NO. 4 ELECTRONIC SWITCHING SYSTEM

NETWORK MANAGEMENT

EXCEPTION PANEL

1. GENERAL

1.01 The exception panel is provided to give the network manager (NM) an updated view of the network and switching machine. The panel, illustrated in Fig. 1, is a problem detection mechanism. Lamps are used to indicate events or conditions which contain potential NM intervention.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 It is the NMs responsibility to establish thresholds associated with most of the lamps. In the majority of cases, the lamp lights only when critical thresholds have been exceeded.

1.04 There are four update intervals associated with the exception panel, event occurrence, 30 seconds, 5 minutes, and 15 minutes. All categories of the panel fall into one of these periods. Further identification of update intervals is contained in the description of the categories.

NETWORK MANAGEMENT DISPLAY

NETWORK PERFORMANCE

TRAFFIC PATTERNS	COMPLETION DATA	TRUNK SUBGROUP PERFORMANCE

TRAFFIC PATTERNS

INCOMING   OUTGOING

■ FOR REG ■
■ HOME REG ■
■ SUBTEND ■
■ HOME TCA ■

COMPLETION DATA

IMA

■ NC   ■ OUT FAIL
■ TIMEOUTS   ■ INC FAIL
■ INT Q   ■ PSTO/FSA
■ CAMA   ■ VAC/IWK
   ■ CONTROL

INEFFECTIVES

■ ■ ■ NPA IMA
■ ■ ■ NPA INA
■ ■ ■ HOME IMA
■ ■ ■ HOME INA
■ ■ ■ FNPA NXX
■ ■ ■ SPECIAL

TRUNK SUBGROUP PERFORMANCE

NC	OFL	ACH	CCH	NSD	OOS

NETWORK CONTROLS

MANUAL CONTROLS	HARD TO REACH LISTS	TRUNK SUBGROUP CONTROLS

MANUAL CONTROLS

■ CODE BLOCK
■ ROUTE CONTROL
■ ■ REROUTE CONTROL

■ MANUAL CHANGE

HARD TO REACH LISTS

TRANSMIT   CONTROL   CHANGES
■ AUTO   ■ AUTO   ■ INTERNAL ADD
■ MANUAL   ■ MANUAL   ■ INTERNAL DELETE
   ■ REMOTE   ■ REMOTE ADD
■ OVERRIDE   ■ OVERRIDE   ■ REMOTE DELETE

■ LIST OVERFLOW

TRUNK SUBGROUP CONTROLS

STR   AUTO OCR   DOC RECEIVED
■ ACTIVE   ■ ACTIVE   ■ MC 3
■ OVERRIDE   ■ RDB NA   ■ MC 2
   ■ TURNOFF SENT   ■ MC 1
   ■ TURNOFF RCVD
   ■ OVERRIDE   ■ OVERRIDE

MACHINE STATUS

EQPT STATUS	CAPACITY	TEST CALLS	OPERATIONS	INTERNAL CONT	DOC SENT

EQPT STATUS

■ CRITICAL
■ MAJOR ALARM
■ INTERRUPTS
■ CARRIER ALARM
■ CAMA
■ TELEMETRY

CAPACITY

OFL   OOS
■ MF TRMTR ■
■ MF INC ■
■ CAMA OPR ■
■ DP/CCIS ■
■ DISK
■ CR

TEST CALLS

SEIZE TIME
■ MF   ■ ADDRESS TIME
■ DP   ■ RESPONSE TIME
■ CCIS   ■ INCOMPLETES

OPERATIONS

PHASE   OVERLOAD
■ P4   ■ REAL TIME
■ P3   ■ MF INCOMING
■ P2   ■ DP INCOMING
■ P1   ■ CCIS INCOMING
   ■ INTERNAL

INTERNAL CONT

■ DENY ACCESS
■ LIMIT ACCESS
■ LIMIT TASKS
■ DEFER MTCE

■ ALARM OFF●

DOC SENT

MC 1   MC 2   MC 3
■ ■ ■ MF
■ ■ ■ DP
■ ■ ■ CCIS

■ MAN ■ DOC ACK
■ OVRD

Fig. 1—Network Performance

1.05 The exception panel is divided into three major areas, network performance, network controls, and machine status.

1.06 Some lamps installed on the panel will not be operational for the first machines. These will be indicated by an asterisk (*) in the following description. Although for some lamps the exact characteristics of operation are still pending, a description of proposed operation will be included.

1.07 Numerical indicators, referred to as *nixies,* are used in three sections of the exception panel. These are one, two, and three digit indicators. A general rule applies to these indicators, when the number to be displayed is larger than the digits available, the number 9 will be displayed in each of the digits spaces. Example: For a two digit counter a 99 would represent a value of 99 or higher.

1.08 An important item concerning lamps associated with the selective dynamic overload control (SDOC) system—when a higher level SDOC is active, the system assumes the lower levels also exist and activates those lamps also. Example: If MC3 is received, the system would assume MC1 and MC2 and light all three lamps.

2. NETWORK PERFORMANCE

GENERAL

2.01 This area is designed to give the NM a view of the network performance as it relates to the reference machine.

TRAFFIC PATTERNS

2.02 This module is divided into two submodules designated INCOMING and OUTGOING. Updated on a 15-minute basis, this module provides the NM a view of the traffic being processed through the reference machine.

