NETWORK MANAGEMENT FEATURE

FEATURE DOCUMENT

"1ESS*" SWITCH

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* Trademark of AT&T Technologies.

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Tables

INTRODUCTION

1. GENERAL INFORMATION

SCOPE

1.01 This practice provides information for using the Network Management feature with the 1ESS switch. This practice covers the 1E8 generic program only.

REASON FOR REISSUE

1.02 Issue 2 of this practice (which covered the 1ESS switch only) was canceled upon issuance of Practice 231-090-305 which covered the 1 and 1A ESS switches. Due to divergent 1E8/1AE8 developments, it was unfeasible to reissue Practice 231-090-305 for these generic programs. Therefore, Practice 231-190-305 is being reinstated for the 1ESS switch,

while Practice 231-390-305 was issued for the 1A ESS switch. These two practices apply to the 1E8, 1AE8, and later generic programs only. Practice 231-090-305 continues to cover the 1E7, 1AE7 and earlier generic programs only. Due to the large number of significant changes, change arrows are not used.

FEATURE AVAILABILITY

1.03 The following network management controls are available with the 1E8 generic program.

- Call gapping controls (effective with 1E8 generic program)
- Trunk group controls (TGC) (preprogrammed and flexible)
- Overload controls dynamic overload control (DOC) signals and selective incoming overload controls (SILC) (effective with 1E8 generic program)
- Network management reroute controls (NMRR) (preprogrammed)
- Interface With Engineering and Administrative Data Acquisition System and Network Management (EADAS/NM)
- Discrete machine and network status indicators.

1.04 With the 1E8 generic program, call gapping controls and SILC are provided to prevent the spread of congestion from carriers that route traffic between local access and transport areas (inter-LATA carriers). Code blocking controls are replaced by call gapping controls effective with the 1E8 generic program. These network management controls are loaded in the generic program base.

1.05 The EADAS/NM feature is optionally loaded via the Engineering Data Acquisition System (EDAS) feature group. The EADAS/NM 1NM2 generic program (or later) is required to interface with the ESS switches.

1.06 The NMRR feature is optionally loaded via the Network Management Reroute TGC feature group. An ESS switch must have network management TGCs to be capable of providing reroute controls.

1.07 The Common Channel Interoffice Signaling (CCIS)/Network Management feature is available with the 1E7 and later generic programs. This feature consists of responses to CCIS DOC and group signaling congestion signals. The CCIS/Network Management feature is optionally loaded via the local CCIS feature group, the CCIS 2-wire feature group, or the CCIS HILO feature group. The CCIS/Network Management feature is loaded in all CCIS offices. See reference A(12) in Part 18.

2. DEFINITION/BACKGROUND

DEFINITION

2.01 The Network Management feature improves total network performance by limiting traffic destined for congested offices. Refer to Fig. 1 for the overview of the network management controls that can be used by the local telephone company. The Carrier Interconnect feature includes network management controls that detect and prevent network congestion resulting from excessive interexchange carrier traffic. An interexchange carrier is designed to serve traffic which crosses a local access and transport area boundary. For example, an inter-LATA carrier or an international carrier is an interexchange carrier. For details refer to A(8) in Part 18. The following paragraphs briefly describe each of the network management controls.

2.02 ***Call gapping*** provides manual code controls for originating inter-LATA carrier traffic based on either a specific carrier access code (ignoring the destination code) or a specific destination code (ignoring the carrier access code). Also, call gapping controls can block intra-LATA calls. In the 1E8A generic program, call gapping controls can block the combination of carrier access code plus NPA or NPA-NXX. Call gapping places an upper limit (at an ESS switch) on the rate at which call attempts to any specified code are allowed. Call gapping controls replace code blocking controls effective with the 1E8 generic program.

2.03 ***Trunk group controls*** (TGCs) allow limits to be placed on traffic based on the trunk group over which it is to be routed.

2.04 ***Dynamic overload control*** (DOC) signals are sent from an access tandem or toll switch requesting that the amount of traffic routed to an access tandem or toll switch be limited because of a

high probability that the traffic could not be processed.

2.05 ***Selective incoming overload control*** (SILC) provides automatic control of traffic coming into the local telephone company network. Selective incoming overload control (SILC) is a new incoming trunk overload control that limits the percentage of incoming calls processed from selected individual trunk groups. Selective incoming overload control is initially available with the 1E8 generic program.

2.06 ***Network management reroute controls*** (NMRRs) allow traffic destined for one trunk group called the "from trunk group" (FTG) to be routed to another trunk group called the "to trunk group" (TTG). Preprogrammed reroute controls require a translator data assembler (TDA) via the telephone company regional center and can only be changed via the recent change message. The following options are available with preprogrammed reroute controls:

- Two hunting options for FTG (immediate and regular)
- Percentages for controlling traffic
- Selection of TTGs (maximum of three).

2.07 A minicomputer system (EADAS/NM) located at a network management center provides the following capabilities:

- Real-time surveillance of switching machines and trunk group activity
- A network exception display system composed of a modular display board, cathode ray tube (CRT) terminal devices, and receive only line printers
- Centralized remote network management control capabilities.

2.08 The ***machine and network status signals*** are sent from numerous switches to a network management center, where they are displayed via binary (ON/OFF) indicators.

BACKGROUND

2.09 The Network Management feature was developed to deal with traffic overloads that have resulted from equipment outages and mass calling which create severe congestion in the switching network. For example, earthquakes, snowstorms, telethons, Mother's Day and radio call-ins can cause severe congestion in the switching network. This congestion initially appears as a lack of switching facilities due to trunks out of service, underengineering, or heavy traffic. Increased alternate routing is necessary to complete calls, thereby using more links of the network. This increased alternate routing tends to propagate the congestion caused by heavy traffic to connected offices. This congestion spreads through the network with a snowballing effect. As available facilities are used, more calls are blocked, resulting in increased reattempts. These reattempts tend to tie up common control equipment by increasing the calling load. Without control, the situation results in gross misuse of network facilities and poor customer service.

2.10 The Network Management feature limits the amount of traffic coming in and leaving an ESS switch. It also provides the capability to complete as many calls as possible, using network capacity, without allowing the congestion to spread.

2.11 The network management controls provided for the local telephone company traffic also apply to all inter-LATA carrier traffic. The local telephone company cannot be assured that the inter-LATA carriers will provide full cooperation with the local telephone company network management. Therefore, the local operating company must be capable of preventing the spread of congestion from the carrier network into the local telephone company network. The Carrier Interconnect feature provides the network management controls that are capable of detecting and controlling the excessive incoming carrier traffic.

DESCRIPTION

3. USER OPERATION

CUSTOMER

3.01 Not applicable.

TELEPHONE COMPANY

A. Call Gapping (Effective With 1E8 Generic Program)

3.02 Call gapping provides manual code control of originating inter-LATA carrier traffic based on a specific carrier access code (ignoring the destination code) or based on a specific destination code (ignoring carrier access code). Call gapping sets an upper limit on the rate at which outgoing attempts to a particular code are allowed out of an ESS switch. The numbering plan area (NPA) code must be specified even if it is the home NPA of the ESS switch initiating the control. The following list indicates the types of codes that can be controlled by call gapping controls:

- 10XXX (XXX = inter-LATA carrier code)
- 10XXX-NPA
- 10XXX-NPA-NXX
- NPA
- NPA-NXX
- NPA-NXX-XXXX
- XXX (eg, 611).

3.03 The control of each code is provided by allowing only one call per specified time interval to leave the ESS switch. This specified time interval is called a gap interval. There are 15 gap intervals, ranging from 0.1 second to 600 seconds. Both North American numbering plan (NANP) and carrier interconnect codes can be controlled by call gapping. Calls affected by call gapping controls are routed to one of three fixed route indexes: NCA, EA1, or EA2.

3.04 Call gapping controls can be activated and deactivated manually via TTY input messages or from the EADAS/NM CRT terminal. These TTY input messages are:

MESSAGE	FUNCTION
CG-ACT	This message activates call gapping on 10XXX, 10XXX-NPA, 10XXX-NPA-NXX, NPA, NPA-NXX, NPA-NXX-XXXX, or XXX (eg, 611) codes. The following information must be specified in the TTY message: (1) code to be controlled, (2) index indicating the call gapping control, (3) disposition (one of three announcements) of canceled calls, and (4) indicator to distinguish between carrier interconnect and NANP codes.
CG-TRAFFIC	This message is used to request traffic peg counts for call gapping controls. This message cannot be used by the EADAS/NM center.
CG-RMV	This message is used to remove call gapping controls from 10XXX, 10XXX-NPA, 10XXX-NPA-NXX, NPA, NPA-NXX, NPA-NXX-XXXX, or XXX (eg, 611) codes. The message must specify the code being removed from the call gapping control and an indicator to distinguish between carrier interconnect or NANP codes.
CG-CLR	This message is used to remove all call gapping controls, or remove only carrier interconnect codes from call gapping controls, or remove only NANP codes from call gapping controls.
CG-STATUS	This message requests a list of all active call gapping controls, or a list of active call gapping controls for carrier interconnect codes only, or a list of active call gapping controls for NANP codes only. Also, the number of available call gapping control slots are displayed.

3.05 A maximum of 63 call gapping controls can be activated simultaneously on specified codes. The actual number provided is a parameter between 4 and 63.

B. Trunk Group Controls

3.06 The TGCs can limit traffic to a congested area based on the trunk group over which a call is

to be routed. The TGCs are available as either preprogrammed or flexible (defined as TTY input).

3.07 The five types of TGCs provided are:

(a) CANCEL-TO controls the number of attempts offered to a trunk group. Upon encountering this control, a call which is to be affected is inhibited from searching any trunk group for an idle trunk and is routed to no circuit announcement (NCA). Control variables include the trunk group on which the control is to be active, percent of direct-routed traffic to be affected, and percent of alternate-routed traffic to be affected.

(b) SKIP controls the number of attempts offered to a trunk group. Upon encountering this control, a call to be affected is inhibited from searching this trunk group for an idle trunk, but is allowed to alternate route to the next trunk group. Control variables include the trunk group on which the control is to be active, percent of direct-routed traffic to be affected, and percent of alternate-routed traffic to be affected.

(c) CANCEL-FROM controls the number of attempts overflowing a trunk group. Upon encountering this control, a call to be affected is inhibited from hunting for an idle trunk after overflowing this trunk group. The call is routed via a fixed route index to NCA. Control variables include the trunk group on which the control is to be active and the percent of overflow traffic to be affected.

(d) TRUNK RESERVATION makes it possible to reserve a specified number of trunks in a trunk group. It limits the number of attempts offered to a trunk group when fewer than the specified number of trunks remain available. The function of the control is to sense when less than a specified number of trunks are idle in the trunk group, at which time the control is activated. Two thresholds are provided per trunk group: protectional reservation of equipment (PRE) threshold and directional reservation of equipment (DRE) threshold. Information that must be included in the input message includes the trunk group on which the control is to be active, the PRE threshold, and the DRE threshold. The threshold values must be less than or equal to the number of equipped trunks in the specified trunk group.

(1) The PRE threshold is useful in reserving facilities for first-routed traffic. If the PRE threshold is crossed, all traffic alternate routed to this trunk group is inhibited from searching for an idle trunk in any trunk group and is routed to NCA.

(2) The DRE threshold is useful in reserving facilities for incoming traffic. Thus, DRE has meaning only on 2-way trunk groups. If the DRE threshold is crossed, all traffic to this trunk group is inhibited from searching for an idle trunk in any trunk group and is routed to NCA.

(e) REROUTE allows traffic destined for one trunk group called the FTG to be routed to another trunk group called the TTG.

3.08 First-routed (direct) and/or alternate-routed traffic can be controlled in any of the following percentages for the CANCEL-TO and SKIP controls:

Direct: 0, 50, 75, or 100

Alternate: 0, 50, 75, or 100.

3.09 For the CANCEL-FROM control, 0, 50, 75, or 100 percent of the overflow traffic can be controlled.

C. Flexible Trunk Group Controls

3.10 The TGCs not defined in translations and not associated with the receipt of a DOC signal are flexible TGCs. For flexible controls, the control information is supplied as part of a TTY input message. The control information consists of the control option (CANCEL-TO, SKIP, CANCEL-FROM, or TRUNK RESERVATION), associated percentages of attempts to be affected, associated thresholds at which controls become active, and the trunk group to which the control is to be applied.

3.11 Each active flexible control uses one control slot. The maximum number of flexible control slots available for the ESS switch is 127. The actual number is a parameter between 0 and 127.

3.12 Flexible TGCs are activated via TTY input only. All information must be inputted at the time of activation of the control. The TTY messages

available for the activation and control of trunk groups using flexible TGCs are:

MESSAGE	FUNCTION
CF-ACT	This message is used to activate a flexible CANCEL-FROM control on a trunk group.
CT-ACT	This message is used to activate a flexible CANCEL-TO control on a trunk group.
FX-CLEAR	This message is used to deactivate all network management flexible TGCs and flexible trunk group peg and overflow counters that are presently active.
FLEX-DEACT	This message is used to deactivate a network management flexible TGC or a flexible trunk group peg and overflow counter.
FX-STATUS	This message is used to request that a list of the active network management flexible TGCs and flexible trunk group peg and overflow counters be printed.
FX-TRAFFIC	This message is used to request traffic peg counts for network management flexible TGCs and flexible trunk group peg and overflow counters.
SK-ACT	This message is used to activate a flexible skip control on a trunk group.
TR-ACT	This message is used to activate the trunk reservation function on a trunk group.

D. Automatic CCIS TGCs

3.13 The CCIS network management controls consist of responses to CCIS DOC and group signaling congestion signals. The DOC signals for CCIS TGCs are transmitted and received via the CCIS data link network rather than via DOC circuits, as in the case of conventional trunk groups. When a CCIS office encounters an overload or outage, broadcast DOC or processor outage signals, respectively, are sent to the CCIS signal transfer points. The signal transfer points then send the appropriate DOC messages to all offices connected to the congested office. At the receiving office, the incoming DOC message activates an automatic network management control on the trunk group to the office sending DOC. Group signaling congestion signals occur in the CCIS network when CCIS data links or signal transfer points become overloaded. When this occurs, a group signal congestion signal is returned for all calls that are routed to the congested link or signal transfer point. At the receiving office, the group signaling congestion signal results in the activation of a network management control on the specified trunk group.

3.14 An incoming CCIS DOC or a group signaling congestion signal results in the automatic activation and deactivation of a flexible TGC. Since CCIS signals are not continuous (as with conventional DOC circuits), the receiving office performs timing on active controls. The timing interval for DOC controls is 2 minutes, and for group signaling congestion controls, it is 10 seconds. Controls are deactivated upon time-out or removal.

3.15 The control information for CCIS trunk groups in translations consists of the control type (CANCEL-TO or SKIP) and the response category (RSPCAT) assigned to the trunk group. The RSPCAT identifies an entry in a generic table that provides the percentages of traffic that are to be affected by an automatic CCIS TGC (Table A). Any CCIS trunk group may respond to DOC machine congestion level 3 and group signaling congestion signals without being preassigned any control information.

3.16 Each CCIS TGC is activated as an automatic flexible TGC and uses one flexible TGC slot. The CCIS TGCs vie for the same resources as flexible TGCs. Therefore, in an office that has the CCIS feature (local or toll), the actual number of flexible control slots is a parameter which can be chosen in the range of 16 through 127.

3.17 The CCIS DOC controls are not activated based on priority (as with conventional DOC controls). A received CCIS DOC signal supersedes any CCIS DOC control active on the same trunk group. If a group signaling congestion signal is received on a trunk group with an active CCIS DOC control, it supersedes only DOC machine congestion levels 1 and 2. It is ignored if a DOC machine conges-

tion level 3 control is active. Conversely, if a DOC machine congestion level 1 or 2 signal is received on a trunk group with an active group signaling congestion control, it is ignored.

E. Sending Dynamic Overload Control Signals

3.18 The DOC signals are sent from an access tandem or toll office to connected offices requesting that they limit the amount of traffic sent to that access tandem or toll office. These signals are sent because there is a high probability that the traffic could not be processed in the office sending DOC signals and the equipment would be tied up in the office receiving DOC signals. This would deny service to calls in the DOC receiving office which are not directed to the DOC sending office.

3.19 The DOC signals are sent from the ESS switch because of a shortage of real time; a shortage of multifrequency (MF), trunk dial pulse (DP), or revertive pulse (RP) receivers; or a lack of ability to switch any calls. The signal sent when the ESS switch is unable to switch calls is a hardware function.

3.20 Two levels of signaling exist for the shortage of real time and the shortage of receivers. Machine congestion level 1 indicates that the machine is sufficiently congested to cause substantial delays in receiver attachment. Delays in the range of 20 through 40 percent of the receiver holding time are considered substantial. Machine congestion level 2 indicates that the machine is considerably more congested than the machine congestion level 1. At machine congestion level 2, delays in the range of 40 through 80 percent of the receiver holding time would be expected.

3.21 A shortage of real time is determined indirectly through the length of the incoming overload control queue. This queue indicates the number of incoming calls waiting to be served. Calls in this queue have not been attached to a receiver, nor have they been allowed to attempt to seize a receiver. The length of this queue is used as a threshold for both levels of DOC for a shortage of real time by assuming an acceptable delay in the queue and using the queue unloading rate. The unloading rate of the queue varies according to the state of the machine (normal, minor overload, and major overload). For example, a call remains in the queue longer when the machine is in major overload than when it is in a normal state. Six thresholds then are used for a shortage of real time, two levels for each of the three states of the machine. These thresholds are defined as constant generic values. Table B shows the length of the incoming overload control queue needed to trigger machine congestion level 1 and machine congestion level 2 signals.

3.22 A shortage of receivers for each receiver type is determined by the length of the queue for that receiver type. Calls which are unable to seize an idle receiver are placed in the queue for that receiver type. The length of each of these queues (MF, DP, and RP receiver queues) is used as a threshold for both levels of DOC for a shortage of each receiver type by assuming an acceptable delay on the queue and using the queue unloading rate. The unloading rate does not vary with machine state. Instead, it depends on the average holding time of the receivers and the number of receivers in the office. Two thresholds are used for each receiver type, one for each level. These thresholds are defined as generic parameters based on the number of receivers equipped in the office. Table C shows the length of the receiver queue (percent full) necessary to trigger machine congestion level 1 and machine congestion level 2 signals.

3.23 In offices equipped for 4-wire transmission, using the HILO 4-wire switching feature, the HILO 4-wire switching MF and DP receivers are monitored for shortages instead of the 2-wire MF and DP receivers. Even if shortages of 2-wire MF and DP receivers develop, DOC signals are not transmitted. The 2-wire RP receivers are still monitored, and shortages of them can trigger DOC signals.

3.24 The thresholds for real-time and receiver shortages are checked every 2 seconds. When a threshold is crossed at two consecutive 2-second checks, the sending of the associated DOC signals is initiated. These DOC signals cease to be sent at the first 2-second check at which the threshold is no longer crossed.

3.25 The DOC signals for machine congestion levels 1 and 2 may be sent to a maximum of 64 offices if a radial signaling arrangement, or 64 loops if a tandem signaling arrangement is used. With radial signaling, the office receiving the DOC signals must return the acknowledgment to the sending office. With tandem signaling, however, the acknowledgment may be transmitted to another office which accepts it as a DOC signal. This office must either

return the acknowledgment or transmit it to another office. The only limit on the number of offices in the tandem loop is that the acknowledgment must be returned to the signaling office within 2 seconds of the initial transmittal. The sum of the numbers of machine congestion levels 1 and 2 signals must not exceed 64. For example, if machine congestion level 1 signals are sent to 48 offices, machine congestion level 2 signals can be sent to only 16 offices. In some cases, when machine congestion level 1 signals are sent to an office, machine congestion level 2 signals can also be sent, thereby using 2 of the 64 signals.

3.26 Crossing each of the eight thresholds (machine congestion levels 1 and 2 for real time, MF receivers, DP receivers, and RP receivers) causes DOC signals to be sent on some subset of the 64 possible signals. These subsets are identified in translations. The interface between software and hardware for sending DOC signals is via signal distributor points. See Fig. 2 for calculation of DOC transmit thresholds for machine congestion levels 1 and 2.

3.27 When the receiver or real-time congestion elevates to the machine congestion level 2 threshold, a machine congestion level 2 signal is sent in addition to the machine congestion level 1 signal. However, when a machine congestion level 3 signal is sent, no machine congestion level 1 or 2 signals are sent. A machine congestion level 3 signal is sent when the switching machine is incapable of processing calls.

3.28 Using a TTY input message, the network manager may send any of the 64 individual signals at any time, regardless of congestion level. In addition, the network manager may at any time use a TTY input message to exclude any of the 64 individual signals from being sent even if the threshold for that signal is crossed. The following TTY messages are available to the network manager to provide control of DOC signals.

MESSAGE	FUNCTION
DOC-CLEAR	This message is used to remove the manual control of all DOC signaling loops.
DOC-EXC	This message is used to manually exclude a DOC signal from being sent automatically to the loop or office specified.
DOC-REM	This message is used to remove the manual control (send or exclude from send) of a DOC signal to the loop or office specified.
DOC-SND	This message is used to manually send a DOC signal to the loop or office identified by the index variable.
DOC-STATUS	This message is used to request that a list of the active DOC loops be printed.
DPD-MCONE	This message is used to request a printout of the translations data which identifies those offices or loops being sent DOC signals. Also, included is the corresponding index (used in input messages DOC-SND, DOC-EXC, and DOC-REM) to which DOC signals are sent upon crossing the threshold for machine congestion level 1 (concerning trunk DP receiver congestion).
DPD-TWO	This message is used to request a printout of the translation data which identifies those offices or loops being sent DOC signals. Also, included is the corresponding index (used in input messages DOC-SND, DOC-EXC, and DOC-REM) to which DOC signals are sent upon crossing the threshold for machine congestion level 2 (concerning trunk DP receiver congestion).
LST-MCTHREE	This message is used to request a printout of the translation data which identifies those offices or loops being sent DOC signals. Also, included is the corresponding index to which DOC signals are sent for machine congestion level 3. These signals are sent only when the office is incapable of processing calls.

MESSAGE	FUNCTION
MFD-MCONE	This message is used to request a printout of the translation data which identifies those offices or loops being sent DOC signals. Also, included is the corresponding index to which DOC signals are sent upon crossing the threshold for machine congestion level 1 (concerning MF receiver congestion).
MFD-MCTWO	This message requests a printout of the translation data which identifies those offices or loops being sent DOC signals. Also, included is the corresponding index to which DOC signals are sent upon crossing the threshold for machine congestion level 2 (concerning MF receiver congestion).
RPD-MCTWO	This message requests a printout of the translation data which identifies those offices or loops being sent DOC signals. Also, included is the corresponding index to which DOC signals are sent upon crossing the threshold for machine congestion level 2 (concerning RP receiver congestion).
RTD-MCONE	This message requests a printout of the translation data which identifies those offices or loops being sent DOC signals. Also, included is the corresponding index to which DOC signals are sent upon crossing the threshold for machine congestion level 1 (concerning real-time congestion).
RTD-MCTWO	This message requests a printout of the translation data which identifies those offices or loops being sent DOC signals. Also, included is the corresponding index to which DOC signals are sent upon crossing the threshold for machine congestion level 2 (concerning real-time congestion).

F. Selective Incoming Overload Control

3.29 Selective incoming overload control (SILC) is a part of the Carrier Interconnect feature, initially available with the 1E8 generic program. Selective incoming overload control (SILC) protects the equal access end office (EAEO) and access tandems from excessive incoming traffic.

3.30 When the ESS switch enters the machine congestion level 1 or 2 state, SILC is automatically activated. Selective incoming overload blocks traffic on 1-way incoming MF or 2-way MF trunk groups. Traffic is blocked by SILC when the incoming overload control bit in the trunk group head cell is set (only applies to trunk groups assigned SILC). When the ESS switch returns to normal processing of calls, SILC is automatically deactivated.

3.31 A maximum of 128 trunk groups per ESS switch can be assigned SILC. Selective incoming overload control (SILC) blocks the excessive incoming traffic on a percentage basis. The percentage of traffic blocked can be between 0 and 100 percent, in 12.5 percent increments. Two blocking percentages must be selected and stored in the carrier interconnect office options auxiliary block before any trunk groups can be assigned SILC. The RC:PSWD TTY input message is used to enter the blocking percentages in the carrier interconnect office options auxiliary block. The two blocking percentages are identified as:

(a) Percentage 1 (P1) is the specified percentage of incoming traffic to be blocked per SILC assigned trunk groups when the access tandem or EAEO is in the machine congestion level 1 state.

(b) Percentage 2 (P2) is the specified percentage of incoming traffic to be blocked per SILC assigned trunk groups when the access tandem or EAEO is in the machine congestion level 2 state.

3.32 The NMG-SILC TTY input message is used to assign SILC to trunk groups. The control information for this message contains the following options:

(a) Assign SILC to a trunk group

(b) Remove SILC from one trunk group

(c) Remove SILC from all trunk groups

(d) Request status of trunk group(s).

The status option indicates the trunk groups assigned SILC, count of blocked calls per associated trunk group, blocking percentages, and current machine congestion level 0, 1, or 2 state.

> ***Note:*** It is ***strongly*** recommended not to use SILC on any trunk group that can be affected by DOC because traffic would be blocked by both the sending office and receiving office.

G. Preprogrammed Trunk Group Controls

3.33 A preprogrammed TGC has its control information stored in translations. This control information consists of the control options (CANCEL-TO, SKIP, or CANCEL-FROM), associated percentage(s) of attempts to be affected, and the trunk group to which this control is being applied.

> ***Note:*** The trunk reservation feature is not available for use with preprogrammed TGCs.

3.34 The maximum number of preprogram TGCs available in an ESS switch is 63. The actual number is a parameter between 0 and 63. These TGCs can be activated manually via TTY input or automatically via DOC signals. The DOC signals are ON/OFF signals received from another ESS switch through the DOC circuit SD-27970. Each DOC signal is associated with one preprogram TGC. All 63 preprograms can be activated manually; a maximum of 30 can be activated automatically.

3.35 Manually activated preprograms (no associated DOC signal) and up to three automatically activated preprograms can control the same trunk group. However, a trunk group can only be controlled by one preprogram at any time. Preprograms activated automatically via a DOC signal must have a priority assigned to them. This priority is associated with the machine congestion level of the remote ESS switch when it sends the DOC signal. Priorities are assigned as 1, 2, or 3 correlating with machine congestion levels 1, 2, or 3 at the ESS switch sending the signal. Therefore, the three automatic preprograms controlling the same trunk must be assigned different priorities. A unique DOC signal is required for each priority.

3.36 A preprogram manually activated assumes immediate control of the associated trunk group, replacing any manual control currently on that trunk group. It also overrides any activation requests received automatically via DOC signals. In the absence of a manual control on a trunk group, the preprogram of the highest priority for that trunk group (when a DOC signal is being received) controls that trunk group. The TTY input can manually exclude a preprogram from automatically taking control on a trunk group causing the DOC signal to be ignored. This exclusion is done on a preprogram basis, allowing the trunk group to remain controlled by another automatic preprogram or by a manual preprogram. A manual exclusion request may be used to deactivate a preprogram which is already active.

3.37 The TTY messages used to manually activate and control preprogram TGCs are:

MESSAGE	FUNCTION
PP-ACT	This message is used to activate preprogrammed TGCs. Activation of the preprograms overrides the existing control, manual or automatic, on the trunk group. Subsequent automatic DOC requests are ignored for this trunk group until control is removed manually.
PP-CLEAR	This message is used to remove all preprogrammed TGCs (active or excluded) that are currently in a manual state. The trunk groups remain controlled by the automatic DOC signal.
PP-DATA	This message is used to request that the control information in translations associated with each preprogrammed TGC be printed.
PP-REM	This message is used to remove a preprogrammed TGC. Removal of the manual control allows the trunk group to be controlled automatically by DOC signals.
PP-EXC	This message is used to exclude a preprogrammed TGC from being activated automatically via DOC signals. In addition, this

MESSAGE	FUNCTION
	preprogram, if active, is removed from control of the trunk group.
PP-STATUS	This message is used to request that a list of the active preprogrammed TGCs and their active state be printed.
PP-TRAFFIC	This message is used to request traffic peg counts for preprogrammed TGCs.

H. Network Management Reroute Controls

Preprogrammed

3.38 The NMRRs are additional TGCs. These controls allow traffic destined for one trunk group called the "from trunk group" (FTG) to be routed to another trunk group called the "to trunk group" (TTG). The reroute controls must be activated as a preprogrammed TGC. All control information for the NMRRs is stored in translations. Several options are available with the reroute controls. These options consist of FTG trunk-hunt options (when the control can be effective), percentage options (what percentage of calls to be effected), and selection of the TTG.

FTG Trunk Hunt Options

3.39 Two hunting options are provided for the FTG: immediate and regular. With the immediate option, calls are not sent to the FTG before the reroute is performed. Calls attempting to seize a trunk in the FTG are immediately intercepted and sent instead to the TTG. With the regular option, only calls that overflow the FTG are rerouted to the TTG.

Percentage Options

3.40 Immediate reroutes have five percentage options (0, 25, 50, 75, and 100 percent) for controlling either direct or alternate routed traffic or both. Percentages for controlling direct and alternate routed traffic are independent of each other; therefore, any combination of the five percentage choices for direct and alternate routed traffic is acceptable. A percentage of 0 is provided to allow either direct or alternate routed traffic to be unaffected while the other is controlled. Regular reroute controls make no distinction between direct and alternate routed traffic. With regular reroute controls, four percentages (25, 50, 75, and 100 percent) are valid for rerouting traffic that overflows the FTG.

Selection of TTG

3.41 Rerouted traffic can be offered up to three TTGs. If more than one TTG is specified for a reroute control, the rerouted traffic is divided equally among the TTGs. An individual trunk group may not be capable of handling all of the traffic, but collectively the trunk groups can. Calls that cannot find an idle TTG are returned to the FTG (ie, the original sequence), at which time normal routing applies. Calls reaching any TTG by normal routing processes are not affected by a reroute control. In other words, routing advances normally.

Activation/Deactivation

3.42 Reroute controls can be activated via the local or remote maintenance TTY, the traffic TTY, and the network management TTY over the EADAS data link under control of EADAS/NM, or in response to a DOC signal. In addition to activation, capabilities are provided for deactivation of status requests, traffic requests, and data requests. If an activation request is from EADAS/NM, an abbreviated output response is returned over the EADAS data link. Preprogrammed reroute controls are activated using the existing input message PP-ACT. The existing messages (PP-REM and PP-CLEAR) are used for deactivating preprogrammed TGCs.

I. Interface Between 1ESS Switch and EADAS/NM

3.43 The EADAS/NM minicomputer system located at a network management center provides the following capabilities:

(a) Real-time surveillance of switching machines and trunk group activity

(b) A network exception display system composed of a modular display board, CRT terminal devices, and receive-only line printers

(c) Centralized remote network management control capabilities.

3.44 Information transmitted between ESS switches and EADAS/NM is not altered by EADAS; EADAS essentially acts as a concentrator. The ESS switch is connected to EADAS/NM via the EADAS computer. All communications between the ESS switch and the EADAS/NM go through EADAS.

3.45 Real-time surveillance and control of the network are centralized by EADAS/NM. Surveillance of ESS switches and their trunk groups is accomplished by analyzing traffic data gathered from ESS switches via EADAS. The EADAS/NM center receives traffic and status data from ESS switches located within the area for which the center is responsible. The EADAS/NM center analyzes the data for possible problems in the network. When problem areas are detected, network managers are notified by the system using display boards, printers, and CRT terminals. At this time, network managers can perform a more detailed analysis of the problem using the EADAS/NM system data base to determine what controls, if any, could be used to alleviate the network problem. Control information is entered into the EADAS/NM system which distributes it to the appropriate ESS switches. Controls are activated via CRTs and EADAS/NM transmits the control information to ESS switches via EADAS.

3.46 The ESS switches and EADAS communicate over a data link. The ESS switch receives polls for network management data from EADAS, assembles the data for transmission, and transmits the requested data to EADAS.

3.47 Five types of network management data are sent to EADAS/NM from ESS switches. They are:

(a) Traffic data

(b) Status and event discrete indicators

(c) Network management control status

(d) Verification of the hourly (H)/continuous (C) schedule data

(e) Verification of trunk group information.

Traffic Data

3.48 All traffic measurements required by EADAS/NM are contained in up to four blocks of network management traffic counts numbered 60, 61, 62, and 63. These blocks of traffic data are polled every 5 minutes by EADAS. All four blocks contain counts from the H/C schedule that have been marked for 5-minute data collection at the ESS switch. Each block contains 250 measurements. Each measurement is coded into two 8-bit characters (one word). Each block contains header information, which includes the block identity number and the collection time of the data. See Fig. 3 for the contents of the 5-minute traffic blocks.

3.49 Data block (60) is required for all ESS switches provided with an EADAS/NM interface. Three additional blocks (61, 62, and 63) may be preassigned on a per office basis, depending on the size of the office and its position in the network hierarchy. The EADAS must have data indicating whether or not to poll for blocks 61, 62, and 63, in addition to block 60, for each polled ESS switch. Word 0 of the office options table (bits 0 through 3) indicates the controls that can be polled on a per ESS switch basis (Fig. 4). If corresponding bit is set, data for the specific control can be collected. When the bit is not set, no data can be collected.

3.50 The ESS switch does not administer a separate 5-minute output schedule for total office and trunk group measurements assigned to blocks 60, 61, 62, and 63. Instead, these measurements are extracted from the hourly H/C schedule. This is accomplished by identifying certain measurements in the H/C schedule as 5-minute counts and by transmitting measurements in the H/C schedule as 5-minute counts in the appropriate data blocks. The order in which the measurements are presented in the data blocks is the same as the order in which they appear in the H/C schedule. Personnel at the EADAS/NM center can verify H/C translations via a H/C information verification.

3.51 Seven types of 5-minute traffic measurements pertinent to network management are preassigned to fixed positions in the data blocks. These seven types of measurements are:

(a) Counts of the number of attempts affected by call gapping controls

(b) Counts of the number of completions affected by call gapping controls

(c) Counts of the number of attempts affected by flexible TGCs

(d) Counts of the number of attempts affected by preprogrammed TGCs

(e) Peg and usage counts associated with DOC signals

(f) Counts of the number of attempts affected by flexible reroute controls

(g) Counts of the number of successful flexible reroute control attempts.

For the flexible traffic measurements in (a), (b), (c), (f), and (g), the ESS switch assigns a slot (position) number in block 60. These assignments are made at the time the request for a flexible control is received from EADAS/NM.

3.52 No 5-minute traffic measurement counts are assigned for SILC. The count of calls blocked per SILC assigned trunk groups is available via the NMG-SILC TTY input message.

3.53 The EADAS/NM center does not have to request the 5-minute counts concerning carrier data; it is provided automatically. This information helps the network manager to protect the local telephone company switching network from excessive incoming and outgoing traffic.

Status and Event Discrete Indicators

3.54 Network management provides a set of binary real-time status discrete bits to the network management indicator circuit to produce visual displays of current machine and network status. These displays, usually located in a network management center, are engineered and supplied by the local telephone company. The network management indicator circuit is not needed with EADAS/NM. Machine status indicators delivered to EADAS/NM, in response to an EADAS poll, are updated by the ESS switch every 30 seconds. These indicators are independent signal bit indicators of conditions within the ESS switch. With EADAS/NM, the ESS switch translates the status discrete signals into 8-bit status words. Each bit in a status word represents an ON/OFF state of a status discrete indicator. The EADAS polls the status words as a block every 30 seconds and passes the data to EADAS/NM.

3.55 There are two types of status discrete signals required for EADAS/NM: machine status and event alerting. Other discrete signals are also required to make the ESS switch compatible with status discrete signals furnished to EADAS/NM by other switching systems. Making the systems compatible allows the EADAS/NM displays to be operated uniformly for all ESS switches.

3.56 Event alerting discrete OFF/ON indicators alert EADAS/NM of events occurring within an ESS switch. The signals are transmitted via EADAS as part of the 30-second status block. When an event occurs that causes an ESS switch to set a discrete indicator to the ON state, EADAS/NM then polls for status. This discrete indicator is reset to OFF after transmission of the associated status block to EADAS/NM. The ESS switch can also receive a message from EADAS requesting a reset of all event discrete indicators to the OFF state.

Network Management Control and Status

3.57 The network management control and status data that can be requested by EADAS/NM consists of:

(a) Network management status messages

(b) Event associated messages

(c) Control messages

(d) Administrative messages.

3.58 The network management status messages are used to increase the information provided by machine status discrete signals. Network management status messages parallel the following network management TTY messages:

(a) CG-STATUS

(b) FX-STATUS

(c) PP-STATUS

(d) TOC-STATUS

(e) DR-STATUS—status of the DOC receive circuit is used to indicate possible failure conditions in DOC receive circuit SD-27970

(f) DT-STATUS—status of the DOC transmit circuit is used to indicate possible failure conditions in the interrupter circuitry and the emergency action (EA) timing circuit of DOC transmit circuit SD-1A334.

3.59 Event-associated messages inform EADAS/NM about changes in network management control status. Messages associated with an event discrete indicator pass information about the event that triggered the discrete indicator to EADAS/NM. When EADAS/NM detects that an event alerting discrete indicator is in the ON state, it requests more information from the ESS switch via EADAS. The ESS switch then transmits an appropriate status message to EADAS/NM. These messages include those previously discussed plus a message that lists traffic measurements preassigned to 5-minute data blocks 60, 61, 62, and 63. Event-related messages keep EADAS/NM abreast of changes in control and traffic count status that are not initiated by EADAS/NM.

3.60 The messages used by EADAS/NM for activation and deactivation of network management controls are the same as those available from the network management TTY (Table D). These controls are:

- Flexible TGCs
- Preprogrammed controls including NMRRs
- Call gapping controls
- SILC.

Verification of the Hourly/Continuous Schedule Data

3.61 A data base is maintained by EADAS/NM identifying all ESS switch and trunk group measurements and relating them to slot numbers and measurement positions in data blocks 60 through 63. When changes in the H/C schedule affect the assignment order of measurements, an event discrete indicator is set to alert EADAS/NM. The EADAS/NM center can ask for verification of the H/C schedule information indicated for collection in blocks 60 through 63 to insure that its stored data base is correct.

J. Interface for Network Management Discrete Indicators

3.62 To better manage the network associated with an ESS switch, visual displays of current machine and network status are provided. These displays are usually located in a network management center where many ESS switches are monitored. To provide a network management center with information for these displays, periodic samples of system resources and network conditions are taken. Binary indicators are then provided as closed/open contacts for use by suitable data-gathering devices.

Machine Status Indicators

3.63 The following machine status indicators are used by the Network Management feature.

(a) ***Transmitters:*** An indicator is provided for each of three types of 2-wire transmitters: MF, DP, and RP plus HILO MF and DP transmitters. If, at the time of the sampling, the requests for a type of transmitter exceeds availability, an overflow condition exists and the binary indicator is placed in the ON state. If the overflow condition does not exist, the binary indicator is placed in the OFF state.

(b) ***Line Service Overload Strategy*** consists of two features as follows:

(1) The ***Improved Overload Strategy*** feature improves system performance and increases the efficiency for providing originating service for all lines during heavy traffic and office overload conditions.

(2) The ***Essential Service Protection*** feature automatically establishes and ensures priority originating service for essential lines during heavy traffic and office overload conditions.

(c) ***Machine Congestion:*** A corresponding binary indicator is placed in the ON state if the ESS switch is in any of the following congestion levels at the time of the sampling: machine congestion level 1 or machine congestion level 2 for shortage of real time or receivers (MF, DP, or RP).

Otherwise, the indicator is placed in the OFF state.

(d) ***Incoming Load Control:*** If the ESS switch is transmitting or excluding from transmission any DOC signals to a connected office at the time of the sampling, an indicator is placed in the ON state. If no DOC signals are being sent, the indicator is placed in the OFF state.

(e) ***Incoming Overload Queue:*** A binary indicator is placed in the ON state if the length of the incoming overload queue exceeds a generic parameter at the time of the sampling. Otherwise, the indicator is placed in the OFF state.

(f) ***Internal Queues:*** If internal queues are active at the time of the sampling (currently only the peripheral order buffer queue is considered), an indicator is placed in the ON state. Otherwise, the indicator is placed in the OFF state.

(g) ***Outgoing Load Control:*** A binary indicator is placed in the ON state if, at the time of the sampling, the ESS switch has done any of the following:

(1) Activated a call gapping control.

(2) Activated a TGC (either manually or automatically via DOC signals).

(3) Excluded a TGC preprogram from automatic activation. Otherwise, the indicator is placed in the OFF state.

(4) Activated a SILC.

(5) Activated a reroute control (via DOC signal).

(h) ***Receivers:*** A corresponding indicator is placed in the ON state if there is an overload on any of the following at the time of the sampling:

(1) Customer digit receiver queue for dual-tone MF service

(2) Customer DP receiver queue

(3) MF receiver queue

(4) RP receiver queue

(5) Trunk DP receiver queue

(6) HILO MF receiver queue

(7) HILO DP receiver queue.

