SWITCHING SYSTEMS MANAGEMENT

NO. 4 CROSSBAR TANDEM

TRAFFIC MEASUREMENTS — NETWORK MANAGEMENT

1. GENERAL

1.01 This section provides information on the Network Management inout/output capabilities in a 4A-ETS equipped with the Peripheral Bus Computer (PBC).

1.02 The PBC is an after-date standard part of all 4A-ETS machines beginning with the Issue 9.1 of the ETS generic program (PG-68000).

1.03 A 1200 W.P.M. DATASPEED (TM, SM) 40 (DS40) terminal printer, and a CRT (cathode ray tube) are used to print the following four types of reports for Network Management purposes:

(1) Automatic

(2) Exception

(3) Demand

(4) Scheduled

The Network Management data terminal is designated Channel 22. A 100 W.P.M. (words per minute) Model 35 TTY, designated as Channel 2, is used to print responses in conjunction with the ETS Network Management Console, and as a back-up for the console, (SD 68604-01), in the event of a console failure.

1.04 The most significant Network Management printouts are the exception reports which print data only when parameters set by the Network Manager have been met or exceeded. These reports are available on a 5-minute basis. Each output data item has an identifier so that templates are not required to interpret output data. Other data are also available on a demand and scheduled basis. The 15-minute marker peg count is printed automatically.

1.05 The PBC provides the necessary data base to interface with Engineering and Administrative Data Acquisition System (EADAS) Phase I or II.

2. NETWORK MANAGEMENT DATA TERMINAL

2.01 The input/output terminal for Network Management in ETS offices equipped with PBC is a DATASPEED 40 equipped with a Cathode Ray Display Tube (CRT) and impact line printer which display and print respectively at the rate of 1200 WPM. Four lines of up to 80 characters can be printed per second. The CRT and printer work independently and one or the other or both, can be turned off. By means of 202T data sets, the terminal may be extended to any remote location. In addition, 202T data sets (one at the processor and one at the terminal) are required if the terminal is to be located more than 50 cable feet from the PBC processor. The NM terminal is designated Channel 22. The Network Management data terminal prints all reports and accepts and responds to input messages in the following priority:

(1) Manual input and response (e.g., demand printout request).

(2) 5-minute exception reports including Sender Attachment Delay Recorder (SADR) reports and scheduled reports for which five-minute calculations are performed.

(3) 15-minute SADR exception and scheduled reports.

(4) 15-minute scheduled data.

2.02 Detailed formats for the Network Management input messages are contained in an input manual, I.M. 68500. Output messages are described in an output manual, O.M. 68500. References to these manuals will be made throughout this practice. Copies of I.M. and O.M. 68500 will be supplied by the Western Electric Co. to each PBC installation.

3. AUTOMATIC REPORTS

3.01 The only report printed automatically on the DS 40 network management data terminal is a 15-minute marker peg count, by train and by total (REPORT: NM15MKR). The peg counts are for the previous 15 minutes. The time of each printout is shown. This report also indicates to the network management personnel that the data terminal and PBC are functioning properly. A 15-minute automatic report of marker peg count is shown in Figure 3b.

4. EXCEPTION REPORTS

4.01 *General*

The network manager is responsible for determining and setting thresholds, via input messages on the data terminal, for the various items which are reported whenever a threshold is exceeded. These printouts may occur every 5 minutes and are called exception reports (REPORT: NM5EX and REPORT: NM5TG). Input message formats for setting thresholds for exception reports are explained in detail in Input Message Manual, IM68500. SADR is the only exception report which will print on a 15-minute as well as a 5-minute basis. Some reports will contain several data items not all of which have exceeded a threshold. An asterisk will be printed beside the item(s) which caused the exception report. Figures 1 to 4 give details on and examples of exception reports:

Figure 1. Types of Exception Reports
Figure 2. Sample 5-Minute Exception Report
Figure 3. Sample 15-Minute (SADR) Exception Report
Figure 4. Threshold Setting Ranges

4.02 *Common Control Peg Counts*

4.02.1 *Marker Peg Count (MPC)*

The Network Manager sets thresholds for the intertoll and toll connecting trains for 5-minute MPC exceptions. Total ITLF (In trunk link frame) PC and PC by train are printed everytime a marker exception is reported. The MPC and the ITLF peg counts also print when any other 5-minute exception occurs.