2.03 *Nixies:* At the top of the two submodules is a set of numerical indicators. These indicators provide a numerical display of incoming and outgoing seizures in thousands of calls. The indications are 3-digit counters updated on a 15-minute interval. If for any given interval the count exceeds the capacity of the counter, 999 will be displayed to indicate this condition.

2.04 *Lamps (White):* Under each category there are four lamps. These lamps represent foreign region, home region, subtending, and home toll center area traffic. The lamps will be activated in pairs to indicate the source and destination of traffic overloads.

The computation is derived by accessing the traffic separation counters by incoming separations (INSEP) index for incoming, and destination separations (DESEP) index for outgoing, in each of the four categories. This figure is then divided by the total incoming and outgoing seizure count. When the percent for any given category exceeds the threshold set by the NM, the lamps are activated.

The status of these lamps is updated on a 15-minute basis. When a category no longer exceeds the threshold, the lamp will be deactivated. This module will require the NM to establish percentage thresholds for each cell of the separations matrix.

COMPLETION DATA

2.05 This module contains several indicators relating to the percentage of incoming attempts that succeed in outpulsing and receive answer supervision. This module is divided into two submodules designated ineffective machine attempts (IMA) and INEFFECTIVES.

2.06 *IMA:* Lamps in this submodule are activated when the percentage of a given IMA exceeds its threshold. Several IMA types are assigned to the same lamp. If any one IMA type assigned to a given lamp exceeds a preset threshold, the lamp will be activated. A printout accompanying the lamp activation identifies the specific type of IMA that has exceeded limits.

The IMAs of a given type will be compared with the total attempt count for the same type. The NM, using a CRT page, will designate the threshold for percent of IMA and the minimum number of attempts for which the system should calculate IMA. Ratios for each individual type of IMA will be computed by the system.

Table A illustrates the IMAs associated with each of the 12 lamps in the IMA submodule. Further definition of IMA types can be found in Division H, 9i(3), Part 4.

TABLE A

ASSIGNMENT OF IMA EXCEPTIONS TO LAMPS

<u>LAMP</u>	<u>IMA EXCEPTIONS</u>
Left IMA (White)	Total Percent IMA Exceeds "Low" Threshold
Center IMA (Yellow)	Total Percent IMA Exceeds "High" Threshold
Right IMA (Red)	Announcement Overflow, or 30 Sec. PHF exception
*NC (White)	AOB, GLR, NCI, NCT
*Timeouts (White)	BST, FST, NSD, XST
*INTQ (White)	CQA, CQO, DED, DQA, DQO, HQO, IWF, MAB, MQA, OWF, PHF, TQA, TQF, XQA, ATO
CAMA (White)	OQA, OQO, RQA
*Control (White)	CBB, CFB, CTB, SDB, SRB
*Out Fail (White)	ATO, CFD, SNF, CKF, IKF, UXS
Inc. Fail (White)	CTT, IAD, CPE, CST, CTR, MCA, OPA, OPD, PER, PDA, PDT, UCA
*PSTO/FSA (White)	CGF, FSA, PST
*VAC/IWK (White)	VCA, IWS

* Some lamps installed on the panel will not be operational for the first machines.

The IMA results are computed on a 15-minute basis. These results are compared against volume and failure thresholds. If both thresholds are exceeded for any given type of IMA, the associated lamp will be lighted.

2.07 *Ineffectives:* The second submodule in this area presents exception status of destination codes relating to IMA and ineffective network attempts (INA). Six rows of lamps, three in each row (white, yellow, and red), are used to represent three levels of exceptions for the categories indicated.

The NM will establish thresholds for each of the lamps in this submodule. The NM will also establish a minimum number of attempts that must be reached before the calculations for IMA and INA are performed.

The capability is provided to exclude codes from these displays. The list can contain up to 32 codes which include 3-digit numbering plan areas (NPAs), home central office code (NXX), and up to six foreign NPAs which have 6-digit resolution.

Calculations will be performed on a 5-minute basis for the following.

NPA IMA—Three lamps present exception status of NPAs in regard to percent IMA.

NPA INA—This set of lamps indicates exception status of percent INA.

Home IMA—The exception status of percent IMA for NXXs in the home NPA is presented.

Home INA—The exception status of percent INA for NXXs in the home NPA is presented.

FNPA-NXX—The three lamps in this category present exception status of percent IMA and percent INA for up to six foreign NPAs which have NXX resolution. The NM may assign any of the following modes:

- Collect raw data only, perform no exception calculations

- Collect raw data, perform percent IMA calculations only

- Collect raw data, perform percent INA calculations only

- Collect raw data, perform both percent INA calculations.

Special—These three lamps are provided to monitor 3- and 6-digit codes of special interest. Codes assigned to this category are excluded from the other ineffective categories. Up to 32 codes can be assigned to this category. An NPA assigned to the special will be calculated against thresholds assigned to the NPA category, and not the special category. Codes to be considered for this category would be INWATS, overseas, and codes which are partially code blocked.