If no receiver queues are experiencing overload, each indicator is in the OFF state.

Network Status Indicators

3.64 Trunk group no-circuit indicators are available for a maximum of 109 trunk groups. The numbers of the trunk groups to be sampled are placed in translations. Both outgoing 1-way and 2-way trunk groups may be designated. A no-circuit condition exists if, at the time of the sampling, all circuits in the trunk group are busy due either to maintenance or traffic. If the no-circuit condition exists, an indicator corresponding to the trunk group is placed in the ON state. If circuits are available in the trunk group, the corresponding indicator is in the OFF state.

3.65 The sampling cycle of the indicators is divided into four segments. During the first segment, all machine status indicators, plus the first 16 trunk groups, are sampled. During each of the remaining segments in the cycle, 32 trunk groups are sampled. The interval between segments is 10 seconds; thus, each indicator is updated every 40 seconds. Receiver attachment delay report (RADR) indicators are administered separately and are updated every 30 seconds.

3.66 If the ESS switch is not equipped with the total of 109 trunk group no-circuit indicators, the update interval for each assigned indicator remains at 40 seconds.

3.67 Upon completion of the sampling, the current state of the signal distributor points is compared with the desired state. If any need to be changed, the appropriate orders are dispatched to the signal distributor.

K. References

3.68 Refer to Part 18B for detailed information concerning the TTY input and output messages described in this part.

4. SYSTEM OPERATION

HARDWARE

A. Network Management

4.01 The dynamic overload control (DOC) receive circuit SD-27970 is required for an ESS switch to receive DOC signals. This circuit is mounted on a miscellaneous frame J1A048A. The DOC receive circuit consists of one control and alarm circuit J23058BP and up to 30 receive circuits J23058CT. The control and alarm unit requires 2 frame inches, and each receive unit requires 4 frame inches. The remote master scanner applique circuit SD-1A210 is required by the DOC circuit for signal supervision.

4.02 The DOC transmit circuit SD-1A334 is required to transmit DOC signals to other offices. This circuit is mounted on one DOC frame J1A083A. The DOC unit requires 26 frame inches and may expand to 56 frame inches.

4.03 The SD-1A335 circuit is required to provide the office with the interface for network management indicators. The network management indicator circuit is located on the DOC frame J1A083A if it is present. Otherwise, it is located on a miscellaneous trunk frame J1A033C. The circuit consists of up to eight network management indicator units J1A083AE. Each unit provides for 24 individual indicators. The number of units is optional and depends on the number of machine status, trunk group no-circuit and receiver attachment delay report (RADR) indicators required. Each unit requires 2 frame inches.

B. Engineering and Administrative Data Acquisition System/Network Management

4.04 The EADAS/Network Management operation with the 1ESS switch requires the SD-1A147 circuit with options ZE and ZI. This transmit-receive circuit with a 202T data set, provides the data link. This data link provides the EADAS interface which is used by EADAS/NM. The transmit-receive unit is mounted on a miscellaneous trunk frame J1A033C, requiring six 2-inch mounting plates per unit. See reference A(11) in Part 18 for further details.

OFFICE DATA STRUCTURES

A. Translations

Call Gapping

4.05 The 3-digit index to NPA translator indicates the NPA of those rate centers to which both call gapping controls and calling line identification (CLID) entries are applicable. The input to the 3-digit NPA translator is actually a 2-digit subtranslator index. The output is an indicator for call gapping/CLID, and the NPA associated with the subtranslator. Call gapping and CLID have separate set cards. The call gapping control slots per office are 0 through 63. The CLID control slots per office are 0 through 31 (Fig. 5).

Preprogrammed Trunk Group Controls

4.06 The translation data associated with each preprogram TGC is accessed via a unit type and a member number translation. The unit type and member number translation produces the address of a unit type 46 auxiliary block containing the translation data (Fig. 6 and Fig. 7). Member number 0 is associated with the DOC circuit alarm and requires no unit type translation. Member numbers 1 through 63 are associated with preprogram TGCs 1 through 63, respectively, and each requires unit type translations.

4.07 Word 0 of the unit type 46 auxiliary block contains the word number that indicates the number of words in the auxiliary block and the master scanner number of the supervisory scan point associated with an automatic DOC signal for this preprogram. This master scanner number is provided to allow a directed scan of the scan point associated with automatic activation of this preprogram.

4.08 Word 1 of the auxiliary block contains the control function provided by the preprogram. The type and amount of control are specified in the control function. The number of the preprogram to which the translation information pertains is specified. Also included in word 1 is the preprogrammed TGCs required by the NMRR feature. This word is copied into the appropriate TGC word in the preprogram TGC control/activity block when the preprogram is activated.

4.09 Word 2 of the unit type 46 auxiliary block contains the priority information for the preprogram (priority = 0 for manual activation only). This is used by the automatic-activate and automatic-reset routines. Also stored in this word is the trunk group number (TGN) for which the preprogram is defined and the index used for accessing the appropriate trunk group activity word and TGC word. The index information is also used to link the trunk group head cell to the TGC word in the preprogram TGC/activity block.

4.10 Word 3 is provided for maintenance purposes only. It contains the master scanner number of the directed scan point associated with the DOC signal for this preprogram. The state of this scan point is always to be opposite that of a supervisory scan point. These two scan points provide the capability to detect FTG errors in the facilities connecting the DOC circuit to the scan points.

4.11 Words 4 and 5 are used by the NMRR feature. Word 4 contains two TGNs that can be used as TTGs in a reroute control. Word 5 is required in offices which have three trunk groups that can be used as TTGs.

4.12 The Network Management feature for CCIS provides automatic controls (CANCEL-TO and SKIP routing) on CCIS trunk groups. These controls are activated in response to DOC and group signaling congestion signals. Optional word C in the TGN supplementary auxiliary block (Fig. 8) contains control information for CCIS trunk groups controlled by DOC and group signaling congestion signals. Items 15 and 16 in optional word C are used to identify the TGC type to be activated for the trunk group. The TGC type is set to 0 if CANCEL-TO controls are to be activated for the trunk group. If no TGC type is specified or if there is no TGN supplementary auxiliary block, the CANCEL-TO control is the default.

4.13 Items 13 and 14 in optional word C of the trunk group supplementary auxiliary block are used to define the response category (RSPCAT). After receiving CCIS DOC or group signaling congestion signals for a trunk group, the types and percentages of traffic affected are determined by the RSPCAT for the particular trunk group (Fig. 8). Table A shows the valid values of the RSPCAT, which identify the percentage of the direct routed traffic and the alternate routed traffic affected, respectively. If a RSPCAT is not assigned or there is no TGN supplementary auxiliary block, a RSPCAT of zero is used.

Preprogrammed Network Management Reroute Controls

4.14 In addition to the translations discussed in paragraph 4.11, NMRRs require a word in the supplementary TGN translator auxiliary block. Optional word R is required for any TGN that can be used as a TTG or FTG (Fig. 9).

4.15 A translator defining 3-digit codes which cannot be rerouted by the office is called the 3-digit code rerouteability translator (Fig. 10). When the reroute control number is 1, the code cannot be rerouted.

Selective Incoming Overload Control

4.16 Two SILC blocking percentages (P1 and P2) must be determined and stored in the carrier interconnect office options auxiliary block (Fig. 11 and Table E). These percentages specify how much of the incoming traffic is to be blocked. Percentage 1 is used to block calls when the office is in machine congestion level 1 state. Percentage 2 is used to block calls when the office is in machine congestion level 2 state. The recent change message, RC:PSWD, is used to enter and change the SILC blocking percentages (P1 and P2).

4.17 Word 6 of the office options table points to the carrier interconnect office options auxiliary block. Word 0 of the auxiliary block contains the SILC blocking percentages (P1 and P2) (Fig. 11).

Network Management Indicators/Sending Dynamic Overload Control Signals

4.18 Unit type 56 (Fig. 12) has 19 member numbers used for the following purposes:

(a) 0—Unused

(b) 1—RADR

(c) 2—Network management indicators

(d) 3—DOC transmit circuit maintenance and interrupter

(e) 4—Machine congestion level 3 DOC signal acknowledgment and administration

(f) 5—Machine congestion level 1 and 2 DOC signal administration

(g) 6 through 9—Machine congestion level 1 and 2 DOC acknowledgments

(h) 10 through 17—Machine congestion level 1 and 2 DOC offices for each congestion reason

(i) 18—Network management indicators for RADR on the HILO network.

4.19 ***Receiver Attachment Delay Report (RADR):*** Unit type 56, member number 1 contains the miscellaneous trunk distributor numbers used by the network management indicator circuit to display the RADR percentages. There can be 11, 22, or 33 miscellaneous trunk distributor numbers indicated in the member number, depending on how many receiver types are being tested by the RADR feature. If no RADR percentages are to be displayed, the member number auxiliary block is not necessary (Fig. 13).

4.20 ***Network Management Indicators:*** Unit type 56, member number 2 contains the miscellaneous trunk distributor numbers associated with the machine status indicators. Included in member number 2 is the TGNs with an associated miscellaneous trunk distributor number to which no-circuit indicators are assigned. If no machine status indicators or trunk group no-circuit indicators are to be provided, the member number auxiliary block is not necessary. This member number also contains five fixed functional network management indicators for HILO and one fixed functional indicator for NMRRs (Fig. 14).

4.21 ***Sending DOC Signals:*** Unit type 56, member numbers 3 through 17 contain the information necessary for sending DOC signals to connected offices. If DOC signals are not transmitted by the office, the auxiliary blocks for member numbers 3 through 17 are not necessary.

4.22 Unit type 56, member number 3 (Fig. 15) identifies the two central pulse distributor points, the six miscellaneous trunk distributor numbers, and the four master scanner numbers used for maintenance of DOC transmitter SD-1A334.

4.23 Unit type 56, member number 4 (Fig. 16) identifies the base supervisory master scanner number for detecting the receipt of machine congestion level 3 signal acknowledgments. Also included in this member number is a list of offices (using three alphanumeric characters) to which the machine congestion level 3 signal is sent.

4.24 Unit type 56, member number 5 (Fig. 17) identifies each office (using three alphanumeric characters) to which a machine congestion level 1 and 2 signal is sent. Associated with each office is a miscellaneous trunk distributor number, identifying the signal distributor point used to send the signal.

4.25 Unit type 56, member numbers 6 through 9 (Fig. 18) each contains a base supervisory master scanner number which is the first point on a supervisory scanner row. These scan points are used to detect reception of the acknowledgment to a machine congestion level 1 and 2 signal.

4.26 Unit type 56, member numbers 10 through 19 (Fig. 19) are each four words in length. Bits 0 through 15 of these words serve as indexes for offices which receive machine congestion level 1 and 2 DOC signals when the predetermined machine thresholds are crossed. Each member number is associated with a different type of congestion; eg, member number 10 identifies the offices to receive a signal when the machine congestion level 1 real-time threshold is crossed. Member number 11 identifies the offices to receive a signal when the machine congestion level 1 MF receiver threshold is crossed and so on for machine congestion level 1 DP receiver, machine congestion level 1 RP receiver, machine congestion level 2 real-time, machine congestion level 2 MF receiver, machine congestion level 2 DP receiver, and machine congestion level 2 RP receiver thresholds.

4.27 Unit type 56, member number 18 is used for network management indicators concerning RADR on the HILO network (Fig. 20). Eleven miscellaneous trunk distributor numbers are required for each receiver type on which test calls are to be made. The groups of 11 are always in the following order: MF followed by trunk DP receivers. The first ten miscellaneous numbers are used to display RADR failure percentages; the eleventh miscellaneous trunk distributor number is used for a current RADR test results indicator.

> ***Note:*** If RADR tests are not being provided on the HILO network or if network management indicators are not being provided, this

member number auxiliary block should not be built.

4.28 ***Master Scanner Number Translation:*** Master scanner points are used by the DOC transmit circuit for maintenance (fuse alarm and interrupt timing) and the reception of acknowledgment signals and by the DOC receive circuit for maintenance and reception of DOC signals (Fig. 21).

Engineering and Administrative Data Acquisition System/Network Management

4.29 The ESS Form 1400 indicates H/C traffic schedules which are to be collected on a 5-minute basis. The data is transmitted to EADAS/NM in one of the four traffic data blocks. See reference C(1) in Part 18.

B. Parameters/Call Store

Call Gapping

4.30 Parameter word N2CSL points to a block of call store called the network management call gapping call store block (NMCGCS). The set card NMCODE specifies the maximum number of call gapping control slots (CLID is not included in this parameter word). See paragraph 4.31 concerning the parameter word for CLID entries. The call store block NMCGCS, contains control information for active call gapping controls (Fig. 22). This call store block is of variable size, consisting of 50 through 640 words. The call store words are divided into 5 through 64 subblocks (slots) of ten words each. Each subblock contains control information for one active call gapping control. Subblock zero is used as a head cell. The office can have a maximum of 63 call gapping control slots (subblocks); the actual range is between 4 and 63.

Calling Line Identification

4.31 The parameter word N2NMCLID and N4CLIH (call store word) point to a block of call store called NMCLID (Fig. 23). This call store block contains information concerning active CLID entries. Call store word, N4CLIN, contains the number of CLID control slots copied from bits 23 through 36 of parameter word N2NMCLID. The NMCLID call store block is divided into 5 through 32 subblocks (slots) of two words each. Each NMCLID control slot contains information for one CLID entry. Slot zero is used as a head cell. The ESS switch can have a maximum of 31 CLID entries; the actual range is between 4 and 31. For details about CLID, see reference A(13) in Part 18.

Preprogrammed Trunk Group Controls

4.32 Parameter word N2TGNANX points to a block of call store called trunk group head cell annex (TGNANX) (Fig. 24). One word is required for each trunk group in the office which can be controlled by TGCs (set card NMTGC). The trunk group head cell annex word (TGNANX) indicates if a TGC is active. Also, the N4TGNANX (call store word) points to a 2-word call store block (TGPP). The TGPP call store block contains control and activity information for the trunk group. Bits 0 through 6 of word X (NMPTR) points to a 2-word call store block (TGPP) used to store control and activity information for the trunk group (Fig. 25). The trunk group head cell annex block is not required if TGCs are not provided and set card NMTGC or NMFLXC (number of flexible control slots) is zero. If either set card NMTGC or NMFLXC is greater than zero, the TGNANX block is allocated.

4.33 A block of call store called TGC and activity block (TGPP) is required for each trunk group in the office to implement preprogrammed controls. The parameter word N2TGPP and N4TGPP (call store word) point to the TGPP call store block (Fig. 25). The TGPP call store block is indexed by bits 1 through 7 of word 2 in the unit type 46 translator (Fig. 7) or from the TGNANX call store block. Two words for each trunk group are required to indicate the specific control active on the trunk group. Also, the words are used to store the activity of the automatic DOC signals applicable to this trunk group. Set card NMTGC indicates the number of trunk groups managed via TGCs. The TGPP is divided into 2 through 64 subblocks of two words each. Subblock zero is presently unused.

4.34 A block of call store, called preprogram TGC status and traffic block (PPTRAF), is required for each preprogram TGC in the office. The PPTRAF call store block is used to store status information (automatic active, manually excluded, etc) and traffic peg counts of affected attempts on a trunk group. The parameter word N2PPTRAF and N4PPTRAF (call store word) point to the PPTRAF call store block (Fig. 26). Set card NMTGPP is used to assign these blocks and is equal to the highest

numbered preprogram TGC. This call store block is divided into 2 through 64 subblocks of four words each. It is indexed by four times the preprogram TGC number. Word 0 holds the current clock quarter-hour peg count of attempts affected by the preprogram for this block. Word 1 serves as a holding register for the peg count over the previous clock quarter-hour. Word 2 contains the TGN. Word 3 is the accumulator for the hourly peg count of attempts affected.

4.35 A 2-word annex is required for each preprogram TGC status and traffic block. Parameter word N2PPTGN points to the variable size call store block (PPTGN) (Fig. 27). This call store block is divided into 2 through 64 subblocks of two words each. Subblock zero is presently unused. The subblocks are used to store traffic peg and overflow counts for the trunks to which the corresponding preprogram is assigned. The subblocks are indexed by two times the preprogram number. The traffic counts for each preprogram are as follows: peg count during the last clock quarter-hour of attempts on the trunk group controlled by the preprogram and peg count during the last clock quarter-hour of overflow from the trunk group controlled by the preprogram. If no preprograms are defined for the office (set card NMTGPP = 0), then no annex block is necessary.

Flexible Trunk Group Control Block

4.36 Parameter word N2NMFLEX is required to implement flexible TGCs. It serves as a pointer to a block of call store (NMFLEX) used to store flexible TGC information (Fig. 28). This call store block is divided into 2 through 128 subblocks of two words each. These slots may contain the control information for one flexible TGC or the activation information for one flexible trunk group peg and overflow counter. These slots also contain an item to indicate whether a flexible TGC slot is automatic (CCIS) or manual. When the CCIS feature package is loaded, the minimum number of words for the flexible TGC block is 34. The number of slots provided limits the number of flexible TGCs (and flexible trunk group peg and overflow counters) that can be active simultaneously. Set card NMFLXC provides the quantity of flexible TGC slots (0 through 127; 16 through 127 when CCIS is loaded). Call store block NMFLEX is indexed by FLXPTR times two in bits 13 through 7 of the trunk group head cell annex (N2TGNANX) (Fig. 24).

Flexible Trunk Group Control Traffic Slots

4.37 Parameter word N2NMFLTR is required as a pointer to a block of call store (NMFLTR) used to accumulate traffic counts for each flexible TGC and flexible trunk group peg and overflow counter (Fig. 29). This block of call store is divided into 2 (17 with CCIS loaded) through 128 subblocks (slots) of four words each. The set card NMFLXC provides the quantity of flexible TGC slots. One slot is associated with each flexible TGC slot. The traffic slots maintain peg counts for:

(a) Calls affected by the control during the current clock quarter-hour

(b) Calls affected by the control during the last clock quarter-hour

(c) Attempts on the trunk group during the last clock quarter-hour

(d) Overflows from the trunk group during the last clock quarter-hour.

This call store block is indexed by the flexible control subblock number (FLXPTR) times four. See paragraph 4.36.

Common Channel Interoffice Signaling Trunk Group Control Status Block

4.38 Parameter word C1TGCSTA is a pointer to a block of call store used to store the timing and control information for automatically activated flexible TGCs (Fig. 30). Each active automatic control uses one word from this block to supplement the existing (manual) flexible TGC slot information (paragraph 4.36). The size of the call store block is set equal to 1 plus the number of flexible TGCs in the office. This parameter word and call store block are only allocated if the local or toll CCIS feature group is loaded.

Detection of Machine Congestion

4.39 A 2-word block of call store called the machine congestion flag/state couplet (Fig. 31) must be available to indicate that the machine has crossed one or more thresholds of congestion. This couplet is based on the union of two set cards, NMDOC and NMSTAT. If either of these cards is set equal to 1, the couplet must be provided. If both set cards are set

equal to 0, the couplet is not allocated. Parameter word N2DOCFLG points to this 2-word block which is used by timed entries to indicate that the machine has crossed a predetermined threshold of congestion. Word 0 contains last-look bits, and word 1 contains current state bits. Other bits are used for administrative and maintenance functions.

Sending Dynamic Overload Control Signals

4.40 Four blocks of call store consisting of 54 words are necessary for the sending and administration of DOC signals. All blocks are based on the set card NMDOC. If NMDOC is set equal to 1, the blocks must be provided; if it is set equal to 0, the blocks are not necessary.

(a) ***Signal Distributor Administration Table:*** Parameter word N2DOCXMT points to a 24-word block of call store required to administer the signal distributor points associated with the machine congestion level 1 and 2 signals of the DOC circuit. The table identifies the state of the control signal and the state of the associated acknowledgment signal. This call store block is made up of six subblocks of four words each used to indicate the state of each signal and the state of the associated acknowledgment signal. A layout of the signal administration table is shown in Fig. 32.

(b) ***Traffic Accumulator Block:*** Parameter word N2MCTRAF points to a 16-word block of call store required to store peg and usage counts for machine congestion level 1 and 2 DOC signals. The block is divided into eight 2-word subblocks, one subblock for each type of machine congestion level 1 and 2 signal. This call store block is made up of eight subblocks of two words each, used to store peg and usage counts for associated DOC signals. The index into the block is the DOC reason number (zero through seven) times two. A layout of the traffic accumulator block is shown in Fig. 33.

(c) ***Pseudo Call Register:*** Parameter word N2XMTCR points to a 10-word block of call store used as a dedicated call register for peripheral order buffer administration. This block contains words used to indicate which signal distributor points are changed for the DOC signal and words used to store information during segmented TTY messages. A layout of the DOC transmit pseudo call register block is shown in Fig. 34.

(d) ***Machine Congestion Level 3 Acknowledgment Administration:*** Parameter word N2MC3 points to a 4-word call store block used to administer machine congestion level 3 signal acknowledgments. The block is arranged in two couplets. One couplet is used to record the presence of signal acknowledgments; the other couplet is used to mark the signal out of service due to hardware failure. A layout of the machine congestion level 3 acknowledgment administration block is shown in Fig. 35.

Selective Incoming Overload Control

4.41 Assigning a trunk group to SILC only makes it eligible for traffic to be blocked. When the ESS switch enters the machine congestion level 1 or 2 state, SILC is automatically activated. Parameter word N2DOCFLG points to a block of call store (DOCFLG) used to indicate which particular resource threshold has been exceeded for machine congestion level 1 or 2 state (Fig. 31). Note that SILC is only concerned with real time or MF receivers. When these thresholds have been exceeded, the incoming overload control bit (word 3 bit 22 in the trunk group head cell) is set to one for the trunk groups assigned SILC. Control information for these trunk groups is stored in the NMSILC call store table. The parameter word N2NMSILC points to the NMSILC call store table (Fig. 36). This call store table contains the trunk groups assigned to SILC and the percentage at which incoming calls to these trunk groups can be blocked. The blocking percentage (P1 or P2) for the current machine congestion level 1 or 2 state is received from word 0 of the carrier interconnect office options auxiliary block (Fig. 11). This blocking percentage information is stored in word 0, bits 0 through 3 of the NMSILC call store block (Fig. 36). Each trunk group assigned SILC requires two call store words. The ESS switch can have a maximum of 128 trunk groups assigned SILC. The NMSILC call store table is divided into 129 subblocks; each subblock consists of two words. The first 2-word subblock is the head cell containing the blocking percentage (P1 or P2) and the audit bit. Trunk groups assigned SILC can be indicated via bits 15 through 21 in each call store word of the trunk group head cell annex block (Fig. 24). Also, an index into the call store table for each SILC trunk group is stored in bits 15 through 21 of the trunk group's head cell annex word (Fig. 24). If this field is non-zero, the SILC pointer indexes into the NMSILC call store table.

Network Management Indicators

4.42 Two call store blocks consisting of 24 words provide the interface for the network management status displays. Both blocks are based on the set card NMSTAT. If NMSTAT is set equal to 1, they must be provided; if NMSTAT is set equal to 0, they are not necessary.

(a) ***Flag and State Word:*** Parameter word N2NMFLG points to a 16-word block of call store required to administer the signal distributor points associated with the network management circuit. The first eight words indicate the current state of the signal distributor point, and the second eight words indicate the desired state (Fig. 37).

(b) ***Pseudo Call Register:*** Parameter word N2CREG points to an 8-word call store block which serves as a dedicated call register for the network management indicator circuit. This block is used to administer the peripheral order buffers containing the signal distributor orders for the indicator circuit and to store information during segmented TTY message prints (Fig. 38).

Engineering and Administrative Data Acquisition System/Network Management

4.43 Operation with EADAS/NM requires an 11-word block of call store used for scratch area and storage for status discrete indicators. Parameter word N2NMEA is a pointer to this call store block (Fig. 39). Set card NMEA (equal to 1) indicates that network management controls and data are transmitted via EADAS.

4.44 Operation with EADAS/NM also uses two parameter words (N2EADAS and N2EADAC) required for operation with EADAS. Parameter word N2EADAS acts as a pointer to an input/output buffer area of call store (Fig. 40). The EADAS/NM also uses this buffer area. The second parameter word, N2EADAC, acts as a pointer to a call store block used as a control scratch area for various control items of the engineering data acquisition system program (Fig. 41). The input/output buffer area is 273 words for a central control switch and 257 words for a signal processor switch.

4.45 Parameter word N2NMRR is required to provide the ESS switch with preprogrammed reroute control capabilities. This word points to the reroute control slot (NMRRC) call store block. Reroute control slots are used to store reroute control and traffic information (Fig. 42). This block of call store is divided into 1 through 64 subblocks (slots) of 12 words each. One compool defined call store word is required for NMRR call processing.

FEATURE OPERATION

A. Call Gapping

4.46 Call gapping controls have the ability to restrict traffic leaving the office by blocking specified 7-digit, 10-digit, and 10XXX destination codes. Activation of the call gapping controls is performed via the TTY input message CG-ACT. This message can be entered from the SCC, local TTY, EADAS/NM, or remote maintenance TTY. The NPA (even if it is the home NPA) of the desired code to be controlled, must be specified in the CG-ACT input message. If a specific customer number is to be blocked, the 4-digit destination code must be included in the input message. When requesting a call gapping control, one of the following actions occurs:

(a) If the dialed NPA matches the home NPA, a temporary recent change is applied to the NXX code. The call gapping control is inserted on the NXX and the directory number.

(b) If the dialed NPA does not match the home NPA, a temporary recent change is applied to the NPA code. The call gapping control is inserted on the NPA, NXX, and the directory number.

(c) If an equal access end office (EAEO) serves more than one NPA or if an access tandem serves EAEOs in more than one NPA, one of the following actions occurs:

(1) When the dialed NPA matches the home NPA of the rate center, the temporary recent change is applied to the NXX code.

(2) When the dialed NPA does not match the home NPA of the rate center, the temporary recent change is applied to the NPA code.

The temporary recent change points to a block of call store called the call gapping control slot. The slot contains information for the desired call gapping

control. Only one control slot is required per requested call gapping control.

4.47 When call gapping controls are applied on conflicting codes NXX, or NPA and NXX, or 3-way conflict [translation guide-1A division 3 section 3, ESS Form 1305-3 for details] the following occurs. The prefix (0, 1) used in code blocking control messages only, is not required in the call gapping control message. Also, the network management center does not need to be familiar with local dialing patterns. The conflict table (part of the rate and route pattern expansion table translator) has been doubled in size to accommodate offices that automatically apply call gapping controls on conflicting codes. The conflict table can handle call gapping controls on conflicting codes and carrier interconnect (7-digits) codes routed via an access tandem. The NPA must be included in the call gapping control message for the call to be routed properly.

B. Trunk Group Controls

4.48 A request to activate a TGC, either manually or automatically via a DOC signal, results in the outgoing load control bit being set in the trunk group head cell of the trunk group on which the control is to be applied. In addition, other call store associated with TGCs is updated to reflect the control option and percentages or thresholds for this control. The activation of a TGC causes the outgoing load control lamp on the MCC to be lighted.

4.49 In order to conserve real time, the interaction of individual controls is limited. The general philosophy is that a manual request to place a control on a trunk group removes any manual control currently on that trunk group and activates the requested control. A TTY output message advises network management personnel of the control that was removed. In addition, if the manual request was to activate a preprogram, any preprogram currently active on the trunk group because of the existence of a DOC signal is overridden, and any DOC signal received requesting action on this trunk group is ignored. However, if the manual request was to activate a flexible control on the trunk group, the DOC signals for this trunk group continue to cause preprograms to be activated and deactivated. Removal of a manual preprogram control allows the automatic DOC controls to resume.

4.50 In the processing of a call, the possible existence of a TGC is detected by finding the outgoing load control bit set in the trunk group head cell upon preparing to search the trunk group for an idle trunk. Only one flexible control and one automatic preprogram may be active on a single trunk group.

4.51 Maintenance is provided for the DOC circuit SD-27970 and for the connection between the DOC circuit and the scan points on the remote master scanner applique circuit SD-1A210.

4.52 The DOC circuit interconnects with the ESS switch for detection of receipt of a false signal. To facilitate this detection, the DOC circuit is arranged to accept two levels of signal, ground or -48 volts. A valid signal is an interrupted -48 volts signal where the interruption is approximately 1 second every 30 seconds. Any steady signal is detected as a false DOC command and signals the ESS switch through a single scan point causing the printing of an output message and the sounding of a major alarm. During the time that a signaling problem exists, the DOC command is not received by the ESS switch for the specific preprogram associated with the DOC signal. The preprogram can be controlled manually via TTY input if so desired. All other preprograms continue to be controlled automatically by their DOC signals.

4.53 To check the integrity of the connecting paths between the DOC circuit and ESS switch, two signaling paths with an associated scan point per path are provided for each DOC signal. The state of the two scan points for a particular signal should always be opposite. If a false cross or ground/open condition exists in either of the signal paths, the state of the two scan points would be equal and the preprogram is taken out of service and responds as if it were in a manually excluded state. When the false cross or ground/open condition is detected, a TTY output message is printed, identifying the preprogram affected, and a major alarm sounds.

C. Preprogrammed Network Management Reroute Controls

4.54 Two methods are provided for the activation of reroute controls. They are the same methods that exist for other network management TGCs. These methods are TTY requests to activate a preprogrammed reroute control and saturation of scan

points associated with a preprogram reroute control in response to the reception of a DOC signal.

4.55 Activation of a preprogrammed reroute control results in the outgoing load control bit being set in the trunk group head cell of the FTG. The trunk group head cell annex of the FTG is initialized to point to the preprogram TGC words for the FTG. The preparation TGC words are initialized with a pointer to a reroute control slot and with control information from the preprogram data stored in the unit type 46 auxiliary block. The reroute control slot is initialized with information stored in the preprogram data and in the supplementary trunk group translation data of the FTG and each TTG.

4.56 Activation of a reroute control caused manually or by a DOC signal results in the outgoing load control lamp on the master control center (MCC) to be lighted. If the activation request is a manual request, a TTY output message (NM07) is returned to the proper input channel stating that the control is active. In addition, if the input request contained invalid data, a response message is output indicating an error in the message. If no reroute control slot is available and the request is manual, an output message is returned indicating that internal lists are full. If no reroute control slot is available and the activation is automatic, the data structure is initialized except for the reroute control slot. An automatic reroute has no affect on traffic using the FTG.

4.57 If the FTG already has an active control on it, the active control may be overridden. If a manual control is overridden, an override message is output (NM01 REQ OVERRIDES).

D. Network Management Processing of From Trunk Group

4.58 The network management code exercised during the trunk hunt of the FTG of a reroute control must determine what kind of TGC is active and whether it should affect the call being processed. If the reroute is an immediate reroute and the call is in the percentage of calls to be blocked, the call searches for an idle TTG. If it does not find an idle trunk in the TTG, the call is routed via the FTG. If the reroute is a regular reroute, the call is returned to the translation program to attempt completion. If the call subsequently overflows the FTG, the network management program is entered again. The network management program determines whether the call should be controlled. The network management program may decide that the call does not fall into the percentage of calls to be rerouted, in which case the call is returned to the translation program for normal processing. The call may have attempted to reroute from the FTG, but base-level call processing decided that the dialed code was not rerouteable or that the call is not rerouteable because a CCIS traveling class mark indicates that the call has rerouted in another office. The call is then returned to the translation program for normal completion.

E. Network Management Processing of To Trunk Group

4.59 An entry to the network management program during the trunk hunt of a TTG only occurs when another TGC is active on the TTG. The presence of a "to control" on a TTG causes the call to be automatically canceled. See Tables G, H, and I. The call is returned busy to base-level call processing where it is routed to a NCA. If the control on the TTG is a "from control," the call is returned to the translation program for completion.

4.60 During the trunk hunt (before an attempt is made to find an idle trunk), the translation program transfers control to the network management program if the outgoing overload control bit is set in the trunk group head cell of the trunk group being hunted. This is the standard network management entry method for all preprogrammed and flexible TGCs. When the translation program determines that no trunks are available and the call is of interest to network management, another entry is made to the network management program for controlling overflow traffic. This method is not changed for reroute controls. When a rerouted call overflows the TTG, the translation program detects that the route index tag input to the change in network program indicates that the call is attempting to complete on a TTG. When this occurs, calls that cannot find an idle trunk in the TTG to which they were offered are returned to the original routing sequence (ie, the FTG).

F. Sending Dynamic Overload Control Signals

4.61 The DOC transmit circuit transmits up to 96 DOC signals. Three types of signals are provided: machine congestion levels 1, 2, and 3. The transmitter accepts input for machine congestion level 1 and 2 signals from signal distributor points and transmits a signal only when the signal distribu-

tor point is operated. Sixty-four signal distributor points must be provided to send sixty-four machine congestion level 1 and 2 signals.

4.62 The machine congestion level 3 signal must be sent when the access tandem or toll office is incapable of processing calls. The command source for this type of signal is derived from either of two lamp signals on the MCC. One lamp signal is an emergency announcement (EA) phase-in-progress, which is on when a software problem exists and call processing has ceased in an attempt to correct the problem. The other lamp signal is a repeated time-out (RTO), which is on when a hardware problem exists. In most cases, a manual action is required to correct the problem. See reference A(10) in Part 18 for the trouble-clearing procedure.

4.63 The machine congestion level 3 signal is a broadcast signal sent to a maximum of 32 connected offices. This signal is sent when the RTO or EA lamp signal is on. These lamp signals are extinguished a short time after call processing has resumed. The machine congestion level 3 signal continues to be sent for approximately 2 seconds after the lamp has been extinguished and call processing has resumed.

4.64 Interface with three types of signaling facilities are provided with options on a per signal basis. The three facility types are:

(a) Balanced loop:

ON—Loop closure

OFF—Loop opening.

(b) E and M leads:

ON— -48 Vdc on M lead via E and M applique circuit SD-99774

OFF—Ground on M lead via E and M applique circuit SD-99774.

(c) Data set:

ON— +5 to +15 Vdc to SL lead of data set 108E

OFF— -5 to -15 Vdc to SL lead of data set 108E.

4.65 For each of the possible 96 signals transmitted, an acknowledgment is returned to the sending office. This acknowledgment is used to determine that connected offices have correctly received a DOC signal. The acknowledgment continues as long as the signal is being sent.

4.66 These acknowledgments are detected at the ESS switch via supervisory scan points at the master scanner circuit. The signaling facility for the acknowledgment must be identical to its associated DOC transmit signal. These facilities are:

(a) Balanced loop:

ON—Far-end loop closure

OFF—Far-end loop opening.

(b) E and M leads:

ON—Ground on E lead via E and M applique circuit SD-99774

OFF—Open on E lead via E and M applique circuit SD-99774.

(c) Data set:

ON— +5 to +15 Vdc from TL lead via data set 108E

OFF— -5 to -15 Vdc from TL lead via data set 108E.

4.67 The signal transmitted by the DOC transmit circuit is an ON signal interrupted by an OFF signal every 30 seconds. The duration of the OFF signal is approximately 1 second. This interruption is inserted to validate the DOC transmit signal. Without the interruption, a steady ON DOC signal is indistinguishable from a shorted pair in the transmission facility between the two switching offices. The interruption is provided by a duplicated hardware interrupter.

4.68 Since the acknowledgment returned from the DOC receiving office is identical to the transmitted signal, the interruption exists in the acknowledgment signal also. To avoid unnecessary processing during the change of states of the scan point, the interruptions are nullified and are continuous ON signals at the scan point.

4.69 If any DOC transmit loop is in a nonidle state, ie, send or exclude, the incoming load control lamp on the MCC is lighted.

4.70 The maintenance provided for the DOC transmit circuit SD-1A334 is primarily operational and provides fault indication only. Except for the interrupter, which is discussed in subsequent paragraphs, no special provision is made to facilitate internal diagnostics or fault isolation.

4.71 On a daily basis or on demand via TTY input message DOCX-EX, the timers included in the transmit circuit are tested to insure correct operation and accurate timing. The timings involved are:

(a) The nominal 1-second interruption in the DOC signal every 30 seconds

(b) The blocking of the interruption in the acknowledgment as it is seen by the ferrod

(c) The continuance of the machine congestion level 3 signal for approximately 2 seconds after the EA phase-in-progress lamp has been extinguished.

4.72 Duplicated hardware interrupters are provided for the 1-second interruption and the blocking of the interruption. As a daily routine, both interrupters are tested, and if both are operating correctly, the active and standby interrupters are switched to allow for equal use. If only one interrupter functions correctly, the minor alarm sounds and a message is printed at the maintenance TTY informing the craft personnel that the standby interrupter is out of service. If neither interrupter functions correctly, the major alarm is sounded and a message is printed at the maintenance TTY.

4.73 A hardware timer is provided to continue the machine congestion level 3 signal after the EA phase-in-progress lamp has extinguished. As a daily routine, this timer is tested for accurate timing. If the timing is not accurate, the minor alarm sounds and a message is printed at the maintenance TTY. However, the machine congestion level 3 signaling circuitry remains functional.

4.74 The active interrupter for DOC signals runs only while a DOC signal is being transmitted. A faulty interrupter might cause the DOC receive circuit SD-27970 at the receiving office to ignore the DOC signal. For this reason, the interrupter is monitored while it is running. If a fault occurs, the maintenance software inserts an interruption, switches to the standby interrupter, sounds the minor alarm, and prints a message at the maintenance TTY. If the standby interrupter is out of service, a major alarm is sounded and a message is printed at the maintenance TTY. A faulty interrupter cannot be detected during the sending of a machine congestion level 3 signal.

4.75 Acknowledgments for all DOC signals are expected within 2 seconds of sending the signal. On an operational check, if either the acknowledgment is not received or an acknowledgment is received but not expected, the loop on which the failure occurred is taken out of service. The craft personnel are notified both via the minor alarm and a message at the maintenance TTY. This message identifies the failing loop. After correcting the problem, the craft person places the loop back in service via TTY input message DOCX-REST.

4.76 The receipt of an acknowledgment for machine congestion level 3 signals cannot be monitored continuously while sending the machine congestion level 3 signal. However, following a repeated time-out or EA phase problem, the acknowledgments can be checked after the system regains sanity since machine congestion level 3 signals are sent for a few seconds after call processing has resumed. The minor alarm sounds, and a TTY output message is printed at the maintenance TTY for each machine congestion level 3 loop on which an acknowledgment was not received.

4.77 An acknowledgment received for machine congestion level 3 when it should not be, ie, when the office is running, is an indication of a problem. At this time, the maintenance software prevents the problem from persisting by isolating the machine congestion level 3 portion of the transmit circuit from the facilities. The minor alarm sounds, and a message is printed at the maintenance TTY. After the problem is corrected, the machine congestion level 3 circuitry is restored via TTY input message DOCX-REST.

4.78 During a manually requested test of the EA phase-in-progress lamp on the MCC, the machine congestion level 3 circuitry of the DOC transmit circuit is isolated from the facilities so that no machine congestion level 3 signal is transmitted.

Interface for Machine and Network Status Displays

4.79 The software-activated indicators are provided as closed contacts controlled by signal distributor points. A maximum of 167 contacts can be required. Included in this total is a maximum of 33 indicators for use by the RADR feature. The 167 contacts are composed of the following:

- Machine status indicators—maximum of 22
- Trunk no-circuit indicators—maximum of 112
- RADR indicators—maximum of 33.

4.80 Each of these 167 contacts is wired to a distributing frame. Any use of the contacts is up to the operating company. No standard display unit is provided. Three additional indicators are available from existing office hardware. These indicators are the repeated time-out and EA phase-in-progress lamps and the machine congestion level 3 condition from the DOC transmit circuit. These three indicators are available on the DOC transmit circuit SD-1A334.

G. Selective Incoming Overload Control

4.81 The SILC blocking percentages must be determined and stored in the Carrier Interconnect office options auxiliary block before assigning any trunk group to SILC. Any 1-way incoming MF or 2-way MF trunks can be assigned SILC. When the ESS switch goes into the machine congestion level 1 or 2 state, SILC is activated. Selective incoming overload control (SILC) is automatically activated if the predefined thresholds for MF receivers and/or real time have been exceeded. A routine in the SILC program examines (every 2 seconds via routine NMSDOC) the resource bits in the N2DOCFLG flag/state couplet (Fig. 31) and determines if SILC should be activated. If SILC is activated, the blocking percentage for the associated machine congestion level 1 or 2 state is retrieved from the Carrier Interconnect office options auxiliary block. This information is stored in word 0 of the SILC call store table. The activation of SILC on a trunk group causes the incoming overload control lamp on the MCC to be lighted. Also, the incoming overload control bit in the trunk group head cell (for a trunk group number) is set indicating the ESS switch is in congestion and the trunk group is marked for SILC.

H. Engineering and Administrative Data Acquisition System/Network Management

General

4.82 All information passed between EADAS/NM and a 1ESS switch is coded into 8-bit information characters for transmission over the EADAS data link. These characters are transmitted in pairs; each pair is called a word. Each character is preceded by one start bit and is terminated with two stop bits. Information exchange occurs over an EADAS data link. Over this data link, EADAS collects traffic data needed for engineering and dial administration as well as network management data. Data transmitted by the ESS switch through EADAS cannot be recognized by EADAS/NM unless transmission of this data is first requested by EADAS/NM.