4.02.2 *Sender Attachment Delay Recorder (SADR)*

SADR counts are used by the NM to monitor machine congestion. SADR data consists of a base count (BC), scored everytime a test call is placed to a sender group (pot) and a delay count (DC), scored everytime a test call must wait more than three seconds for a sender. Seven-second SADR measurements are not required with PBC. The NM sets a %SAD threshold for each type of sender: Multi-frequency (MF), Dial pulse (DP), CAMA, Overseas (OVS), Revertive pulse (RP), and Outdial pulse (ODP). If one of these types meets or exceeds its threshold, the BD, DC, % SAD and all sender groups (pots) of that type with a DC greater

than zero are indicated on a 5-minute exception report. A 15-minute SADR report by type and group is printed whenever a 5-minute SADR exception report occurs.

4.03 *Ineffective Machine Attempts (IMA)*

IMA's are calls which fail within the 4A-ETS. IMA data are reported on a 5-minute exception basis. The NM sets the threshold individually for each IMA item listed in Figure 1. An exception is reported whenever an item meets or exceeds its threshold.

IMA announcement thresholds are computed as percentages of different bases. There is one threshold for FRA OFL. An exception report is generated whenever FRA OFL equals or exceeds this assigned value. The thresholds for FRA, SOA, ROA, NCA, EA1, EA2, and VCA peg count are computed as a percentage of total ITLF peg count, i.e., announcement PC x 100 divided by ITLF. Whenever the threshold for FRA OFL or FRA peg count occurs, all announcements with OFL greater than zero are automatically printed. The two thresholds for the CAMA announcements UCA and MCA are computed as a percentage of CAMA Sender PC thresholds. CAMA Sender peg count also prints out whenever a UCA or MCA exception occurs. The NCIT and NCTC IMA are also computed as a percentage of total ITLF.

4.04 *NC — Network Management Reports*

All NCA calls score a single register in software. In addition, separate "No Circuits" registers (NCIT — NM, NCTC — NM, NCA — NM) indicate the number of calls routed to NCA due to Network Management (including Dynamic Overload) Controls. These counts do not have thresholds associated with them but are reported automatically whenever NCIT, NCTC, or NCA are reported.

4.04.1 *Cancel Follow With Second Trial*

Cancel Follow with Second Trial (CFST) counts are scored by train when D.O.C. is triggered during periods of machine congestion. CFST does not have any thresholds associated with it; it has a PRINT/NO PRINT indicator only. When set to PRINT, CFST data will be reported when it occurs on either train. If the CFST is zero on both trains, no report is made. When the indicator is set to NO PRINT, CFST data is never reported.

4.05   Trunk Group Reports

4.05.1   Five-minute % OFL, ACH and CCH calculations are made on all trunk groups in the 4A-ETS. Exceptions are printed when individual trunk group thresholds are met or exceeded. There are four exception calculations available depending on the type trunk group:

(1) Percent Overflow (% OFL)

(2) Attempts per Circuits per hour (ACH)

(3) Out connections per circuit per hour (OCCH)

(4) In connections per circuit per hour (ICCH)

All calculations can be printed for two-way groups; on one-way outgoing trunk groups the % OFL, ACH, and OCCH are calculated; on one-way incoming groups the ICCH is calculated. The incoming peg count (IPC) used in the ICCH calculation includes only those incoming calls which result in a translation request. During periods of machine congestion when senders are not available the IPC count may be lower than total offered incoming attempts. The percent occupancy for outgoing groups will be printed along with the exception although occupancy does not have a threshold setting. The total number of trunks and the equivalent number of two-way circuits incoming and outgoing are necessary to compute these calculations. These data are supplied to the PBC from the FC-01B and FC-04B forms (Questionnaire E8075) which are completed by the Dial Administrator.