TRUNK SUBGROUP PERFORMANCE

2.08 This module consists of six submodules designated no circuit available (NC), overflow (OFL), attempts per circuit per hour (ACH), connections per circuit per hour (CCH), no start dial (NSD), and out of service (OOS). Under each submodule are five rows of indicators. Each horizontal row corresponds to a study group.

2.09 *Study Group:* There are five study groups designated 1, 2, 3, 4 and 5. The NM may assign trunk subgroups (TSGs) to these study groups via CRT page input. There is no limit to the number of TSGs assigned to a given study group as long as the total number of TSGs assigned to the five study groups does not exceed 256.

When a TSG is assigned to a study group, the NM data is collected on a 5-minute basis. Calculations are performed and when thresholds established by the NM are exceeded, the indicators associated with

that study group are activated. The description of each submodule which follows is applicable to all study groups.

2.10 *NC (Nixies)*:* This indicator is updated on a 30-second basis. It indicates the number of TSGs in the study group which are in the no circuit available (NC) state.

2.11 *OFL (White, Yellow):* A pair of lamps for each study group is used to indicate two levels of percent overflow. If one or more TSGs assigned to a given study group should exceed limits established by the NM, the associated lamps will be activated. The percentage of overflow is calculated for each TSG in the study group using the following formula:

$$\frac{\text{Overflow PC}}{\text{Outgoing Seizure PC} + \text{Overflow PC}} \times 100 = \% \text{ OFL}$$

This calculation is made on a 5-minute basis. If the first threshold is exceeded by any TSG in the study group, the left lamp (white) will be activated. If the second threshold is exceeded by any TSG in the study group, the right lamp (yellow) will be activated.

2.12 *ACH (White, Yellow):* A pair of lamps for each study group will indicate exceptions for two levels of attempts per circuit per hour (ACH). The ACH display is updated on a 5-minute basis using the formula:

$$\frac{\text{Outgoing Seizure PC} + \text{Overflow PC}}{\text{Equiv. TSG Size} - \text{Maintenance Busy PC}} \times 12 = \text{ACH}$$

To use this formula, the TSG size is modified to reflect equivalent number of trunks as follows:

TSG SIZE x 1 for 2-way

TSG SIZE x 2 for 1-way outgoing

The calculation is made for each TSG in the study group. If one or more TSGs exceed the first

threshold established by the NM, the right lamp (yellow) will be activated.

2.13 *CCH (White, Yellow):* Two lamps associated with each study groups indicate exceptions for two values of connections per circuit per hour (CCH). The NM must establish a threshold associated with each lamp. The following formula is used to compute CCH for each TSG in the study group:

$$\frac{\text{Incoming Seizure PC} + \text{Outgoing Seizure PC}}{\text{Equiv. TSG Size} - \text{Maintenance Busy}} \times 12 = \text{CCH}$$

If one or more TSGs in the study group exceed the first threshold, the left lamp (white) will be activated. If the second threshold is exceeded, the right lamp (yellow) will be activated. This display is updated on a 5-minute basis.

It should be noted that this is a combined CCH measurement that uses both incoming and outgoing peg count (PC). The TSG size is the equivalent number of 2-way trunks. The number of one-way trunks is doubled to arrive at the equivalent value.

2.14 *NSD (White, Yellow):* Calculations are made for TSGs in each study group to determine the percentage of no start dial (NSD). Two lamps for each study group are used to indicate two levels of NSD. A discrete threshold is set by NM for each lamp. The calculations are compared against the thresholds. If one or more TSGs exceed the first threshold, the left (white) lamp is activated. If the second threshold is exceeded, the right (yellow) lamp is activated. The formula used to determine percent NSD follows:

$$\frac{\text{Time Out PC}}{\text{Outgoing Seizure PC}} \times 100 = \% \text{ NSD}$$

This display is updated on a 5-minute basis.

2.15 *OOS (White, Yellow):* Two lamps are used to indicate percent out-of-service (OOS) exceptions. Updated on a 5-minute basis, the percent out-of-service is computed for each TSG in

each study group. The formula used for this calculation follows:

$$\frac{\text{Maintenance Busy PC}}{\text{TSG Size}} \times 100 = \% \text{ OOS}$$

The NM establishes two thresholds, and the calculations are compared to these thresholds. If the first threshold is exceeded, the left (white) lamp will be activated. If the second threshold is exceeded, the right (yellow) lamp will be activated.

3. NETWORK CONTROLS

GENERAL

3.01 This area is made up of three modules designated, MANUAL CONTROLS, HARD-TO-REACH LISTS and TRUNK SUBGROUP CONTROLS. These modules provide the NM an up-to-date status of the automatic and manual controls that have been implemented.

MANUAL CONTROLS

3.02 This module provides a status of manual controls. It indicates when controls have been implemented and any change in previous status. All lamps in this module are updated on an event basis with the exception of the change lamps. This lamp is on a 5-minute update interval.

3.03 *Code Block (Green):* This lamp will be activated when the first code is inserted into the code block table. After the first code is inserted, the lamp will remain activated until the last code is removed.