Types of Data

Traffic Data

4.83 Traffic data contained in the 5-minute data blocks is collected in accumulating registers by call processing, maintenance, and administrative programs. The data collected in accumulating registers is transferred to holding registers during a traffic update. Data is requested from an ESS switch by EADAS/NM via a 3-word poll. The first word in the poll identifies the request as a network management poll (Fig. 4), the second word contains the requested block number (60, 61, 62, or 63), and the third word is all zeros. If any of the repeated words (or the returned data words) is incorrect, an all-ones word is returned indicating that the request is to be started over. Once the poll request has been accepted by the ESS switch and properly echoed back to EADAS/NM, the requested data block is sent. This block of data exchanged between an ESS switch and EADAS/NM consists of 503 8-bit information characters. The last character in each block of data, including the 5-minute traffic data blocks, is a check sum (Fig. 3).

4.84 The code in the EADAS/NM interface (NMEA feature package) program updates a copy of the status discrete polls using three methods:

(a) Scanning for machine status indicators using a 2-second entry

(b) Updating a discrete indicator when an event occurs in the ESS switch

(c) Scanning the indicators after an entry from EADAS when the 20-second status discrete poll is received.

When EADAS polls for traffic counts, the EADAS program assembles the counts from the H/C schedule that are flagged for 5-minute network management collections and transmits via the EADAS data link. Traffic counts are updated by the traffic program on a 15-minute basis.

Status and Event Discrete Indicators

4.85 A portion of the Network Management feature provides an interface for binary real-time status discrete polls to produce visual displays of current machine and network status. These visual displays are usually located in network management centers; however, the display can also be located at the ESS switch. The ESS switch scans the state of most indicators every 40 seconds and sets the corresponding status discrete indicators to the state found at the last scan. With the EADAS/NM feature, the ESS switch scans the machine and network status indicators every 2 seconds and sets the status discrete indicators accordingly. Once a machine status discrete indicator has been set to the on state, it remains in this state until the status block is transmitted to EADAS. The 2-second scanning is used to increase the probability of determining that the actual machine status indication has been on once in the last 30-second status block update interval.

4.86 The EADAS/NM status poll request contains three words. The first word identifies the type of request; the second and third words are zeros. The data block transmitted after receiving the echoed response consists of a 2-character header of eight bits each (sixteen bits) and the discrete poll words (four words). The header includes the number of transmission words (exclusive of the check sum). After assembling the data block, the status discrete indicators are reset to the off state.

4.87 When the EADAS program receives 30-second discrete polls from EADAS, it transmits them as they are stored in the updated copy. Machine status discrete indicators are set to OFF upon transmission of the status block to EADAS. Event discrete indicators are set to OFF by a response message from EADAS/NM or by a reset message from EADAS/NM. The engineering data acquisition system program can poll EADAS/NM for transmission of all discrete indicators as if they were set to ON in order to check the exception display board for lamp problems.

Network Management Control and Status

4.88 In order to initiate controls in the ESS switch and ask for the status of active controls, EADAS/NM sends special polls through EADAS that simulate TTY inputs at the ESS switch. Figure 43 shows the general EADAS/NM input message format. The first 8-bit character of the input message contains the character count (octal). This count is used by the ESS switch interface program to determine the number of characters to receive. The rest of the message is the same as the TTY input message (see references in Part 18B) with the exception of the initial XX-XXX- portion defining the control to be taken. This initial American Standard Code for Information Interchange (ASCII) string, up to and including the second hyphen, is replaced by a 16-bit equivalence code as defined in Table F. The remainder of the ASCII string is identical to the ESS switch TTY input message. All messages end with an ASCII period and a final all-zero character completes the transmission. Figure 44 shows an example of the CT-ACT input message using the format described above.

4.89 When the engineering data acquisition system (EDAS) program receives one of these polls, it loads the ASCII characters received as input with the poll into a special EADAS TTY buffer for the EADAS channel. The buffer is then released to the TTY program. The TTY program handles the data essentially the same as if the ASCII characters were input on a TTY at the office. As a result of the TTY processing, the network management program gets an entry from the TTY program. The network management program processes the message normally until it is time to output a response. When the network management programs determine that the request for data was an EADAS request, the data is formatted for output to EADAS. (Refer to Fig. 43 through 91 for the EADAS output buffer formats of the network management messages transmitted to EADAS/NM. Buffer layouts include a header, the length of the buffer being transmitted, data which can identify the type of control requested, and any specifics of the control which EADAS/NM may re-

quire to understand the status of the office.) After formatting, the output is loaded in the EADAS output buffer. The EDAS program subsequently transmits the contents of the output buffer. In addition to the EADAS output transmission, the network management programs also generate conventional TTY printouts on the network management or traffic channel when EADAS/NM has changed the status of controls active in the ESS switch.

Hourly/Continuous Schedule Verification

4.90 Verification of the H/C schedules to assure proper interpretation of data collected in blocks 60 through 63 is initiated at the ESS switch in response to a poll request from EADAS/NM.

Trunk Group Information Verification

4.91 In addition to verifying H/C schedule 5-minute data, EADAS/NM also verifies trunk group translation data. Trunk group verification data consists of five 8-bit transmission characters. This data contains information related to:

(a) The trunk group number (TGN)

(b) The number of maintenance-busy trunk circuits from the trunk group head cell

(c) The number of equipped trunk circuits from the TGN auxiliary block

(d) The type of trunk from the trunk class code expansions

(e) The service type of the trunk group.

The trunk group data is formatted and loaded into the output buffer area of call store that is pointed to by parameter word N2EADAS. [Refer to A(11) in Part 18.] The trunk group data can be for a specified single trunk group or for all the active trunk groups starting with trunk group 1.

CHARACTERISTICS

5. FEATURE ASSIGNMENT

5.01 Effective with the 1E8 generic program, the Network Management feature provides the following capabilities to the ESS switch on a per EAEO or access tandem basis:

(a) Call gapping controls (replaced code blocking controls)

(b) Selective incoming overload control (SILC)

(c) DOC signals

(d) TGCs—flexible and preprogrammed (NMRRs)

(e) Interface between the ESS switch and EADAS/NM

(f) Discrete machine and network status indicators.

5.02 The Operation With EADAS/NM feature and the CCIS feature are provided on a per EAEO basis, or access tandem basis. The Network Management feature is required in all CCIS offices.

5.03 Reroute controls may be applied on an outgoing trunk group basis because the control is applied to the FTG and reroutes traffic to the TTG. Reroute controls are effective on a per call basis.

6. LIMITATIONS

OPERATIONAL

6.01 Effective with the 1E8 generic program, code blocking controls are replaced by call gapping controls. The set card NMCODE is redefined, no longer defining the number of available code block controls and CLID entries. The set card only specifies the number of available call gapping controls. The CLID entries are defined by the set card NCLIDS. The maximum number of call gapping controls active at one time in an ESS switch is 63. The maximum number of CLID entries active at one time in an ESS switch is 31.

6.02 Effective with the 1E8 generic program, selective incoming overload control (SILC) is available. Set card NSILCT indicates the maximum number of trunk groups that can be assigned SILC. The maximum number of trunk groups assigned SILC is 128; however, the recommended range is 10 through 64. Selective incoming overload control

(SILC) can only be assigned to incoming MF or 2-way MF receivers.

6.03 The DOC circuit used for receiving automatic activate/deactivate signals can distribute up to 30 DOC signals to a maximum of 8 ESS switches in a wire center. The DOC transmit circuit includes basic equipment for sending 16 machine congestion level 1 and/or 2 signals and 32 machine congestion level 3 signals. The machine congestion level 1 and/or 2 signals may be added in increments of 16 to a maximum of 64.

6.04 Segmented print messages requested from a SCC, traffic TTY, or network management TTY will block EADAS/NM requests for the same message until they are finished. When EADAS/NM requests segmented messages, the SCC, traffic TTY, and network management TTY requests are blocked. Only the TTY location requesting the status message(s) receives the printout. These segmented print messages are:

- PP-STATUS
- PP-DATA
- FX-STATUS
- DOC-STATUS
- DOC-DATA
- MFD-MCONE
- MFD-MCTWO
- RTD-MCTWO
- RTD-MCONE
- RPD-MCTWO
- RPD-MCONE
- DPD-MCTWO
- DPD-MCONE
- LST-MCTHREE
- CG-STATUS
- NMG-SILC-S.

6.05 The total number of preprogrammed reroute controls that can be active simultaneously is defined by parameter N2NMRR. The maximum number of preprogrammed reroute control blocks is 63. These controls share the ESS switch facilities with other preprogrammed TGCs. Each preprogrammed reroute control uses one of the preprogrammed TGCs provided for the ESS switch.

6.06 When reroute controls are applied, codes marked no-reroute on the 3-digit code rerouteability translator are not rerouted (Fig. 10).

6.07 Offices that perform both 2-wire and HILO 4-wire trunk switching cannot reroute traffic from a trunk group on the 2-wire trunk link network to a trunk group on the HILO trunk link network. Likewise, reroute specifying a FTG on the HILO network and a TTG on the 2-wire network are not allowed.

6.08 Concerning network management TGCs, it is not possible to have more than one manual control active on a given trunk group. In the reroute control case, this restriction applies to the FTG.

ASSIGNMENT

6.09 The maximum number of flexible TGCs allowed in an office is 127. The minimum number of flexible TGCs is 16 in an office which has the Local or Toll CCIS feature loaded. The minimum required for non-CCIS offices is zero.

6.10 The number of trunk groups in an office, which can be controlled by a preprogrammed TGC, is limited by the number of preprograms in the office (63) and the number of preprograms for the same trunk group. This is because each preprogram is a single function (CANCEL-TO, SKIP, or CANCEL-FROM) on a single trunk group. An absolute maximum number of trunk groups that can be controlled is 63, but a more practical maximum is somewhat less than 63 because, in most cases, more than one preprogram will be desired per trunk group. These preprogram TGC slots are also used for peg and overflow counts on flexible trunk groups. Any 1-way outgoing or 2-way trunk group can be controlled by flexible or preprogrammed TGCs.

6.11 The network management indicators are provided for the ESS switch as a system. If the network management indicator circuit is installed, up to 27 software-activated machine status indicators and 109 trunk group no-circuit indicators are available. In addition, up to 55 additional indicators may be assigned to the RADR feature.

6.12 Trunk groups that carry normal 7- and 10-digit direct distance dialing (DDD) traffic can be used as a TTG in a reroute control. A TTG must be either 1-way outgoing or 2-way. Any trunk group that carries DDD traffic can be used as a FTG in a reroute control. The trunk group must be 1-way outgoing or 2-way. Outgoing trunk groups that carry predominantly traffic that is marked no-reroute in office translations should not be used as FTGs.

6.13 All trunk groups that can be used as FTGs or TTGs in reroute controls must be identified in translation data before they can be accepted by a reroute control activation. Each TTG identified in translations uses system resources. For this reason, it is recommended that the number of TTGs be held to a minimum. It is recommended that not more than 128 trunk groups be identified as TTGs.

6.14 All traffic measurements required by EADAS/NM are contained in one to four blocks of network management traffic counts (60, 61, 62, and 63). These blocks of data are polled every 5 minutes by EADAS and contain counts from the H/C schedule that have been marked for 5-minute data collection at the ESS switch. The maximum number of H/C counts assignable to 5-minute collection is 843.

7. INTERACTIONS

STATIC

7.01 Not applicable.

DYNAMIC

7.02 Since reroute controls are provided as part of the existing network management TGC capability, there are dynamic interactions between TGCs and reroute controls. The following tables show the effects of simultaneously attempting to activate more than one TGC on a trunk group:

- Table G—Matrix for Preprogram to Preprogram Controls
- Table H—Matrix for Preprogram to Flexible Controls
- Table I—Matrix for Flexible to Flexible Controls.

Also, these tables show the interaction between CCIS controls, manual flexible controls, and preprogrammed controls. A CCIS automatic flexible control and an automatic preprogram control can simultaneously be active on the same trunk group. However, automatic preprogram controls, which require DOC circuits, are not recommended for controlling CCIS trunk groups.

7.03 If, during the process of a call, it is rerouted to a TTG that has a "to control" on it, the call is canceled before it is offered to the TTG.

7.04 The trace-on-outgoing-calls portion of CLID and call gapping performs similar functions. Both have to determine whether a match exists between dialed digits and a prespecified code or directory number. To provide program store and real-time savings, a portion of the CLID feature implementation was incorporated into the call gapping feature. This incorporation improved the capability of CLID by allowing more than four CLID entries simultaneously without real-time penalties and allowing distinction between no prefix, prefix 1, and prefix 0 access codes. In addition, if the audit finds an error in the slot used for CLID, it removes only that entry in error.

7.05 The RADR feature determines the delay in attaching a receiver to an incoming test call. The network management indicator interface provides a visual display of current RADR percentages for an ESS switch and is included in the set of EADAS/NM status and event discrete indicators.

7.06 If EADAS fails to poll the ESS switch for data for 45 minutes, the interface between the ESS switch and EADAS is switched into the non-EADAS mode. This mode switch breaks the interface, thus isolating EADAS and EADAS/NM from the ESS switch. All selected traffic reports are transmitted to

administrative TTY(s) provided the traffic map is maintained.

7.07 The flexible control deactivation routine zeros the CCIS status word for automatic flexible controls that are being deactivated. This routine is used for manual deactivation, by the TGC audit, and upon receipt of a DOC 0 message and automatic control time-out. A segment is also added to the flexible TGC audit to perform point-to-point back and consistency checks on the CCIS TGC status words.

7.08 The existing 2-second network management main program entry is used to call the CCIS control timing module to administer CCIS automatic controls.

8. RESTRICTION CAPABILITY

8.01 Not applicable.

INCORPORATION INTO SYSTEM

9. INSTALLATION/ADDITION/DELETION

9.01 To provide the Network Management feature in a working office, the required changes must be implemented in the following sequence:

(1) Install a parameter data assembler run with values for set cards NMSTAT, NMDOC, and NMFLXC.

(2) If the DOC transmit circuit SD-1A334 and/or the network management indicator circuit SD-1A335 are to be installed in the office, indicate their addition using the Equipment Questionnaire E8056.

(3) Install the new hardware.

(4) Build the necessary translations in accordance with procedures outlined in Fig. 92.

(5) See Part 13 for testing.

9.02 The procedures required to provide an ESS switch with the Operation With EADAS/NM feature are given in Fig. 93. An ESS switch must have the EADAS feature and a polled EADAS port to have EADAS/NM capabilities. See Part 13 for testing.

9.03 The procedures required to provide an ESS switch with the reroute control capabilities are given in Fig. 94. The network management reroute control (NMRR) feature package is required to make reroute controls operational. See Part 13 for testing.

9.04 The following set cards are applicable to the Network Management feature:

- 9SEDAS—EADAS interface and network management feature group
- 9SNMRR—NMRR TGC feature group
- 9FEDAS—EADAS interface and network management feature package
- 9FNMEA—NM EADAS feature package
- 9FNMIN—Network management indicators feature package
- 9FNMRR—NMRR feature package
- 9FNMTD—Network management DOC transmitter feature package
- 9FNMTG—Network management trunk group feature package
- EDAS—EADAS interface
- NMDOC—DOC transmitter circuit
- NMEA—Network management control via EADAS
- NMFLXC—Flexible TGC blocks
- NMRR—Network management reroute control
- NMSTAT—Network management indicator circuit
- NMTGC—Network management trunk group control
- NMTGPP—Network management preprogram TGCs
- NTG—Trunk groups

- NMTGD—Data set provided for network management TTY channel
- MNGTT—Network management TTY transmit-receive unit member number
- NMGTP—Network management TTY parity
- NSILCT—Number of SILC trunk groups
- NMCODE—Call gapping control slots (redefined—was used for code blocking control slots before the 1AE8 generic program update)
- NCLIDS—CLID entry slots.

See reference C(4) in Part 18 for more details.

10. HARDWARE REQUIREMENTS

Note: This part contains cost factors and determination of quantities. Central Office Equipment Engineering System (COEES) Planning and Mechanized Ordering Modules are the recommended procedures for developing these requirements. However, for planning purposes or if COEES is not available, the following guidelines may be used.

10.01 The hardware costs of the Network Management feature are as follows:

(a) Circuits:

(1) DOC (receive) circuit SD-27970-01

(2) DOC transmit circuit SD-1A334-01

(3) Network management indicator circuit SD-1A335-01

(4) An engineered number of announcement trunks for disposing of affected attempts.

(b) Master Scanner Points:

(1) Quantity—up to 162.

(2) Uses:

- 2 scan points per DOC signal received SD-27970-01
- 1 scan point for alarm indicator for the DOC circuit SD-27970-01
- 64 machine congestion level 1 and 2 signals, DOC transmit circuit SD-1A334-01
- 32 machine congestion level 3 signals, DOC transmit circuit SD-1A334-01
- 5 maintenance, DOC transmit circuit SD-1A334-01.

(c) Signal Distributor Points:

(1) Quantity—up to 237.

(2) Uses:

- 64 machine congestion level 1 and 2 signals, DOC transmit circuit SD-1A334-01
- 2 interrupters, DOC transmit circuit SD-1A334-01
- 4 maintenance, DOC transmit circuit SD-1A334-01
- 167 indicator circuit SD-1A335-01.

(d) Central Pulse Distributor Points:

(1) Quantity—2 bipolar points.

(2) Use:

- Maintenance of DOC transmit circuit SD-1A334-01.

10.02 The interface between a 1ESS switch and EADAS/NM consists of a modified TTY T and R unit, SD-1A147-02 with options ZE and ZI. Option ZE is the addition of one bipolar central pulse distributor point and one supervisory master scanner number scan point. Option ZI is the addition of an A1128 circuit pack (SG26). The modified TTY circuit, SD-1A147-02 requires two bipolar central pulse distributor points and thirteen supervisory master scan number scan points for system operation. This data link is required for EADAS operation and is used for EADAS/NM. See reference A(11) in Part 18.

10.03 The ESS switch requires DOC circuit SD-27970-01 to receive DOC signals from higher

level offices (eg, access tandem) (Fig. 95). This DOC circuit can receive up to 30 DOC signals from higher level offices. Also, this circuit can distribute all 30 signals up to N offices, located in a wire center, where N equals eight minus the number of ESS switches. The maximum number of ESS switches allowed is equal to four. Each signal is used for automatic activation/deactivation of one TGC preprogram. These 30 signals are received in the ESS switch via 60 scan points on the remote master scanner applique circuit SD-1A210-01. Two scan points (one supervisory and one directed) are provided per DOC signal for checking the condition of the connections between the DOC circuit and the remote master scanner applique circuits. The two scan points should always be in opposite states for each DOC signal. If this circuit is to be housed in the ESS switch, an additional scan point is required for maintenance.

10.04 One of the N offices is used for maintenance of the DOC circuit. The hardware includes a check for the receipt of a false signal by the DOC circuit. To facilitate this integrity check, a true signal is interrupted every 30 seconds for approximately 1 second. If any of the 30 DOC signals are detected by hardware as false signals, the office chosen for maintenance of the circuit is signaled. The signaling is via a single supervisory scan point on the remote master scanner applique circuit.

10.05 In addition to passing the DOC signals on to the offices in the wire center, the DOC circuit is equipped so that the DOC signal acknowledgments are transmitted either to another wire center equipped with a DOC circuit or to the office sending the signal. When the office which is sending the signal receives a return of the signal, it accepts it as an acknowledgment that the controlled office(s) received the original signal.

10.06 Offices not equipped with the DOC circuit are unable to receive automatic DOC signals from higher level offices. However, these offices can still use TGCs on a manual input basis only.

10.07 The ESS switch requires hardware for transmitting DOC signals to connected offices (Fig. 96). The hardware used for this function is the network management DOC transmit circuit SD-1A334. The DOC transmit circuit is interconnected to the ESS switch via signal distributor points, central pulse distributor points, and master scanner points. Twenty-two signal distributor points, two bipolar central pulse distributor points, three supervisory master scanner rows, one directed master scanner point, and four supervisory master scanner points are required for the basic DOC transmit circuit. Each additional group of sixteen machine congestion level 1 and 2 signals requires sixteen signal distributor points and one supervisory master scanner row.

10.08 Circuit SD-1A335 is required to provide the ESS switch with the interface for network management indicators. The circuit includes the machine status, RADR, and the trunk group status indicator interface. The network management indicator circuit is interconnected with the ESS switch via signal distributor points. One signal distributor point is required for each software activated indicator. A maximum of 192 signal distributor points can be required.

10.09 Announcement trunks for the no-circuit announcement and emergency announcements 1 and 2 are required for disposing of calls affected by network management controls.

10.10 An additional TTY channel may be required for network management. In all cases, the maintenance channels may be used for network management. A new channel may be chosen for network management, or the traffic channel may be used as the network management channel.

11. SOFTWARE REQUIREMENTS

Note: This part contains cost factors and determination of quantities. Central Office Equipment Engineering System (COEES) Planning and Mechanized Ordering Modules are the recommended procedures for developing these requirements. However, for planning purposes or if COEES is not available, the following guidelines may be used.

MEMORY

11.01 Software engineering data is provided herein for program stores (PS).

A. Base Generic Program (PS)

11.02 Approximately 3850 words are required for TGCs and approximately 50 words are required for NMRRs. Effective with the 1E8 generic program, approximately 5420 words are required for

call gapping controls and approximately 210 words are required for EADAS/NM.

B. Optionally Loaded Feature Packages (PS)

11.03 See Table J for optionally loaded feature package program store words.

C. Parameters (PS)

11.04 The following 24 fixed parameter words are required:

- One word for TGCs
- Three words for preprogrammed TGCs
- Two words for flexible TGCs
- One word for detection of machine congestion
- One word for NMRRs
- One word for CCIS/NM TGCs
- Three words for EADAS/NM
- Four words for sending DOC signals
- Two words for network management status indicators.

Effective with the 1E8 generic program:

- Two words for call gapping controls
- Two words for SILCs
- Two words for CLID entries.

D. Call Store Requirements

11.05 The following memory is required when the Network Management feature is activated:

- Trunk group head cell annex—value of set card NTG plus 1, 1 additional word required to access the table
- TGC/activity block—2 times the value of set card NMTGC plus 1, 1 additional word required to access the block
- TGC traffic and status block—4 times the value of set card NMTGPP plus 1, 2 additional words required to access the block
- Preprogram TGC traffic block annex—2 times the value of set card NMTGPP plus 1
- Flexible TGC block—2 times the value of set card NMFLXC plus 1
- Flexible TGC traffic block—4 times the value of set card NMFLXC plus 1
- CCIS TGC status block—value of set card NMFLXC plus 1
- DOC flag/state couplet—2 words
- Sending and administering DOC signals—54 words
- Network management indicators—24 words
- EADAS/NM control scratch area—11 words
- EADAS input/output buffer—273 words
- EADAS control block—14 words
- NMRR slots—12 times value of set card NMRR plus 1
- Call gapping control slots—10 times value of set card NMCODE plus 10
- CLID entries—2 times value of set card NCLIDS plus 2
- SILC slots—2 times value of set card NSILCT plus 2. Maximum of 258 words.

One compool-defined word is required with NMRRs for call processing. For set card engineering, see reference C(2) and C(4) in Part 18.

E. Translations (PS)

11.06 When the Network Management feature is applied, the following translation words are required:

(a) 3-digit code rerouteability translator—101

(b) Reroute preprogram TGC for the unit type 46 preprogram auxiliary block—6

(c) Trunk group supplementary auxiliary block—1 per CCIS trunk group to be controlled by DOC and group signaling congestion signals, 3 if the auxiliary block does not exist for a CCIS trunk group prior to the assignment of a TGC

(d) Trunk group supplementary auxiliary block for each TTG and FTG assigned to a reroute control—1, 3 if the auxiliary block does not exist for a trunk group prior to the assignment of a preprogram reroute control.

(e) 3-digit index to NPA translations—64

- Carrier interconnect office options auxiliary block—1 for blocking percentages of trunk groups assigned SILC.

(f) Unit type 56 auxiliary block:

- Member number 1 auxiliary block—1 plus 1 for each miscellaneous trunk distributor number used by the network management indicator circuit to display RADR percentages
- Member number 2 auxiliary block—25 plus 2 per machine status/trunk group no-circuit indicator, 5 for HILO network management indicators and 1 as a fixed functional indicator for NMRR
- Member number 3 auxiliary block—5
- Member number 4 auxiliary block—2 plus 1 per office to which machine congestion level 3 signals are sent
- Member number 5 auxiliary block—1 plus 2 per office to which machine congestion level 1/2 signals are sent
- Member numbers 6 through 9 auxiliary blocks—2 each
- Member numbers 10 through 17 auxiliary blocks—4 each
- Member number 18 auxiliary block—1 plus 1 per network management indicator for RADR on the HILO network
- Master scanner number translator for each DOC transmit and receive circuit in the office—1.

REAL TIME IMPACT

A. Trunk Group Control

11.07 The processor real-time impact for network management controls depends upon the number of simultaneous controls, the amount of traffic in the office directed to the overload, and the severity of the controls taken. Trunk group control values yield a negligible real-time cost and maximum values costing less than 0.5 percent.

B. Transmitting Dynamic Overload Control Signals

11.08 Processor real-time impact for transmitting DOC signals varies according to the amount of traffic and the state of the system. If no overload exists, a negligible real-time cost of approximately 0.025 percent is incurred.

C. Network Management Indicators

11.09 The real-time impact associated with updating the network management indicator circuits depends on the number of changes of state since the last entry for the group of indicators. On the average, few indicators need to be placed in a new state, and a negligible real-time equivalent cost of 0.05 percent can be expected.

D. Engineering and Administrative Data Acquisition System/Network Management

11.10 The real-time impact of the Operation With EADAS/NM feature is the number of real-time cycles required to initiate a control request. Refer to Fig. 43 through 91 for the real time required to initiate each network management control request.

E. Reroute Controls

11.11 The real-time impact for activation of NMRRs requires approximately 200 cycles.

Deactivation of the NMRRs requires approximately 200 cycles.

11.12 The call processing time costs of NMRRs are: (1) a rerouted call requires approximately 100 cycles and (2) a call not rerouted because it is not in the percentage of calls that can be routed requires approximately 50 cycles per call.

11.13 The administration processor time costs of data requests for preprogrammed reroute controls require approximately 60 cycles.

11.14 The cycle times for a 1ESS switch are as follows: 5.5 microseconds (no clock speedup), 5.24 microseconds (5-percent speedup), or 5.0 microseconds (10-percent speedup).

12. DATA ASSIGNMENTS AND RECORDS

TRANSLATION FORMS

12.01 The following ESS translation forms, detailed in reference C(1) in Part 18, are applicable to the Network Management feature.

ESS 1216—Trunk Group Supplementary Record

ESS 1303—Trunk and Service Circuit Route Index Record

ESS 1305-3—Rate and Route Pattern (Supplemental)

ESS 1400—Traffic Register Assignment Record

ESS 1405—Network Management Teletypewriter Activity Log

ESS 1500D—Office Option Record

ESS 1506—Miscellaneous Assignment Information Record

ESS 1507—Supplementary Rate Center Record

ESS 1508—Network Management Trunk Group Control (Pointer) Index Record

ESS 1509 A/B—Network Management Dynamic Overload Control Office Record

ESS 1512—Network Management 3-Digit Nonrerouteable Code Record

ESS 1600—Master Scanner Record.

RECENT CHANGES

12.02 The following recent change messages are affected by the Network Management feature.

MESSAGE	FUNCTION
RC:NMTGC	Adds or deletes a preprogram block (member number of unit type 46) to/from a network management TGC. This message is also used to add a NMRR. For details see reference A(4) in Part 18.
RC:PSWD	Used to assign blocking percentages for SILC. For details see reference A(5) in Part 18.

13. TESTING

13.01 The following TTY input/output messages can be used to verify translation data for the Network Management feature. See references in Part 18B for details.

(a) Use T-READ to verify the reroute controls and EADAS/NM translations. System response is a TWO2 output message with the requested information.

(b) Use the VFY-MSN-13 message to verify that each scan point is available to the system. System response is a TR12 output message with the translation information.

(c) Use the VFY-UNTY message to verify the unit type translations for the Network Management feature. System response is a TR13 output message with the requested information.

13.02 Testing procedures for DOC circuit SD-27970 are described in reference A(10) in Part 18.

13.03 Testing procedures for DOC circuit SD-1A334 are described in reference A(10) in Part 18. These testing procedures for dynamic overload loop testing should be performed as routine maintenance.

14. ADVANCE PLANNING

COORDINATION

14.01 Since this feature is concerned with the hierarchical switching network, the operating companies must plan for network management in such a way that each individual office fits the overall network plan. This requires coordination among network management personnel, dial administrator, plant, and traffic engineering personnel.

HARDWARE CONSIDERATIONS

A. Equipment, Space Requirements, and Current Drain

14.02 The DOC receive circuit SD-27970 is located on a miscellaneous frame J1A048A, if located in the ESS switch or equal access end office (EAEO). The circuit consists of one control and alarm circuit J23058BP and up to 30 receive circuits J23058CT. The control and alarm unit requires 2 frame inches, and each receive unit requires 4 frame inches. The maximum current drain on the -48 volt power supply is 6.2 amps.

14.03 The DOC transmit circuit SD-1A334 is located on one DOC frame J1A083A. The basic DOC unit requires 26 frame inches which can expand to 56 frame inches. The maximum current drain on the +24 volt power supply is 3.5 amps. The maximum current drain on the -48 volt power supply is 6.8 amps.

14.04 The network management indicator circuit SD-1A335 is located on the DOC frame J1A083A if it is present. Otherwise, it is located on a miscellaneous trunk frame J1A033C. The circuit consists of up to eight network management indicator units (J1A083AE). Each unit provides for 24 individual indicators. The number of panels is optional and depends on the number of machine status, trunk group no-circuit, and receiver attachment delay report (RADR) indicators required. Each contact panel requires 2 frame inches.

14.05 It is important to note that the network management indicator circuit provides only the interface for a network management display. Open/closed contacts are provided for each indicator to be used to light the lamps, to transmit to a remote location via some transmission system, eg, Status Assembly System, or to use in any other manner at the discretion of the operating company.

B. Assignment Recommendations and Guidelines

14.06 The ESS Form 1506 provides the control information for the preprogram. Items identified on this form are type of control, percentage of attempts to be controlled, trunk group number (TGN), pointer assigned to this trunk group, and priority of preprogram. The ESS Form 1600 provides the master scanner numbers which identify the scan points associated with each preprogram that can be controlled automatically via DOC signals.

14.07 A suggested procedure for assigning network management TGC preprograms would be as follows:

(a) Decide which trunk groups (less than 64) should be controlled by network management.

(b) Assign each of these trunk groups a number, beginning with one and numbering consecutively. Administrative ESS Form 1508 should be used for this purpose. This number is used as the value of pointer on ESS Form 1506 for its respective TGN.

(c) Decide whether any trunk group can be controlled automatically via DOC signals. If so, the office must be connected to DOC circuit SD-27970. Scan point assignments and member numbers are found on master scanner record, ESS Form 1600.

(d) For each member number found on ESS Form 1600, assign control information on ESS Form 1506:

(1) Determine office sending signal.

(2) Determine reason for sending signal.

(3) Assign priority according to congestion level of office sending signal as follows: pri-

ority 1, priority 2, priority 3 assigned to machine congestion levels 1, 2, and 3, respectively.

(4) Determine which trunk group is to be affected.

(5) Assign trunk group and value of pointer [see (b) above].

(6) Assign control option desired—CANCEL-TO, SKIP, CANCEL-FROM, REGULAR REROUTE, or IMMEDIATE REROUTE.

(7) Assign percentages of attempts to be affected. Overflow percentage is assigned only if the control is CANCEL-FROM or REGULAR REROUTE. Direct routed and alternate routed percentages are assigned only if control is CANCEL-TO, SKIP, or IMMEDIATE REROUTE.

(e) Insure that no more than three automatic preprograms (member numbers) have been assigned per trunk group. Where the trunk groups are identical, the priorities should be different.

(f) Decide whether any additional controls are desired which can be activated manually via TTY input message only. Note that any control that can be activated automatically via DOC signals can also be activated manually via TTY input message.

(g) Using any preprogram numbers not currently assigned, assign control information on ESS Form 1506:

(1) Assign priority = 0.

(2) Perform Steps (4) through (7) in (d) above. Note that any number of preprograms with priority = 0 may be assigned for the same trunk group.

(h) Total number of member numbers (ie, preprograms) must not be greater than 63.

(i) Choose the preprograms for which traffic peg counts of calls desired are printed on the H schedule. Indicate these preprograms on ESS Form 1400.

INPUT AND RECORD KEEPING

A. Activity Data

14.08 A list of the call gapping controls currently active (date and time included) can be requested via TTY input message CG-STATUS. The administrator can request call gapping controls on carrier interconnect codes and/or North American Numbering Plan (NANP) codes.

14.09 A list of the preprogrammed TGCs currently active can be requested via TTY input message PP-STATUS. The list gives the date and time the input message was processed and all active preprograms with their status. All preprograms in a nonreset state are considered active. Thus, the list contains preprograms that have been excluded from control and that are out of service for automatic DOC because of faulty connections between the DOC circuit and the scan points.

14.10 A list of the flexible TGCs currently active can be requested via TTY input message FX-STATUS. The list gives the date and time the request was processed and each active control with its control information. Automatic and manual controls are identified. Also included in the list are the active flexible trunk group peg and overflow counters.

14.11 A list of the DOC transmit signals currently active can be requested via TTY input message DOC-STATUS. The list gives the date and time the input message was processed and the status of all active signals. All signals that are in a nonreset state are considered active. Thus, the list includes signals that have been excluded from use and signals that are out of service because of hardware failures or maintenance testing.

14.12 A list of trunk groups currently assigned SILC can be requested via the TTY input message NMG-SILC. The list contains the TGNs, a count of the blocked calls per trunk (date and time included) group, blocking percentages, and current machine congestion level 0, 1, or 2 state. These counts are zeroed every 30 minutes.

B. Teletypewriter Activity Log

14.13 A network management TTY activity log may be maintained on Administrative ESS Form 1406.

C. Translation Information

14.14 The translation information associated with preprogrammed TGCs can be requested via TTY input message PP-DATA. The list contains the date and time the input message was processed and each preprogram with the associated TGN, the priority, the control option, and the percent of attempts to be affected.

14.15 The translation information identifying offices where DOC signals may be sent can be requested via the following TTY input messages:

- RTD-MCONE
- RTD-MCTWO
- MFD-MCONE
- MFD-MCTWO
- DPD-MCONE
- DPD-MCTWO
- RPD-MCONE
- RPD-MCTWO
- LST-MCTHREE.

Nine lists of offices can be requested, one list for each congestion reason. Each list contains the date and time the input message was processed. The offices or loops are identified by three alphanumeric characters and a 2-digit index.

14.16 A list of the TGNs for which no-circuit indicators are provided can be requested via TTY input message TGN-DATA. This list gives the date and time the input message was processed.

SOFTWARE CONSIDERATIONS

14.17 Identify those rate centers from which calls can be affected by call gapping controls. Since the trace-on-outgoing-calls portion of the calling line identification (CLID) shares in the identification procedure, the rate centers identified are the rate centers from which calls may be traced. This information is supplied on ESS Form 1507.

14.18 Choose the number of call gapping control slots to be provided. This number can be 4 and 63. This information is supplied via parameter set card NMCODE. Call gapping controls replace code blocking controls. The NMCODE set card used for code blocking controls is redefined for call gapping controls. Also CLID entries are separated from call gapping control slots. The number of CLID entries that can be chosen is 4 through 31. This information is supplied via parameter set card NCLIDS.

14.19 Choose the number of trunk groups to be assigned SILC. This number can be 0 through 128. However, a more reasonable choice would be 10 through 64. This information is supplied via parameter set card NSILCT. Two blocking percentages (P1 and P2) must be assigned and stored in the carrier interconnect office options auxiliary block before any trunk groups can be assigned SILC.

14.20 Choose the number of and the identification of trunk groups for which any network management controls will be provided. Any outgoing 1-way or 2-way trunk group may be chosen for network management controls. The number must be less than 64 and may need to be much smaller so that more than one preprogram may be designated for each trunk group. The information is supplied via set card NMTGC and ESS Form 1506.

14.21 Choose the number of preprogrammed TGCs. Each preprogram is a single function (CANCEL-TO, SKIP, CANCEL-FROM, or REROUTE) with specified percentage of attempts to be affected on a single trunk group. In addition, each priority desired requires a preprogram. The total number of preprograms must be less than 64. This information is supplied via set card NMTGPP and ESS Form 1506. If preprograms are to be used for receiving DOC signals, a DOC circuit SD-27970 must be ordered on the E8056 questionnaire. This circuit need not be ordered on this form if it is to be housed in another switching entity in the wire center.

14.22 Identify the trunk group and the number of trunks to be provided in the trunk groups for each of the three announcements (fixed route indexes 180, 181, and 182) used for calls affected by network management controls. Calls finding no trunk available when routed to one of these announcements are routed to regular overflow (fixed route index 80). This information is supplied on ESS Forms 1212 and 1303.

14.23 Identify those offices to which it is desirable to send DOC signals. Determine the type of traffic, eg, MF, received from the office in order that the correct DOC signal may be associated with the office. Group the offices, if desirable, into tandem signaling loops so that one signal is received by many offices. This information is supplied on ESS Forms 1509 A/B. In addition, a DOC transmit circuit SD-1A334 must be ordered on the E8056 questionnaire.

14.24 Determine which of the machine status indicators in the network management indicator circuit are applicable to the office. For example, a customer DP receiver queue overflow indicator is not necessary for a trunk-only office. Determine if RADR percentages are to be included in the displays. The information is supplied on the E8056 questionnaire. If any of the machine status indicators, RADR displays, or the trunk group no-circuit indicators described in the next paragraph are required, a network management indicator circuit SD-1A335 must be ordered on the E8056 questionnaire.

14.25 Determine the number and the identity of the trunk groups on which it is desirable to have no-circuit indicators. The number of indicators can range from 0 through 109. This information is supplied on the E8056 questionnaire and ESS Form 1506.

14.26 Choose the number of flexible TGC slots to be provided. These slots are used for control activation, flexible trunk group peg and overflow counter activation, and for responding to CCIS DOC and group signaling congestion signals. The number can be chosen from 0 through 127. The information is supplied via parameter set card NMFLXC.

14.27 Determine which trunk group will be used as FTG or TTG in a reroute control. These trunk groups need their translations to be supplied with the NPA of the office at the other end of the trunk group. Each TTG also needs its translations built to include a route index number. This route index is a special route index called the reroute route index for the trunk group. The ESS Form 1216 is used to input supplementary TGN data, and ESS Form 1303 is used for inputting route index data.

14.28 Identify which codes are not rerouteable by the office. These are codes that are destined to special offices such that if the codes were rerouted to another office, that office would not know how to interpret them. The INWATS (800 Service) codes, for example, probably could not be rerouted by most offices. Use ESS Form 1512 to identify codes that cannot be rerouted.

ADMINISTRATION

15. MEASUREMENTS

GENERAL

15.01 Calls affected by TGCs CANCEL-TO, SKIP, or TRUNK RESERVATION do not peg as an attempt or overflow on the trunk group on which the control is active. Calls affected by CANCEL-FROM peg as both an attempt and an overflow on the trunk group on which the control is active. The originating and tandem counts are scored appropriately and are not affected by network management controls.

15.02 ***Call Gapping Controls:*** Traffic measurements are available for call gapping controls via TTY input message CG-TRAFFIC. The measurements are listed as the number of attempts which can be controlled and the number of attempts which can be controlled, but not blocked. These two counts are available on the H, C, DA15, and special studies (S1, S2, S3) schedules. A total call gapping control count is available via TMC 05, EGO 252 and EGO 253. Traffic data is transmitted to EADAS/NM with the existing 5-minute traffic counts.

15.03 ***Trunk Group Controls:*** Traffic measurements are available for TGCs (both preprogrammed and flexible) on request via TTY input messages PP-TRAFFIC and FX-TRAFFIC or on an hourly printout. These measurements are listed as peg counts of calls affected during the last quarter hour, peg counts of attempts on the trunk group during the last clock quarter-hour, and peg counts of overflows of the trunk group during the last clock quarter-hour. The peg counts are listed per preprogram and per trunk group controlled by a flexible control during the quarter-hour. Note that counts of calls affected for the previous to last clock quarter-hour are no longer available for preprograms. Hourly peg counts of the calls affected by all flexible controls (TMC 05, EGO 234) and a total of the calls affected by all preprogrammed controls (TMC 05, EGO 233) can be requested on the H, C, or DA15 schedule.

15.04 ***Trunk Group Peg and Overflow:*** A flexible trunk group peg and overflow counter may be activated via TTY input message TG-ACT on any trunk group in the office. Activation of this counter allows network management personnel to obtain on demand, via TTY input message FX-TRAFFIC and via scheduled printouts, peg counts of attempts on the trunk group during the last clock quarter-hour and peg counts of overflows of the trunk group during the last clock quarter-hour. This is made possible by sharing the call store for flexible TGCs. The sum of the two, ie, flexible TGCs and flexible peg and overflow counters, active simultaneously must not exceed the number of slots engineered in the office.