4.05.2   Route Numbers (RN's) are assigned by the NM using input message INPUT:NMRN. A RN is an identifier associated with each route in the office where a route can be:

(1) Only an incoming trunk group

(2) Only an outgoing trunk group or

(3) Associated incoming and outgoing trunk groups.

Associated incoming and outgoing trunk groups are indicated as such on FC-01B and this information is stored in the PCS. Associated trunk groups form a route between two locations; they can contain

two-way trunks or incoming only and outgoing only trunks or a combination of all three. In the case of associated incoming and outgoing trunk groups, when anyone of the four exceptions occure, all the data and calculations for both directions are printed.

4.05.3   Group Numbers (GN's) are also assigned by the NM using input message INPUT: NMRN. Trunk data which will be reported in REPORT: NM5TG and REPORT: NM 15TG are printed in a sequence dependent on the GN and RN assigned. All routes with the same GN are printed consecutively by ascending RN. Groups are printed in order of ascending GN and separated from one another by blank lines. For this reason, GN's and RN should be assigned   usually by network hierarchy, to facilitate the NM's use of printout data.

4.05.4   In   the   exception   report   REPORT: NM5TG the name of the group and real time and reference data are printed. This data includes the number of equivalent two-way outgoing trunks (OTKS-EQ2W) and equivalent two-way incoming trunks (ITKS-EQ2W) outgoing peg count (PC) and overflow (OFL), and incoming peg count (IPC).

An asterisk follows all exception calculations which equal or exceed their thresholds. (See Figure 2.)

4.05.5   The Trunk Group Index (TGI), shown in Figure 2 is the ETS index used by the network manager to implement a control on a given trunk group through the Network Control Console (NCC). The TGI will be printed out on each exception report to facilitate application of network controls. Only the first TGI of a multiple-part trunk group will be printed (i.e., more than one GB relay assigned).

4.06   Common Control Usage

4.06.1   Five-minute usage exception reports are made on the following common control equipment when thresholds are met or exceeded:

(1) Markers

(2) Senders, by group

(3) Decoder channels

(4) Link controllers by group

(5) Transverters by group

The exception calculation is based on a total percent occupancy threshold set by the NM. When an exception occurs, the following information on that item will be printed as shown on Figure 2:

(1) Average number out of service (AV#OUT)

(2) Maintenance CCS (MCCS)

(3) Traffic CCS (TCCS)

(4) Total CCS (TOTCCS)

(5) % occupancy (%OCC)

(6) Peg count (PC)

(7) Holding time per attempt (HT/A)

The Network Manager may set eight percent-occupancy thresholds. These are for markers, MF Senders, DP Senders, CAMA Senders, OVS Senders, Decoder channels, link controllers, and transverters.

4.07   First Trial Failures

4.07.1   Five minute exception reports are provided on Follow with Second Trial — All trunks Busy (FST-ATB) and sender retrials due to No Sender Ahead (NSD) when thresholds on these items are met or exceeded.

4.07.2   The FST-ATB threshold is a percentage of marker train peg count. An FST-ATB exception on either train causes data for both trains to be printed, with an asterisk indicating the train causing the exception.

4.07.3   The No Sender Ahead threshold is a percentage of total marker peg count. NSD is scored only on first trail failures which are given a retrial. Second trial failures are sent to ROA (recorder announcement) and score the Final Attempt Reorder (FATR) register. During periods of machine congestion sender retrial is cancelled (short sender timing triggered) and calls then failing the first trial due to no sender ahead are sent to SOA (sender overload announcement).

NSD does not include calls failing the first trial which are sent to SOA.

