SERVICE ANALYSIS
GUIDELINES AND PROCEDURES
NETWORK ADMINISTRATION
DIGITAL MULTIPLEX SYSTEM-10

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1. GENERAL

1.01 This section provides the network administrator (NA) with recommended guidelines and procedures for analyzing data obtained from the Digital Multiplex System (DMS-10*). The information is based on the 207 generic. It also gives the NA an insight to the total scope of the network activities that require constant surveillance in order to provide the ultimate service capabilities through efficient administration.

1.02 Whenever this section is reissued, this paragraph will contain the reason for reissue.

1.03 The title of each figure includes a number(s) in parentheses which identifies the paragraph(s) in which the figure is referenced.

1.04 The data available to monitor system performance and level of service are in the Operational Measurements System software program in the DMS-10. Operational measurements are discussed in detail in Section 241-120-040 and Northern Telecom Practice (NTP) 297-3001-456. Data sources and analysis tools are described in Part 3 of this section.

1.05 The NA is responsible for scheduling, collecting, analyzing, and administering the data pertinent to the surveillance of the DMS-10 office.

2. DATA SURVEILLANCE

A. Operational Measurements System

2.01 The types of data collected are as follows:

(a) ***Peg Count (PEG):*** A count of the number of times a particular event occurs.

(b) ***Network Blockage (BLK):*** A count of blockages that occur in the switching network due to the unavailability of a path.

(c) ***Traffic Blockage (BLK):*** A count of unsuccessful call completion due to network blockage or lack of office resources.

(d) ***Usage (USE):*** The amount of time a particular piece of equipment is in use or the duration of a particular call type. Usage data are expressed in units of hundred call seconds (CCS).

(e) ***All Resources Busy (OVFL):*** A count of the number of times a request for a particular resource is denied due to an all items busy condition.

(f) ***Percent Service Delay (%):*** A percentage of the requests for a particular service that are delayed beyond a specified time interval.

(g) ***Request (REQ):*** A count of the number of times a particular resource is requested.

2.02 The data are stored in accumulation registers and in holding registers internal to the DMS-10. It requires no external equipment. Data can be printed on the TTY of the NA by schedule for daily surveillance or on request if problems exist.

> ***Note:*** Measurement printouts by request reflect the current contents of the holding registers, ie, data collected since the last scheduled printout. The accumulation register data will not be affected.

2.03 Data are considered valid when it reflects accurate accounts of the performance of the switching machine. Reliability tests and validation procedures are defined in Section 241-120-040. When it is determined that the data collected are valid, it is the responsibility of the NA to review the data to ensure an acceptable grade of service is being given the customer. In the event that the the grade-of-service criteria are not met, corrective action must be taken to guard against system overload and/or deterioration of service. For system overload recovery procedures, refer to Part 4 of this section.

B. Dial Tone Delay

2.04 Dial tone delay is the time between an off-hook condition to the return of dial tone. Multifrequency (MF) and DIGITONE† receivers are analog service circuits that are engineered, according to a delay criteria, to return dial tone within 3 seconds. Part 3 of this section describes the Dial Tone Delay Measurement Program and service circuit analysis.

*Trademark of Northern Telecom Limited.

†Trademark of Northern Telecom Limited.

C. Matching Loss

2.05 Matching loss (blockage) results when a call cannot complete due to the unavailability of a path. Calls defined as blocked must be analyzed. Part 3 of this section describes calculations and formulas to be used to analyze blocked calls.

3. DATA SOURCES AND ANALYSIS TOOLS

A. Traffic Measurements

3.01 The Operational Measurements System data are printed out in the form of measurement blocks. Measurement blocks currently in the Operational Measurements System are described in NTP 297-3001-456 and Section 241-120-040. Data may only be requested on a per block basis. Printouts to the TTY can be scheduled to occur every:

- Quarter hour (QRTR)
- Half hour (HALF)
- Hour on the hour (HRHR)
- Hour on the half hour (HRHF)
- Daily (DALY) at a specified hour (0 to 23)
- Weekly (DOWK) on a specified day(s) at a specified hour (0 to 23).