15.05 ***Other Demand Network Traffic Data:*** Other traffic data available via TTY input message NMG-TRAFFIC on a last clock quarter-hour basis includes:

- Peg count of failure due to no circuit (ie, no trunk) on originating calls and tandem calls
- Total transmitter time-outs of MF, DP, and RP
- Total originating attempts
- Total tandem attempts
- Total incoming attempts.

15.06 ***Exception Traffic Data:*** A message is printed at the network management TTY after any clock 5-minute period during which the machine crossed or remained across any of the DOC congestion thresholds. The message gives a peg count of the number of times each threshold was crossed and a usage count (based on a 10-second scan) for the 5-minute period.

15.07 A message is printed at the network management TTY after any clock 5-minute period during which the receiver attachment delay report (RADR) percentage for any receiver type was above an office threshold. The message gives the current percent RADR for each receiver type. The threshold is an office parameter.

15.08 ***Scheduled Traffic Data:*** Every 15 minutes, all network management traffic measurement messages can be printed at the network management TTY. These messages include:

- Call gapping control traffic counts per active code block
- Preprogrammed TGC traffic counts per preprogram
- Flexible TGC traffic counts per active flexible TGC plus counts for all active flexible trunk group peg and overflow counters.

15.09 The printing of these messages is optional. A TTY input message LS-NMQU is used to allow or inhibit the printout. These 15-minute measurements are available to be scheduled only if the office is equipped with a dedicated network management TTY or two traffic TTYs.

15.10 Three other traffic-associated messages are printed on the network management TTY. These are the TC15 and the two traffic overload control (TOC) messages, TOC01 and TOC02. Two network management related counts have been added to the TC15 message. These are the number of calls affected by call gapping and the number of calls affected by TGCs, both preprogrammed and flexible. It is possible to request a current TOC message from the network management TTY.

15.11 ***Reroute Controls (Preprogrammed):*** Five traffic counts are maintained with each reroute control. These are:

- Outgoing peg count on FTG
- Overflow count on FTG
- Outgoing peg count on each TTG
- Overflow count on each TTG
- Peg count of calls affected by remote controls.

Reroute control traffic counts can be obtained by using the preprogrammed TGC (PP-TRAFFIC) traffic message. These counts may be scheduled for a 15-minute printout at the network management TTY and are updated on a 15-minute traffic schedule. All counts printed out are from the last traffic schedule. For immediate reroutes, the peg and overflow counts

of the FTG are pegged only by calls not affected by the reroute control. For regular reroutes, all calls peg the FTG peg and overflow counts.

15.12 ***Engineering and Administrative Data Acquisition System/Network Management:*** The Operation With EADAS/NM feature collects traffic counts from the ESS switch that are flagged for 5-minute collections. Each measurement is coded into two 8-bit characters and loaded into one of up to four blocks (60, 61, 62, and 63) dedicated to EADAS/NM. These blocks contain up to 250 measurements or 503 characters. This traffic data is requested by EADAS/NM every 5 minutes.

15.13 The Operation With EADAS/NM feature collects large amounts of traffic data. No network performance measurements are collected on the operation with EADAS/NM.

15.14 ***Common Channel Interoffice Signaling/Network Management:*** Traffic measurement code (TMC) 05 collects traffic counts for the CCIS/Network Management feature. These counts define the CCIS total office traffic counts and are available on the H or C, DA15, S1, S2, and S3 traffic schedules. The office counts are as follows:

EGO	DEFINITION
625	***CCIS DOC Cancel Peg Count:*** This is a count of the number of calls affected by an automatically activated (via DOC) CANCEL-TO control.
626	***CCIS DOC Skip Peg Count:*** This is a count of the number of calls affected by an automatically activated (via DOC) SKIP control.
627	***CCIS Group Signaling Congestion Cancel Peg Count:*** This is a count of the number of calls affected by an automatically activated CANCEL-TO control (via group signaling congestion signals).
628	***CCIS Group Signaling Congestion Skip Peg Count:*** This is a count of the number of calls affected by an automatically activated SKIP control (via group signaling congestion signals).

16. CHARGING

16.01 Not applicable.

SUPPLEMENTARY INFORMATION

17. GLOSSARY

17.01 To avoid ambiguity, terms frequently used in this document are defined as follows:

Access Tandem—An ESS switch used to provide interlocal access and transport area carriers or international carriers access to end offices (and possibly to collocated stations).

Alternate Routed Traffic—Traffic that has overflowed a trunk group and is now attempting to get on an alternate route trunk group.

Cancel—A call that is sent to a no-circuit announcement.

Data Link—A channel used for digital data transmission.

Direct Traffic—Traffic that has not yet overflowed any other trunk group. The trunk group under consideration is its first attempt out of the office.

Equal Access End Office (EAEO)—Any switch used to provide interlocal access and transport area carriers or international carriers access to collocated stations only.

Flexible Control—A type of control in which all control information is supplied in a TTY input message. This is in contrast to preprogrammed controls.

From Trunk Group (FTG)—For a reroute control, the trunk group that provides the source of traffic that is to be rerouted out of the normal routing chain.

Immediate Reroute—A reroute control that offers traffic to the TTG before it has attempted on the FTG. This is applicable to flexible and preprogrammed trunk group controls.

Interexchange Carrier—A carrier designed to serve traffic which crosses a local access and transport area boundary (eg. inter-LATA carrier, intra-LATA carrier, or international carrier).

Local Access and Transport Area—A geographical area where equal access end offices and access tandems or both can provide an interlocal access and transport area carrier/international carrier access to the local operating company network.

Preprogrammed Control—Trunk group controls (TGC) which have the control information stored in translations. This is in contrast to a flexible control.

Radial Signaling—This signaling is used when dynamic overload control (DOC) signals are transmitted to wire centers which have a 2-wire path established between the transmitter and destined wire center. Each wire center must send back an acknowledgment of the receipt of DOC signals to the transmitter.

Rate Center—A specified geographical location within an exchange area from which mileage measurements are determined for the application of interchange mileage rates. Any two customers within a rate center dial the same digits to reach a given destination.

Regular Reroute—A reroute control that offers traffic to the "to trunk group" (TTG) only after it has overflowed the "from trunk group" (FTG). Applicable to flexible and preprogrammed trunk group controls.

Reroute Control—A type of TGC that allows traffic destined for one trunk group, called the "from trunk group" (FTG), to be routed to another trunk group, called the "to trunk group" (TTG).

Scratch Area—A memory area that is allocated to the program for temporary storage of calculations.

Tandem Signaling—This signaling is used when dynamic overload control (DOC) signals are transmitted to wire center in a serial loop. The last wire center which receives the DOC signals returns an acknowledgment of the receipt of DOC signals back to the transmitter.

To Trunk Group (TTG)—For a reroute control, a trunk group that receives the reroute traffic. The traffic was originally intended for the "from trunk group" (FTG).

18. REFERENCES

18.01 The following documentation contains information pertaining to or affected by the Network Management feature.

A. AT&T Practices

(1) Practice 231-048-303—CCIS, CFTRK, TG, TGBVT, TGMEM, TKCONV, and TRK—Trunk Translation Recent Change Formats

(2) Practice 231-048-304—ARS, CCOL, CHRGX, DITABS, DIGTRN, DNHT, IDDD, IWSA, NOCNOG, NOGRAC, RATPAT, RI, RLST, TDXD, and TNDM—Rate and Route Translation Recent Change Formats

(3) Practice 231-048-305—GENT, PSBLK, PSWD, and SUBTRAN—Recent Change Formats

(4) Practice 231-048-310—ANIDL, BISI, CAMA, CFG, CLAM, CPD, JUNCT, LRE, MSN, NMTGC, PLM, PUC, PUCMB, RCHAN, ROTL, RSP, RSSCB, SCGA, SIMFAC, and TMBCGA—Recent Change Formats

(5) Practice 231-048-311—Translators Not Having Specific Recent Change Messages Updating Translations

(6) Practice 231-061-450—Program Store

(7) Practice 231-061-460—Call Stores

(8) Practice 231-090-120—Carrier Interconnect Feature—Feature Document

(9) Practice 231-090-207—Feature Document—Traffic Measurements Feature

(10) Practice 231-055-004—Task Oriented Practice—Network Management Controls—Dynamic Overload Control (Through 1E8 Generic Program)

(11) Practice 231-190-314—Operation With Engineering and Administrative Data Acquisition System Feature—Feature Document

(12) Practice 231-090-416—Common Channel Interoffice Signaling Feature Local and Toll—Feature Document

(13) Practice 231-090-083—Calling Line Identification (CLID) Feature—Feature Document.

B. Teletypewriter Input/Output Message Manuals

(1) Input Message Manual IM-1A001

(2) Output Message Manual OM-1A001.

C. Other Documentation

(1) Translation Guide TG-1A (1 and 1A ESS switches)

(2) Office Parameter Specification PA-591001

(3) Translation Output Configuration PA-591003

(4) Parameter Guide PG-1

(5) 759-100-000 BISP—Subject Index—Central Office Equipment Engineering System (COEES)

(6) 759-100-100 BISP—General Description—Central Office Equipment Engineering System (COEES).

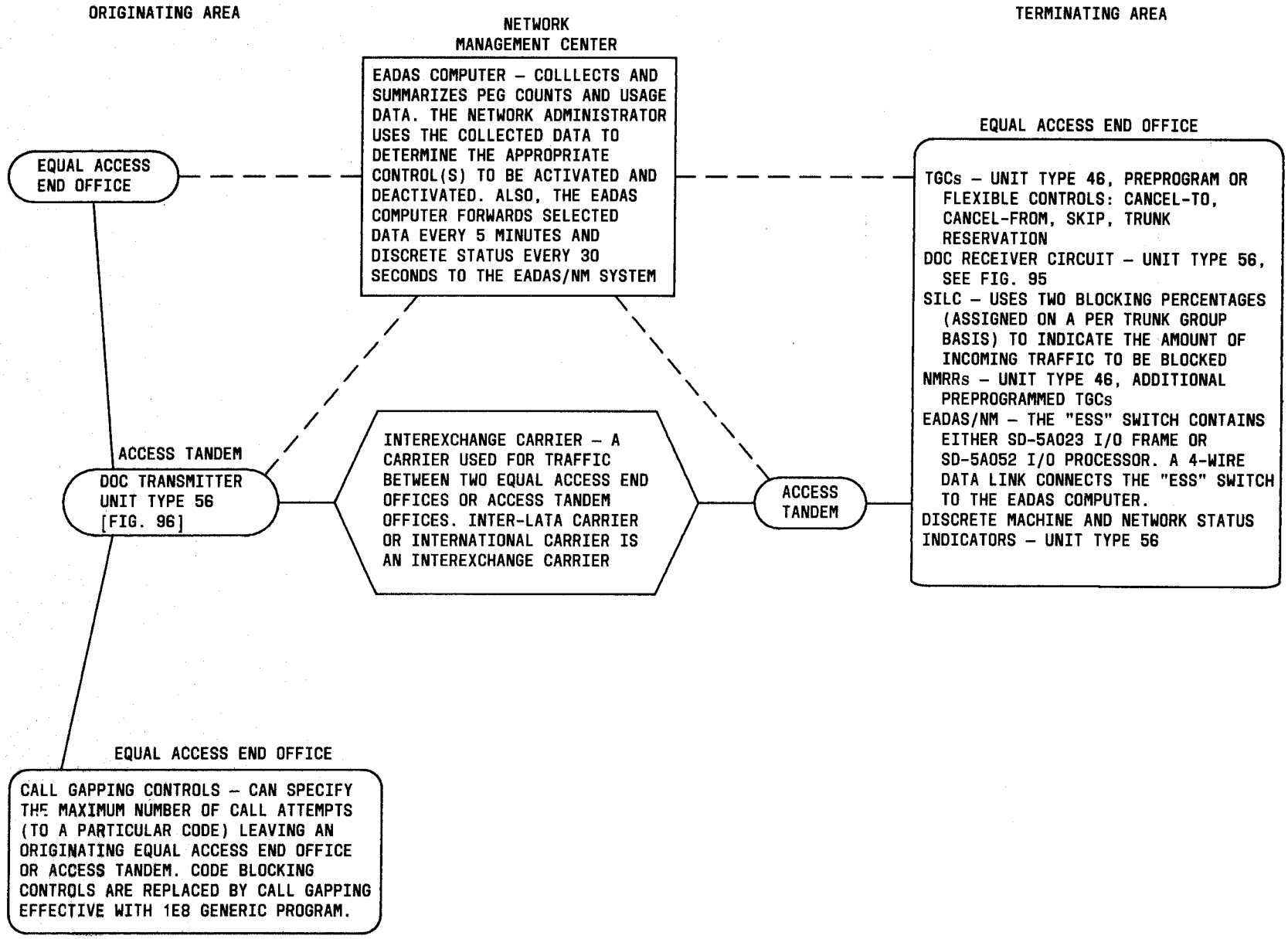


Fig. 1—Overview of Network Management

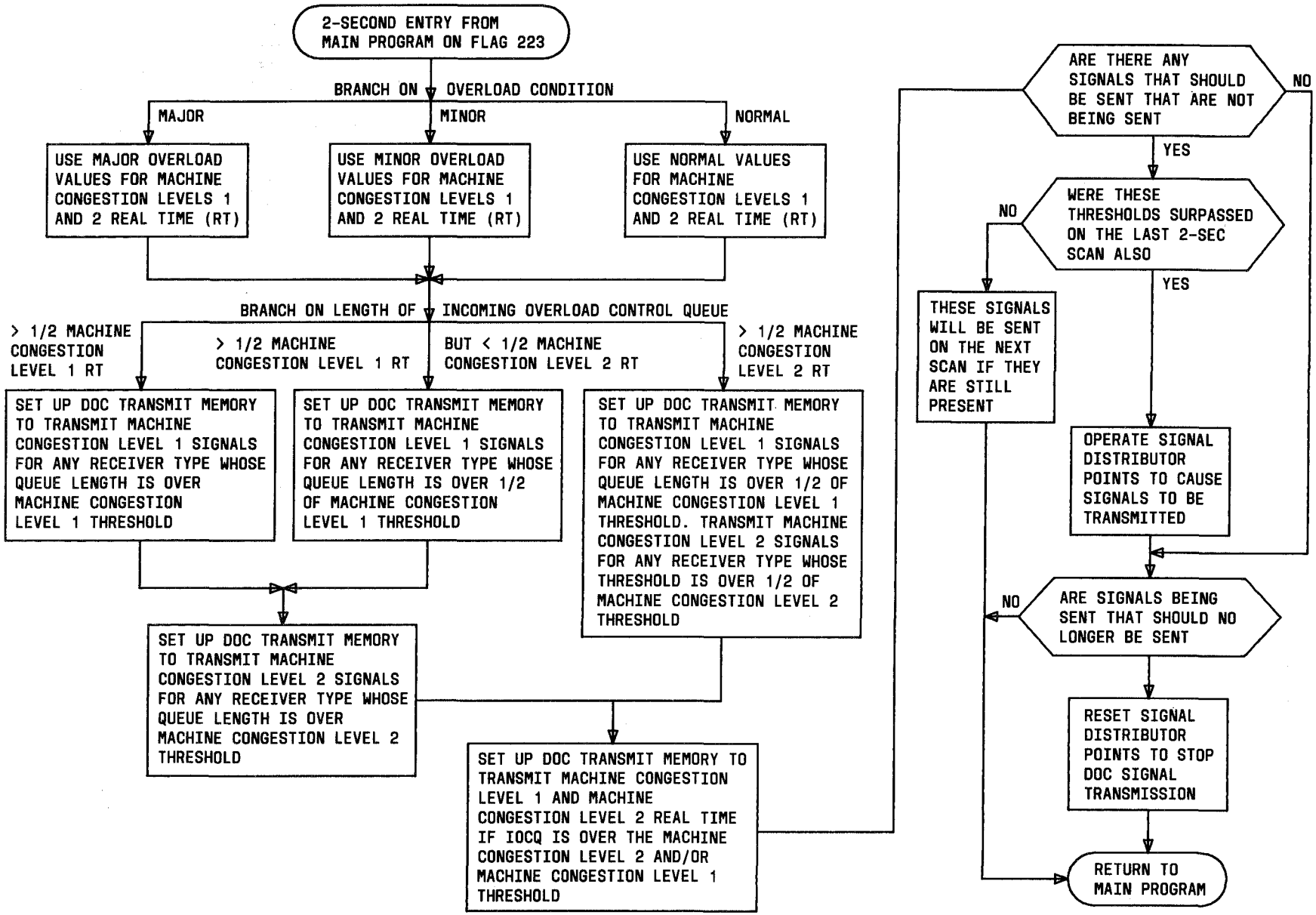


Fig. 2—Calculation of DOC Transmit Thresholds for Machine Congestion Levels 1 and 2

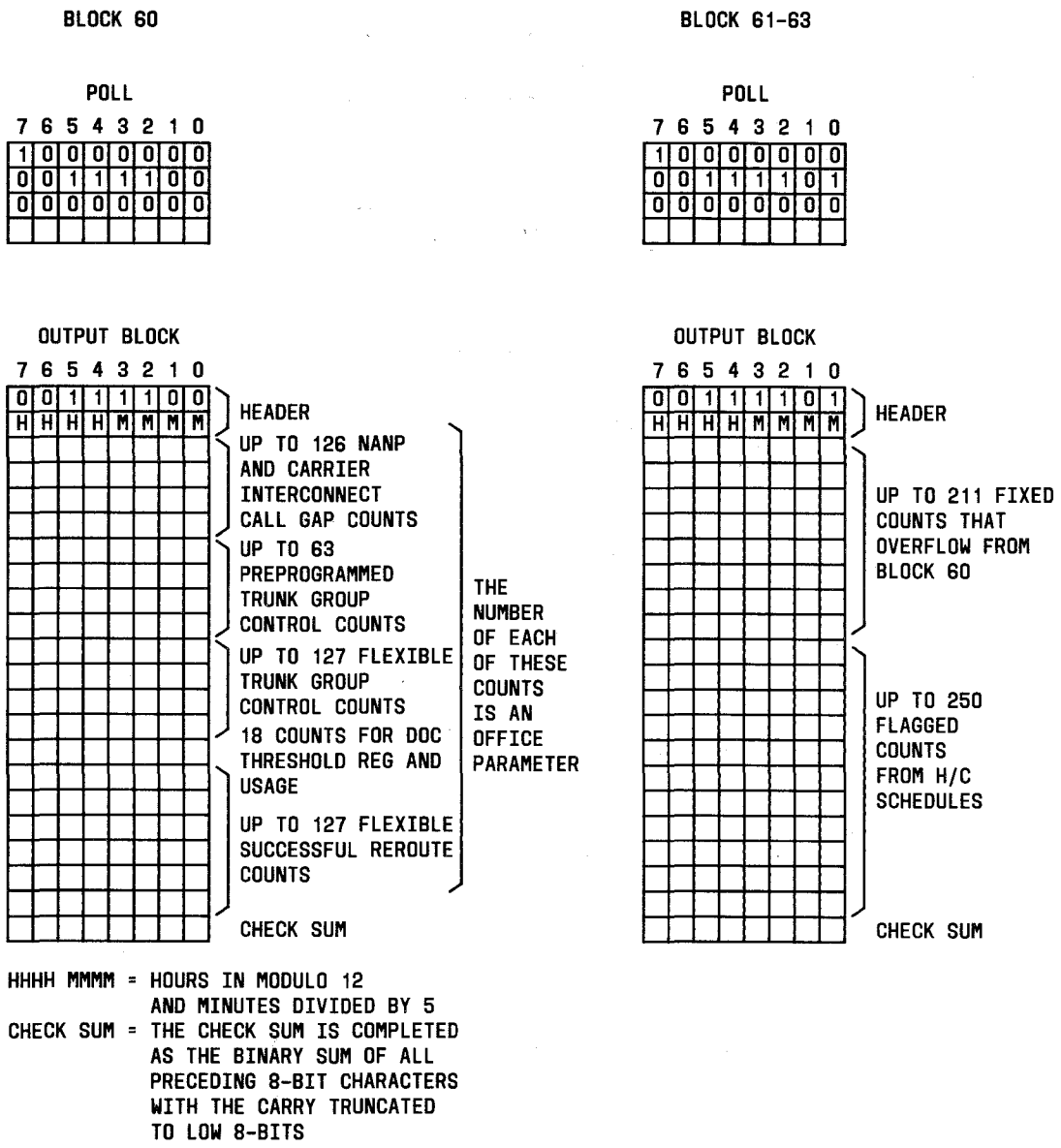
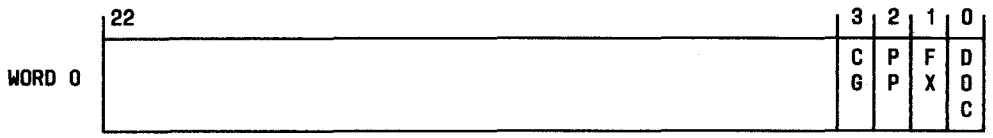


Fig. 3—Organization of Contents of the 5-Minute Traffic Blocks



NOTE:
1. When the bit is set to = 0, no counts are sent to EADAS/NM. If the bit is set to = 1, successful counts are sent to EADAS/NM.

LEGEND:

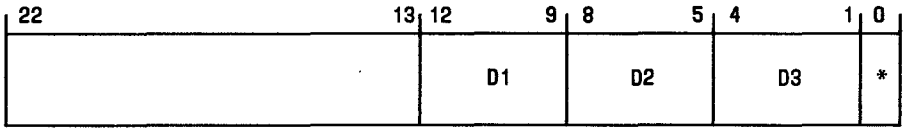
CG - COUNTS FOR CALL GAPPING CONTROLS

DOC - COUNTS FOR DYNAMIC OVERLOAD CONTROL SIGNALS

FX - COUNTS FOR FLEXIBLE TGCs

PP - COUNTS FOR PREPROGRAMMED CONTROLS.

Fig. 4—Office Options Table—Word O



* CALL GAPPING (CG)/CLID

LEGEND:

D1, D2, D3 - BINARY CODED DECIMAL DIGITS WITH 0 STORED AS 10. THEY ARE THE HOME NPA FOR THIS 3-DIGIT TRANSLATOR.

CG/CLID - EQUAL TO 1 IF TRAFFIC USING THIS 3-DIGIT TRANSLATOR MAY BE AFFECTED BY NETWORK MANAGEMENT CALL GAPPING AND CALLING LINE IDENTIFICATION.

Fig. 5—Three-Digit Index-to-NPA Translator PTW

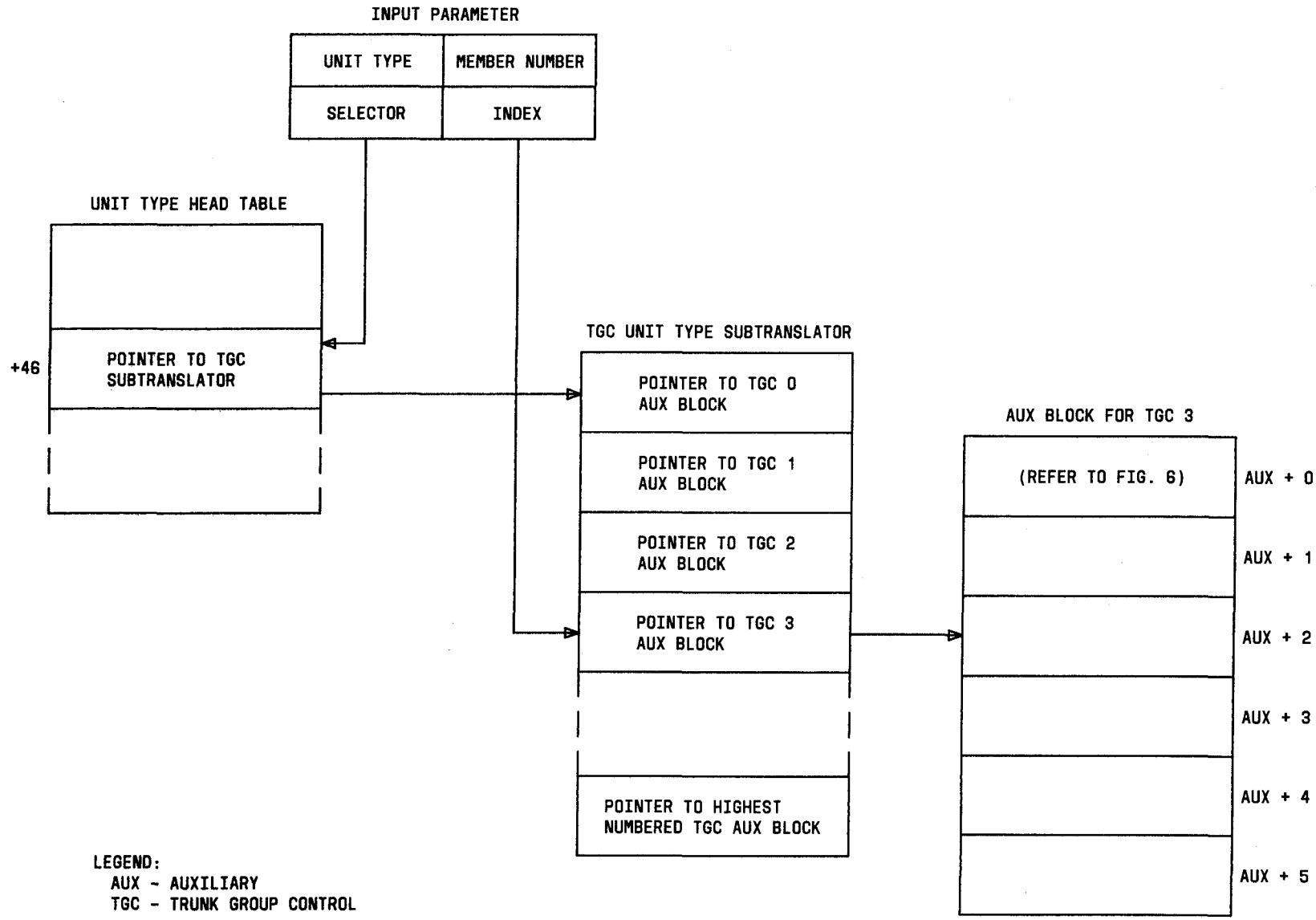
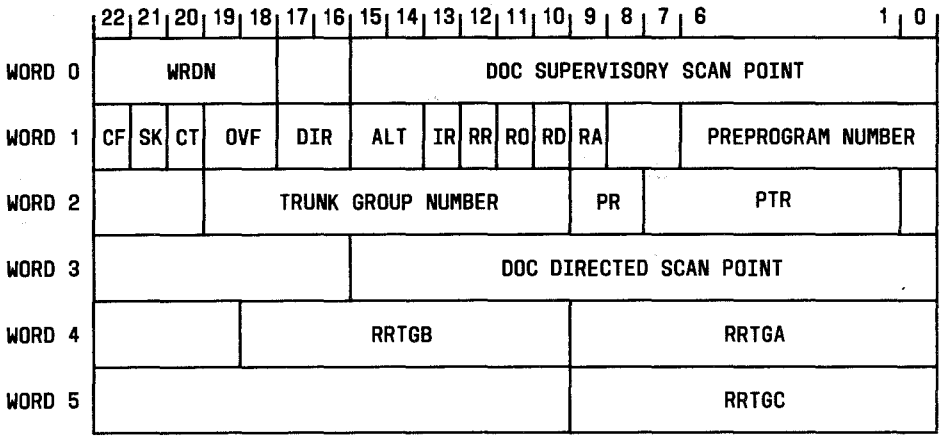
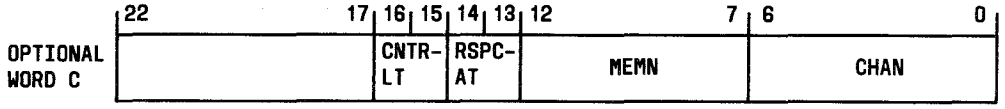


Fig. 6—Layout of TGC Unit Type Translator (Unit Type 46)



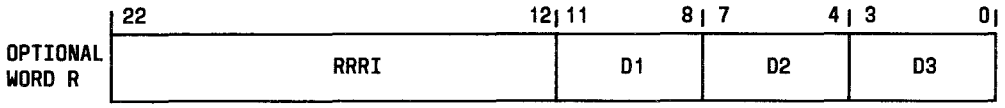
LEGEND:
- WRDN – WORD NUMBER = 4, 5, OR 6
- ALT – PERCENTAGE OF ALTERNATE ATTEMPTS
- DIR – PERCENTAGE OF DIRECT ATTEMPTS
- OVF – PERCENTAGE OF OVERFLOW ATTEMPTS
- CT – CANCEL-TO INDICATOR
- SK – SKIP INDICATOR
- CF – CANCEL FROM INDICATOR
- RA – USED WITH ALT TO INDICATE PERCENT OF ALTERNATE ROUTED TRAFFIC TO REROUTE
- RD – USED WITH DIR TO INDICATE PERCENT OF DIRECT ROUTED TRAFFIC TO REROUTE
- RO – USED WITH OVF TO INDICATE PERCENT OF OVERFLOW TRAFFIC TO REROUTE
- RR – REGULAR REROUTE
- IR – IMMEDIATE REROUTE
- PR – PRIORITY EQUAL TO MACHINE CONGESTION LEVEL BINARY CONVERSION
- PTR – INDEXES 2-WORD CALL STORE IN N2TGPP – TRUNK GROUP CONTROL/ ACTIVITY BLOCK
- RRTGA – REROUTE TRUNK GROUP A. USED AS TO TRUNK GROUPS (TTG) IN REROUTE CONTROL.
- RRTGB – REROUTE TRUNK GROUP B. USED AS TO TRUNK GROUPS (TTG) IN REROUTE CONTROL.
- RRTGC – REROUTE TRUNK GROUP C. USED AS TO TRUNK GROUPS (TTG) IN REROUTE CONTROL.

Fig. 7—TGC Unit Type 46 Auxiliary Block



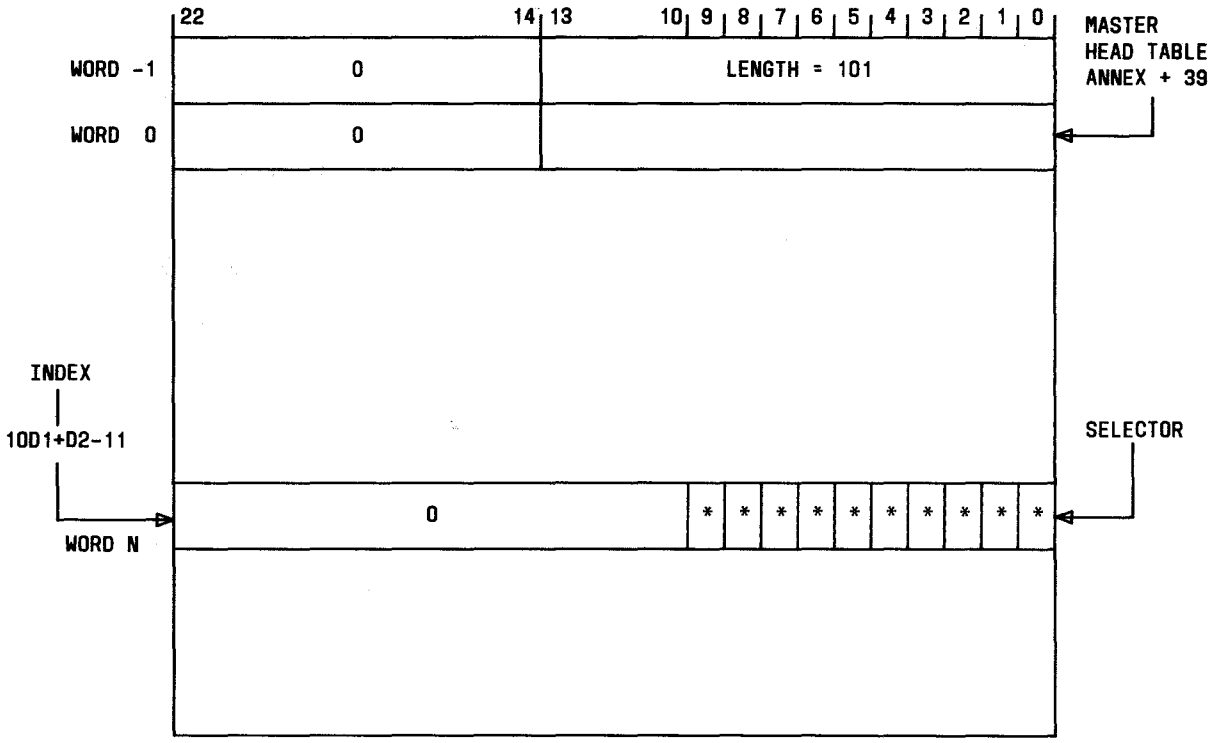
LEGEND:
RSPCAT - RESPONSE CATEGORY
CNTRLT - CONTROL TYPE
0 = CANCEL-TO (DEFAULT)
1 = SKIP
2 = INVALID
3 = INVALID
MEMN - REMOTE ACCESS FRAME MEMBER NUMBER
CHAN - CHANNEL NUMBER RANGE

Fig. 8—Trunk Group Number Supplementary Auxiliary Block—Optional Word C



LEGEND:
D1, D2, D3 - BINARY CODED DECIMAL DIGITS OF THE NPA THAT THIS TGN TERMINATES IN. D1, D2, AND D3 ARE REQUIRED FOR BOTH "FROM TRUNK GROUPS" AND "TO TRUNK GROUPS"
RRRI - REROUTE ROUTE INDEX POINTING TO THIS TRUNK GROUP AND SPECIFYING NO DIGIT PREFIXING OR DELETING AND A NEXT ROUTE INDEX OF STOP. RRRI IS REQUIRED ONLY FOR "TO TRUNK GROUPS". MUST BE NORMALIZED BEFORE INDEXING OCCURS.

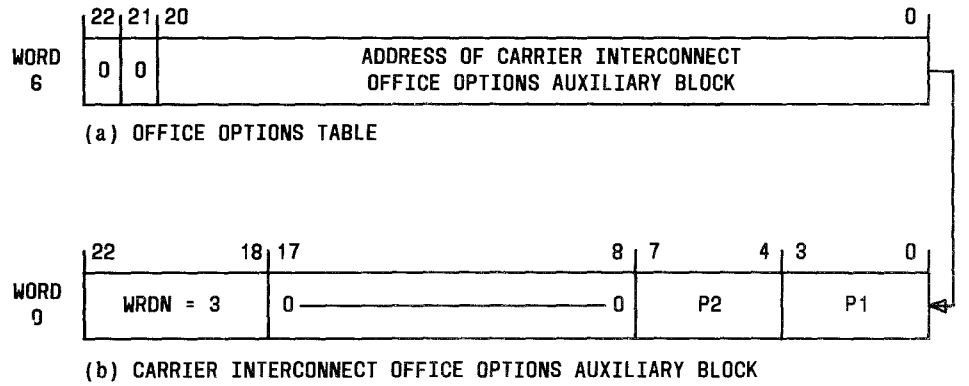
Fig. 9—Trunk Group Number Supplementary Auxiliary Block—Optional Word R



*RRCN

LEGEND:
D1,D2,D3 - THE 3 DIGITS OF THE CODE. THE DIGITS MUST BE NORMALIZED BEFORE INDEXING BECAUSE 0 IS REPRESENTED AS 10.
RRCN - REROUTE CODE NUMBER. THE VALUE OF THE D3-1 ITEM IN THE TABLE IS ONE IF THIS CODE CANNOT BE REROUTED.

Fig. 10—Three-Digit Code Rerouteability Translator



LEGEND:
P1 - SILC BLOCKING PERCENTAGE 1 WHEN OFFICE IS IN MACHINE CONGESTION LEVEL 1 STATE
P2 - SILC BLOCKING PERCENTAGE 2 WHEN OFFICE IS IN MACHINE CONGESTION LEVEL 2 STATE
WRDN - WORD NUMBER = SIZE OF AUXILIARY BLOCK ALWAYS 3.

Fig. 11—Carrier Interconnect Office Options Auxiliary Block

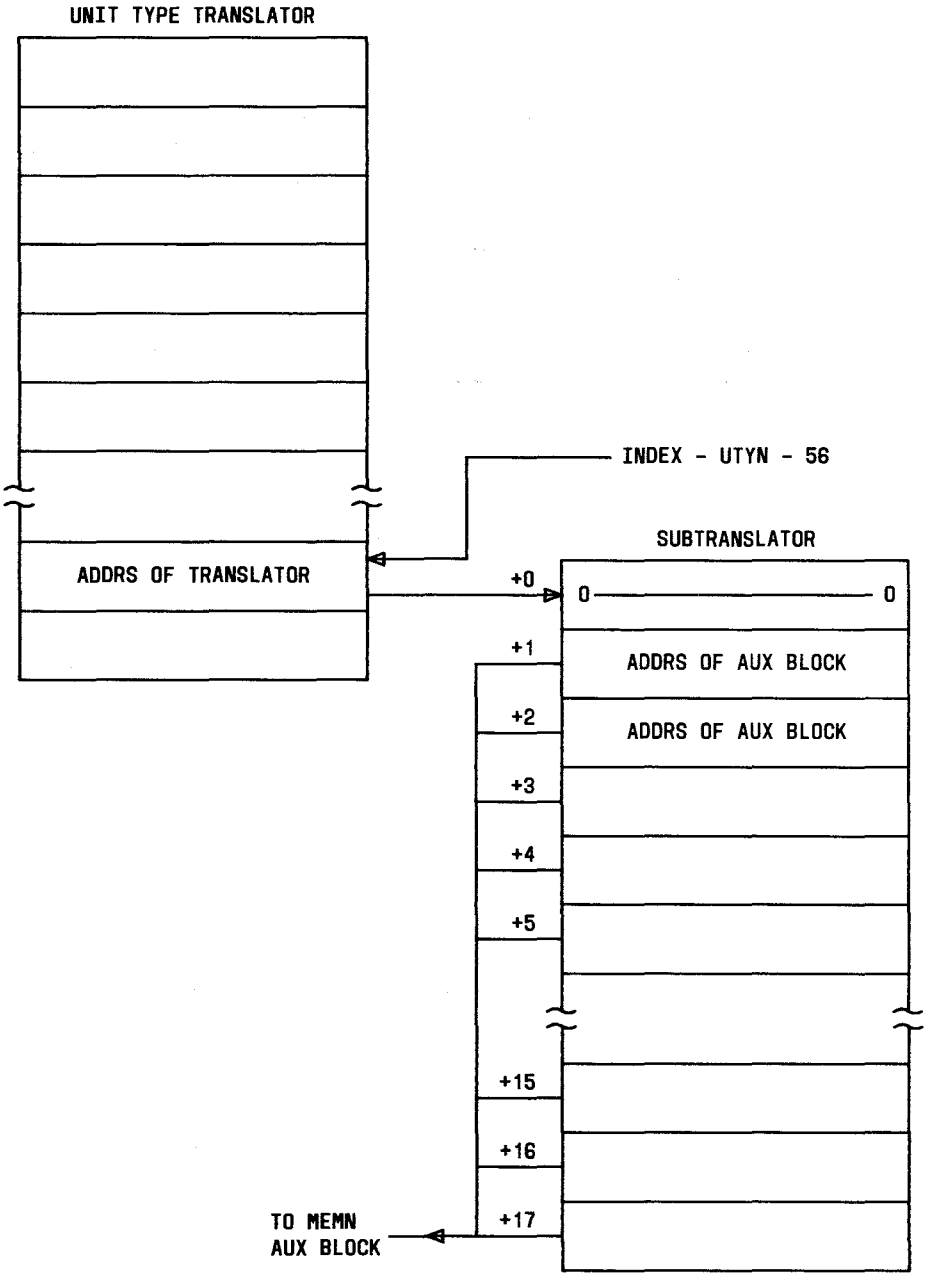
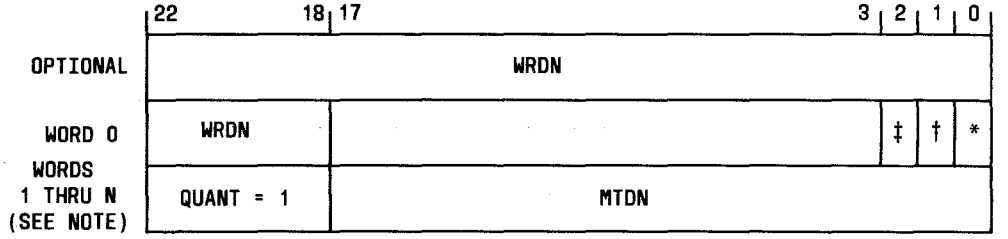


Fig. 12—UTYN Translator—Unit Type 56

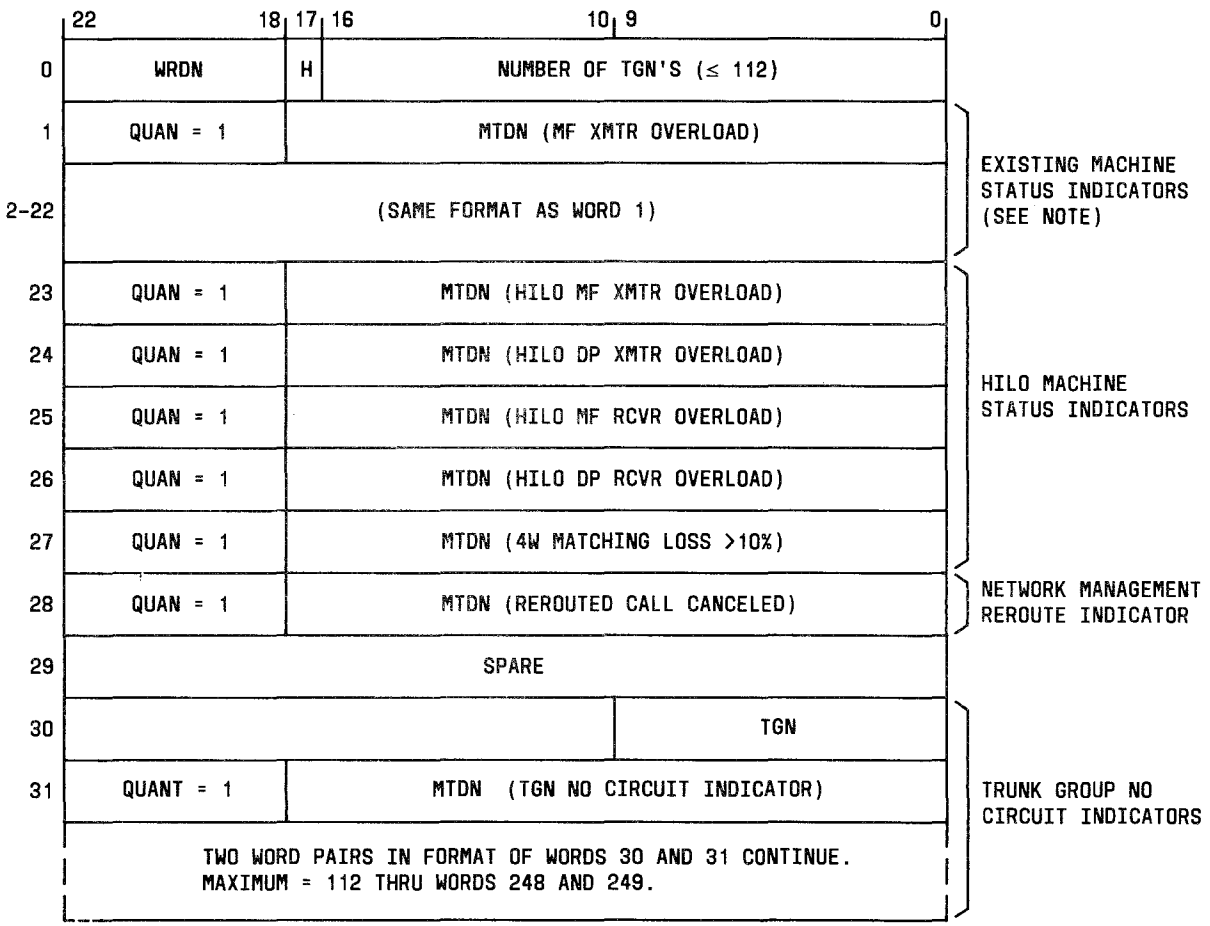


NOTE:
1. N may be 11, 22, or 33 words.