4.08   Reroute Peg Counts

The Reroutes Peg Count and the Traffic Overload Reroute Control (TORC) data each have PRINT/NO PRINT indicators the same as CFST data. When either of these items are to be reported, they appear in the five minute exception report as shown in Figure 2. Reroute Peg Count is the total of all calls rerouted by the ETS console and, in Regional Centers, by TORC operation.

4.09   INWATS

A five-minute exception will print when the total INWATS PC meets or exceeds a threshold percentage of the ITLF PC. When INWATS data is reported, the PC and % ITLF for INWATS total, originating, thru, and terminating are included.

5. DEMAND REPORTS

5.01   General

Demand reports may be requested at anytime by Network Management. The data printed is for the most recent 5-minute clock interval and will print out even though thresholds on the item requested have not been met or exceeded.

5.02   Demand Reports For Real Time Data

Demand reports for real time data may be requested on all items which appear in exception report printouts REPORT: NM5EX and REPORT: NM5TG using input messages as shown in Figure 5.

5.03   Demand Reports For Reference Data

The Network Manager can at anytime demand reference information. This category includes threshold settings and trunk group records and may be obtained using input messages OP: NMTG, OP: NMTGT, and OP: NM5EXT outlined in I.M.68500.

5.04   Dial Administration Data

The Network Manager can demand schedule-type dial administration data which normally only prints on the dial administra-

tion Channel 23 data terminal. The NM cannot receive DA exception reports nor can he schedule DA reports. Input messages necessary to obtain DA reports are included in Figure 6 and described in I.M.68500.

6. SCHEDULED REPORTS

6.01 *General*

The Network Manager can schedule certain data categories to print on a scheduled basis using input messages REPT: NM5EX, REPT: NM5TG, and REPT: NM15TG, as described in I.M. 68500. These reports can be scheduled for up to 60 five- or fifteen-minute intervals (5 or 15 hours) and will have to be rescheduled if they are desired for a longer period of time.

6.02 *Scheduled 5 Minute Reports*

All of the items, listed in Figures 1 and 5; plus DRE (but excluding reference data, CFST and RR) may be scheduled for up to 60 five-minute printouts. Scheduled five-minute items are included in the five-minute exception reports REPORT: NM5EX and REPORT: NM5TG. An asterisk prints at the beginning of scheduled report line to distinguish it from an exception report line. See input message descriptions outlined in Figure 6 (input messages REPT: NM5EX, and REPT: NM5TG).

Items scheduled for 5-minute reporting will be printed out along with any exception data which occurred during the requested period. Trunk data from both sources will print out according to the trunk group RN number as shown in Figure 2, page 2. An asterisk will print at the beginning of a line of scheduled data output. An exception item will have an asterisk printed beside the value which exceeded a threshold.

6.03 *Scheduled 15 Minute Reports — Trunk Group Data*

Fifteen-minute trunk group data may be scheduled on up to 64 routes for up to 60 intervals (15 hours). All trunk group reference information in the 5-minute trunking report (output message REPORT: NM5TG) is also printed in the 15-minute report. (Output message REPORT: NM15 TG). Input message REPT: NM15TG is used to specify the trunk groups and number of output report periods.

6.04 *Scheduled 15-Minute Reports — Traffic Separation*

The primary purpose of traffic separation is to provide data for Division of Revenues. In the PBC, the Dial Administrator assigns incoming trunks, and the incoming portion of 2-way trunks, to one of eight categories (1-7 and "none"). Assignments are made on Form Code 01B. Outgoing traffic separation (A-G and "none") is by trunk group route index and is assigned on Form Code 05. The available classifications of traffic separation invariably exceed the Division of Revenue requirements. The network manager in conjunction with the Dial Administrator can utilize this extra break-down capability to obtain data on where traffic is coming from and going to.

The network manager should work with the dial administrator in the assignment of traffic separation categories to:

(1) Meet Division of Revenue requirements.

(2) Facilitate analysis of traffic flow through the machine.

Examples of incoming classifications might be:

(1) Originating TC Switchboards

(2) Originating DDD

(3) Other subtending groups

(4) Home Region — Intra state

(5) Home Region — Interstate, etc.