3.04 *Route Control (Green):* This lamp is activated when a cancel to, cancel from, or skip control has been inserted for a TSG. This lamp remains activated until all these controls are no longer in effect for any TSG.

3.05 *Reroute Control (Red, Green):* There are two indicators in this category. The left lamp (red) will be activated when a manual reroute fails due to NC or other controls, on the reroute TSG, in a 5-minute period. This lamp is deactivated at the end of a 5-minute period during which no

manual reroute fails. The right lamp (green) is activated, on an event basis, when a manual reroute control is inserted for a TSG. The lamp remains activated until no manual reroute control remains on any TSG.

3.06 **Manual Change (Green):** This lamp is updated on a 5-minute basis. The lamp is activated if a manual control is inserted or deleted for any TSG during the previous 5 minute period. The lamp is deactivated at the end of a 5-minute interval during which no manual control activity has taken place.

HARD-TO-REACH LISTS

3.07 This module is divided into four submodules designated TRANSMIT, CONTROL, CHANGES, and LIST OVERFLOW. These lamps provide hard-to-reach (HTR) status, indicating whether there are codes that would be affected by controls.

3.08 **Transmit:** Under this submodule are three lamps that indicate the addition or deletion of codes on the HTR transmit list.

(a) **Auto (White):** This lamp is activated if at least one code is placed on the HTR transmit list due to internal calculation and the failure rate has exceeded a threshold established by the NM. The display is updated on a 5-minute basis and will be deactivated if the worst failure rate does not exceed the threshold.

(b) **Manual (Green):** This lamp is activated if at least one code is placed on the HTR transmit list via manual insertion by NM personnel. The lamp is deactivated when no manually inserted codes appear on the HTR transmit list.

(c) **Override (Green):** This lamp is updated on an event basis. The lamp is activated when a manual override is specified for any code subject to internal calculation for placement on the HTR transmit list. The lamp will be deactivated when no manual override has been specified.

3.09 **Control:** This submodule consists of four lamps which provide the NM with the status of the HTR control list, in relation to codes being added or deleted.

(a) **Auto (White):** This lamp, updated on a 5-minute basis, indicates that the number of codes placed on the HTR control list due to internal calculation has reached a designated threshold. This threshold is established by the NM. The lamp is activated when the threshold is exceeded and deactivated when the number is less than the threshold.

(b) **Manual (Green):** This lamp is activated when at least one code has been placed on the HTR control list via manual input. This lamp will remain activated until no manually inserted codes remain on the list. This display is updated on a 5-minute basis.

(c) **Remote (White)*:** This lamp is activated when the number of remotely received HTR codes reaches a set limit. The NM must specify the threshold associated with this lamp. Updated on a 5-minute basis, the lamp is deactivated when the number of codes received is less than the threshold.

(d) **Override (Green):** This lamp is activated when a manual override is inserted by the NM for at least one code. This could be a code subject to internal calculation, or a remotely received code to be inserted on the HTR control list. This lamp will remain activated until no override exists.

3.10 **Changes:** Under this submodule are five lamps which provide the NM with the status of the HTR control list in relation to number of codes being added or deleted.

(a) **Internal Add (White):** This lamp gives an indication of the number of new codes placed on the HTR control list as a result of internal calculations. On a 5-minute update basis, the lamp will be activated if the number of new codes exceeds a threshold established by the NM. At the beginning of the 5-minute update interval, the status is re-evaluated. If the threshold is not exceeded, the lamp is extinguished.

(b) **Internal Delete (White):** This lamp indicates the number of codes deleted from the HTR control list as a result of internal calculations. When the number deleted exceeds a threshold established by the NM, the lamp will be activated. At the beginning of the 5-minute update interval,

the status is re-evaluated; if the threshold is not exceeded, the lamp is extinguished.

(c) **Remote Add*:** This lamp is activated when the number of remotely received codes exceeds a threshold established by the NM. The status is re-evaluated at the 5-minute update interval. If the threshold is not exceeded, the lamp is extinguished.

(d) **Remote Delete (White)*:** This lamp is activated when the number of remotely received codes to be deleted from the HTR control list exceeds a threshold established by the NM. The status is re-evaluated at the 5-minute update interval; if the threshold is not exceeded, the lamp will be extinguished.

3.11   List Overflow (Red): This lamp provides the NM an indication that the list is beginning to reach maximum limits. The lamp is activated when the number of codes on the HTR control list exceeds a threshold established by the NM. The lamp will be deactivated when the number of codes on the list is less than the threshold. There are eight thresholds associated with the hard-to-reach module for which the NM must establish values.

TRUNK SUBGROUP CONTROLS

3.12   This module is comprised of three submodules which alert the NM to TSG control activity with respect to selective trunk reservation (STR), automatic out-of-chain routing (AOCR) and selective dynamic overload control (SDOC).

3.13   STR: This submodule consists of two lamps.

(a) **Active (White):** This lamp indicates STR activity. If during the previous 5 minutes at least one call is controlled due to STR threshold comparison, the lamp will be activated. The status is re-evaluated at the 5-minute update interval. If STR is not active, the lamp is extinguished.

(b) **Override (Green):** This lamp is activated when a manual override of STR has been specified for a TSG. This lamp is updated on an event basis and will remain activated until no TSGs are in the STR override state.