* MF REC
† TDP REC
‡ RP REC

LEGEND:
WRDN - 12 IF RADR IS USED FOR 1 PULSING TYPE, 23 IF USED FOR 2, 33 IF USED FOR 3 PULSING TYPES.
MF REC - MF RECEIVERS, MEMBER NUMBERS 000-010.
TDP REC - TDP RECEIVERS, MEMBER NUMBERS 011-021.
RP REC - RP RECEIVERS, MEMBER NUMBERS 022-032.

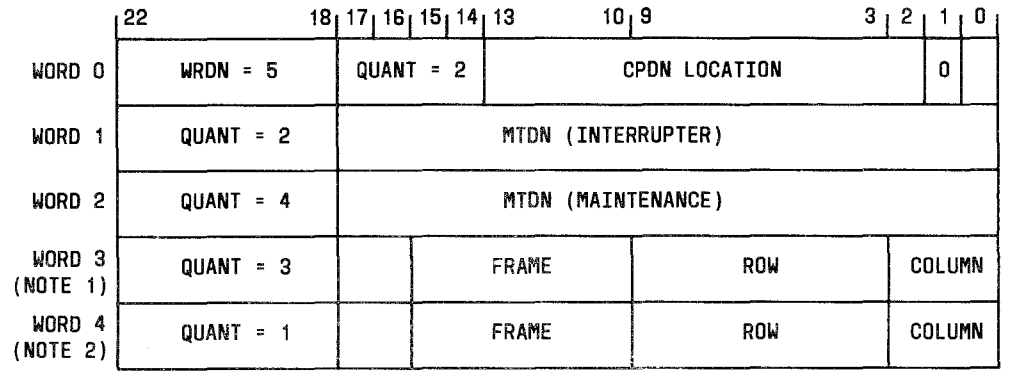
Fig. 13—MEMN 1 Auxiliary Block (RADR)



NOTE:
1. In the 4-wire network, these indicators are machine congestion level 1 for MF and DP receivers and machine congestion level 2 for MF and DP receivers.

LEGEND:
DP - DIAL PULSE
H - 1, IF FORMAT OF THE BLOCK IS AS SHOWN
H - 0, IF THE BLOCK IS IN THE OLD FORMAT
MF - MULTIFREQUENCY
MTDN - MISCELLANEOUS TRUNK SIGNAL DISTRIBUTOR NUMBER
TGN - TRUNK GROUP NUMBER
WRDN - WORD NUMBER.

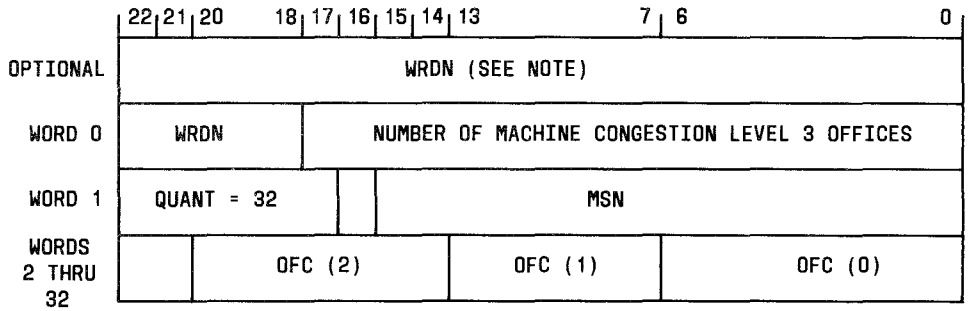
Fig. 14—MEMN 2 Auxiliary Block



NOTE:
1. Bits 0-15 indicate quantity of supervisory master scanner points.
2. Bits 0-15 indicate quantity of directed master scanner points.

LEGEND:
CPDN - CENTRAL PULSE DISTRIBUTOR POINTS USED BY MAINTENANCE PROGRAM
MTDN - MISCELLANEOUS TRUNK DISTRIBUTOR NUMBER.

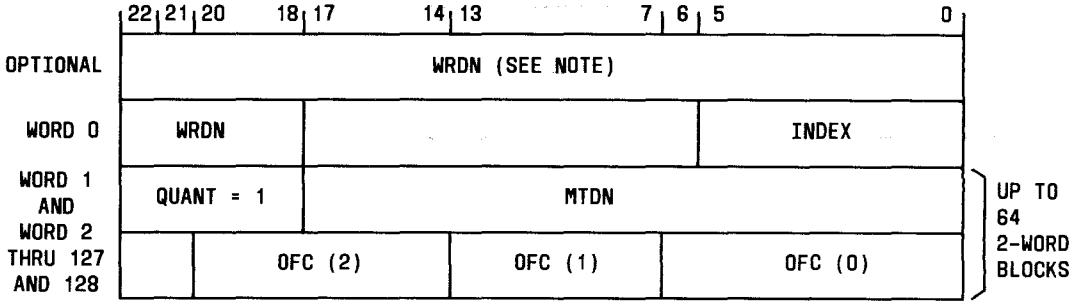
Fig. 15—MEMN 3 Auxiliary Block



NOTE:
1. Number of words in the auxiliary block when the number of office codes to be assigned is greater than 30.

LEGEND:
MSN - MASTER SCANNER NUMBER
OFC (X) - ALPHANUMERIC CHARACTERS TO IDENTIFY OFFICES OR LOOPS
WRDN - $3 \leq \text{WRDN} \leq 34$.

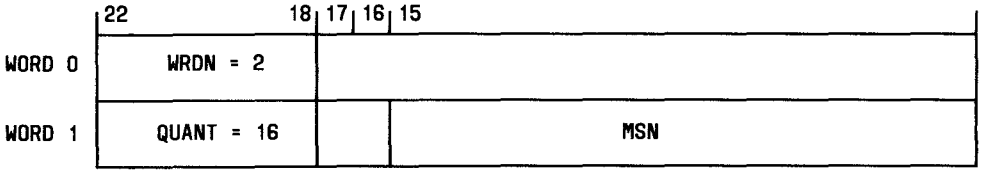
Fig. 16—MEMN 4 Auxiliary Block



NOTE:
1. Number of words in the auxiliary block when the number of office codes to be assigned is greater than 15.

LEGEND:
MTDN - MISCELLANEOUS TRUNK DISTRIBUTOR NUMBER
CFC (X) - ALPHANUMERIC CHARACTERS TO IDENTIFY OFFICES OR LOOPS
WRDN - NUMBER OF WORDS IN AUXILIARY BLOCK ($3 \leq$ WRDN ≤ 65).

Fig. 17—MEMN 5 Auxiliary Block



LEGEND:
MSN - MASTER SCANNER NUMBER

Fig. 18—MEMN 6 Through 9 Auxiliary Block

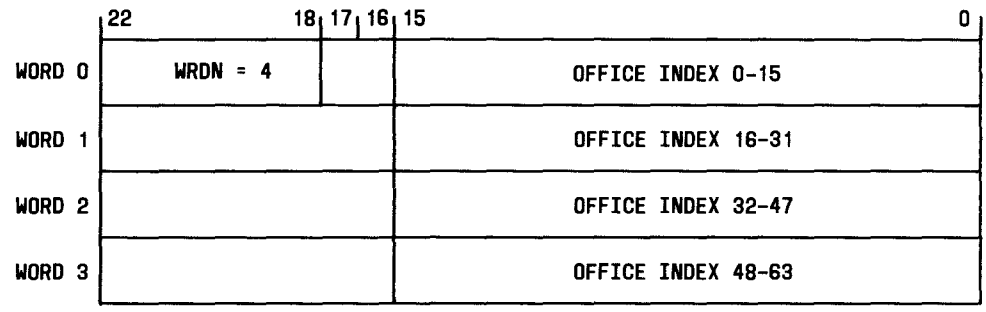
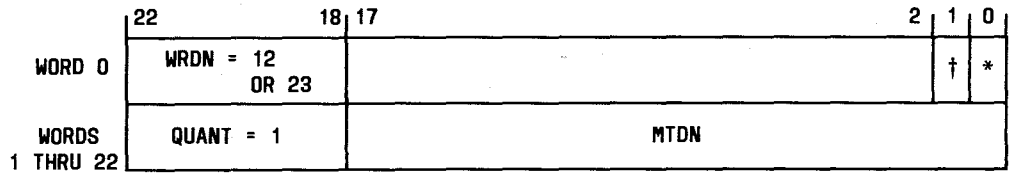


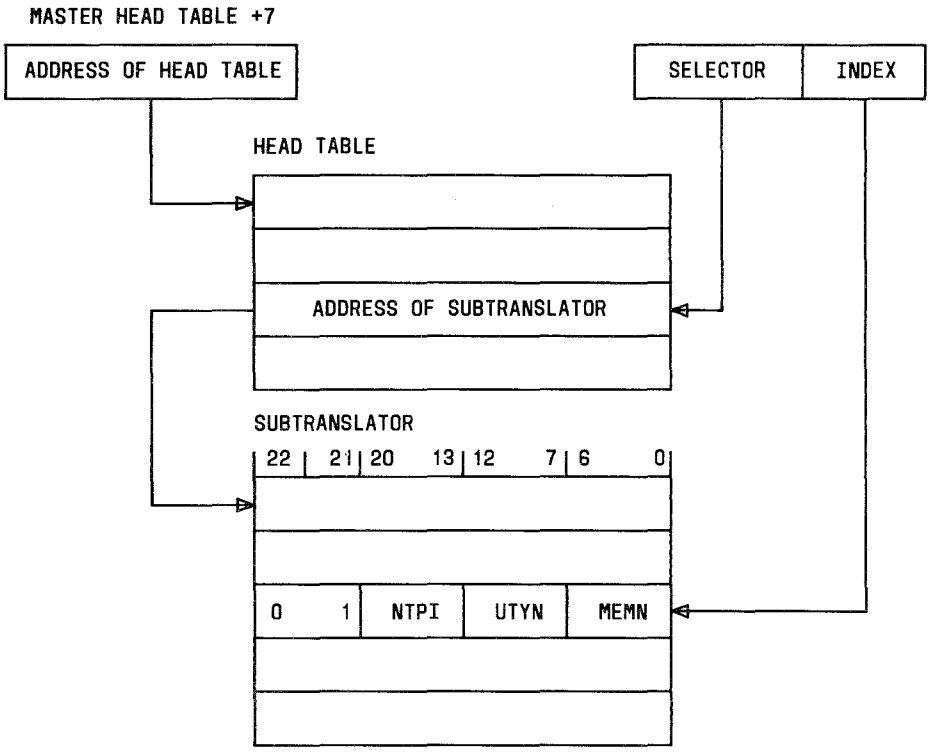
Fig. 19—MEMN 10 Through 17 Auxiliary Block



* MF REC
† TDP REC

LEGEND:
MF REC - MF RECEIVER TYPES FOR NM INDICATORS
TDP REC - TDP RECEIVER TYPES FOR NM INDICATORS
MTDN - MISCELLANEOUS TRUNK DISTRIBUTOR NUMBER

Fig. 20—MEMN 18 Auxiliary Block

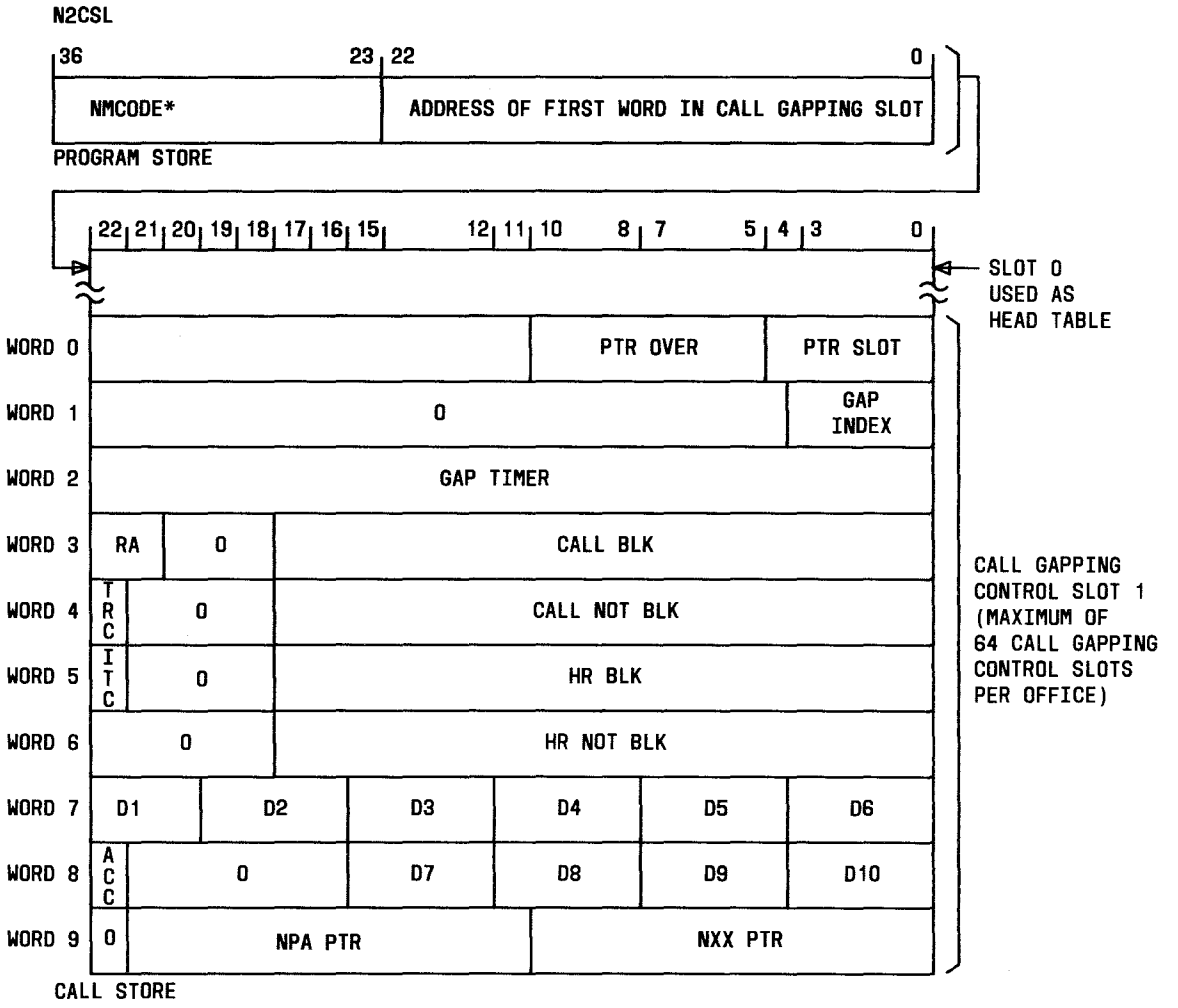


NON-TRUNK PROGRAM INDEXES

UNIT TYPE NO.	SCAN POINT	NTPI	MNEMONIC	REMARKS
46	1 SCAN POINT SC00 MEMBER NUMBER 00	28	DOC	DOC RECEIVE CIRCUIT MEMBER NUMBER 00 ONLY
	1 SUPERVISORY SCAN POINT	57		MEMBER NUMBER 01-63
56	SC00-15	57		DOC TRANSMIT CIRCUIT MEMBERS 6-9
	SC16-47	57		MEMBER 4
	SC48, SC49	57		MEMBER 3
	SC50	57		MEMBER 3
44	SC52	39		DOC TRANSMIT CIRCUIT

LEGEND:
NTPI - NON-TRUNK PROGRAM INDEX
UTYN - UNIT TYPE NUMBER
MEMN - MEMBER NUMBER

Fig. 21—Master Scanner Translator



See footnote on next page.

Fig. 22—Call Gapping Control Slot Layout—N2CSL (Sheet 1 of 2)

Note:
1. See maxtrix below for gap indexes and their respective gap intervals. (Word 1 bits 0 through 3 is where this information is stored).

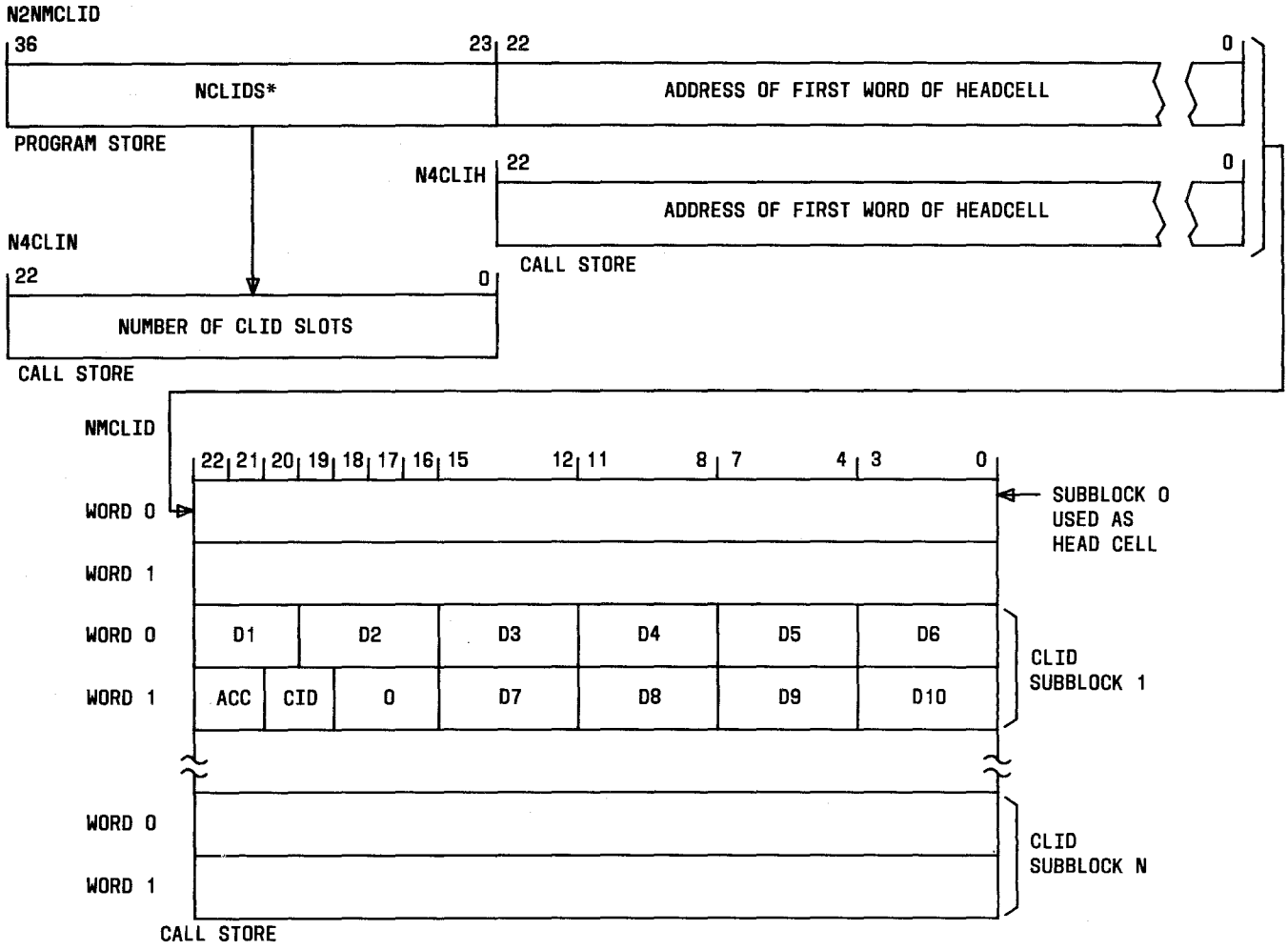
OCTAL EQUIVALENT	GAP INDEX	GAP INTERVAL (IN SECONDS)	MAXIMUM CALLS PER HOUR
0000	0	-	IN = OUT
0001	1	0	IN = OUT
0002	2	.1	36000
0003	3	.3	14400
0004	4	.5	7200
0005	5	1	3600
0006	6	2	1800
0007	7	5	720
0010	8	10	360
0011	9	15	240
0012	10	30	120
0013	11	60	60
0014	12	120	30
0015	13	300	12
0016	14	600	6
0017	15	STOPS ALL CALLS	0

* 10 X (NMCODE+1), THIS FORMULA BUILDS THE NUMBER OF SUBBLOCKS FOR THIS TABLE

LEGEND:

NMCODE - NUMBER OF CALL GAPPING CONTROL SLOTS
PTR OVER - POINTS TO OVERLAPPING CONTROL FOR 10-DIGIT CONTROLS
PTR SLOT - POINTS TO NEXT CONTROL SLOT OF UNIQUE CONTROL ON SAME LEVEL (IE, 10-DIGIT LEVEL, 7-DIGIT LEVEL, OR 10XXX LEVEL)
GAP INDEX - INDEXES A GAP INTERVAL
GAP TIMER - TIME AFTER WHICH NEXT SUBSEQUENT ATTEMPT TO A CONTROLLED CODE DOES PROCEED UNBLOCKED
RA - DISPOSITION CODE FOR BLOCKED CALLS SENT TO RECORDED ANNOUNCEMENT (IE, 1 = NCA, 2 = EA1, 3 = EA2)
CALL BLK - ACCUMULATED COUNT OF CALL ATTEMPTS SUBJECTED TO THIS CONTROL
TRC - INDICATES CONTROL SLOT IS POINTED TO BY TEMPORARY RECENT CHANGES
CALL NOT BLK - COUNT OF CALL ATTEMPTS SUBJECTED TO CALL GAPPING CONTROL WHICH WERE NOT BLOCKED
ITC - INDICATES TYPE OF CONTROL (00 = INVALID, 01 = 10XXX-CARRIER INTERCONNECT, 10 = SEVEN DIGITS, 11 = TEN DIGITS)
HR BLK - 15-MINUTE HOLDING REGISTER FOR COUNT OF CALL ATTEMPTS SUBJECTED TO CALL GAPPING CONTROL
HR NOT BLK - 15-MINUTE HOLDING REGISTER FOR COUNT OF CALL ATTEMPTS SUBJECTED TO CALL GAPPING CONTROL WHICH ARE NOT BLOCKED
D1 - D6 - DIGITS 1 THROUGH 6 OF CALL GAP CONTROLLED CODE (NPA-XXX)
ACC - ACCESS PREFIX DIGIT (00 = NO PREFIX REQUIRED TO RESOLVE CONFLICTING CODES, 01 = PREFIX OF 1, 10 = PREFIX OF 1, 11 = NO PREFIX CONFLICTING DIALING PATTERN EXISTS
D7 - D10 - DIGITS 7 THROUGH 10 OF CALL GAPPING CONTROLLED CODE (IE, DIRECTORY NUMBER)
NPA PTR - POINTS TO CONTROL SLOT WITH CONFLICTING NPA
NXX PTR - POINTS TO CONTROL SLOT WITH CONFLICTING NXX.

Fig. 22—Call Gapping Control Slot Layout—N2CSL (Sheet 2 of 2)



* NCLIDS + 1, THIS FORMULA BUILDS THE NUMBER OF SUBBLOCKS FOR THIS TABLE

LEGEND:

NCLIDS - INDICATES NUMBER OF AVAILABLE CLID ENTRIES

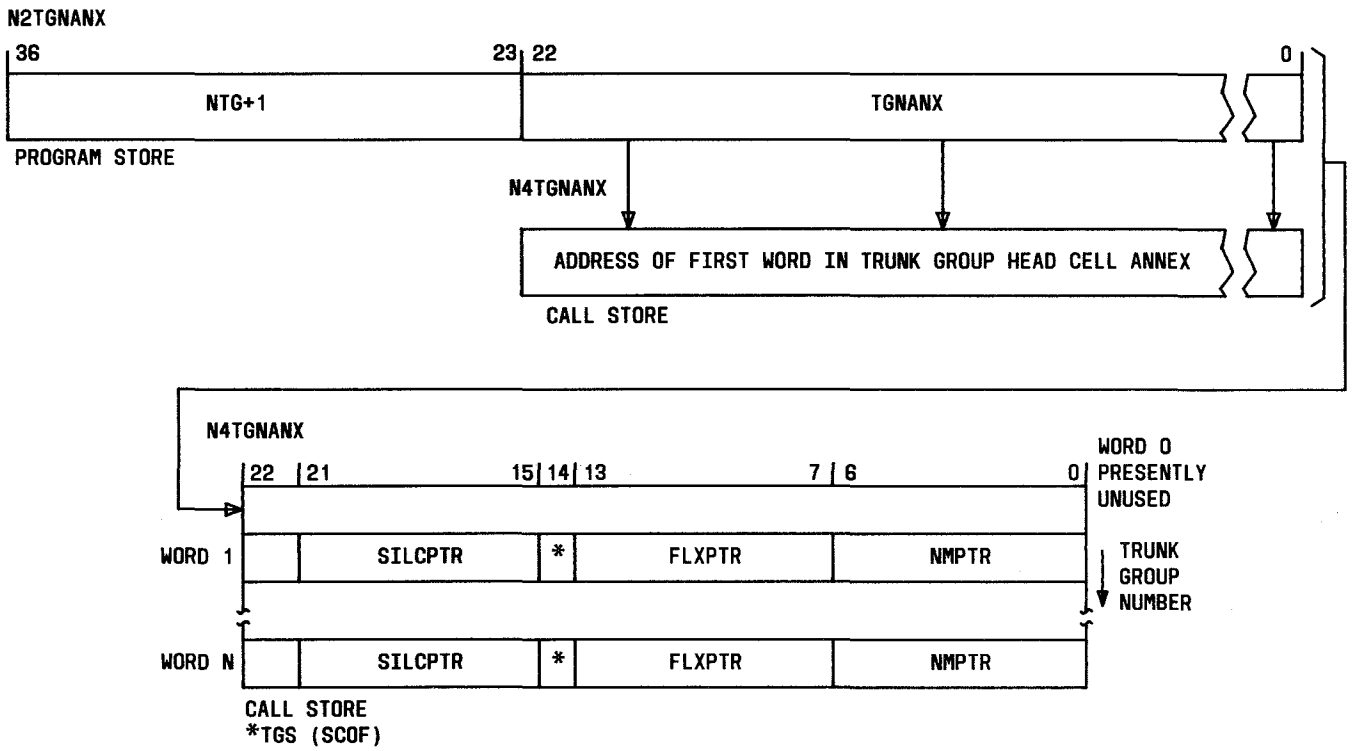
D1 - D6 - NPA (D1-D3); NXX (D4-D6) ALL DIGITS ARE STORED AS BINARY CODED DECIMAL (BCD), ALL ZEROS ARE STORED AS BCD 10.

D7 - D10 - DIRECTORY NUMBER STORED AS BCD

ACC - ACCESS PREFIX (00 - NO PREFIX REQUIRED TO RESOLVE CONFLICTING DIALING PATTERN; 01 - PREFIX + 1; 10 - PREFIX + 0; 11 - NO PREFIX REQUIRED BUT CONFLICT EXISTS)

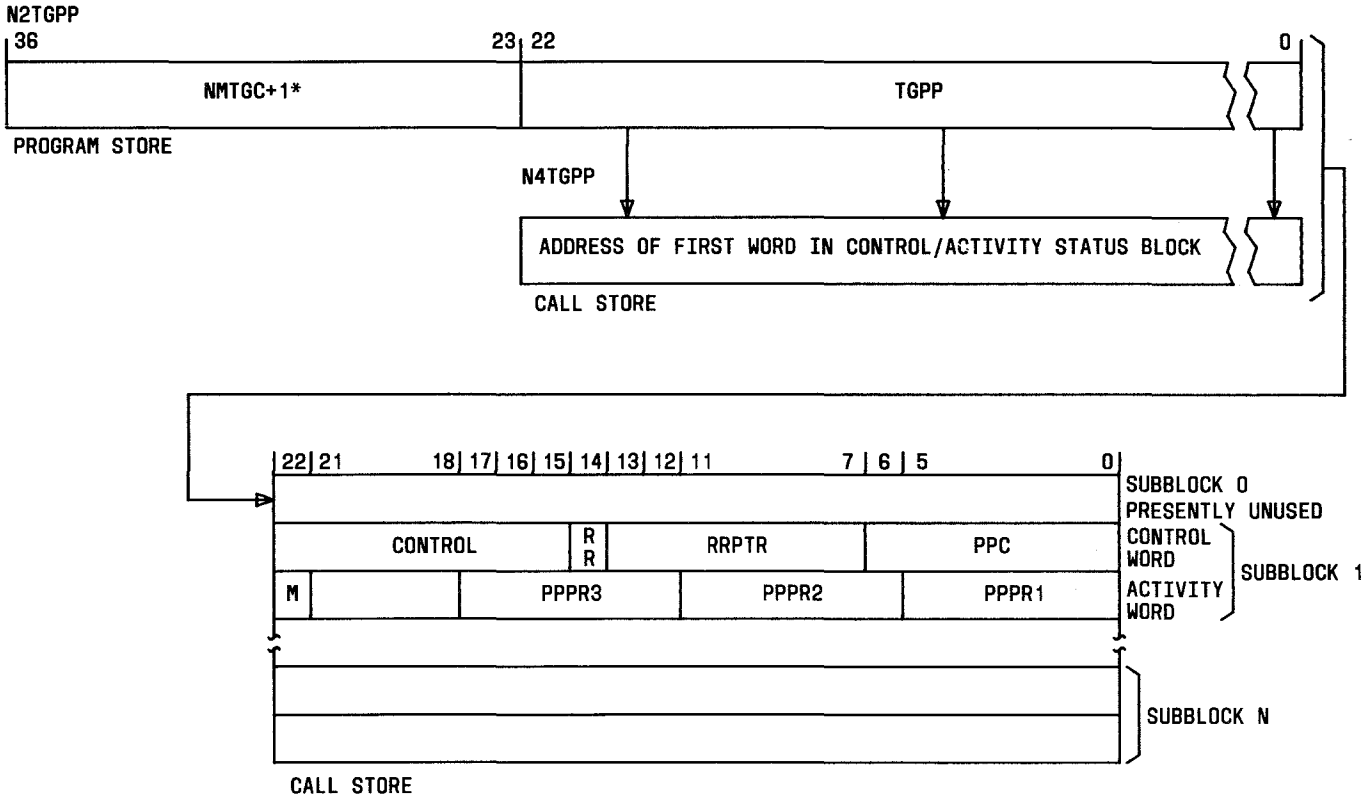
CID - CALL INDICATOR (11 - TEN DIGITS, TEMPORARY RECENT CHANGE AGAINST NPA; 10 - SEVEN DIGITS, TEMPORARY RECENT CHANGE AGAINST NXX)

Fig. 23—CLID Control Slot Layout



LEGEND:
NMPTR - 0 IF PREPROGRAM NOT DEFINED FOR THIS TRUNK GROUP OR IF PREPROGRAM NOT ACTIVE FOR THIS TRUNK GROUP
FLXPTR - 0 IF FLEXIBLE CONTROL NOT ACTIVE FOR THIS TRUNK GROUP
NTG - SET CARD EQUAL TO NUMBER OF TRUNK GROUPS IN THE OFFICE
TGNANX - ADDRESS OF FIRST WORD IN TRUNK GROUP HEAD CELL ANNEX
TGS - 0 IF SELECTIVE CONTROL OF FACILITIES (SCOF) FEATURE IS NOT ACTIVE FOR THIS TRUNK GROUP
SILCPTR - SILC POINTER, 0 IF SILC NOT ASSIGNED TO THIS TRUNK GROUP

Fig. 24—Trunk Group Head Cell Annex Layout and Parameter Word N2TGNANX



*2 X (NMTGC+1), THIS FORMULA BUILDS THE NUMBER OF SUBBLOCKS FOR THIS TABLE

LEGEND:
- CONTROL - TGC OPTION AND PERCENTAGE OF CONTROL
- M - 1 IF TG IS CONTROLLED MANUALLY BY A PREPROGRAM; 0 OTHERWISE
- NMTGC - SET CARD EQUAL TO THE NUMBER OF TRUNK GROUPS WHICH MAY BE MANAGED VIA TRUNK GROUP CONTROLS
- PPC - CONTROLLING PREPROGRAM (PP) NUMBER FOR THIS TRUNK GROUP
- PPPR'X' - 0 IF AUTOMATIC PREPROGRAM OF PRIORITY 'X' IS NOT ACTIVE; PP NUMBER OF AUTOMATIC PREPROGRAM OF 'X' IS ACTIVE (ACTIVE WHEN RECEIVING AUTOMATIC SELECTIVE DYNAMIC OVERLOAD CONTROL [DOC] SIGNAL)
- RR - REROUTE INDICATOR
- RRPTR - INDEX NUMBER OF REROUTE CONTROL SLOT USED FOR THIS REROUTE
- TGPP - ADDRESS OF FIRST WORD IN TRUNK GROUP CONTROL/ACTIVITY BLOCK.