Outgoing classifications could be in a similar pattern.

6.05 *Demand and Scheduled Data*

Demand and scheduled data print on the DS 40 only in response to an input message. Attachment 6 outlines the data categories that may be requested and also:

(1) The input message required for each data category.

(2) The types of data printed for each request.

Network Management input messages in this

category start with the verbs OP (for demand messages) and REPT (for scheduled messages) and are explained in detail in I.M. 68500.

7. THRESHOLD SETTINGS

7.01 Thresholds have to be set on all items in the exception reports. Thresholds to be set and the range over which each threshold is adjustable are outlined in Figure 4. All NM threshold input messages start with the 5-letter verb INPUT.

The Network Manager is responsible for setting the threshold parameters for each individual office. Parameters, for common control equipment, may be affected by the age and type of equipment and, for trunks, by calling patterns etc. For these reasons it is not practical to establish threshold guidelines, which could apply throughout the system. The input message for submitting common control and IMA thresholds is identified as INPUT: NM5EXT. Detailed instructions are given in I.M. 68500.

7.02 *Trunk Group Thresholds*

Trunk group thresholds are established by a two-step procedure. First, a threshold data table must be built for exception calculations. Seven thresholds are set for each trunk group calculation (% OFL, ACH, OCCH, or ICCH) with input message INPUT: NMTGT. For example, the NM may assign the following values:

LEVEL	%OFL	ACH	OCCH	ICCH
1	0	10	5	5
2	2	12	7	7
3	10	15	9	9
4	25	18	11	11
5	50	20	13	13
6	80	25	15	15
7	100	35	18	18

7.03 After the network manager has established the trunk group threshold table he then assigns to each trunk group (RN) threshold indices for each of the four trunk group data categories with the input message INPUT: NMTGTI. For example, if the thresholds desired for a particular

trunk group were:

% OFL	=	10%
ACH	=	10
OCCH	=	7
ICCH	=	7

the indices assigned for that group would be (using the previous table):

% OFL	=	3
ACH	=	1
OCCH	=	2
ICCH	=	2

Note: The assignment of a threshold index of zero to a data category for a group suppresses the threshold comparison for that item.

This arrangement gives the network manager the capability of assigning a group of trunks to one set of parameters for ABD surveillance and then, by simply changing the threshold table, affect a change for exception reporting on peak days. Of course the same change could be affected by changing the indices for each trunk group, but this would be a much longer procedure.

7.04 *Change in Equivalent 2W Circuits*

The number of equivalent 2-way circuits for each group is obtained via ETS Form Codes FC-01 and FC-04. This number can be changed by the NM when all trunks are not in service due to directionalization or trouble to get valid calculations of ACH, OCCH, ICCH. This is done by using input message INPUT: NMEQ2W. This message is also used to restore the number of equivalent 2-way circuits to the original number when all circuits are back in service.

8. DATASPEED 40 TERMINAL TRANSFER

8.01 The functions of DATASPEED 40 terminal 22 may be manually transferred to Channel 23 using input message RMV: DTERM. Service may be restored to Channel 22 by inputting the message RST: DTERM from either Channel 20 or 21. There is also automatic back-up and transfer of Channel 22 to Channel 23 in the event of trouble.