3.14   Automatic OCR: This submodule consists of five lamps which inform the NM of activity in AOCR and its degree of success.

(a) **Active (White):** This lamp is updated on a 5-minute interval. The lamp will be activated if during the previous 5 minute period at least one call was automatically out-of-chain routed. The status is evaluated at the update interval, if AOCR is not active, the lamp will be extinguished.

(b) **RDB NA (Yellow):** This lamp will be activated on an event basis when the last available TSG in an AOC routing data block (RDB) was turned off. This turn-off could be either manually or automatically implemented. The lamp will be extinguished when the condition does not exist.

   Note: For Chicago 7, this lamp will be on a 5-minute update.

(c) **Turnoff Sent (White):** This lamp is activated on an event basis if an automatic turnoff message was transmitted after receipt of AOC routed call. The lamp is deactivated when the condition does not exist.

   Note: For Chicago 7, this lamp will be on a 5-minute update.

(d) **Turnoff Received (White):** This lamp is activated on an event basis if an automatic turnoff message was received in response to an out-of-chain (OC) routed call. The lamp is extinguished when the condition does not exist.

   Note: For Chicago 7, this lamp is on a 5-minute update.

(e) **Override (Green):** This lamp is activated when a manual turnoff of a TSG in an AOC RDB is specified. The lamp remains activated until no turnoff is specified.

3.15   DOC Received: This submodule uses two lamps and two numerical counters to provide the NM with an indication of the SDOC signals being received from other offices.

(a) **MC3 (Red):** This lamp is activated when an MC3 signal is received on any TSG. The lamp remains activated until there are no TSGs

in the MC3 state. This lamp is updated on an event basis.

(b) *MC2 (Nixies)*:* This is a numeric display of the total number of TSGs in the MC2 state. This display is updated on an event basis. The count of the number of TSGs in the MC2 state is transmitted to the display each time an MC2 signal is received.

(c) *MC1 (Nixies)*:* This is a numerical display of the total number of TSGs in the MC1 state. This display is updated on an event basis. The count of the number of TSGs in the MC1 state is transmitted to the display each time an MC1 signal is received.

(d) *Override (Green):* This lamp is activated when a manual override of SDOC has been inserted for a TSG. This lamp is updated on an event basis and is deactivated when no TSG is in the SDOC override state.

4. MACHINE STATUS

GENERAL

4.01 This area is divided into six modules. The modules provide the NM with an overall view of the status of the reference machine.

EQUIPMENT STATUS

4.02 Six lamps provide the NM with a status of equipment which may lead to service degradation. Lamps in this group are not activated by the incrementation of counters, but by a flag set in the program by the same conditions that caused the counters to be incremented.

4.03 *Critical (Red):* Anytime the critical alarm source peg counter is incremented, this lamp will be activated. The peg counter will be stimulated by the maintenance center alarm system. This lamp will be updated on a 30-second basis and will be activated anytime an alarm has been active during the past 30 seconds, even if the alarm cleared before the update interval.

4.04 *Major Alarm (Yellow):* This lamp is activated when the major alarm source peg counter is incremented. This peg counter will be incremented when there is a major alarm in the maintenance center. This display is updated every

30 seconds and will be deactivated when there is no major alarm activated.

4.05 *Interrupt (White):* This lamp is activated from the interrupt level duration counter. Each 30 seconds the counter is compared to the previous look. If the difference is greater than 0, the lamp is activated. If the difference is 0, the lamp will be deactivated. Maintenance interrupts (teletypewriter requests) will be excluded. Only an exceptional hardware condition will activate the lamp.

4.06 *Carrier Alarm (Red):* This lamp is activated each time a carrier group alarm is detected by the carrier group alarm program. The update for this lamp is on an event basis. When no carrier group alarm exists, the lamp is deactivated.

4.07 *CAMA (Yellow)*:* This lamp permits the NM to detect centralized automatic message accounting (CAMA) equipment failures, including automatic number identification (ANI) and automatic number failure (ANF). This lamp is updated on a 30-second interval.

4.08 *Telemetry (Red):* This lamp will be activated and deactivated by E2A system hardware. This will be a hardwired connection, and the update will be on an event basis.

CAPACITY

4.09 This module is made up of two submodules which provide the NM a view of service circuit status.

4.10 *OFL:* Under this submodule are six lamps which indicate overflow (OFL) status of service circuits.

(a) *MF TRMTR (Yellow):* This lamp is updated every 30 seconds and indicates multifrequency (MF) transmitter overflow. The lamp is activated when the MF TRMTR queue entry failure peg counter exceeds 0. If the PC is 0 when compared to the previous look, the lamp is deactivated.

(b) *MF INC (Yellow):* One lamp is provided to indicate MF receiver overflow or MF origination queue establishment. The queue length is compared against a threshold established by the NM. Either MF receiver overflow or queue length exceeding the threshold will activate

the lamp. No printout is provided, and ambiguities will be resolved using the CRT. This lamp is updated at 30-second intervals.

(c) **CAMA OPR (Yellow):** This lamp will be activated if the CAMA operator queue overflow PC compared to the previous look is greater than 0. Otherwise the lamp will be deactivated. This display will be updated every 30 seconds.