B. Dial Tone Delay Measurements

3.02 Data on the grade of dial tone service that customers receive can be found in the Originating Service Operational Measurement Block (OPM) 002. Dial tone speed tests are timed on all off-hook line originations. Peg count is shown on DIGITONE service calls originating, dial pulse calls originating, and total number of originating calls.

> ***Note:*** The peg count of total calls originating can be greater than the total of DIGITONE service and dial pulse calls due to some originating calls requiring neither service (such as manual lines). See Fig. 1 and 2. Tables A and B contain the descriptions for the mnemonics shown in these figures.

3.03 The DMS-10 dial tone registers provide measurements similar to other switching systems. It is recommended that the NA use the local company standard form for recording busy hour dial tone speed data.

3.04 Network Administration is responsible for reviewing dial tone data daily to ensure that an acceptable grade of service is being given to the subscribers. American Telephone and Telegraph Company (AT&T) traffic engineering is based on 1.5 percent dial tone delay during the average busy season busy hour (ABSBH). If the dial tone delay exceeds 1.5 percent, the NA must determine the reason and one or more of the following corrective actions should be considered:

- Reduction in the amount of service circuits in a made busy condition (man-made busy or machine-made busy)
- Verification of translations to ensure calls are processing correctly
- Redistribution of trunks, lines, and/or service circuits over multiplex (MUX) loops.

3.05 Dial tone is provided from the DMS-10 by tone and digit senders (TDSs). The TDS data are provided in OPM 005. See Fig. 2. Dial tone is provided to rotary dial subscribers directly from the TDS pack. For subscribers with the DIGITONE service option, a DIGITONE service receiver (DTR) pack must be attached to the line. Dial tone is then routed from the TDS pack to the subscriber's line via the DTR pack. This process requires two connections—one from TDS to DTR, and one from DTR to the line circuit. DIGITONE service receiver data are also measured in OPM 005 along with dial tone requests.

C. Matching Loss Measurements

3.06 The data necessary for analyzing traffic distribution, originating service, and terminating service are measured in the first six blocks of the Operational Measurements System. Data will be shown in the form of requests, peg count, usage, and blockages. The peg count and usage data are on successful calls only, eg, each call for which ringing begins and each call to a busy number. In order to have matching loss considered a blocked call, a called line must be idle and the service circuit must be available.

3.07 The NA can use measurement blocks OPM 001 through OPM 003 (Fig. 3 and Table C) to ana-

lyze switching performance. This is done by taking the number of blocked calls divided by the total number of attempts and multiplying by 100 to get a percentage. This percentage is called matching loss. The three types of matching loss used as service indicators and their respective formulas are as follows:

(a) ***Incoming Matching Loss (IML):*** The inability to find a talk path for an incoming trunk to an idle called line. Less than 2 percent of the attempts should experience a block in the office during the ABSBH.

Note: Incoming Service (ISVC), OPM 003, contains receiver delay (RDLY) data which is the percentage of incoming calls that are not connected to a receiver within 3 seconds.

$$\% \text{ IML} = \frac{\text{INTM BLK}}{\text{INTM PEG} + \text{INTM BLK}} \times 100$$

(b) ***Outgoing Matching Loss (OML):*** The inability to complete a talk path between a line and an idle trunk on a desired route. Less than 1 percent of the attempts should experience a block in the office during ABSBH.

$$\% \text{ OML} = \frac{\text{OROG BLK}}{\text{OROG BLK} + \text{OROG PEG}} \times 100$$

(c) ***Intraoffice Matching Loss (IAML):*** The inability to complete a talk path between a line and an idle called line (intraoffice call). Less than 4 percent of the attempts should experience a block in the office during ABSBH.

$$\% \text{ IAML} = \frac{\text{ORTM BLK}}{\text{ORTM PEG} + \text{ORTM BLK}} \times 100$$

3.08 Matching loss is an indicator of customer service. The AT&T traffic engineering is based on a 2 percent IML during the ABS. Therefore, whenever the IML, OML, or IAML is 2 percent or greater at any time, customer service is below the objective. When a thorough analysis of the data indicates corrective action is necessary, one or more of the following actions should be considered:

- Reduction in the amount of equipment out of service (tone and digit sender packs, MF receiver packs, service network packs, and conference packs)
- Check translations to determine if the routing information is correctly completing call processing
- Trunk, service circuit, and/or line redistribution over MUX loops.