TYPES OF EXCEPTION REPORTS

DATA	EXCEPTION CALCULATIONS
1. Machine Peg Counts:	PC by train, total PC*
Marker PC by train	Total PC
ITLF PC by train	Total PC*
CAMA Sender PC	
2. SADR Counts:	
BC, DC by type	%SAD
BC, DC by group (15 minute basis)	%SAD
3. Ineffective Machine Attempts:	
PC & OFL for FRA, SOA, ROA, NCA, VCA, EA1&2	ANN PC AS % ITLF, FRA OFL
NCIT, NCTC	PC AS % ITLF
NCA, NCIT, NCTC — NM (controls)	PC AS % ITLF*
CFST IT, TC	PC AS % ITLF
UCA, MCA PC & OFL	PC AS % CAMA Sender PC
4. Trunk Groups:	
PC, OFL, IPC, CCS	% OFL, ACH, OCCH, ICCH
	% OCC* for each group
5. First Trial Failures:	
FST-ATB PC by train	PC AS % MARKER PC by train
No Sender Ahead PC	PC % MARKER PC
6. Common Control Usage:	
MTC CCS, TOT CCS, PC for	% Total Occupancy
Markers by train	Average Number Out,*
Senders by group	TFC CCS*, Holding Time*
Decoder Channels	
Link Controllers by group	
Transverters by group	
7. INWATS: Total, Thru,	Total as % ITLF
Originating, Terminating PC	Thru, Orig, Term, as % ITLF*
8. Reroute Counts:	Total PC
Total Reroute PC	PC per trunk group
TORC PC	

* These calculations will not have a threshold associated with them.

Note: 1-7 above (excluding CFST, including DRE) maybe demanded anytime
using input messages OP:NM5EX and OP:NM5TG as described in Input Manual 68500.

FIGURE 1

SAMPLE 5 MINUTE EXCEPTION REPORT

REPORT:NM5EX
NETWORK MANAGEMENT 5 MINUTE EXCEPTION REPORT
AKRN OH 02 T5A   1/3/74   10:30

REGISTER	IT PC	TC PC	TOTAL
MARKER	3075	3726	6751
ITLF	3015	3705	6720
CAMA SNDR			1203

REGISTER		PC	%MKR
FST-ATB IT		40	1.4*
FST-ATB TC		10	0.3
NSDR		30	0.4

REGISTER	PC	OFL	% ITLF
FRA	220	1	3.3*
SOA	21	0	0.3
ROA	50	2	0.7
NCA	40	0	0.6
EA1	5	0	0.1
EA2	10	0	0.1
VCA	30	0	0.4
UCA	10	1	% CAMA
MCA	2	0	0.2

REGISTER	PC		% ITLF
NCIT TOTAL	32		0.4
NCIT NM	2		0.0
NCTC TOTAL	7		0.1
NCTC NM	3		0.0
NCA NM	5		0.0
CFST IT	3		0.0
CFST TC	1		0.0
INWATS TOTAL	75		1.1
ORIGINATING	20		0.3
THRU	12		0.2
TERMINATING	43		0.6
REROUTE	10		

TORC PC
  FROM
  NRWY IL NO 4AT   0
TO
  WHPL NY 02 4AT   0

FIGURE 2
PAGE 1

REPORT:NM5TG
NETWORK MANAGEMENT 5 MINUTE TRUNK GROUP EXCEPTION REPORT
AKRN OH 02 T5A   1/03/74   10:30

NAME	EQ2W OTKS	PC	OFL	%OFL	ACH	CCH	IN CCH	IPC	EQ2W ITKS	OUT %OCC	TGI	RN
*NRWY IL NO 4AT	155	307	222	72*	24*	6	6	77	153	95	460	1
CHCG IL 03 4AT	36	48	40	83	16*	3	4	12	36	90	572	2
CHCG IL 02 4MT	16	22	15	68	17*	5	5	7	16	87	376	3
DESM IA DT 4AT	36	58	47	85	19*	3	4	12	36	98	1,054	6
*WHPL NY 02 4AT	132	117	440	34*	11	9*	8*	88	135	85	1,276	40
ALBY NY SS 4AT	24	145	139	96*	72*	3	3	6	24	100	2,064	44
*DNVR CO MA 4AT CF	72	120	84	70*	20*	6	4	24	72	83	1,890	70
DNVR CO MA 4AT 1W	48	100	72 .	72*	25*	7	5	20	46	92	1,895	71
DNVR CO MA 4AT IF	12	21	17	81	21*	4	6	6	12	93	1,886	72
CLEV OH 03 4AT	10	12	2	17	14	12				94	186	100
MDNA OH 07 4AT							3 '	6	24	100	0	760