(d) **DP/CCIS (Yellow):** The following four conditions can be reflected by this lamp:

> DP incoming work list full

> DP outgoing work list full

> CCIS CR queue entry failure

> DP CR queue entry failure.

This lamp is updated on a 30-second basis. Other lamps on the panel will provide resolution as to which condition caused the onset of the lamp. The 15-minute IMA data will also provide resolution.

(e) **DISK (Yellow):** This lamp is activated when the high priority disk queue overflow PC, as compared to the previous 30-second look, is greater than 0. If the difference is equal to 0, the lamp is deactivated.

(f) **CR (Yellow)*:** On a 30-second basis, this lamp indicates an all-busy condition for call registers (CRs) at the time of the update.

4.11   OOS: This submodule provides the NM with a view of service circuits which are maintenance busy.

(a) **MF TRMTR (White):** This lamp indicates that the number of MF transmitters that are maintenance busy have reached a certain threshold. This threshold is established by the NM. The lamp is activated when the maintenance busy PC exceeds the threshold. Updated every 15 minutes, the lamp is deactivated when the threshold is not exceeded.

(b) **MF RCVR (White):** This lamp is activated if the maintenance busy peg count exceeds a threshold which is established by the NM. If

the threshold is not exceeded the lamp will be deactivated. The display is updated on a 15-minute interval.

(c) **CAMA OPR (White)*:** This lamp is activated if the maintenance busy peg counter for a CAMA TSG exceeds a threshold established by the NM. The lamp is deactivated when the threshold is not exceeded. The update is on a 15-minute interval.

(d) **DP/CCIS (White)*:** This display is updated on a 15-minute basis. The lamp is activated if the common channel interoffice signaling (CCIS) XCVR accumulated maintenance occupancy counter exceeds a threshold established by the NM. The lamp is deactivated if the threshold is not exceeded. In the OOS submodule the NM is responsible for designating a total of four thresholds.

TEST CALLS

4.12   The test call program tests the ability of the system to process calls at the current traffic level. The MF, DP, and CCIS calls are tested. Test calls are made by call type in the mix that relates to the installed equipment combination. If the office is engineered for 30 percent MF, 30 percent DP, and 40 percent CCIS, the test call percentages will be the same combination for each cycle. This measurement corresponds to the sender attachment delay recorder (SADR) or receiver attachment delay report (RADR) measurement used in systems other than the No. 4 ESS. The test call cycle consists of 16 test calls which require approximately 150 seconds to complete. The test call module provides the NM with a current indication of the ability of the reference machine to switch calls. The lamps in this module are controlled by 30 second calculations based on most recent 32 test calls. The NM will establish thresholds associated with these lamps.

4.13   Seizure Time: Time indicators in this module are updated on a 30-second basis, but uses the test call cycle data base of 32 test calls. Seizure time is defined as that interval of time between initial bid for service and receipt of the go ahead dial signal.

(a) **MF (Yellow):** This display is activated when the percentage of MF seizures experiencing delay have exceeded a threshold set

by the NM. The NM must also establish the threshold to determine the delay a seizure must experience before it is considered a seizure delay for the purpose of updating this display. The ratio is stated:

$$\frac{\text{No. of MF Seizures} > \text{Threshold}}{\text{Total MF Test Seizures}} \times 100 = \% \text{ Delay}$$

If the threshold for percent experiencing delay is not exceeded, the lamp is deactivated.

(b) *DP (Yellow):* This display is activated when the percent of DP seizures experiencing delay has exceeded a threshold established by the NM. The NM must also establish the threshold to determine the delay a seizure must experience before it is considered a seizure delay for the purposes of updating this display. The ratio is stated:

$$\frac{\text{No. of DP Seizures} > \text{Thresholds}}{\text{Total DP Test Seizures}} \times 100 = \% \text{ Delay}$$

DP seizures = Number of DP seizures experiencing delay. If the threshold for percent experiencing delay is not exceeded the lamp is deactivated.

(c) *CCIS (Yellow):* The display is activated when the percent of CCIS seizures experiencing delay exceeds a threshold established by the NM. The NM must also establish the threshold to determine the delay a seizure must experience before it is considered a seizure delay for the purpose of updating this display. The ratio is stated:

$$\frac{\text{No. of CCIS Seizures} > \text{Threshold}}{\text{Total CCIS Test Seizures}} \times 100 = \% \text{ Delay}$$

CCIS seizures = CCIS seizures experiencing delay. If the threshold for percent experiencing delay is not exceeded, the lamp is deactivated.

(d) *Address Time (Yellow):* The address time for a call is defined as the delay between receipt of the first translatable digit and the seizure of an outgoing trunk. The display is activated when the percent of address times experiencing delay exceeds a threshold established by the NM. The NM must establish a threshold to determine the delay in address time that will be considered as address time delay for the purpose of updating this display. The ratio is stated:

$$\frac{\text{No. of Address Times} > \text{Threshold}}{\text{Total Number of Test Seizures}} \times 100 = \% \text{ Add. Time Delay}$$

Address Time = Address time experiencing delay. If the percent of address times experiencing delay does not exceed the threshold, the lamp is deactivated.