Fig. 25—Trunk Group Control/Activity Block Layout and Parameter Word N2TGPP

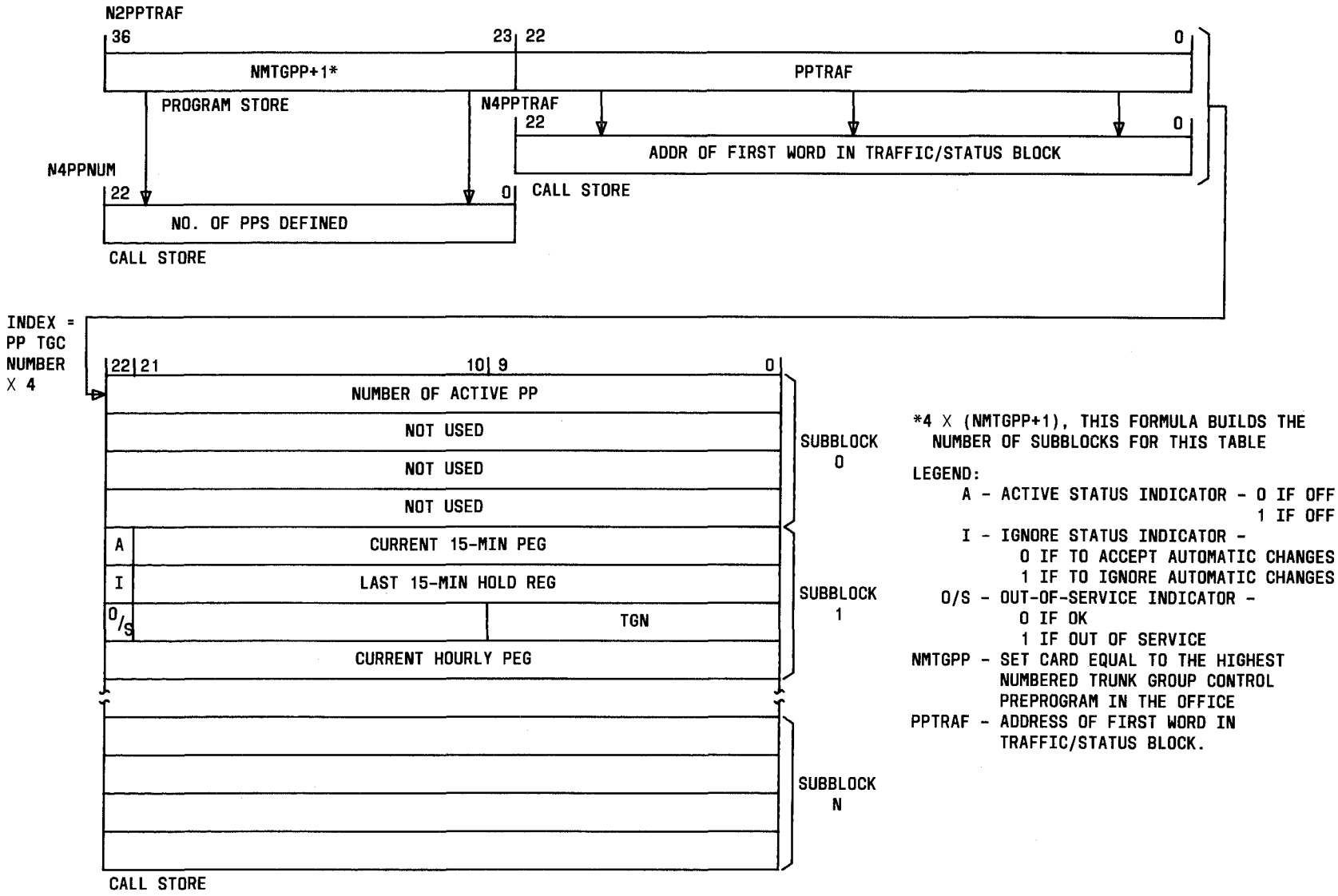
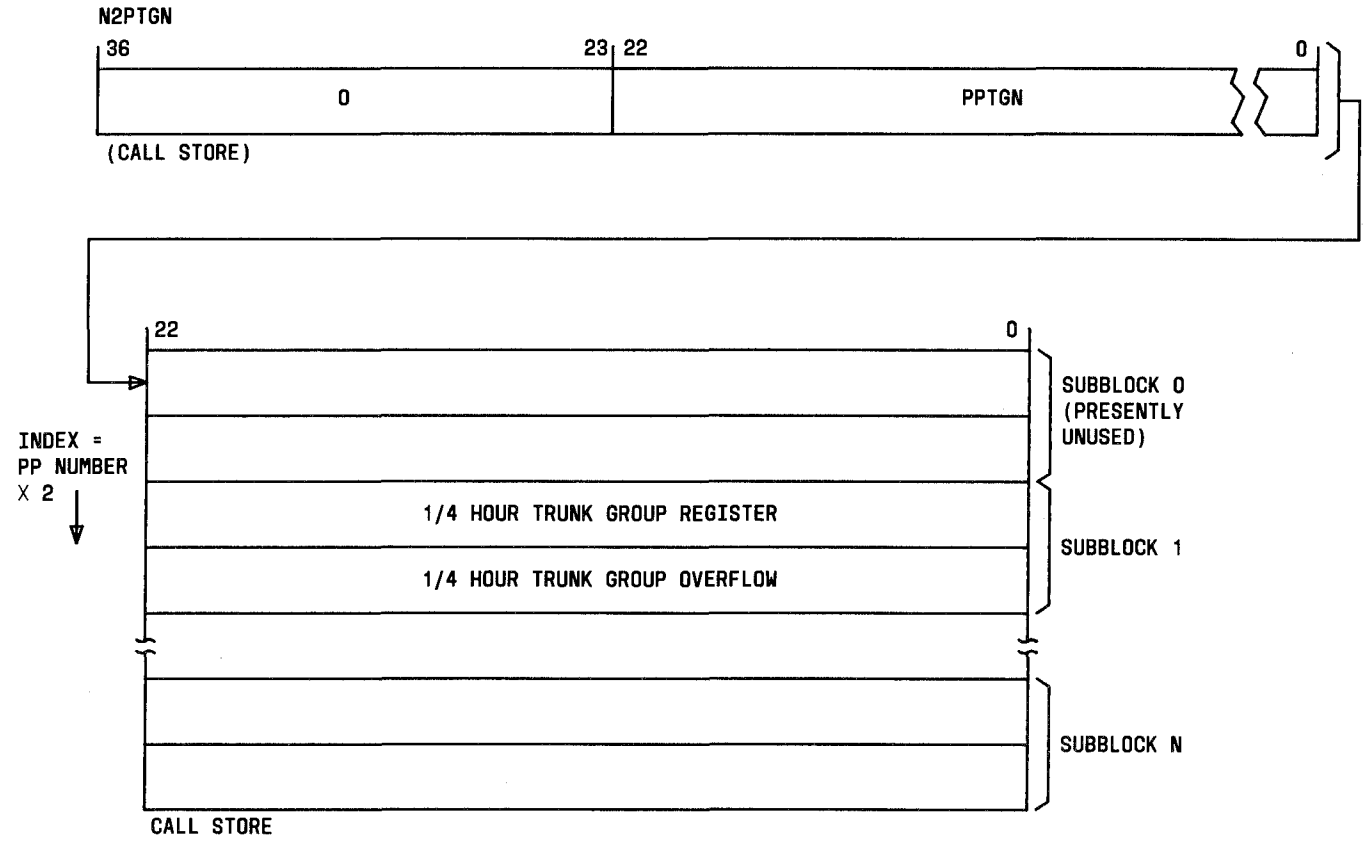
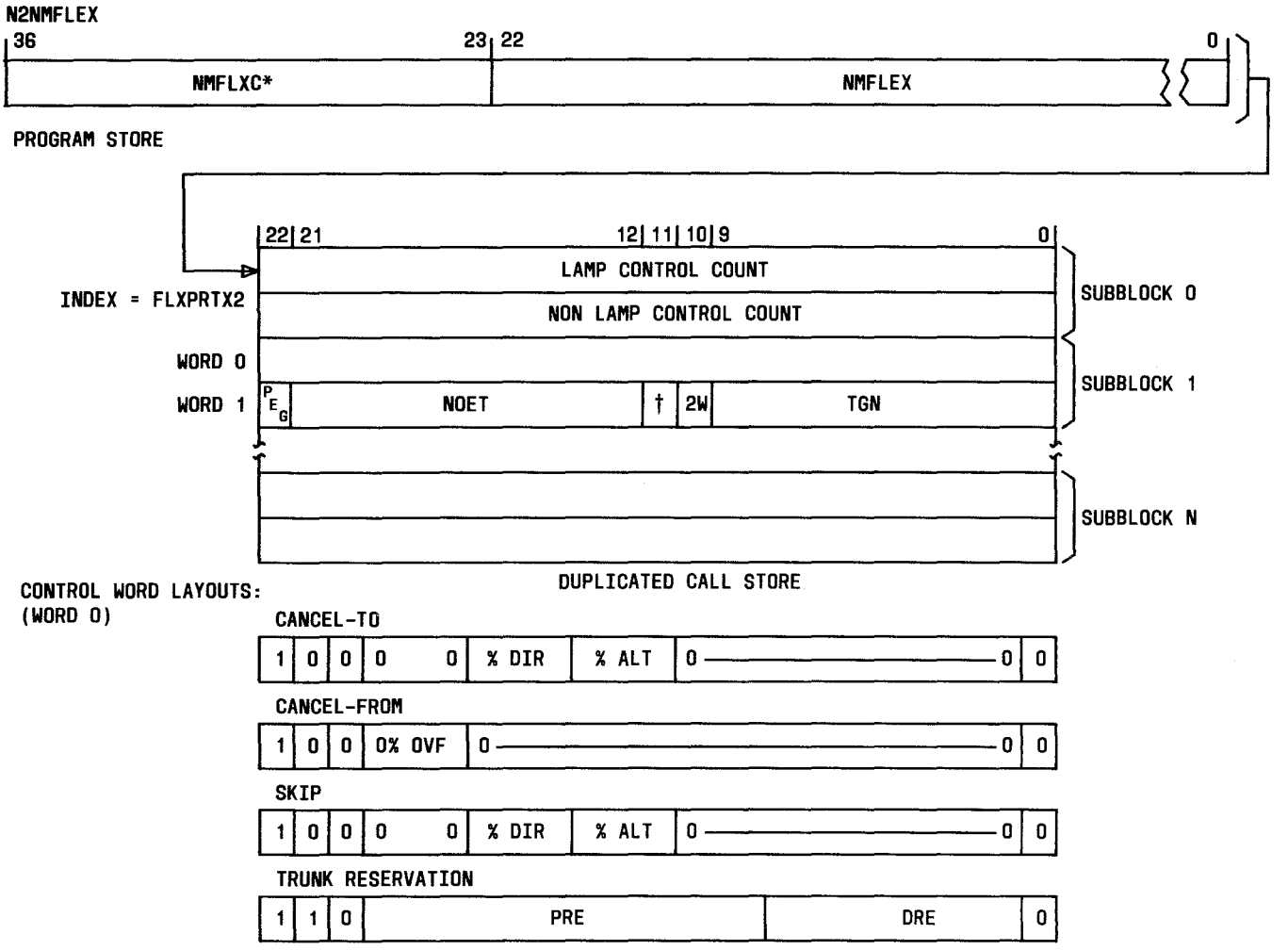


Fig. 26—Trunk Group Control Status and Traffic Block Layout and Parameter Word N2PPTRAF



LEGEND:
PPTGN – ADDRESS OF THE FIRST WORD IN THE PREPROGRAM TRAFFIC ANNEX BLOCK.

Fig. 27—Preprogram Traffic Annex Block Layout and Parameter Word N2PPTGN



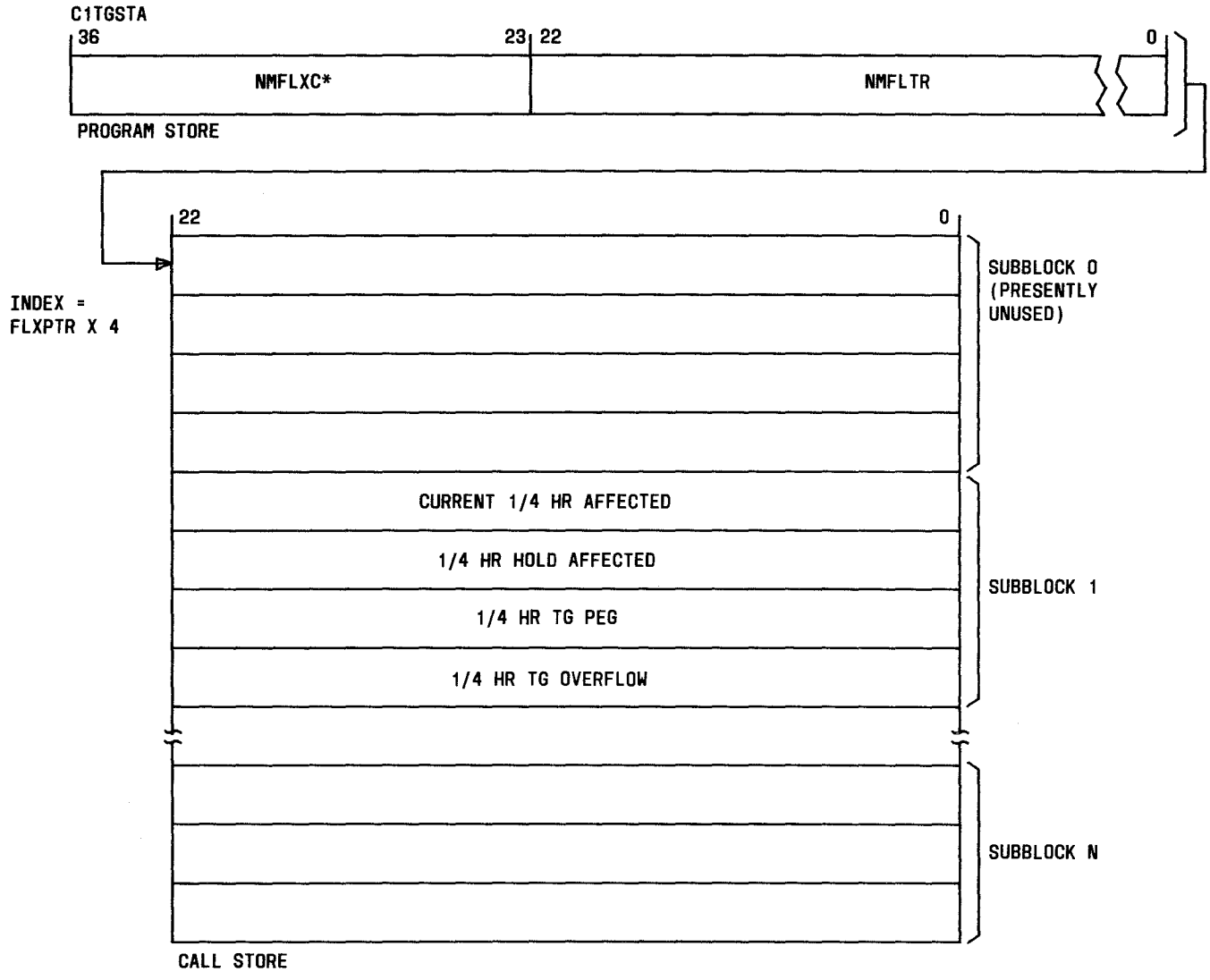
NOTE:
1. SEE MATRIX TO DETERMINE CONTROL PERCENTAGE AND ASSOCIATED BIT CODE FOR DIRECT-ROUTED, ALTERNATE-ROUTED, OR OVERFLOW TRAFFIC.

* 2 X (NMFLXC+1), THIS FORMULA BUILDS THE NUMBER OF SUBBLOCKS FOR THIS TABLE
† MANUAL/AUTOMATIC INDICATOR; 0 = MANUAL, 1 = AUTOMATIC

LEGEND:
% DIR - % DIRECT-ROUTED TRAFFIC TO BE CONTROLLED
% ALT - % ALTERNATE-ROUTED TRAFFIC TO BE CONTROLLED
% OVF - % OVERFLOW TRAFFIC TO BE CONTROLLED
D - DISPOSITION OF AFFECTED CALLS
PRE,DRE - THRESHOLDS
NMFLXC - SET CARD THAT PROVIDES THE QUANTITY OF FLEXIBLE TRUNK GROUP CONTROL SLOTS
NMFLEX - ADDRESS OF FIRST WORD IN FLEXIBLE CONTROL SLOTS BLOCK
NOET - NUMBER OF EQUIPPED TRUNKS (USED ONLY ON) TR-ACT INPUT MESSAGE)

BIT CODE	PERCENT
00	0
10	50
11	75
01	100

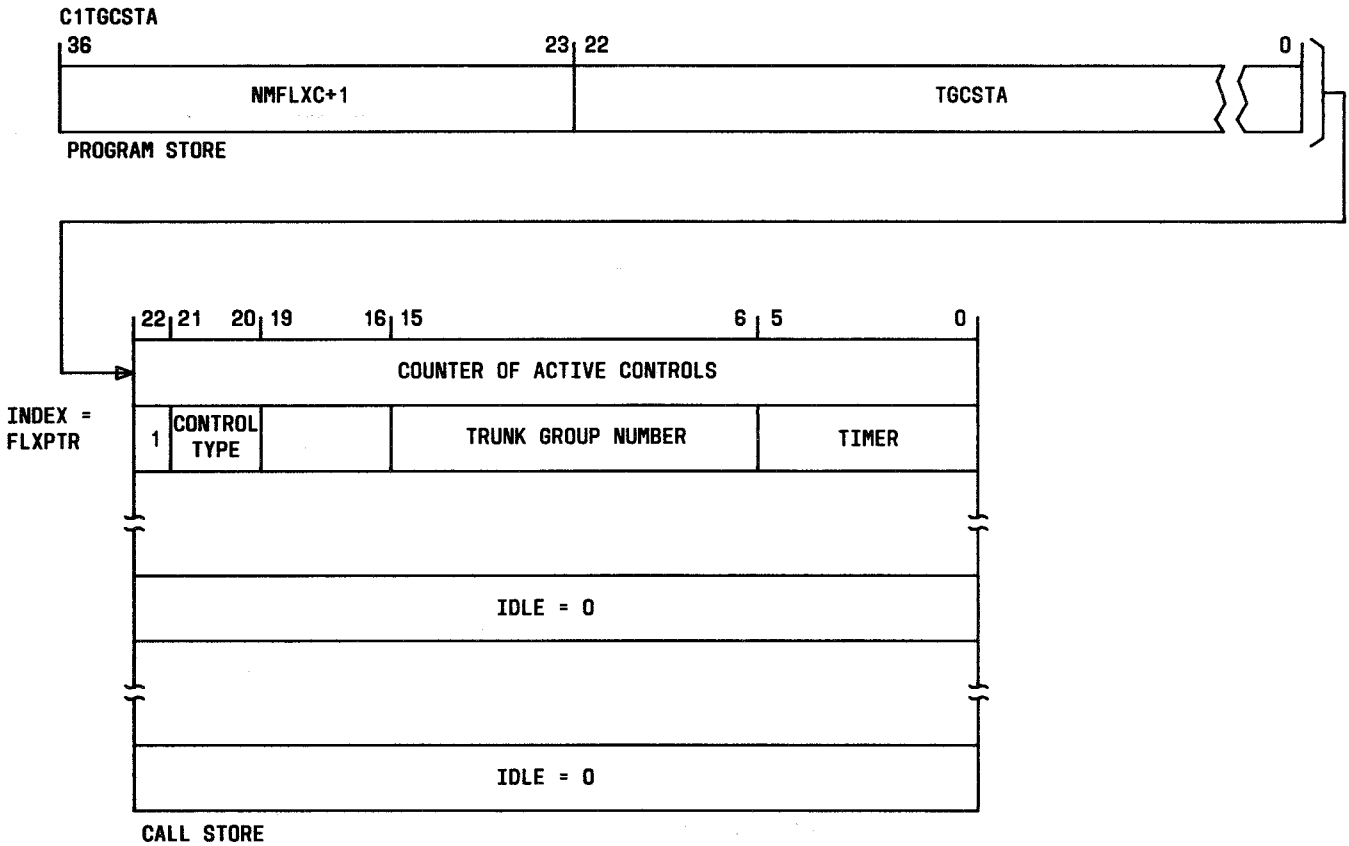
Fig. 28—Flexible Trunk Group Control Block Layout and Parameter Word N2NMFLEX



* 4 X (NMFLXC+1), THIS FORMULA BUILDS THE NUMBER OF SUBBLOCKS FOR THIS TABLE

LEGEND:
NMFLTR - ADDRESS OF FIRST WORD IN FLEXIBLE TRAFFIC BLOCK
NMFLXC - SET CARD PROVIDING THE QUANTITY OF FLEXIBLE TRUNK GROUP CONTROL SLOTS

Fig. 29—Flexible Trunk Annex Block Layout and Parameter Word N2NMFLTR



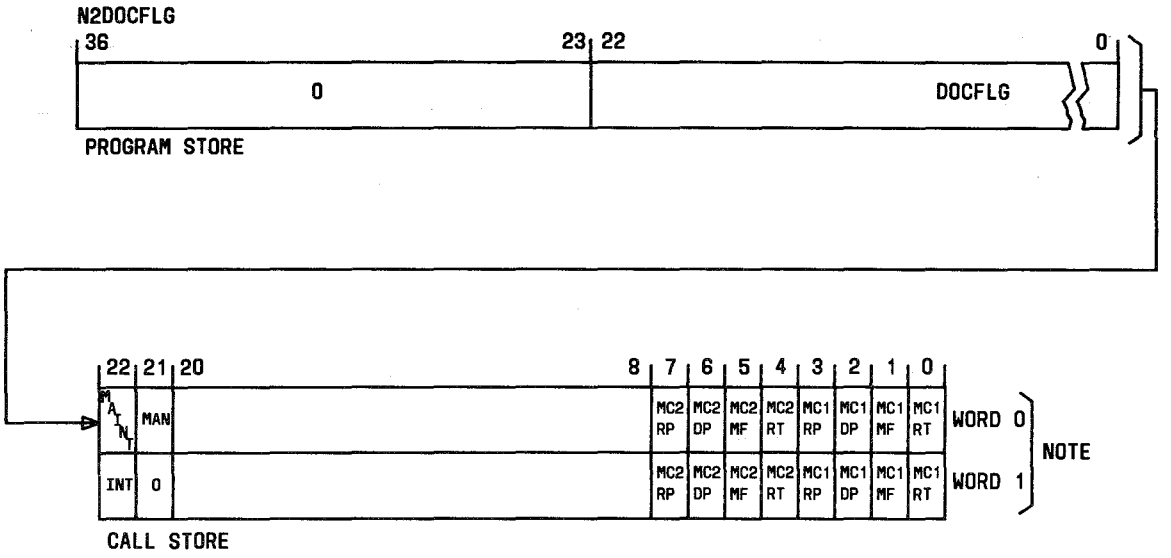
LEGEND:

NMFLXC – SET CARD PROVIDING THE QUANTITY OF FLEXIBLE TRUNK GROUP CONTROL SLOTS

TGCSTA – ADDRESS OF FIRST WORD IN CCIS TRUNK GROUP CONTROL STATUS BLOCK

CONTROL TYPE – 000-NONE
001-DOC LEVEL 1
010-DOC LEVEL 2
011-GROUP SIGNAL CONGESTION
100-DOC LEVEL 3
101-UNASSIGNED
110-UNASSIGNED
111-UNASSIGNED.

Fig. 30—CCIS Trunk Group Control Status Block



NOTE:
1. Bits 7-0:
   Word 0 is flag word
   Word 1 is flag word
   1 - Sending for this reason
   0 - Not sending for this reason.

LEGEND:
MAINT - DOC TRANSMIT CIRCUIT MAINTENANCE BIT
MAN - MANUAL STATE CHANGE BIT
INT - INTERRUPTER RUNNING
DOCFLG - ADDRESS OF FIRST WORD IN 2-WORD FLAG/STATE COMPLETE BLOCK
MC"X" - MACHINE CONGESTION LEVEL FOR THE "ESS" SWITCH

Fig. 31—Flag/State Couplet

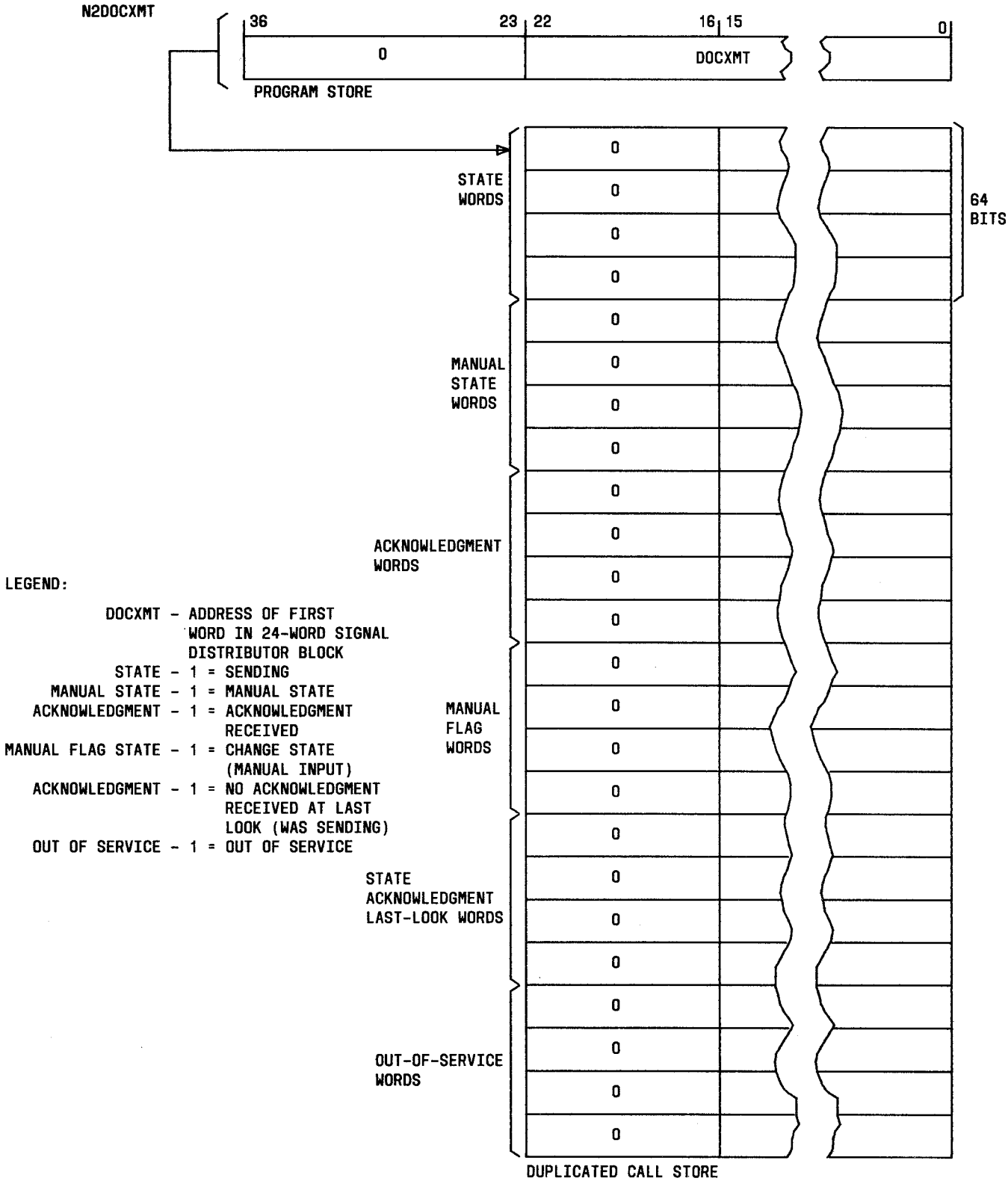
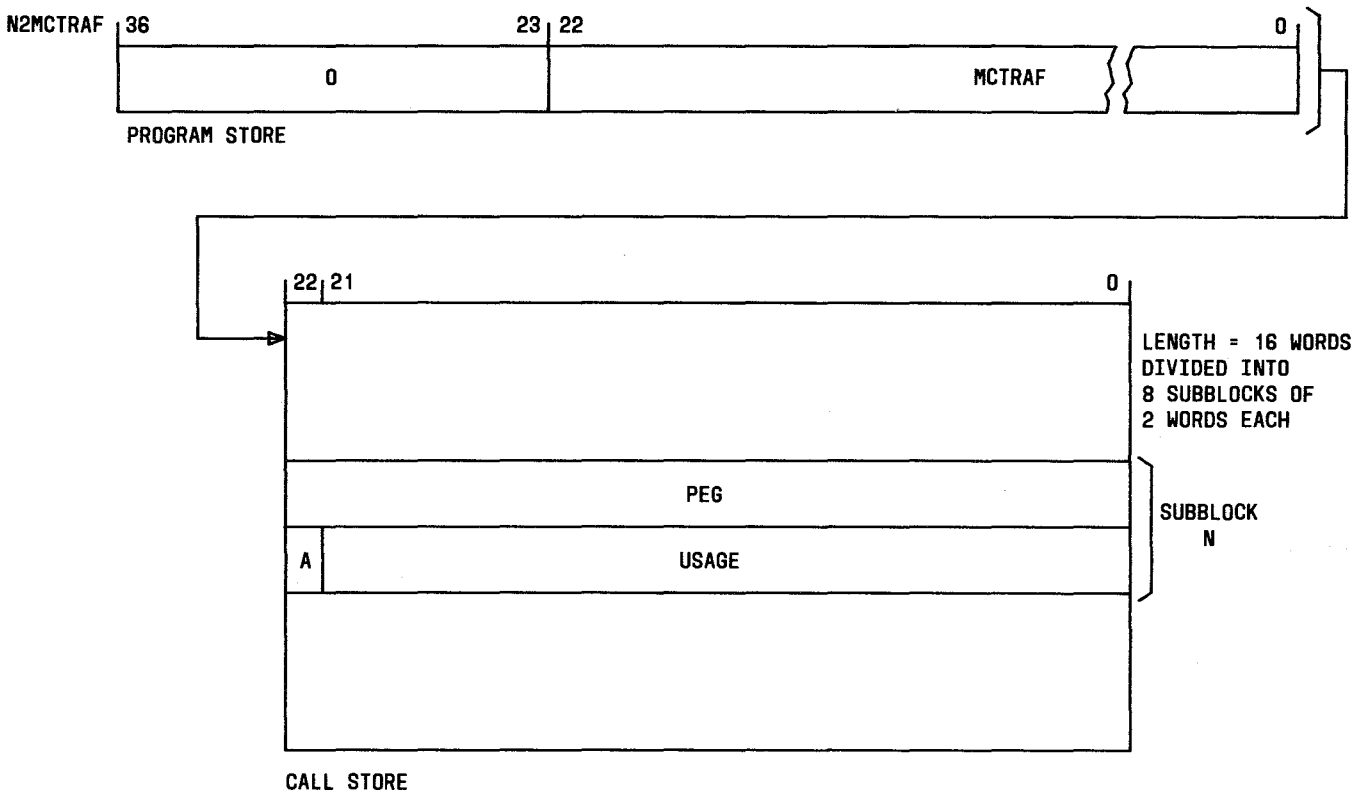


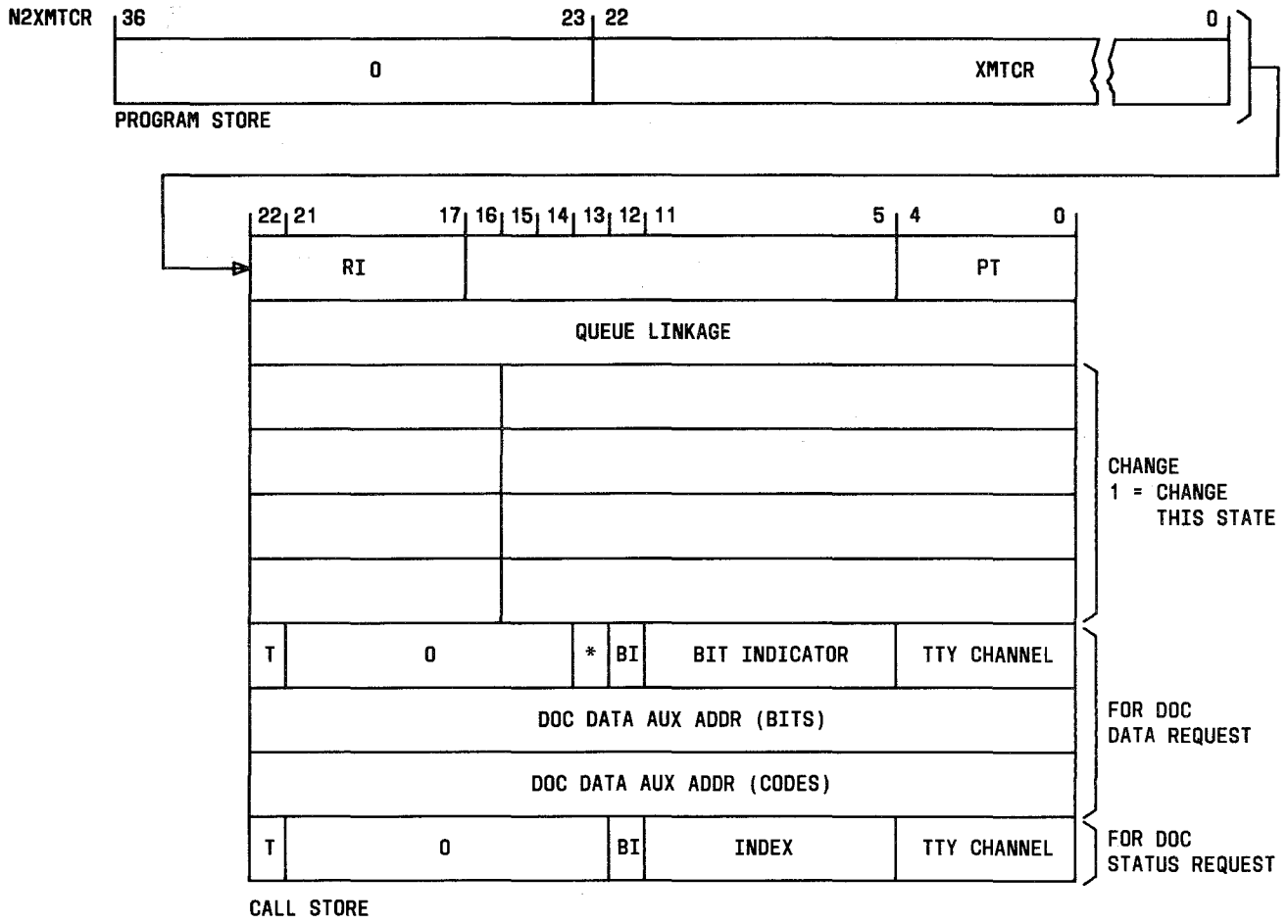
Fig. 32—Signal Distribution Administration Table



LEGEND:

A – EQUAL 1 IF SENDING DOC SIGNALS FOR THIS REASON
PEG – NUMBER OF TIMES SENDING IN 5 MINUTES
USAGE – PER 5 MINUTES
MCTRAF – ADDRESS OF FIRST WORD IN 16-WORD BLOCK

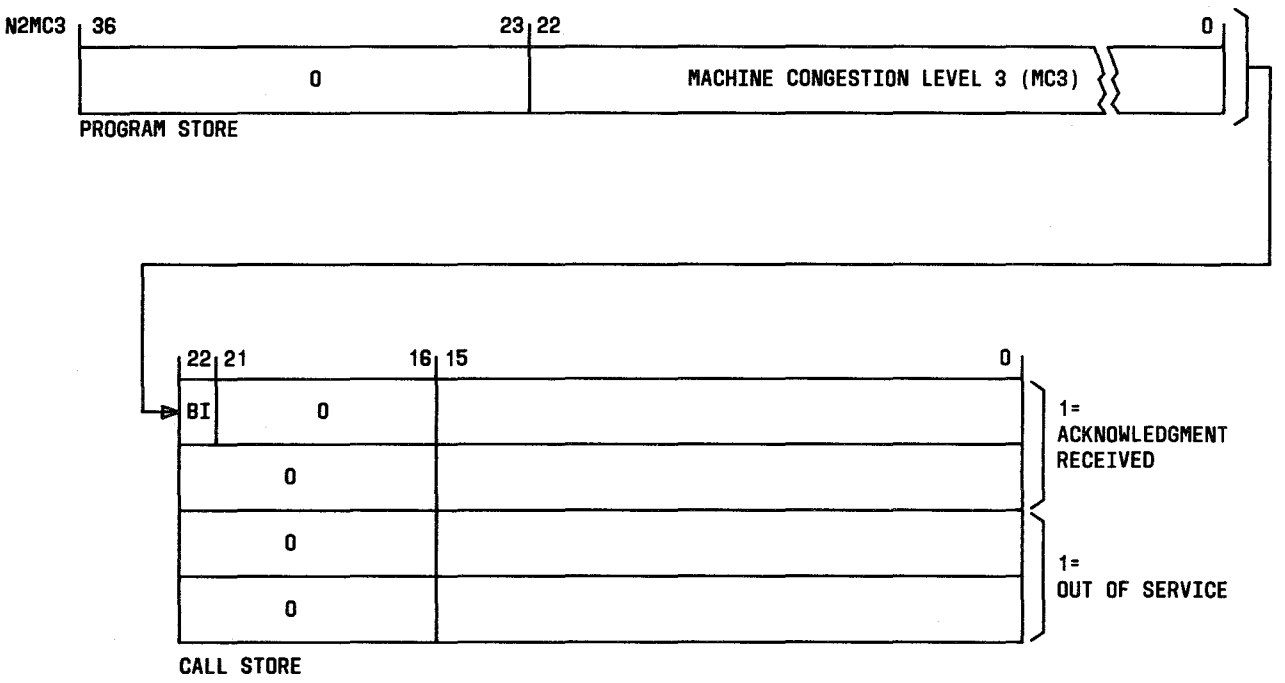
Fig. 33—Traffic Accumulator Block Layout



* MACHINE CONGESTION LEVEL 3

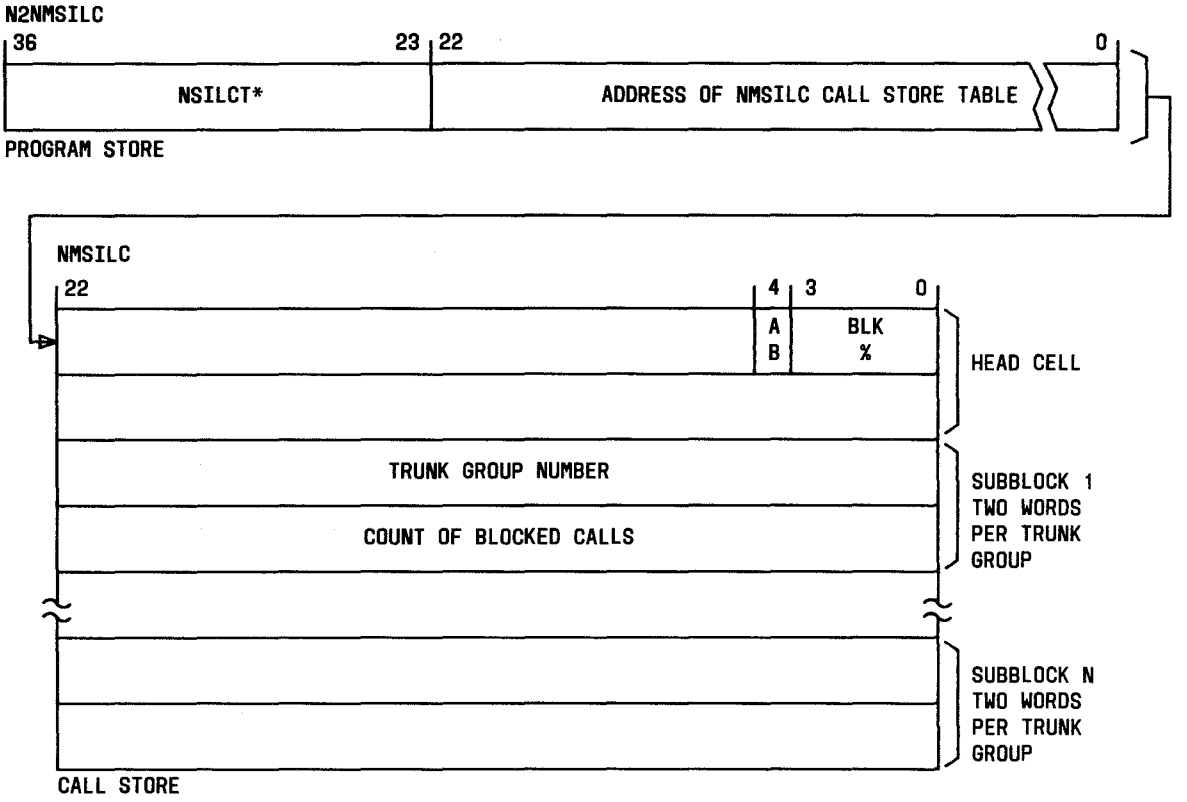
LEGEND:
RI – REGISTER IDENTIFIER
PT – PROGRAM TRANSFER
BI – BUSY INDICATOR – INDICATING REGISTER IS BUSY
XMTCR – ADDRESS OF FIRST WORD IN 10-WORD PSEUDO CALL REGISTER

Fig. 34—Pseudo Call Register Layout



LEGEND:
BI – BUSY INDICATOR
MC3 – ADDRESS OF FIRST WORD IN 4-WORD MACHINE CONGESTION LEVEL 3 ACKNOWLEDGEMENT ADMINISTRATION BLOCK

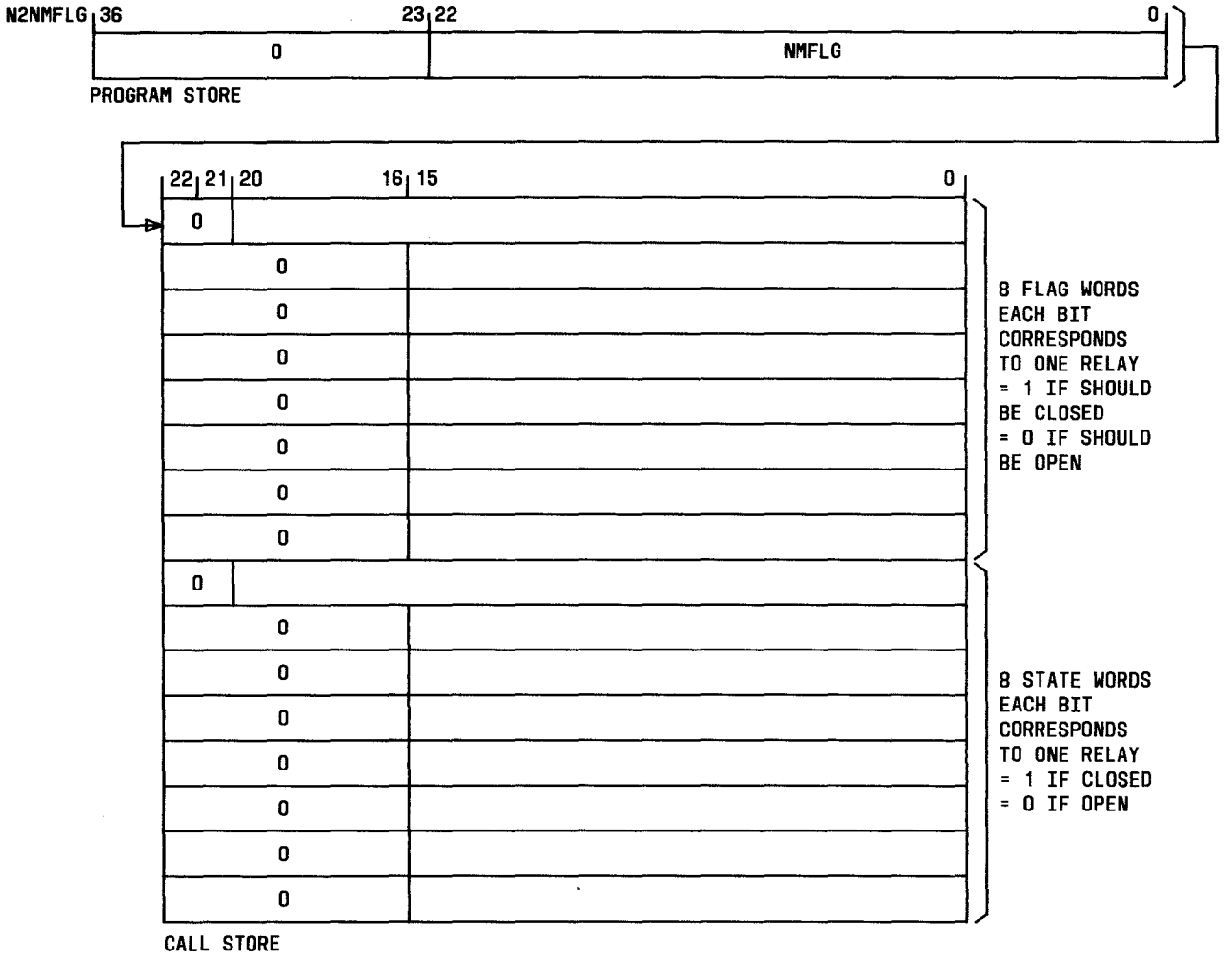
Fig. 35—Machine Congestion Level 3 Acknowledgment Administration Block and Parameter Word N2MC3



* 2 X (NSILCT+2), THIS FORMULA BUILDS THE NUMBER OF SUBBLOCKS FOR THIS TABLE

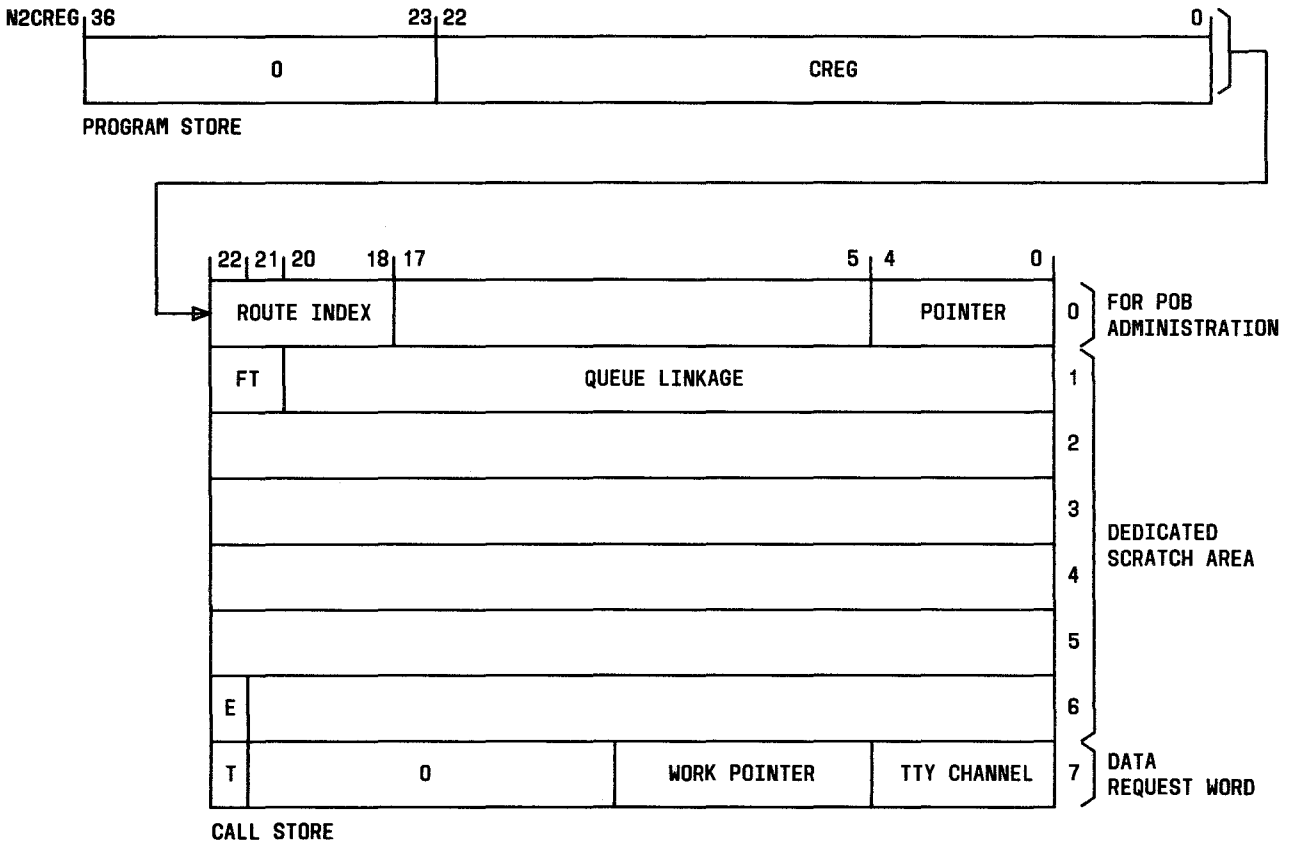
LEGEND:
NSILCT - NUMBER OF SILC TRUNK GROUPS
AB - AUDIT BIT
BLK % - CURRENT BLOCKING PERCENTAGE (P1, P2, OR 0%).