EQPT	AV=OUT	MCCS	TCCS	TOTCCS	%OCC	PC	HT/A
ITMKR	1	3	12	15	50	3,025	0.40
TCMKR	0	1	14	15	53	3,726	0.38
DCH	2	5	15	20	67	7,000	0.21
MF-A	5	14	46	60	50	844	5.45
DP	2	6	66	72	60	505	13.08
CAMA-A	1	2	94	96	80	1,442	6.52
LKCNT-B (MF-A)	4	13	81	94	05	1,020	0.53
TRNSV	2	5	22	27	75	1,400	1.57

Note: In the Trunk Group Exception Report on asterisk at the
beginning of the line indicates data printed for a scheduled report.
An asterisk beside a value within the line indicates an item where
threshold was exceeded.

FIGURE 2
PAGE 2

SAMPLE 15 MINUTE EXCEPTION REPORT

REPORT:NM15EX
NETWORK MANAGEMENT 15 MINUTE EXCEPTION REPORT
AKRN OH 12 T5A   1/03/74   10:30

TYPE	BC	DC	%SAD
MF	180	18	10.0
MF-A	22	4	18.2
MF-B	22	2	9.1
MF-C	23	1	4.4
MF-D	22	3	13.6
MF-E	23	2	8.7
MF-F	23	5	21.7
MF-G	23	0	0
MF-H	22	1	4.6
DP	24	3	12.5
CAMA-A	21	6	28.6

SAMPLE AUTOMATIC 15 MINUTE MARKER REPORT

REPORT:NM15MKR: AKRN OH 02T5A   1/03/74 10:30
IT MKR PC 16472   TC MKR PC 16191   MKR TOTAL PC 32663

FIGURE 3

THRESHOLD SETTING RANGES

DATA CATEGORY	RANGE	# OF THRESHOLDS TO BE SET
1. MARKER PC	0-6000 (incr. 100)	2 (IT & TC)
2. SADR (DC AS A % BC)	0-10 (Whole #'s)	6 (MF, DP, OVS, CAMA, ODP, RP)
3. IMA		
(A) FRA OFL	0-10 (whole #)	1
(B) ANN PC AS % ITLF	0-10 (one dec.)	7 (FRA,SOA,ROA,NCA,EA1&2,VCA)
(C) ANN PC AS % CAMA SNDR	0-10 (one dec.)	2 UCA & MCA
(D) NCIT & NCTC AS % ITLF	0-10 (one dec.)	2 (See Note 2)
4. COMMON CONTROL % OCCUPANCY	0-100 (whole #'s)	8 (Decoders, markers)
		MF,DP,CAMA,OVS SENDERS, LINK CONT & TRANS.
		(See Note 3)
5. FIRST TRIAL FLRS		
(A) FST-ATB %MKR	0-5 (one dec.)	2 (IT & TC)
(B) NO SNDR AHEAD % MKR	0-5 (one dec.)	1
6. REROUTE COUNTERS	PRINT/NO PRINT	2 (Total reroute PC & TORC DATA)
7. CFST	PRINT/NO PRINT	1
8. INWATS		
TOTAL (AS A % ITLF PC)	0-50 (whole #'s)	1
9. TRUNKS		
% OFL	0-100 (whole #'s)	7
ACH	0-50 "	7
OCCH	0-20 "	7
ICCH	0-20 "	7

NOTE: 1. Thresholds for categories 1-8 are set using input message INPUT: NM5EXT. Thresholds for % OFL, ACH, OCCH and ICCH are set with input message INPUT:NMTGT: Threshold indexes for each trunk group (RN) are set with input message INPUT:NMTGTI: (See IM68500 for exact formats).