(e) *Response Time (Yellow):* Response time is defined as that time from the end-of-wink on an OGT (E Lead) trunk to the beginning of outpulsing. This lamp is activated when the percent of response time experiencing delay exceeds a threshold established by the NM. The NM must also establish a threshold to determine the amount of elapsed time which will be considered as delay. The ratio is stated:

$$\frac{\text{Response Time} > \text{Threshold}}{\text{Total Test Call Services}} \times 100 = \% \text{ Response Time Delay}$$

Response Time = Delayed response time.

(f) *Incompletes (Yellow):* This display will be activated if the number of test calls which do not complete exceeds a threshold established by the NM. The lamp will be deactivated if the threshold is not exceeded.

OPERATIONS

4.14 This module consists of two submodules. The module provides the NM with a view of the status of the processor and software.

4.15 *Phase:* This display indicates possible software errors. Phase events are begun because data structures have failed to pass audits for validity. High level phases can be indicative of substantial loss of switching capacity.

(a) *P4 (Red):* When the software integrity control (SICO) program, controlling software initialization enters a phase 4, this lamp is activated. The lamp is activated on an event basis and is deactivated when the SICO program relinquishes control.

(b) *P3 (Red):* This lamp is activated on an event basis. The lamp lights when the SICO program enters a phase 3 routine and is deactivated when the phase 3 routine relinquishes control.

(c) *P2 (Yellow):* This lamp is updated on a 30-second basis. The lamp is activated when a phase 2 was initiated during the update interval. To determine this condition the following formula is used:

Phase 2 manually initiated PC + Phase 2 program initiated PC—the previous 30-second look.

If the result of this computation is greater than 0, the lamp is lighted; if the difference is equal to 0, the lamp is deactivated.

(d) *P1 (White):* This lamp is updated on a 30-second basis. The lamp is activated if, during the 30-second interval, a phase 1 was initiated. The formula used to determine this condition follows:

Phase 1 manually initiated PC + Phase 1 program initiated PC—the previous 30-second look at these counters.

If the difference is greater than 0, the lamp is activated. If the difference equals 0, the lamp is deactivated.

4.16 *Overload:* The overload lamps serve to inform the NM that an overload condition exists and to give some explanation about its type. The five lamps in this submodule are updated on a 30-second basis.

(a) *Real Time (Yellow):* The lamp is activated if, at the time of the 30-second look, segment control by the maintenance administration control (MAC) program is specified. If no control is specified, the lamp is deactivated.

(b) *MF Incoming (Yellow):* This lamp is activated if, at the time of the 30-second look, MF SDOC is specified by the overload program. If MF SDOC is not specified, the lamp is deactivated.

(c) *DP Incoming (Yellow):* This lamp is activated if, at the 30-second look, DP SDOC is specified by the overload program. If SDOC is not specified, the lamp is deactivated.

(d) *CCIS Incoming (Yellow):* This lamp is activated if CCIS SDOC control is specified by the overload program at the time of the 30-second look; otherwise, the lamp is deactivated.

(e) *Internal (Yellow):* This lamp is activated if segment control is specified by the overload program for input/output, recent change, network management, or traffic measurements programs. The lamp is deactivated if no control specified.

INTERNAL CONTROL

4.17 This module provides the NM with an indication of what control actions have been taken to relieve an overload condition.

4.18 *Deny Access (Red):* This lamp is activated if main call processing program is descheduled by the overload program, allowing no incoming attempts. If the main call processing is not descheduled, the lamp is deactivated. This display is updated on a 30-second interval.

4.19 *Limit Access (Yellow):* This lamp is activated if main call processing program is limited by the overload program to accept a smaller number of incoming attempts. If the main call processing is not limited, the lamp is deactivated. This display is updated on a 30-second interval.

4.20 *Limit Tasks (Yellow):* This lamp is updated on a 30-second basis. The lamp is activated if the overload program specifies segment restriction for input/output, recent change, network management, or traffic measurements. If there is no restriction specified, the lamp will be deactivated.

4.21 *Defer MTCE (White):* This lamp, updated every 30 seconds, is activated if the overload program specifies segment restriction for the MAC program. If the above condition is not implemented, the lamp is deactivated.

DOC SENT

4.22 This module indicates what control actions have been taken (or not taken by virtue of a manual override) to reduce the influx of traffic contributing to an overload condition. This module consists of four submodules.

4.23 *MC1:* All lamps in this submodule are updated on a 30-second basis. If the SDOC condition does not exist at the update interval, the lamps are deactivated.

(a) *MF (White):* The lamp is activated if the overload program specifies that the system is in MF SDOC MC1 state.

(b) *DP (White):* The lamp is activated if the overload program specifies that the system is in the DP SDOC MC1 state.

(c) *CCIS (White):* The lamp is activated if the overload program specifies that the system is in CCIS SDOC MC1 state.

4.24 *MC2:* The lamps in this submodule are updated on a 30-second basis. If the DOC state does not exist at the time of update, the lamp is deactivated.

(a) *MF (Yellow):* The lamp is activated if the overload program specifies that the system is in the MF SDOC MC2 state.