Fig. 36—SILC Slot Layout—N2NMSILC



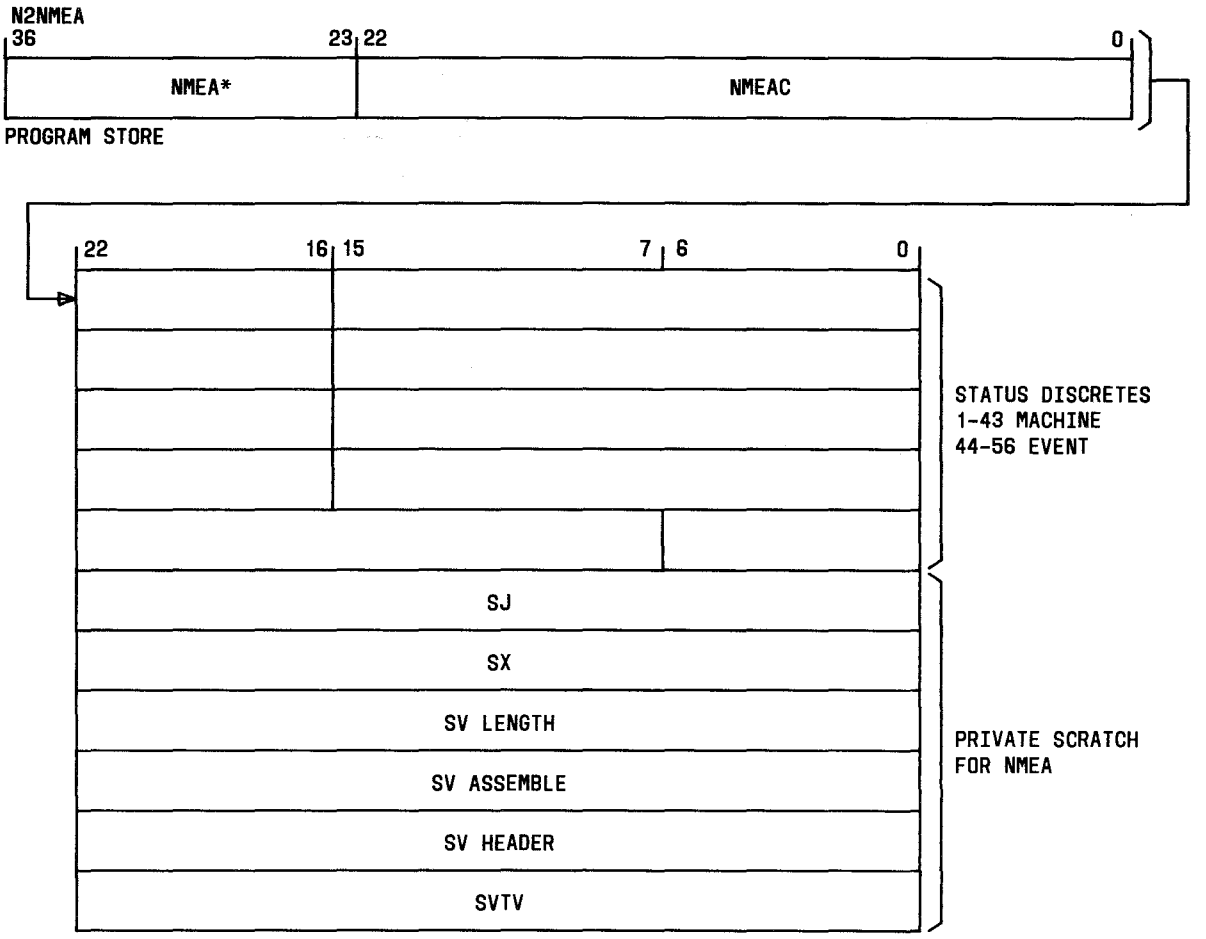
LEGEND:
NMFLG – ADDRESS OF FIRST WORD IN 16-WORD FLAG/STATE WORD BLOCK

Fig. 37—Flag/State Word Block Layout



LEGEND:
CREG – ADDRESS OF FIRST WORD IN 8-WORD PSEUDO CALL REGISTER
E – END BIT – 1 IF ROUTINE FINISHED
FT – FAILURE TYPE
T – TIMING BIT (USED BY AUDIT)
TTY CHL – TELETYPEWRITER CHANNEL

Fig. 38—Pseudo Call Register for Network Management Indicator Circuit



* 11 X NMEA, THIS FORMULA BUILDS THE NUMBER OF SUBBLOCKS FOR THIS TABLE.

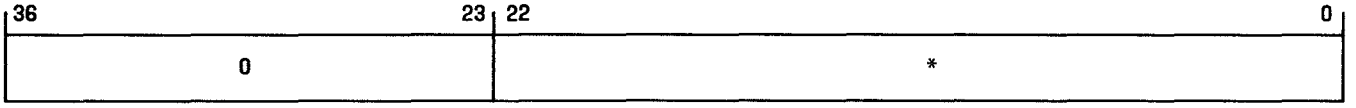
LEGEND:

NMEA – SET CARD, VALUE OF ONE INDICATES THAT NETWORK MANAGEMENT CONTROLS AND DATA ARE TRANSMITTED VIA EADAS. VALUE OF ZERO INDICATES OTHERWISE.

NMEAC – ADDRESS OF FIRST WORD IN 11-WORD BLOCK USED FOR CONTROL OF NETWORK MANAGEMENT ASPECTS ON THE EADAS/NM FEATURE.

Fig. 39—N2NMEA Layout

N2EADAS



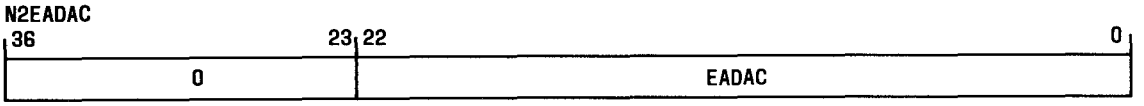
PROGRAM STORE

* EQUAL TO EADASB IN A CENTRAL CONTROL SWITCH OR EQUAL TO SPEDPR IN A SIGNAL PROCESSOR SWITCH

LEGEND:
EADASB - ADDRESS OF 273-WORD EADAS INPUT/OUTPUT BUFFER
SPEDPR - ADDRESS OF 257-WORD EADAS INPUT/OUTPUT BUFFER (SIGNAL PROCESSOR CALL STORE ONLY)

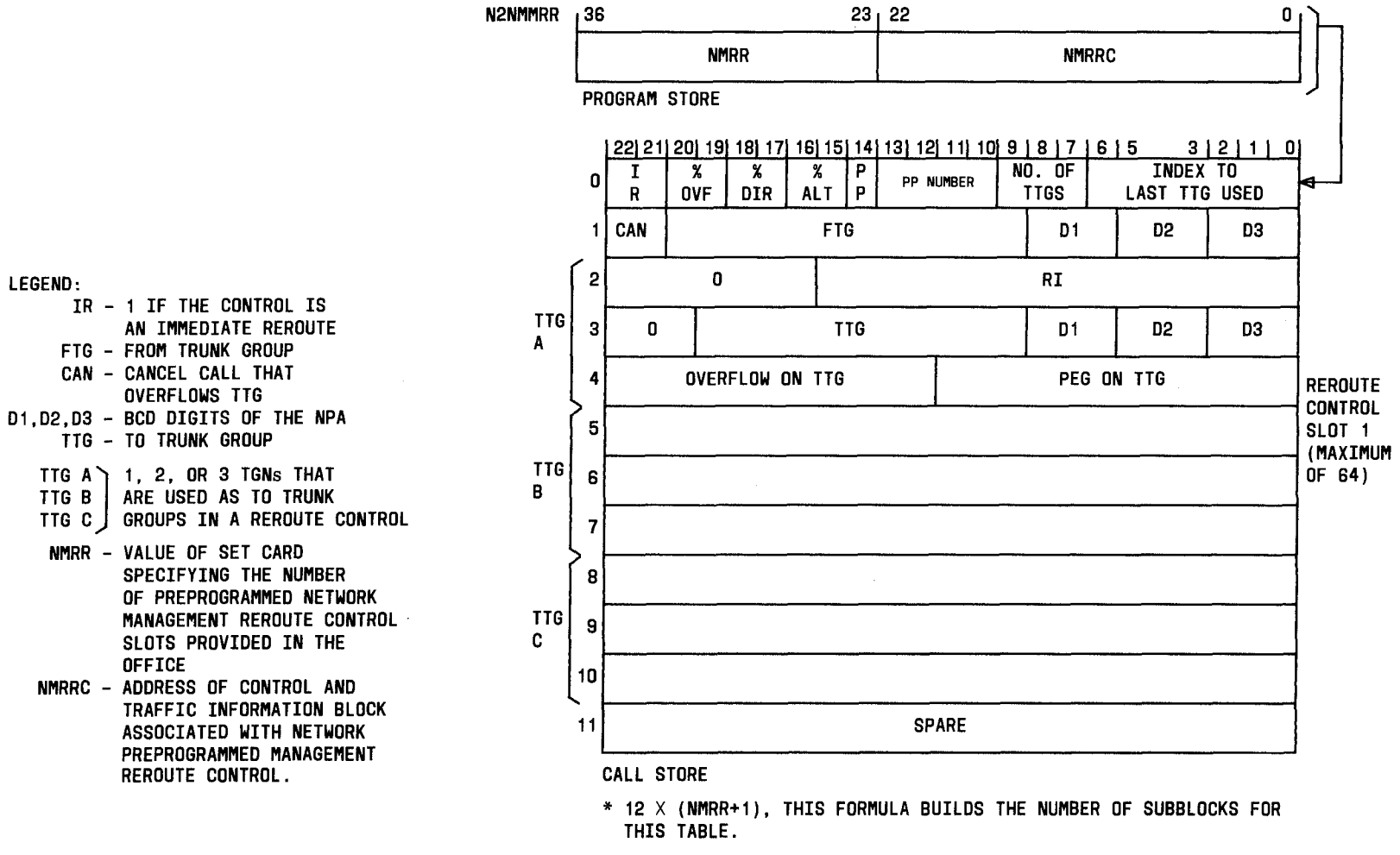
Fig. 40—Parameter Word N2EADAS—EADAS Buffer Pointer

N2EADAC



LEGEND:
EADAC - ADDRESS OF BLOCK OF 14-WORD CALL STORE USED FOR CONTROL PURPOSES BY THE EADAS FEATURE.

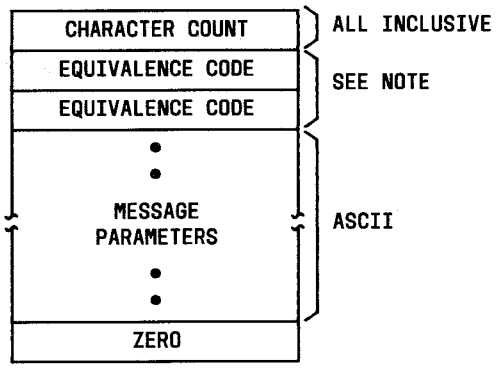
Fig. 41—Parameter Word N2EADAC—EADAS Control Pointer



LEGEND:

- IR - 1 IF THE CONTROL IS AN IMMEDIATE REROUTE
- FTG - FROM TRUNK GROUP
- CAN - CANCEL CALL THAT OVERFLOWS TTG
- D1,D2,D3 - BCD DIGITS OF THE NPA
- TTG - TO TRUNK GROUP
- TTG A, TTG B, TTG C - 1, 2, OR 3 TGNs THAT ARE USED AS TO TRUNK GROUPS IN A REROUTE CONTROL
- NMRR - VALUE OF SET CARD SPECIFYING THE NUMBER OF PREPROGRAMMED NETWORK MANAGEMENT REROUTE CONTROL SLOTS PROVIDED IN THE OFFICE
- NMRRC - ADDRESS OF CONTROL AND TRAFFIC INFORMATION BLOCK ASSOCIATED WITH NETWORK PREPROGRAMMED MANAGEMENT REROUTE CONTROL.

Fig. 42—Network Management Reroute Control Slot Layout



NOTE:
1. See Table F.

Fig. 43—EADAS/NM Input Message Format

TTY MESSAGE: CT-ACT-050 100 197
DESCRIPTION: COMMAND TO ACTIVATE A FLEXIBLE CANCEL-TO CONTROL AFFECTING 50% DIRECT ROUTED TRAFFIC AND 100% ALTERNATE ROUTED TRAFFIC ON TRUNK GROUP NUMBER 197.

								OCTAL	DEFINITION
0	0	0	0	1	1	1	0	16	CHARACTER COUNT
1	0	0	0	0	0	1	1	203	"CT" } SEE NOTE
0	0	0	0	1	1	1	0	016	"ACT" } SEE NOTE
0	0	1	1	0	0	0	0	060	ASCII "0"
0	0	1	1	0	1	0	1	065	ASCII "5"
0	0	1	1	0	0	0	0	060	ASCII "0"
0	0	1	1	0	0	0	1	061	ASCII "1"
0	0	1	1	0	0	0	0	060	ASCII "0"
0	0	1	1	0	0	0	0	060	ASCII "0"
0	0	1	1	0	0	0	1	061	ASCII "1"
0	0	1	1	1	0	0	1	071	ASCII "9"
0	0	1	1	0	1	1	1	067	ASCII "7"
0	0	1	0	1	1	1	0	056	ASCII "."
0	0	0	0	0	0	0	0	000	ALL ZEROS

Note:
1. See Table F.

Fig. 44—Example EADAS/NM Input Message Format—CT-ACT Message

DESCRIPTION: ACTIVATE CALL GAP CONTROL
INPUT MESSAGE: CG-ACT
OUTPUT MESSAGE: NM05

									OCTAL
1	0	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	1	0	6
3	1	1	1	0	0	0	1	1	343
4	0	0	0	0	1	1	0	0	014
5									101/130/117/127
6									0-77

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR CG-ACT
5 - 101 ACTIVATED
101 REPLACED
130 INVINP
130 INVCOD
117 NOFSL
127 RCAFUL
6 - BINARY SLOT NUMBER 0 TO 63 (DECIMAL).

Fig. 45—EADAS/NM Output Response to CG-ACT Message

DESCRIPTION: CALL GAP STATUS REQUEST
INPUT MESSAGE: CG-STATUS
OUTPUT MESSAGE: NM03

								OCTAL	
1								302/303/342/343	
2								VARIABLE	
3	1	1	1	0	0	0	1	1	343	
4	0	1	0	1	0	0	0	0	120	
5									117/116/103	
6									60 TO 71	
7									60 TO 71	
8									103/116	
9									60 TO 71	
10									60 TO 71	
11									60 TO 71	
12									60 TO 71/130	
13									60 TO 71/130	
14									60 TO 71/130	
15									60 TO 71/130	REPEAT
16									60 TO 71/130	
17									60 TO 71/130	
18									60 TO 71/130	
19									60/61	
20									60 TO 71	
21									61/62/73	
22									0 TO 77	

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR CG-STATUS MESSAGE
5 - 117-OK/116-NO GOOD/ 103-CONTINUED
6-7 - NUMBER OF REMAINING SLOTS (ASCII)
8 - 103-CARRIER INTERCONNECT TYPE CODE/ 116-NANP TYPE CODE
9-11 - CARRIER INTERCONNECT PREFIX IF CHARACTER 8=C OR NPA CODE IF CHARACTER 8=N
12-14 - XXX IF CHARACTER 8=C OR OFFICE CODE OR XXX IF CHARACTER 8=N
15-18 - XXXX IF CHARACTER 8=C OR LINE NUMBER OR XXXX IF CHARACTER 8=N
19-20 - GAP INTERVAL INDEX 0 TO 15 (DECIMAL) ASCII
21 - DISPOSITION OF GAPPED CALLS G1-NCA/62-EA1/63-EA2
22 - BINARY SLOT NUMBER 0 TO 63 (DECIMAL)

Fig. 46—EADAS/NM Output Response to CG-STATUS Message

DESCRIPTION: REMOVE ALL CALL GAP CONTROLS
INPUT MESSAGE: CG-CLR
OUTPUT MESSAGE: NM08

								OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	0	1	5
3	1	1	1	0	0	0	1	1	343
4	0	0	1	1	0	0	0	0	60
5									101/130

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR CG-CLR
5 - 101-REMOVED/130-INVALID

Fig. 47—EADAS/NM Output Response to CG-CLR Message

```
DESCRIPTION: REMOVING CODES FROM CALL GAPPING CONTROL
INPUT MESSAGE: CG-RMV
OUTPUT MESSAGE: NM06
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	0	1	5
3	1	1	0	1	0	0	1	1	343
4	0	0	1	1	0	0	1	0	64
5									101/130/121

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH
        3-4 - 16-BIT EQUIVALENT FOR CG-RMV
          5 - 101-DEACTIVATED
              130-INVINP, INVCOD, NOT FND
              121-NOCNL
```

Fig. 48—EADAS/NM Output Response to CG-RMV Message

```
DESCRIPTION: CLEAR ALL FLEXIBLE TRUNK GROUP CONTROLS
INPUT MESSAGE: FX-CLEAR
OUTPUT MESSAGE(S): NM08
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	0	1	5
3	1	0	0	0	0	1	1	0	006
4	0	1	1	0	0	0	0	1	263
5	0	1	0	0	1	1	1	1	117

REAL TIME CYCLES REQUIRED 1190

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH
        3-4 - 16-BIT EQUIVALENT FOR FX-CLEAR
          5 - 117 OK, ALL CLEARED
```

Fig. 49—EADAS/NM Output Response to FX-CLEAR Message

DESCRIPTION: DEACTIVATE A FLEXIBLE TRUNK GROUP CONTROL
INPUT MESSAGE: FLEX-DEACT
OUTPUT MESSAGE(S): NM18

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	1	1	0	0	0	1	0	1	5
3	1	0	0	0	0	1	1	0	206
4	1	1	1	0	0	0	0	1	341
5									104/116

REAL TIME CYCLES REQUIRED 1060

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR FLEX-DEACT
5 - 104 DEACTIVATED, 116-NOT FOUND

Fig. 50 — EADAS/NM Output Response to FLEX-DEACT Message

DESCRIPTION: LIST ALL FLEXIBLE TRUNK GROUP CONTROLS
INPUT MESSAGE: FX-STATUS
OUTPUT MESSAGE(S): NONE

		OCTAL
1	1 1 0 0 0 0 1 0	302
2		X REAL TIME CYCLES REQUIRED 382 + 390/CONTROL
3	0 0 0 0 0 1 1 0	6
4	0 1 0 1 0 0 1 1	123
5		117/116
6		TGNL
7		TGNM
8		106/124/113/122
9		103/103/123/124
10		%DL/PREL
11		%DU/PREU
12		%AL/DREL
13		%AU/DREU
14		1-77

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH (OCTAL)
3-4 - 16-BIT EQUIVALENT FOR FX-STATUS
5 - 117-OK, 116-NO GOOD
6 - LOWER 8-BITS OF TRUNK GROUP
7 - UPPER 8-BITS OF TRUNK GROUP NUMBER
8-9 - 106-103 CANCEL FROM, 124-103 CANCEL TO
113-123 SKIP, 122-124 TRUNK RESERVATION
10 - LOWER BITS, DIRECT % OR PROTECTION RESERVATION EQUIPMENT
11 - UPPER BITS, DIRECT % OR PROTECTION RESERVATION EQUIPMENT
12 - LOWER BITS, ALTERNATE % OR DIRECTIONAL RESERVATION EQUIPMENT
13 - UPPER BITS, ALTERNATE % OR DIRECTIONAL RESERVATION EQUIPMENT
14 - SLOT NUMBER (OCTAL)

NOTE: LINES 6-14 REPEAT PER FLEXIBLE CONTROL EXCEPT IF LINE 5 = 116

Fig. 51—EADAS/NM Output Response to FX-STATUS Message

```
DESCRIPTION: ACTIVATE A CANCEL-FROM TO REPLACE A PREPROGRAM
INPUT MESSAGE: CF-ACT
OUTPUT MESSAGE(S): NM14
                   NM01
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	1	11
3	1	1	0	0	0	0	1	1	303
4	0	0	0	0	1	1	0	0	14
5	0	1	0	0	0	0	0	1	101
6									1-77
7	0	0	1	0	1	1	1	0	56
8	1	1	0	0	1	0	1	1	313
9	0	0	0	0	1	0	1	1	13

REAL TIME CYCLES REQUIRED 2455

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH
        3-4 - 16-BIT EQUIVALENT FOR CF-ACT
          5 - 101 ACTIVATED
          6 - SLOT NUMBER
          7 - ASCII EQUIVALENT FOR PERIOD (.)
        8-9 - 16-BIT EQUIVALENT FOR REPLACING PREPROGRAMS
```

Fig. 52—EADAS/NM Output Response to CF-ACT Message for Replacing a Preprogram Control

```
DESCRIPTION: ACTIVATE A CANCEL-FROM TO REPLACE ANOTHER FLEXIBLE CONTROL
INPUT MESSAGE: CF-ACT
OUTPUT MESSAGE(S): NM14
                   NM21
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	1	11
3	1	1	0	0	0	0	1	1	303
4	0	0	0	0	1	1	0	0	14
5	0	1	0	0	0	0	0	1	101
6									1-77
7	0	0	1	0	1	1	1	0	56
8	1	1	0	0	0	1	1	1	307
9	0	0	0	0	0	1	1	1	7

REAL TIME CYCLES REQUIRED 2020

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH
        3-4 - 16-BIT EQUIVALENT FOR CF-ACT
          5 - 101-ACTIVATED
          6 - SLOT NUMBER
          7 - ASCII EQUIVALENT
        8-9 - 16-BIT EQUIVALENT FOR REPLACING A FLEXIBLE CONTROL
```

Fig. 53—EADAS/NM Output Response to CF-ACT Message for Replacing a Flexible Control

DESCRIPTION: ACTIVATE A FLEXIBLE CANCEL-FROM CONTROL
INPUT MESSAGE: CT-ACT
OUTPUT MESSAGE(S): NM14

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	1	0	6
3	1	1	0	0	0	0	1	1	303
4	0	0	0	0	1	1	0	0	14
5									101/130/117
6									1-77

REAL TIME CYCLES REQUIRED 1265

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR CT-ACT
5 - 101 ACTVD. 130 ILLEGAL. 117 OVERFLOW
6 - SLOT NUMBER

Fig. 54—EADAS/NM Output Response to CT-ACT Message for Activation of a Flexible Cancel-From Control

DESCRIPTION: ACTIVATE A CANCEL-TO TO REPLACE A FLEXIBLE CONTROL
INPUT MESSAGE: CT-ACT
OUTPUT MESSAGE: NM14
NM21

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	1	11
3	1	0	0	0	0	0	1	1	203
4	0	0	0	0	1	1	1	0	16
5	0	1	0	0	0	0	0	1	101
6									1-77
7	0	0	1	0	1	1	1	0	56
8	1	1	0	0	0	1	1	1	307
9	0	0	0	0	0	1	1	1	7

REAL TIME CYCLES REQUIRED 2030

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR CT-ACT
5 - 101 ACTIVATED
6 - SLOT NUMBER
7 - ASCII EQUIVALENT FOR PERIOD(.)
8-9 - 16-BIT EQUIVALENT FOR REPLACING A FLEXIBLE CONTROL

Fig. 55—EADAS/NM Output Response to CT-ACT Message for Replacing a Flexible Control

```
DESCRIPTION: ACTIVATE A FLEXIBLE CANCEL-TO CONTROL
INPUT MESSAGE: CT-ACT
OUTPUT MESSAGE: NM14
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	1	0	6
3	1	0	0		0	0	1	1	203
4	0	0	0	0	1	1	1	0	16
5									113/130/117
6									1-77

REAL TIME CYCLES REQUIRED 1270

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH
        3-4 - 16-BIT EQUIVALENT FOR CT-ACT
          5 - 101 ACTVD. 130-ILLEGAL. 117-OVFL
          6 - SLOT NUMBER
```

Fig. 56—EADAS/NM Output Response to CT-ACT Message to Activate a Flexible Cancel-To Control

```
DESCRIPTION: ACTIVATE A FLEXIBLE SKIP CONTROL
INPUT MESSAGE: SK-ACT
OUTPUT MESSAGE(S): NM14
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	1	0	6
3	0	1	1	1	0	0	1	1	163
4	0	0	0	0	1	1	0	1	15
5									101/130/117
6									1-77

REAL TIME CYCLES REQUIRED 1275

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH
        3-4 - 16-BIT EQUIVALENT FOR SK ACT
          5 - 101 ACTVD, 130 ILLEGAL, 117 OVFL
          6 - SLOT NUMBER
```

Fig. 57—EADAS/NM Output Response to SK-ACT Message for Activation of a Flexible Skip Control

DESCRIPTION: ACTIVATE A CANCEL-TO TO REPLACE A PREPROGRAM
INPUT: CT-ACT
OUTPUT: NM14

NM01

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	1	11
3	1	0	0	0	0	0	1	1	203
4	0	0	0	0	1	1	1	0	16
5	0	1	0	0	0	0	0	1	101
6									1-77
7	0	0	1	0	1	1	1	0	56
8	1	1	0	0	1	0	1	1	313
9	0	0	0	0	1	0	1	1	13

REAL TIME CYCLES REQUIRED 2465

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR CT-ACT
5 - 101 ACTIVATED
6 - SLOT NUMBER
7 - ASCII FOR PERIOD (.)
8-9 - 16-BIT EQUIVALENT FOR REPLACING A PREPROGRAM

Fig. 58—EADAS/NM Output Response to CT-ACT Message for Replacing a Preprogram Control

DESCRIPTION: REMOVE MANUAL CONTROL FROM ALL DOC LOOPS
INPUT MESSAGE: DOC-CLEAR
OUTPUT MESSAGES(S): NM08

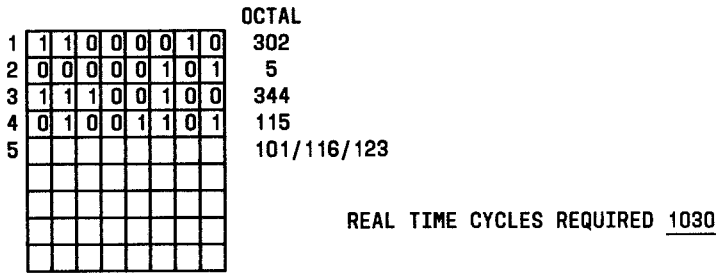
									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	0	1	5
3	1	1	1	0	0	1	0	0	344
4	1	0	0	0	1	1	0	0	215
5	0	1	0	0	0	1	0	0	104

REAL TIME CYCLES REQUIRED 815

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT
5 - 104 DEACTIVATED

Fig. 59—EADAS/NM Output Response to DOC-CLEAR Message

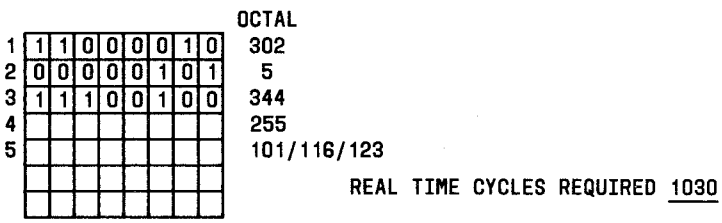
DESCRIPTION: MANUALLY SEND A DOC CONTROL SIGNAL
INPUT MESSAGE: DOC-SND
OUTPUT MESSAGE(S): NM20



CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR DOC-SND
5 - 101 ACTIVATED, 116 NOT FOUND, 123 OUT OF SERVICE

Fig. 60—EADAS/NM Output Response to DOC-SND Message

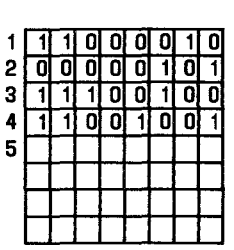
DESCRIPTION: MANUALLY EXCLUDE A DOC SIGNAL
INPUT MESSAGE: DOC-EXC
OUTPUT MESSAGE(S): NM20



CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR DOC-EXC
5 - 101 ACTVD. 116-NOT FOUND. 123-OUT OF SERVICE

Fig. 61—EADAS/NM Output Response to DOC-EXC Message

DESCRIPTION: REMOVE A MANUAL SEND OR EXCLUDE FROM SEND
A DOC SIGNAL
INPUT MESSAGE: DOC REM
OUTPUT MESSAGE(S): NM20

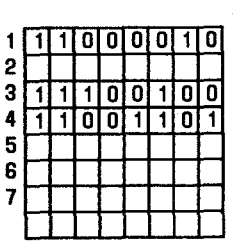


REAL TIME CYCLES REQUIRED 1030

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR DOC-REM
5 - 101 ACTIVATED, 116 NOT FOUND, 123 OUT OF SERVICE

Fig. 62—EADAS/NM Output Response to DOC-REM Message

DESCRIPTION: LIST ALL ACTIVE DOC LOOPS
INPUT MESSAGE: DOC STATUS
OUTPUT MESSAGE(S): NONE



REAL TIME CYCLES REQUIRED 1275 + 105/ACTIVE LOOP

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR DOC-STATUS
5 - 177-OK. 127-WAIT
6 - DOC LOOP INDEX
7 - 101 AUTO ACTIVATED. 104 DOC OUT OF SERVICE
105-MANUAL EXCLUDE. 115 MAN ACTIVATED

Fig. 63—EADAS/NM Output Response to DOC-STATUS Message

DESCRIPTION: LIST ALL DOC RECEIVER LOOPS THAT ARE OUT
OF SERVICE
INPUT MESSAGE: DR-STATUS (EADAS ONLY)
OUTPUT MESSAGE(S): NONE

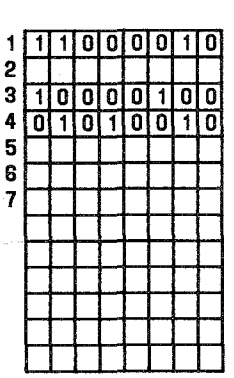
								OCTAL
1	1	1	0	0	0	0	1	0	302
2									X
3	0	1	0	0	0	1	0	0	104
4	0	1	0	1	0	0	1	0	122
5									117/124
6									117/124
7									N

REAL TIME CYCLES REQUIRED 260

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR DR-STATUS
5 - 117-NO FALSE SIGNAL. 124-RECEIVING FALSE SIGNAL
6 - 117-NO LOOP TROUBLE. 124-LOOP TROUBLE
REPEAT 7 - LOOP INDEX (NOT LOADED IF LINE 6 = 117)

Fig. 64—EADAS/NM Output Response to DR-STATUS Message

DESCRIPTION: LIST ALL DOC TRANSMIT LOOPS THAT ARE OUT OF SERVICE
INPUT MESSAGE: DT-STATUS (EADAS ONLY)
OUTPUT MESSAGE(S): NONE

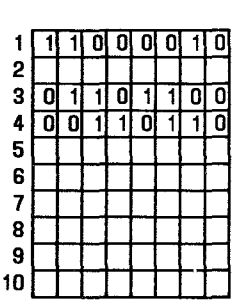


REAL TIME CYCLES REQUIRED 310

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR DT-STATUS
5 - 117-OK COMMON CIRCUITRY
124-TROUBLE
6 - 117-OK. NO LOOP TROUBLE
124-TROUBLE
116-NOT PROVIDED
REPEAT 7 - LOOP INDEX

Fig. 65—EADAS/NM Output Response to DT-STATUS Message

DESCRIPTION: IDENTIFY THOSE OFFICES RECEIVING DOC SIGNALS FOR
MACHINE CONGESTION LEVEL THREE, INCAPABLE OF PROCESSING CALLS
INPUT MESSAGE: LST-MCTHREE
OUTPUT MESSAGE(S): NM22



REAL TIME CYCLES REQUIRED 630 + 510/5 LOOPS

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH (OCTAL)
3-4 - 16-BIT EQUIVALENT FOR LST-THREE
5 - 116 NO GOOD, 117 OK
REPEAT 6 - DOC LOOP INDEX (OCTAL)

Fig. 66—EADAS/NM Output Response to LST-MCTHREE Message

DESCRIPTION: IDENTIFY THOSE OFFICES RECEIVING DOC SIGNALS FOR
MACHINE CONGESTION LEVEL TWO FOR MF RECEIVERS
INPUT MESSAGE: MFD-MCTWO
OUTPUT MESSAGE(S): NM22

									OCTAL
1	1	1	0	0	0	0	1	0	302
2									5-12
3	1	1	0	0	1	1	0	1	315
4	0	0	1	1	0	1	0	0	64
5									116/117
6									0-77
7									0-77
8									0-77
9									0-77
10									0-77

REAL TIME CYCLES REQUIRED 655 + 510/5 LOOPS

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH (OCTAL)
3-4 - 16-BIT EQUIVALENT FOR MFD-MCTWO
5 - 116 NO GOOD. 117 OK
REPEAT { 6-9 - DOC LOOP INDEX (OCTAL)

Fig. 67—EADAS/NM Output Response to MFD-MCTWO Message

DESCRIPTION: IDENTIFY THOSE OFFICES RECEIVING DOC SIGNALS FOR
MACHINE CONGESTION LEVEL ONE FOR MF RECEIVERS
INPUT MESSAGE: MFD-MCONE
OUTPUT MESSAGE(S): NM22

									OCTAL
1	1	1	0	0	0	0	1	0	302
2									5-12
3	1	1	0	0	1	1	0	1	315
4	1	0	1	1	0	1	0	0	264
5									116/117
6									0-77
7									0-77
8									0-77
9									0-77
10									0-77

REAL TIME CYCLES REQUIRED 655 + 510/5 LOOPS

NOTE:
1. PP-REM only removes manual controls not automatic controls.

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH (OCTAL)
3-4 - 16-BIT EQUIVALENT FOR MFD-MCONE
5 - 116 NO GOOD, 117 OK
REPEAT { 6-9 - DOC LOOP INDEX (OCTAL)

Fig. 68—EADAS/NM Output Response to MFD-MCONE Message

DESCRIPTION: IDENTIFY THOSE OFFICES RECEIVING DOC SIGNALS FOR
MACHINE CONGESTION LEVEL TWO FOR TRUNK DIAL-PULSE RECEIVERS
INPUT MESSAGE: DPD-MCTWO
OUTPUT MESSAGE(S): NM22

									OCTAL
1	1	1	0	0	0	0	1	0	302
2									5-12
3	0	0	0	0	0	1	0	0	4
4	0	0	1	1	0	1	1	0	66
5									116/117
6									0-77
7									0-77
8									0-77
9									0-77
10									0-77

REAL TIME CYCLES REQUIRED 655 + 510/5 LOOPS

NOTE:
1. PP-CLEAR only removes manual controls

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH (OCTAL)
3-4 - 16-BIT EQUIVALENT FOR DPD-MCTWO
5 - 116 NO GOOD. 117 OK
REPEAT 6-9 - DOC LOOP INDEX (OCTAL)

Fig. 69—EADAS/NM Output Response to DPD-MCTWO Message

DESCRIPTION: ACTIVATE A PREPROGRAM CONTROL
INPUT MESSAGE: PP-ACT
OUTPUT MESSAGE(S): NM07

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	0	1	5
3	0	0	0	1	0	0	0	0	20
4	0	0	0	0	1	1	1	0	16
5									101/116

REAL TIME CYCLES REQUIRED 1145

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR PP-ACT
5 - 101 ACTIVATED, 116 NOT ACTIVATED

Fig. 70—EADAS/NM Output Response to PP-ACT Message

```
DESCRIPTION: ACTIVATE A PREPROGRAM TO REPLACE A PREPROGRAM CONTROL
INPUT MESSAGE: PP-ACT
OUTPUT MESSAGE(S): NM07
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	0	10
3	0	0	0	1	0	0	0	0	20
4	0	0	0	0	1	1	1	0	16
5									101
6	0	0	1	0	1	1	1	0	56
7	1	1	0	0	1	0	1	1	313
8	0	0	0	0	1	0	1	1	13

REAL TIME CYCLES REQUIRED 2365

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH (OCTAL)
        3-4 - 16-BIT EQUIVALENT FOR PP-ACT
          5 - 101 ACTIVATED
          6 - ASCII EQUIVALENT FOR PERIOD (.)
        7-8 - 16-BIT EQUIVALENT FOR REPLACING A PREPROGRAM
```

Fig. 71—EADAS/NM Output Response to PP-ACT Message for Replacing a Preprogram Control

```
DESCRIPTION: ACTIVATE A PREPROGRAM TO REPLACE A FLEXIBLE CONTROL
INPUT MESSAGE: PP-ACT
OUTPUT MESSAGE(S): NM07
                   NM21
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	0	10
3	0	0	0	1	0	0	0	0	20
4	0	0	0	0	1	1	1	0	16
5									101/116
6	0	0	1	0	1	1	1	0	56
7	1	1	0	0	0	1	1	1	307
8	0	0	0	0	0	1	1	1	7

REAL TIME CYCLES REQUIRED 1945

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH (OCTAL)
        3-4 - 16-BIT EQUIVALENT FOR PP-ACT
          5 - 101 ACTIVATED, 116 NOT ACTIVATED
          6 - ASCII EQUIVALENT FOR PERIOD (.)
        7-8 - 16-BIT EQUIVALENT FOR REPLACING A FLEXIBLE CONTROL
```

Fig. 72—EADAS/NM Output Response to PP-ACT Message for Replacing a Flexible Trunk Group Control

DESCRIPTION: EXCLUDE A PREPROGRAM CONTROL THAT WAS NOT ACTIVE
INPUT MESSAGE: PP-EXC
OUTPUT MESSAGE(S): NM07

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	0	1	5
3	0	0	0	1	0	0	0	0	20
4	0	1	1	0	0	0	1	0	142
5									101/116

REAL TIME CYCLES REQUIRED 945

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR PP-EXC
5 - 105 ACTIVATED. 116 NOT ACTIVATED

Fig. 73—EADAS/NM Output Response to PP-EXC Message

DESCRIPTION: REMOVE A PREPROGRAM CONTROL
INPUT MESSAGE: PP-REM
OUTPUT MESSAGE(S): NM07

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	0	1	5
3	0	0	0	1	0	0	0	0	20
4	0	0	0	1	0	1	1	0	26
5									104/116

REAL TIME CYCLES REQUIRED 1065

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR PP-REM
5 - 104 DEACTIVATED, 116 NOT DEACTIVATED

Fig. 74—EADAS/NM Output Response to PP-REM Message

DESCRIPTION: CLEAR ALL PREPROGRAM CONTROLS
INPUT MESSAGE: PP-CLEAR
OUTPUT MESSAGE(S): NM08

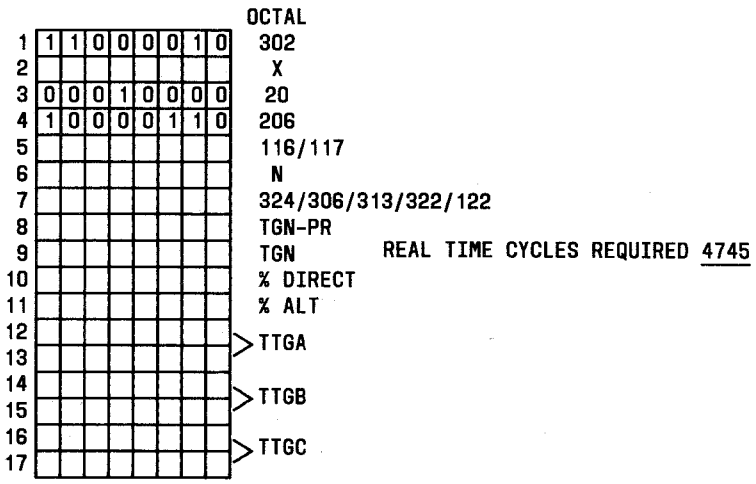
									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	0	1	5
3	0	0	0	1	0	0	0	0	20
4	1	0	1	1	0	0	1	0	262
5									104/127

REAL TIME CYCLES REQUIRED 1065

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR PP-CLEAR
5 - 104 CLEARED, 127 WAIT

Fig. 75—EADAS/NM Output Response to PP-CLEAR Message

DESCRIPTION: LIST ALL AVAILABLE PREPROGRAMS
INPUT MESSAGE: PP-DATA
OUTPUT MESSAGE(S): NM04



CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR PP-DATA
5 - 116 NO GOOD, 117 OK

REPEAT
- 6 - PREPROGRAM NUMBER
- 7 - 324 CANCEL-TO, 306 CANCEL FROM, 313 SKIP, 322 IMMEDIATE REROUTE, 122 REGULAR REROUTE
- 8 - LOWER 2 BITS = PRIORITY, REMAINING BITS = LOWER BITS OF TGN
- 9 - TGN = UPPER BITS OF TGN
- 10 - % DIRECT TRAFFIC AFFECTED
- 11 - % ALTERNATE TRAFFIC AFFECTED

Fig. 76—EADAS/NM Output Response to PP-DATA Message

DESCRIPTION: LIST ALL ACTIVE OR EXCLUDED PREPROGRAMS
INPUT MESSAGE: PP-STATUS
OUTPUT MESSAGE(S): NM02

								OCTAL
1	1	1	0	0	0	0	1	0	302
2									X
3	0	0	0	1	0	0	0	0	20
4	0	1	0	1	0	0	1	0	122
5									117/127
6									1-77 (NOTE)
7									101/115/104/105

REAL TIME CYCLES REQUIRED 675 + 110/PREPROGRAM

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH (OCTAL)
3-4 - 16-BIT EQUIVALENT FOR PP-STATUS
5 - 117-OK. 127 WAIT
REPEAT 6 - PREPROGRAM NUMBER
7 - 101 AUTOMATIC ACTIVATED. 115 MANUALLY ACTIVATED
104 DOC OUT OF SERVICE. 105 MANUALLY EXCLUDED

NOTE:
1. Repeat lines 6 and 7 per preprogram control.