         2. Item 3(D) is based on final route TPC classification, not on the train.

         3. Item 6 — Total Reroute count includes TORC counts.

FIGURE 4

DEMAND AND SCHEDULE REPORT DATA

DATA CATAGORY	DATA INCLUDED	INPUT MESSAGES TO	
		Demand Data	Schedule Data
1. Machine PC	MKR IT, TC, TOTAL ITLF IT, TC, TOTAL CAMA SNDR PC	OP:NM5EX	REPT:NM5EX
2. SADR	BC, DC, % SADR FOR MF, DP, CAMA, OVS, ODP, RP	OP:NM5EX	"
3. IMA	PC, OFL, % ITLF FOR FRA, ROA, NCA, EA1&2, VCA. PC, OFL, % CAMA SNDR FOR UCA, MCA PC, % ITLF FOR NCIT, NCTC FST-ATB, INWATS	OP:NM5EX	"
4. COMMON CONTROL	AV#OUT, MCCS, TCCS, TOT CCS, % OCC, PC, HT/A	OP:NM5EX	"
5. FIRST TRIAL FALURES	FST IT, FST TC, FST TOT, % IT MKR, % TC MKR, % TOT MKR NSDR PC, % MKR	OP:NM5EX	"
6. INWATS	TOTAL PC, ORG PC, TERM PC, THRU PC, % ITLF FOR EACH	OP:NM5EX	"
7. TRUNKS			
(A) 5 Min. data	PC, OFL, % OFL, ACH	OP:NM5TG	REPT:NM5TG
(B) 15 Min. data	OCCH, ICCH, IPC % OCC		REPT:NM15TG
8. DRE	PC, USAGE	OP:NM5EX	REPT:NM5EX
9. REFERENCE DATA			
(A) THRESHOLDS GENERAL	ALL NON TRUNKING THRESHOLDS	OP:NM5EXT	—
(B) THRESHOLDS TRUNKS	% OFL, ACH, OCCH, ICCH	OP:NM5TGT	—
(C) TRUNK RECORDS	1WO,2W, IW!, EQ2WIN EQ2WOUT, TGI, RN, CLLI, & THRESHOLD INDEXES (%OFL, ACC, OCCH, ICCH).	OP:NMTG	—

FIGURE 5

NETWORK MANAGEMENT CHANNEL 22 INPUT MESSAGES

Input message formats (data fields) are outlined in detail in I.M. 68500. The verb and identifier for most input messages used by the Network Manager follows:

INPUT:NMTGT:

Sets trunk group %OFL, ACH, OCCH AND ICCH thresholds

INPUT:NMTGTI:

Sets trunk group threshold indicies

INPUT:NMRN:

Assigns route numbers (RN'S) to trunk groups

INPUT:NM5EXT:

Sets thresholds for 5 minute exception report data categories other than trunks

OP:NM5EX:

Request to print 5 minute exception report machine data

OP:NM5TG:

Request to print 5 minute exception report trunk data

OP:NMTG:

Request to print trunk reference data (thresholds, trunk quantities, etc.)

OP:NMTGT:

Request to print thresholds for %OFL, ACH, OCCH AND ICCH

OP:NM5EXT:

Request to print thresholds for machine data

REPT:NM5EX:

Message to schedule 5 minute machine data

REPT:NM5TG:

Message to schedule 5 minute trunk data

REPT:NM15TG:

Message to schedule 15 minute trunk data

REPT:DIMAH:

Message to print IMA for a specified hour

REPT:DMLSS:

Message to print MLSS for a specified hour

REPT:DTSEP:LDAY:

Message to print previous days traffic separation

REPT:DTSEP:

Message to print traffic separation for a specified hour

RMV:DTERM:

Message to remove data terminal 22 from service. Data transfers to Chan. 23

RST:DTERM:

Message to restore data terminal 22 to service.

REPT:DTBPC:

Message to print trunk block connector peg counts for a specified hour

REPT:DTKOT:

Message to print out-trunk group report for a specified hour

REPT:DINTK:

Message to print in-trunk group report for a specified hour

REPT:DMISC:

Message to print office reserved counters for a specified hour

FIGURE 6