(b) *DP (Yellow):* The lamp is activated if the overload program specifies that the system is in the DP SDOC MC2 state.

(c) *CCIS (Yellow):* The lamp is activated if the overload program specifies that the system is in the CCIS SDOC MC2 state.

4.25 *MC3 (Red):* There are three lamps in this submodule. They are updated on an event basis. The lamps are activated when an MC3 message is transmitted. The lamps will be deactivated when the MC3 condition is de-escalated to an MC2 or lower condition as specified by the overload program. There is one lamp each for MF, DP, and CCIS.

4.26 *Manual (Green):* This lamp, updated on an event basis, indicates that a SDOC state has been manually specified for a TSG. The lamp is deactivated when no manual specification exists.

4.27 *OVRD (Green):* This lamp indicates an override has been implemented. The lamp is activated when a manual override of SDOC messages to be transmitted is input. The lamp is updated on an event basis and is deactivated when no such override exists on the control list.

4.28 *DOC ACK (Red):* This lamp indicates the status of DOC acknowledge signals. If no DOC acknowledgment was received within 5 seconds, or if acknowledgment was received but no DOC signal sent, this lamp will be activated. This lamp is updated on a 30-second basis. The lamp will be deactivated when no exception to DOC acknowledgment exists.

AUDIBLE ALARM

4.29 The exception panel is equipped with an audible alarm system. The NM will designate those lamps which will activate the alarm.

4.30 At the bottom of the *internal controls* section of the panel is a lamp and key associated with the audible alarm. The key is a cutoff device to silence the audible alarm when desired. The lamp is an indicator that the alarm is in the cutoff state. When this cutoff is in effect, no lamp will produce an audible alarm.

TABLE B

ABBREVIATIONS AND ACRONYMS

ABBREVIATIONS	TITLE
ACH	Attempts Per Circuit Per Hour
ANI	Automatic Number Identification
ANF	Automatic Number Failure
AOB	Automatic Out of Chain Blocked
AOC	Automatic Out of Chain
AOCR	Automatic Out of Chain Routing
ATO	No Audible Ring Trunk
BST	CCIS Backward Time Out
CAMA	Centralized Automatic Message Accounting
CBB	Code Blocked Calls
CCH	Connections Per Circuit Per Hour
CCIS	Common Channel Interoffice Signaling
CFB	Cancel From a Trunk Subgroup
CFD	Call Fail Detection
CGF	Carrier Group Failure
CKF	CCIS Continuity Failure
CPE	CAMA POS Error
CQA	Abandon CCIS Orig. Queue
CQO	CCIS Orig. Full
CR	Call Register
CRT	Cathode Ray Tube
CST	CAMA Seizure Time Out
CTB	Cancel to a Trunk Subgroup
CTR	CAMA POS Trouble Report
CTT	Continuity Time Out
DED	DP Early Digit Lost
DESEP	Destination Separation
DOC	Dynamic Overload Control
DP	Dial Pulse
DQA	Abandon DP Queue
DQO	DP Queue Full
FSA	Abandon False
FST	CCIS Forward Time Out
GLR	Glare
HTR	Hard to Reach
HQO	Hi-Priority Disk Queue
IAD	Incomplete Address
IKF	Integrity Check Fail
INA	Ineffective Network Attempts
INC	Incoming
INSEP	Incoming Separation
IMA	Ineffective Machine Attempts
IWF	Incoming DP Worklist Full
IWS	IWATS Screen Failure
MAB	Miscellaneous Abandon
MAC	Maintenance Administration Control
MCA	Misrouted CAMA
MF	Multifrequency

TABLE B (Cont)

ABBREVIATIONS AND ACRONYMS

ABBREVIATION	TITLE
MQA	Abandon MF Orig. Queue
NC	No Circuit Available
NCI	No Circuit Intertoll
NCT	No Circuit Toll
NM	Network Manager
NPA	Numbering Plan Area
NSD	No Start Dial
NXX	Central Office Code
OC	Out-of-Chain
OFL	Overflow
OOS	Out of Service
OPA	Abandon CAMA Position
OPD	CAMA Position Disconnect
OQA	Abandon CAMA OP Queue
OQO	CAMA OP Queue Full
OVRD	Override
OWF	Out DP Worklist Full
PC	Peg Count
PDA	Abandon Partial Dial
PDT	Partial Dial Time Out
PER	Pulsing Error
PHF	Network Patch Hunt Failure
PST	Permanent Signal Time Out
RADR	Receiver Attachment Delay Report
RDB	Routing Data Block
RQA	Abandon MFR Queue
SADR	Sender Attachment Delay Recorder
SDB	Blocked by SDOC
SDOC	Selective Dynamic Overload Control
SIOC	Software Integrity Control
SNF	Signal Net Failure (CCIS)
SRB	Blocked by STR
STR	Selective Trunk Reservation
TQA	Abandon MFT Queue
TQF	MFT Queue Fail
TSG	Trunk Subgroup
UCA	Unauthorized CAMA
UXS	Unexpected Stop
VCA	Vacant Code Announcement
XQA	Abandon CCIS XCUR Queue
XVCR	Transceiver
XST	Expect Stop Time Out