Fig. 77—EADAS/NM Output Response to PP-STATUS Message

DESCRIPTION: IDENTIFY THOSE OFFICES RECEIVING DOC SIGNALS FOR MACHINE CONGESTION ONE FOR TRUNK DIAL-PULSE RECEIVERS

INPUT MESSAGE: DPD-MCONE
OUTPUT MESSAGE(S): NM22

								OCTAL
1	1	1	0	0	0	0	1	0	302
2									5-12
3	0	0	0	0	0	1	0	0	4
4	1	0	1	1	0	1	1	0	266
5									116/117
6									0-77
7									0-77
8									0-77
9									0-77
10									0-77

REAL TIME CYCLES REQUIRED 655 + 510/5 LOOPS

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH (OCTAL)
3-4 - 16-BIT EQUIVALENT FOR DPD-MCONE
5 - 116 NO GOOD, 117 OK
REPEAT 6-10 - DOC LOOP INDEX (OCTAL)

Fig. 78—EADAS/NM Output Response to DPD-MCONE Message

DESCRIPTION: EXCLUDE A PREPROGRAM CONTROL THAT WAS ACTIVE
INPUT MESSAGE: PP-EXC
OUTPUT MESSAGE(S): NM07

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	0	10
3	0	0	0	1	0	0	0	0	20
4	0	1	1	0	0	0	1	0	142
5									101
6	0	0	1	0	1	1	1	0	56
7	1	1	0	0	1	0	1	1	313
8	0	0	0	0	1	0	1	1	13

REAL TIME CYCLES REQUIRED 1625

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH (OCTAL)
3-4 - 16-BIT EQUIVALENT FOR PP-EXC
5 - 101 ACTVD
6 - ASII EQUIVALENT FOR PERIOD (.)
7-8 - 16-BIT EQUIVALENT FOR REPLACING A PREPROGRAM

Fig. 79—EADAS/NM Output Response to PP-EXC Message for Excluding an Active Preprogram Control

DESCRIPTION: IDENTIFY THOSE OFFICES RECEIVING DOC SIGNALS FOR
MACHINE CONGESTION TWO FOR REVERTIVE PULSE RECEIVERS
INPUT MESSAGE: RPD-MCTWO
OUTPUT MESSAGE(S): NM22

									OCTAL
1	1	1	0	0	0	0	1	0	302
2									5-12
3	0	0	0	1	0	0	1	0	22
4	0	0	1	1	0	1	1	0	66
5									116/117
6									0-77
7									0-77
8									0-77
9									0-77
10									0-77

REAL TIME CYCLES REQUIRED 655 + 510/5 LOOPS

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR RPD-MCTWO
5 - 116 NO GOOD, 117 OK
REPEAT 6-9 - DOC LOOP INDEX

Fig. 80—EADAS/NM Output Response to RPD-MCTWO Message

```
DESCRIPTION: IDENTIFY THOSE OFFICES RECEIVING DOC SIGNALS FOR
             MACHINE CONGESTION LEVEL TWO FOR REVERTIVE PULSE RECEIVERS
INPUT MESSAGE: RPD-MCONE
OUTPUT MESSAGE(S): NM22
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2									5-12
3	0	0	0	1	0	0	1	0	22
4	1	0	1	1	0	1	1	0	266
5									116/117
6									0-77
7									0-77
8									0-77
9									0-77
10									0-77

REAL TIME CYCLES REQUIRED 655 + 510/5 LOOPS

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH (OCTAL)
        3-4 - 16-BIT EQUIVALENT FOR RPD-MCONE
          5 - 116 NO GOOD, 117 OK
REPEAT [6-9 - DOC LOOP INDEX (OCTAL)
```

Fig. 81—EADAS/NM Output Response to RPD-MCONE Message

```
DESCRIPTION: IDENTIFY THOSE OFFICES RECEIVING DOC SIGNALS FOR
             MACHINE CONGESTION LEVEL TWO FOR REAL TIME CONGESTION
INPUT MESSAGE: RTD-MCTWO
OUTPUT MESSAGE(S): NM22
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2									5-12
3	1	0	0	1	0	0	1	0	222
4	0	0	1	1	0	1	1	0	66
5									116/117
6									0-63
7									0-63
8									0-63
9									0-63
10									0-63

REAL TIME CYCLES REQUIRED 655 + 510/5 LOOPS

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH
        3-4 - 16-BIT EQUIVALENT FOR RTD-MCTWO
          5 - 116 NO GOOD, 117 OK
REPEAT [6-9 - DOC LOOP INDEX
```

Fig. 82—EADAS/NM Output Response to RTD-MCTWO Message

```
DESCRIPTION: IDENTIFY THOSE OFFICES RECEIVING DOC SIGNALS FOR
             MACHINE CONGESTION LEVEL ONE FOR REAL TIME CONGESTION
INPUT MESSAGE: RTD-MCONE
OUTPUT MESSAGE(S): NM22
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2									5-12
3	1	0	0	1	0	0	1	0	222
4	1	0	1	1	0	1	1	0	266
5									116/117
6									0-77
7									0-77
8									0-77
9									0-77
10									0-77

REAL TIME CYCLES REQUIRED
655 + 510/5 LOOPS

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH
        3-4 - 16-BIT EQUIVALENT FOR RTD-MCONE
          5 - 116 NO GOOD. 117 OK
REPEAT [6-9 - DOC LOOP INDEX
```

Fig. 83—EADAS/NM Output Response to RTD-MCONE Message

```
DECRIPTION: ACTIVATE A SKIP CONTROL TO REPLACE A FLEXIBLE
            TRUNK GROUP CONTROL
INPUT MESSAGES: SK ACT
OUTPUT MESSAGE(S): NM14
                   NM21
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	1	11
3	0	1	1	1	0	0	1	1	163
4	0	0	0	0	1	1	0	1	15
5	0	1	0	0	0	0	0	1	101
6									1-77
7	0	0	1	0	1	1	1	0	56
8	1	1	0	0	0	1	1	1	307
9	0	0	0	0	0	1	1	1	7

REAL TIME CYCLES REQUIRED 2030

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH (OCTAL)
        3-4 - 16-BIT EQUIVALENT FOR SK-ACT
          5 - 101 ACTIVATED
          6 - SLOT NUMBER (OCTAL)
          7 - ASCII FOR PERIOD (.)
        8-9 - 16-BIT EQUIVALENT FOR REPLACING A FLEXIBLE CONTROL
```

Fig. 84—EADAS/NM Output Response to SKIP-Control Message for Flexible Trunk Group Controls

DESCRIPTION: ACTIVATE A SKIP CONTROL TO REPLACE A PREPROGRAMMED
TRUNK GROUP CONTROL.
INPUT MESSAGE: SK-ACT
OUTPUT MESSAGE(S): NM14
NM01

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	1	11
3	0	1	1	1	0	0	1	1	163
4	0	0	0	0	1	1	0	1	15
5	0	1	0	0	0	0	0	1	101
6									1-77
7	0	0	1	0	1	1	1	0	56
8	1	1	0	0	1	0	1	1	313
9	0	0	0	0	1	0	1	1	13

REAL TIME CYCLES REQUIRED 2460

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH (OCTAL)
3-4 - 16-BIT EQUIVALENT FOR SK-ACT
5 - 101 ACTIVATED
6 - SLOT NUMBER (OCTAL)
7 - ASCII FOR PERIOD (.)
8-9 - 16-BIT EQUIVALENT FOR REPLACING A PREPROGRAM.

Fig. 85—EADAS/NM Output Response to SK-ACT Message

DESCRIPTION: ACTIVATE THE TRUNK RESERVATION FUNCTION
INPUT MESSAGE: TR-ACT
OUTPUT MESSAGE(S): NM14

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	0	1	1	0	6
3	0	1	0	1	0	1	0	0	124
4	0	0	0	0	1	1	1	0	16
5									101/130/117
6									1-77

REAL TIME CYCLES REQUIRED 1260

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR TR-ACT
5 - 101 ACTVD, 130 ILLEGAL, 117 OVFL
6 - SLOT NUMBER (OCTAL)

Fig. 86—EADAS/NM Output Response to TR-ACT Message

```
DESCRIPTION: ACTIVATE TRUNK RESERVATION TO REPLACE A PREPROGRAM
INPUT MESSAGE: TR-ACT
OUTPUT MESSAGE(S): NM14
                   NM01
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	1	11
3	0	1	0	1	0	1	0	0	124
4	0	0	0	0	1	1	1	0	16
5	0	1	0	0	0	0	0	1	101
6									1-77
7	0	0	1	0	1	1	1	0	56
8	1	1	0	0	1	0	1	1	313
9	0	0	0	0	1	0	1	1	13

REAL TIME CYCLES REQUIRED 2430

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH (OCTAL)
        3-4 - 16-BIT EQUIVALENT FOR TR-ACT
          5 - 101 ACTIVATED
          6 - SLOT NUMBER (OCTAL)
          7 - ASCII FOR PERIOD (.)
        8-9 - 16-BIT EQUIVALENT FOR REPLACING PREPROGRAMS
```

Fig. 87—EADAS/NM Output Response to TR-ACT Message for Replacing a Preprogrammed Trunk Group Control

```
DESCRIPTION: ACTIVATE TRUNK RESERVATION TO REPLACE A
             FLEXIBLE CONTROL
INPUT MESSAGE: TR-ACT
OUTPUT MESSAGE(S): NM14
                   NM21
```

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	1	11
3	0	1	0	1	0	1	0	0	124
4	0	0	0	0	1	1	1	0	16
5	0	1	0	0	0	0	0	1	101
6									1-77
7	0	0	1	0	1	1	1	0	56
8	1	1	0	0	0	1	1	1	307
9	0	0	0	0	0	1	1	1	7

REAL TIME CYCLES REQUIRED 2015

```
CHARACTER 1 - BUFFER HEADER
          2 - BUFFER LENGTH (OCTAL)
        3-4 - 16-BIT EQUIVALENT FOR TR-ACT
          5 - 101 ACTIVATED
          6 - SLOT NUMBER (OCTAL)
          7 - ASCII FOR PERIOD (.)
        8-9 - 16-BIT EQUIVALENT FOR REPLACING A FLEXIBLE CONTROL
```

Fig. 88—EADAS/NM Output Response to TR-ACT Message for Replacing a Flexible Trunk Group Control

DESCRIPTION: ASSIGN SILC TRUNK GROUP(S)
INPUT MESSAGE: NMG-SILC
OUTPUT MESSAGE: NM35

									OCTAL
1	0	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	1	11
3	1	0	1	0	1	1	1	0	256
4	0	1	0	0	1	1	0	1	115
5	0	1	0	0	0	0	0	1	101
6									101/120/130/117
7									60 TO 71
8									60 TO 71
9									60 TO 71

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR NMG-SILC
5 - 101-ASSIGN
6 - 101-ACCEPT, DUPLICATE/120-DENY, NO BLOCKING PERCENTAGES/130-INVALID/117-OVERFLOW
7-9 - ASCII TRUNK GROUP NUMBER

Fig. 89—EADAS/NM Output Response to NMG-SILC Message for Assigning Trunk Groups SILC

DESCRIPTION: REMOVE SILC FROM TRUNK GROUP(S)
INPUT MESSAGE: NMG-SILC
OUTPUT MESSAGE: NM35

									OCTAL
1	1	1	0	0	0	0	1	0	302
2	0	0	0	0	1	0	0	1	11
3	1	0	1	0	1	1	1	0	256
4	0	1	0	0	1	1	0	1	115
5	0	1	0	1	0	0	1	0	122
6									101/120/130/
7	0	1	0	0	0	0	0	1	101/60 TO 71
8	0	1	0	0	1	1	0	0	114/60 TO 71
9	0	1	0	0	1	1	0	0	114/60 TO 71

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR NMG-SILC
5 - 122-REMOVE
6 - 101-ACCEPT/120-DENY/130-NOT FOUND
7-9 - ASCII TRUNK GROUP NUMBER OR ALL

Fig. 90—EADAS/NM Output Response to NMG-SILC Message for Removing SILC From Trunk Groups

DESCRIPTION: STATUS OF SILC ASSIGNED TRUNK GROUPS
INPUT MESSAGE: NMG-SILC
OUTPUT MESSAGE: NM36

									OCTAL
1									302/303/342/343
2									VARIABLE
3	1	0	1	0	1	1	1	0	256
4	0	1	0	0	1	1	0	1	115
5	0	1	0	1	0	0	1	1	123
6									117/116/120
7									0 TO 144/200
8									0 TO 144/200
9									60/61/62
10									60 TO 71
11									60 TO 71 REPEAT
12									60 TO 71

CHARACTER 1 - BUFFER HEADER
2 - BUFFER LENGTH
3-4 - 16-BIT EQUIVALENT FOR NMG-SILC (STATUS) MESSAGE
5 - 123-STATUS(S)
6 - 116-NOT FOUND INVALID/117-OK/120-DENY
7 - BLOCKING PERCENTAGE WHEN "ESS" SWITCH IS IN MACHINE CONGESTION LEVEL 1 STATE OR OCTAL 200 IF ERROR
8 - BLOCKING PERCENTAGE WHEN "ESS" SWITCH IS IN MACHINE CONGESTION LEVEL 2 STATE OR OCTAL 200 IF ERROR
9 - 60-NO CONGESTION(0)/61-IN MACHINE CONGESTION LEVEL STATE(1)/62-IN MACHINE CONGESTION LEVEL 2 STATE
10-12 - ASCII TRUNK GROUP NUMBER.

Fig. 91—EADAS/NM Output Response to NMG-SILC Message for Status of SILC Assigned to Trunk Groups

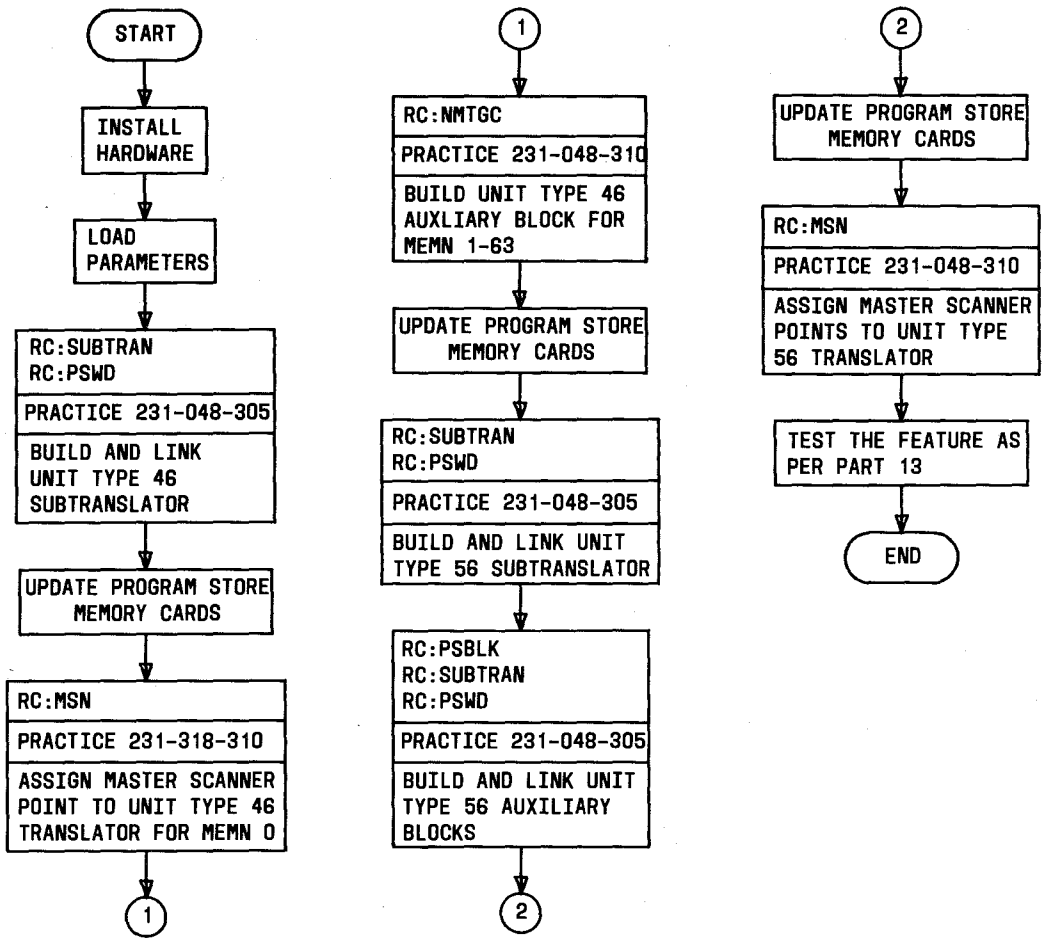


Fig. 92—Network Management Growth/Retrofit Procedures

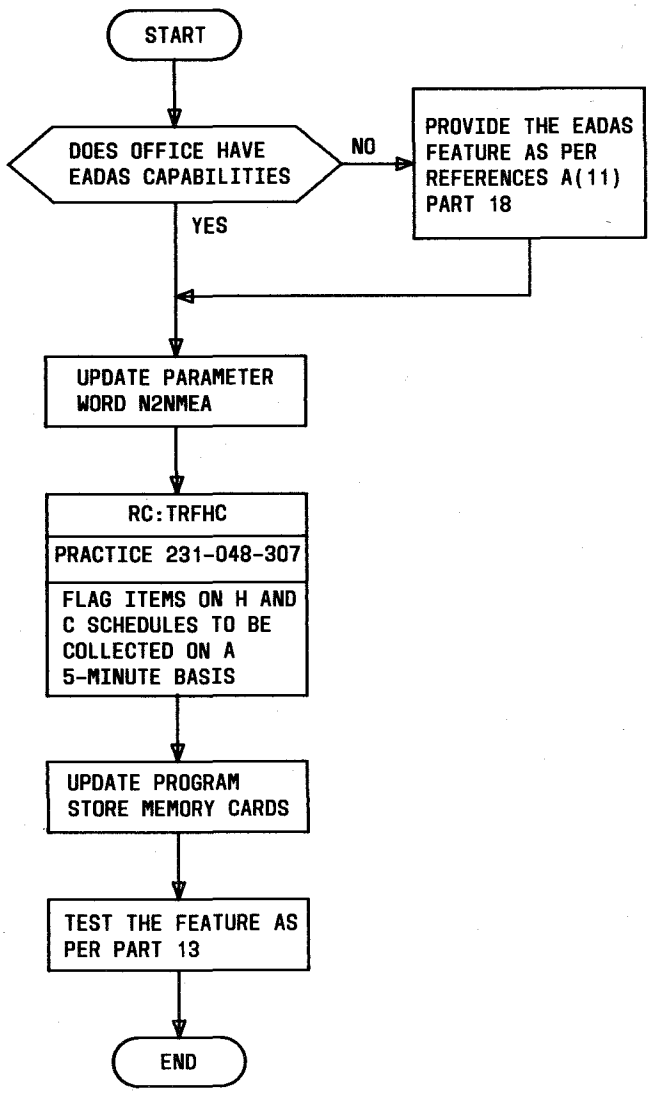


Fig. 93—Growth/Retrofit Procedures for Operation With EADAS/NM

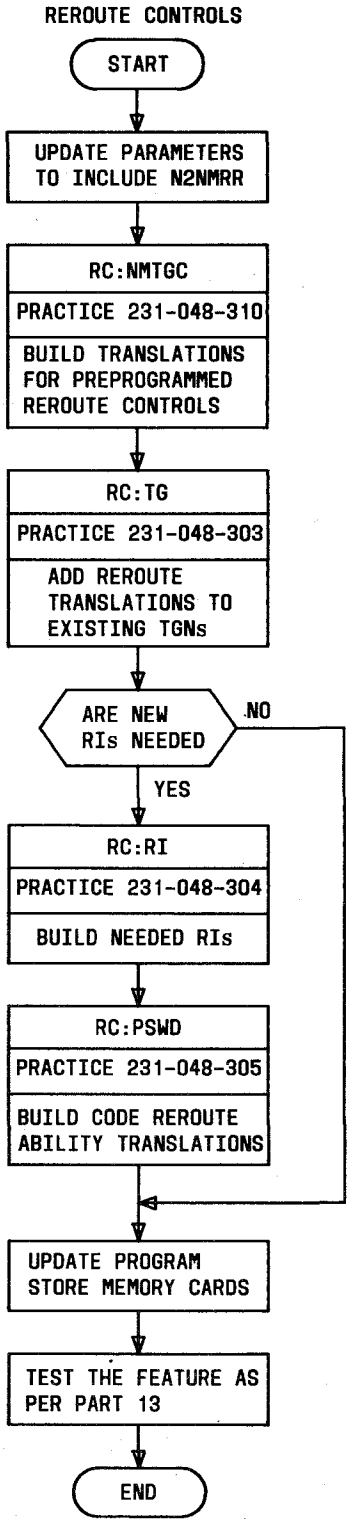
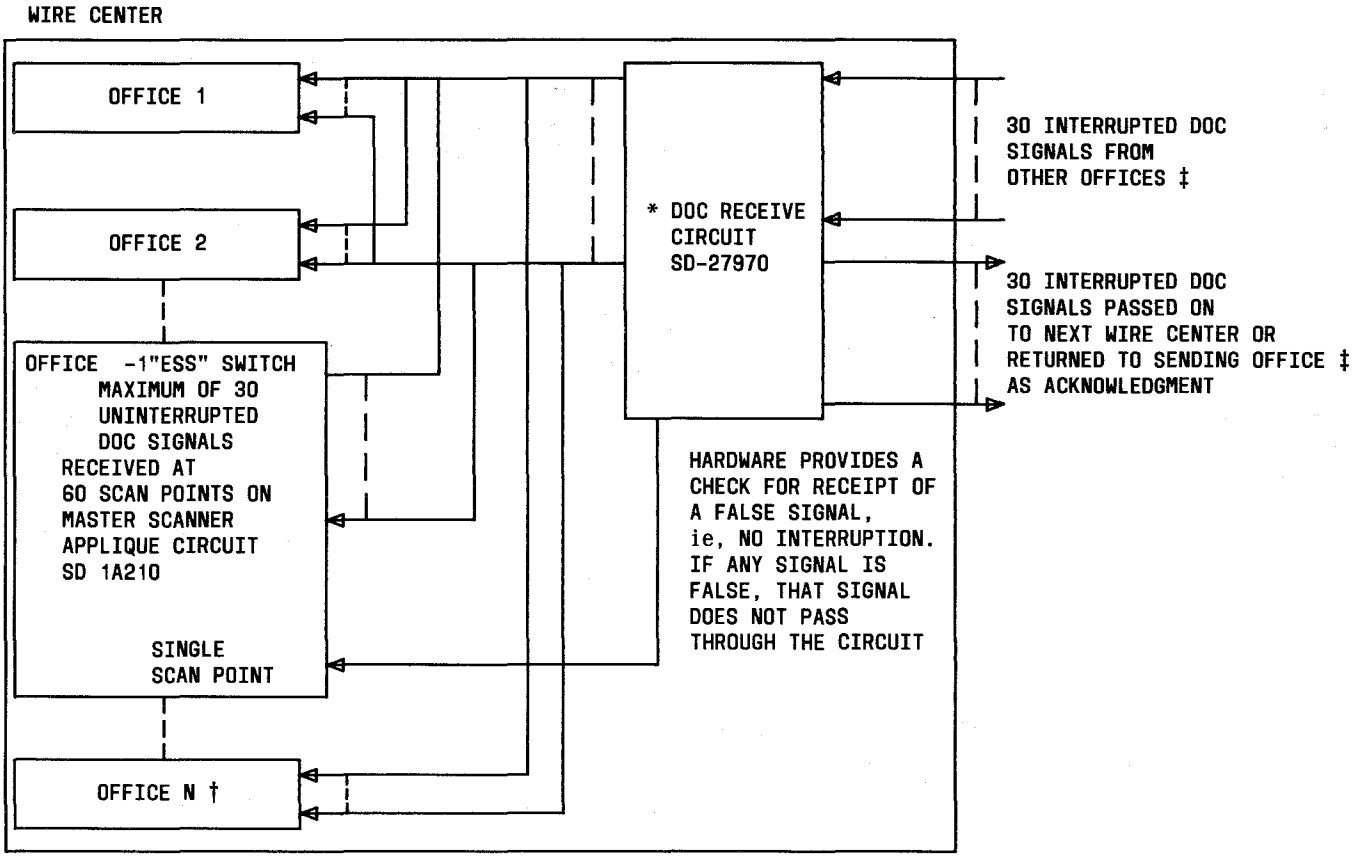


Fig. 94—Network Management Growth/Retrofit Procedures for Reroute Controls



* DOC CIRCUIT SD-27970 IS HOUSED AND MAINTAINED IN ONLY ONE OF THE N OFFICES. FALSE SIGNAL DETECTION IS SENT ONLY TO THIS OFFICE.

† N = 8-(NUMBER OF "ESS" SWITCHES)

‡ VALID INTERRUPTED SIGNAL

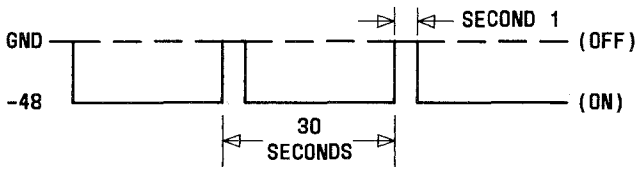


Fig. 95—Functional Hardware Schematic for Dynamic Overload Control (Receive) Circuit

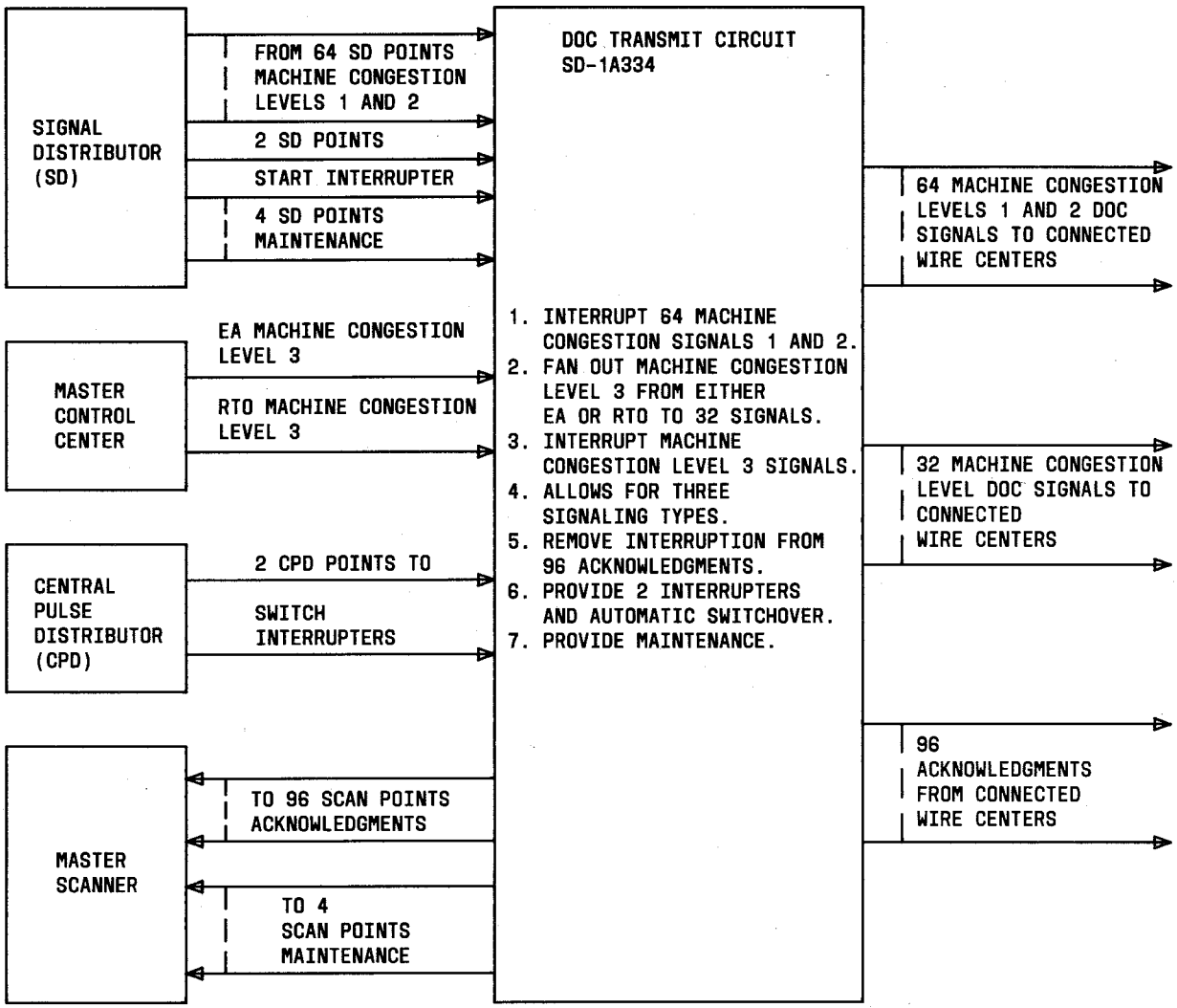


Fig. 96—Functional Hardware Schematic for Dynamic Overload Control Transmit Circuit

TABLE A

CCIS RESPONSE CATEGORY TABLE

RECEIVED SIGNAL	DOC 1				DOC 2				DOC 3 GROUP SIGNALING CONGESTION
Response Category	0	1	2	3	0	1	2	3	All
Percentage Of Alternate-Routed Traffic Controlled	0	0	0	100	0	100	100	100	100
Percentage Of Direct-Routed Traffic Controlled	0	0	0	0	0	0	75	75	100

TABLE B

REAL-TIME THRESHOLDS (LENGTH OF INCOMING OVERLOAD CONTROL QUEUE)

CONDITION	MACHINE CONGESTION LEVEL 1	MACHINE CONGESTION LEVEL 2
Normal	33	66
Minor Overload	19	38
Major Overload	9	18

TABLE C

RECEIVER QUEUE THRESHOLDS (PERCENT FULL)

RECEIVER TYPE	MACHINE CONGESTION LEVEL 1	MACHINE CONGESTION LEVEL 2
MF	40	80
DP	24	48
RP	24	48

TABLE D

MESSAGES FOR ACTIVATION/DEACTIVATION OF NETWORK MANAGEMENT CONTROLS

TYPE OF CONTROL	CONTROL ACTIVATION/DEACTIVATION	
	INPUT	OUTPUT
Call Gapping Controls	CG-ACT	NM05
	CG-RMV	NM06
	CG-CLR	NM08A
	CG-STATUS	NM03
	CG-TRAFFIC	NM11
Flexible Trunk Group Controls	SK-ACT	NM14, NM21, NM01
	CT-ACT	NM14, NM21, NM01
	CF-ACT	NM14, NM01, NM21
	FLEX-DEACT	NM18
	FX-CLEAR	NM08
	TR-ACT	NM14, NM01, NM21
	FX-STATUS	
Preprogrammed Controls	PP-ACT	NM07, NM01
	PP-REM	NM07
	PP-CLEAR	NM08
	PP-EXC	NM07
	PP-STATUS	NM02
	PP-DATA	NM04
Dynamic Overload Controls	DOC-SND	NM20
	DOC-REM	NM20
	DOC-EXC	NM20
	DOC-CLEAR	NM08
	DOC-STATUS	NM23
	DPD-MCONE	NM22
	DPD-MCTWO	NM22
	MFD-MCONE	NM22
	MFD-MCTWO	NM22
	RPD-MCONE	NM22
	RPD-MCTWO	NM22
	RTD-MCONE	NM22
	RTD-MCTWO	NM22
	LST-MCTHREE	NM22
	DR-STATUS	—
	DT-STATUS	—
Selective Incoming Overload Control	NMG-SILC	NM35, NM36

TABLE E

SILC BLOCKING PERCENTAGES

BLOCKING PERCENTAGE	BINARY VALUE	DECIMAL VALUE
0	0001	1
12.5	0010	2
25	0011	3
37.5	0100	4
50	0101	5
62.5	0110	6
75	0111	7
87.5	1000	8
100	1001	9

TABLE F

EADAS/NM INPUT MESSAGE EQUIVALENCE TABLE

MESSAGES	16-BIT EQUIVALENCE (Note)
CF-ACT-	006303
CT-ACT-	007203
CG-ACT-	006343
CG-CLR-	030343
CG-RMV-	032343
CG-STATUS-	050343
DOC-CLEAR-	106744
DOC-EXC-	112744
DOC-REM-	144744
DOC-SND-	046744
DOC-STATUS-	146744
DPD-MCONE-	133004
DPD-MCTWO-	033004
FX-CLEAR-	131406
FLEX-DEACT-	160606
FX-STATUS-	051406
FX-TRAFFIC-	045406
LST-MCTHREE-	033154
MFD-MCONE-	132315
MFD-MCTWO-	032315
NMG-TRAFFIC-	150656
NMG-SILC-	046656
PP-ACT-	007020
PP-CLEAR-	131020
PP-DATA-	103020
PP-EXC-	061020
PP-REM-	013020
PP-STATUS-	051020
PP-TRAFFIC-	045020
RAD-ALLOW-	002062
RAD-INH-	022062
RAD-STATUS-	146062
RPD-MCONE-	133022
RPD-MCTWO-	033022
RTD-MCONE-	133222
RTD-MCTWO-	033222
SK-ACT-	006563
TG-ACT-	006364
TR-ACT-	007124

Note: The low-order byte is transmitted first, followed by the high-order byte.

TABLE G

MATRIX FOR PREPROGRAM TO PREPROGRAM CONTROLS (NOTES 1, 2, AND 3)

	PREPROGRAM MANUAL		PREPROGRAM AUTOMATIC	
	TO CONTROL	FROM CONTROL	TO CONTROL	FROM CONTROL
PREPROGRAM MANUAL TO CONTROL	*	*	†	†
PREPROGRAM MANUAL FROM CONTROL	—	*	†	†
PREPROGRAM AUTOMATIC TO CONTROL	—	—	‡	‡
PREPROGRAM AUTOMATIC FROM CONTROL	—	—	—	‡

Note 1: The "to control" represents CANCEL-TO, SKIP, TRUNK-RESERVATION, and immediate REROUTE controls. The "from control" represents CANCEL-FROM and regular REROUTE controls.

Note 2: Automatic controls are activated via DOC/group signaling congestion signals (conventional DOC activates preprogrammed controls; CCIS DOC/group signaling congestion activates flexible controls).

Note 3: Manual controls are activated via TTY or EADAS/NM.

* The second control overrides the first; only the second control is active.

† The manual control is active and the automatic control is not looked at.

‡ The preprogram of the highest priority has control.

TABLE H

MATRIX FOR PREPROGRAM TO FLEXIBLE CONTROLS (NOTES 1, 2, AND 3)

	FLEXIBLE MANUAL		
	TO CONTROL	FROM CONTROL	FLEXIBLE AUTOMATIC TO CONTROL
PREPROGRAM MANUAL TO CONTROL	*	*	†
PREPROGRAM MANUAL FROM CONTROL	*	*	†
PREPROGRAM AUTOMATIC TO CONTROL	‡	§	‡
PREPROGRAM AUTOMATIC FROM CONTROL	‡	§	‡

Note 1: The "to control" represents CANCEL-TO, SKIP, TRUNK-RESERVATION, and immediate REROUTE controls. The "from control" represents CANCEL-FROM and regular REROUTE controls.

Note 2: Automatic controls are activated via DOC/group signaling congestion signals (conventional DOC activates preprogrammed controls; CCIS DOC/group signaling congestion activates flexible controls).

Note 3: Manual controls are activated via TTY or EADAS/NM.

* The second control overrides the first; only the second control is active.

† The manual control is active and the automatic control is not looked at.

‡ Both controls can affect a call. The flexible control is looked at first; if it does not affect the call, the preprogram control then has a chance to control the call.

§ The automatic preprogram is active and the flexible control is not looked at.

TABLE I

MATRIX FOR FLEXIBLE TO FLEXIBLE CONTROLS (NOTES 1, 2, AND 3)

	FLEXIBLE MANUAL		
	TO CONTROL	FROM CONTROL	FLEXIBLE AUTOMATIC TO CONTROL
FLEXIBLE MANUAL TO CONTROL	*	*	†
FLEXIBLE MANUAL FROM CONTROL	—	*	†
FLEXIBLE AUTOMATIC TO CONTROL	—	—	‡

Note 1: The "to control" represents CANCEL-TO, SKIP, TRUNK RESERVATION, and immediate REROUTE controls. The "from control" represents CANCEL-FROM and regular REROUTE controls.

Note 2: Automatic controls are activated via DOC/group signaling congestion signals (conventional DOC activates preprogrammed controls; CCIS DOC/group signaling congestion activates flexible controls).

Note 3: Manual controls are activated via TTY or EADAS/NM.

* The second control overrides the first; only the second control is active.

† The manual control is active and the automatic control is not looked at.

‡ The DOC control received overrides all existing controls. A group signal congestion control can only override DOC 1 and 2. If DOC 3 is active, the group signal congestion control is ignored.

TABLE J

FEATURE PACKAGE PROGRAM STORE WORDS (NOTE 1)

FEATURE PACKAGE	1AE8
9FEDAS	1900
9FNMEA	2150
9FNMIN	525
9FNMRR	1320
9FNMTD	2305
9FNMTG	3250

Note 1: These program store words are estimated values.