS 3100 - Telephone Number Table***—Used to specify special toll billing for an individual line or member of a MLHG
- ***ESS 3105 - Multi-Line Hunting Group Table***—Used to specify special toll billing for an entire MLHG.

10.04 The following recent change messages may be used to incorporate the CAMA feature:

- ***RC:CKT***—Used to associate distributor triplet address and scan point number with a CAMA trunk group
- ***RC:DIG***—Used to make changes in the 3- and 6-digit translator
- ***RC:GRP***—Used to change data related to trunk groups
- ***RC:RTI***—Used to change a route index
- ***RC:CHI***—Used to assign the free charge index 01 to a CAMA trunk group
- ***RC:GTSA***—Used to assign a trunk to a traffic schedule.

10.05 The following messages may be used to assign special toll billing:

- ***RC:LINE***—Used to assign special toll billing (keyword BLN) to an individual line
- ***RC:MLHG***—Used with keyword BLN to assign special toll billing to an entire MLHG
- ***RC:MTL***—Used with keyword BLN to assign special toll billing to a member of a MLHG.

Further details about the messages and their use can be found in IM-3H300 and the Recent Change Users Guide.

11. HARDWARE RESTRICTIONS

11.01 Not applicable.

12. INSTALLATION/ADDITION/DELETION

12.01 The procedures for providing the CAMA feature include making the proper trunk group assignments through the use of the recent change messages or the ODA run as previously mentioned. Adequate hardware units (MF transmitters, MF receivers, trunk circuits, etc) must also be provided. Procedures for determining the required quantities may be found in Sections 232-060-ZZZ, Network Switching Practices.

12.02 No hardware is associated with the Special Toll Billing feature; however, the proper software assignments must be made as previously described.

13. TESTING

13.01 All trunks and service circuits associated with the CAMA feature can be tested at the No. 3 ESS using the maintenance TTY and the trunk and line test panel. Refer to the No. 3 ESS TOP Maintenance Document, Section 233-142-100 for test procedures.

13.02 Tests to verify the translation information in the No. 3 ESS consists of the appropriate office records or verification messages entered via the TTY. The messages applicable to the CAMA and Special Toll Billing features are listed in Table B. Refer to IM-3H300 for information pertaining to the variable fields of these messages. OM-3H300 provides the interpretation for the responses of these messages.

14. OTHER PLANNING TOPICS

14.01 Adequate CAMA trunks should be provided to meet the expected toll call demand. No other special planning considerations are necessary for this feature.

TABLE B

OFFICE RECORDS AND VERIFICATION MESSAGE APPLICABLE TO CAMA AND SPECIAL TOLL BILLING

TTY MESSAGE		
	3E3 AND LATER	
SO-2 ISSUE 4A	KEYWORD FOR OP:OFR MESSAGE	PURPOSE
VER:CDI	CDI	To verify code index assignments
VER:CHI	CHI	To verify free charge index (01) for CAMA trunks
VER:DIG	DIG	To verify code index associated with 3- or 6-digit codes
VER:GRP	GRP	To verify trunk group data
VER:LSTRIG*		To verify all route indexes pointing to a CAMA group
VER:LSTTCI*		To verify all 3-digit codes pointing to a specific code index
VER:RTI	RTI	To verify route index entries
VER:LINE*	TN	To verify special toll billing assignment for a line
VER:MTL*	TN	To verify special toll billing assignment for MLHG member

* This message may also be used with the 3E3 generic.

ADMINISTRATION

15. MEASUREMENTS

15.01 Peg count, usage, overflow, and maintenance busy traffic measurements are available for the trunks and service circuits associated with the CAMA feature. The details of these measurements can be found in Section 233-152-135. No other measurements are necessary for this feature.

16. CHARGING

16.01 All charging for calls routed through CAMA from No. 3 ESS is performed by the CAMA office; however, the No. 3 ESS must outpulse the customer's billing number (when available) to the CAMA. This number may be the customer's listed directory number (LDN) or some other number as desired by the customer.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

17.01 The following list defines abbreviations and terms which may be unfamiliar to the reader.

- ANI (Automatic Number Identification) Signal—An off-hook signal sent from the CAMA to the No. 3 ESS upon the reception of the called telephone number. The signal indicates that the CAMA is ready to receive the billing number.

- BLN—Designation used to indicate whether a line has special toll billing (formerly known as QZ billing).

- DDD (Direct Distance Dialing)—Customer dialed toll calls

- KP (Keypulse)—An MF signal transmitted to indicate the beginning of an MF encoded message (ie, a called or calling party telephone number).

- MF Signaling (Multifrequency Signaling)—A method of sending numerical address information between telephone offices by sending simultaneously a combination of two tones out of a group of six frequencies.

- ODA (Office Data Administration) Run—Mechanism by which software may be changed in the No. 3 ESS. Information from

the ODA input forms are inputted into the regional ODA computer, then sent back to the No. 3 ESS.

- ONI (Operator Number Identification)—A means of obtaining billing information by connecting the calling party to an operator position.
- OTYP—Designation used to indicate that a trunk group is being routed to TSPS or CAMA.
- Outpulse—The process of sending called and calling party telephone numbers from the No. 3 ESS to the CAMA.
- SPN—Scan Point Number
- Start (ST) Pulse—An MF signal transmitted to indicate the end of an MF encoded message. CAMA processing begins with the reception of this pulse.
- TSPS—Traffic Service Position System
- Wink—A brief off-hook signal sent from the CAMA to the No. 3 ESS to indicate that the CAMA is ready to receive the called party telephone number.

18. REFERENCES

18.01 The following is a list of documents which may be consulted for further information related to this feature.

- PR-3H153—Digit Sending and Receiving Program (DIGPRO)
- PR-3H155—Digit Intrepretation Progress Marks (DNTRP)
- PR-3H157—Equipment Selection Subroutines (EQPSEL)
- PR-3H159—Fast Trunk Scanning Program (FASTTK)
- PR-3H165—Outgoing Trunk Program (OUTCAL)
- PR-3H166—Network Path Hunt, Busy, and Idle Program (PATHNT)
- Sections 233-060-ZZZ—Network Switching Practices
- Section 233-060-210—Network Design Worksheets, Service Circuits No. 3 ESS
- Section 233-190-024—Trunking Arrangements No. 3 ESS
- Section 233-190-101—Charging Arrangements No. 3 ESS
- Section 233-154-130—Recent Change Users Guide
- TG-3 Translation Guide
- IM-3H300—Input Message Manual No. 3 ESS
- OM-3H300—Output Message Manual No. 3 ESS
- PA-3H3XX—Office Data Tables Layout Specification No. 3 ESS
- Section 233-152-135—Traffic and Plant Measurements No. 3 ESS
- Section 233-142-100—TOP Maintenance Document No. 3 ESS
- CD and SD-3H220-01—Universal Trunk Circuit No. 3 ESS