3.09 All percent matching loss levels are based upon 600 CCS per MUX loop. Peg count, blockage, and usage on MUX loops (by common equipment [CE] shelf) are provided in OPM 006 (Fig. 4 and Table D). However, because Network Administration assigns by peripheral equipment (PE) shelf location, it is necessary to determine which PE shelves are being served by which MUX loops. This association can be determined from Office Record 001 or by querying the system. To query the system, use the **OVLY NTWK** command. This overlay program will list PE shelves and the MUX loops that serve them. The NA can then determine if MUX loop CCS is nearing or exceeding the 600 CCS capacity.

Note: Each multiplexed network loop is paired with another network loop in a different CE shelf. In the event of a failure in a MUX loop, the mate will carry traffic on four shelves instead of two. However, the traffic capacity will be reduced from 300 CCS to 150 CCS per shelf. Two simultaneous network loop outages will require that maintenance personnel be dispatched to the central office to restore service.

D. Noncompleting Calls

3.10 Noncompleting calls are those originating or terminating attempts that cannot complete due to insufficient or mutilated digits, dialed number is disconnected, or dialed number is a vacant code, etc. Calls defined as noncompleting may be routed to

an announcement, a tone, an operator, or a combination of tone or announcement followed by operator. The NA is responsible for the translations that route noncompleting calls to the various recorded announcements, tones, etc. Parts 6 and 7 of this section describe recorded announcement options, capacities, and recommendations for routing.

3.11 Noncompleting calls, both originating and terminating, are measured in OPM 001, Traffic Measurements (Fig. 5 and Table E). Noncompleting calls fall into three categories:

(a) ***Ineffective attempt:*** When a customer dials a number and the call cannot complete.

(b) ***Permanent signal:*** When a customer receives dial tone but fails to dial any digits. Permanent signal treatment begins 30 seconds after receipt of dial tone.

(c) ***Partial dial:*** When a customer dials an incorrect number of digits.

3.12 The DMS-10 will route these calls to a tone or recorded announcement trunk specified in the generic configuration records of translation (Form GCON CNFG 06). Peg count of the attempts that terminate on a tone or announcement trunk appear in OPM 004 and OPM 005. The system will also peg these attempts as a noncompleting call in OPM 001.

3.13 If the peg count of noncompleting calls exceeds the peg count of tone and announcement trunks, the NA should determine the reason and take corrective action. Verify translations to be sure the calls are routing correctly. Notify the appropriate engineer for traffic requirements for additional equipment for announcements or tones. Also, the Switching Control Center (SCC) should be notified and their assistance requested if required.

3.14 Examples of tone and announcement trunks that will also produce peg count in the noncompleting columns are as follows:

- Partial dial
- Permanent signal
- Vacant code
- Access code omitted (1+)
- Access code dialed in error (1+)
- Custom calling dialed in error.

E. Service Circuit Analysis

3.15 Service circuit data are provided in OPM 005. See Fig. 2. Items measured include receivers (DIGITONE service and MF), senders, and tones. Every call through the network will produce peg count in either the digit sender column or in a tone column, ie, busy tone, ringback tone, reorder, etc. Therefore, the DIGITONE service sender peg count plus the peg counts of all the tones measured should equal the service network peg count. Unreasonable peg counts should be analyzed and corrective action taken. If the system detects invalid route information, ie, vacant code, call processing will direct the call to an announcement based on translations.

3.16 Blockage can occur when trying to set up to an idle service circuit. In OPM 005, compare the number of requests for DIGITONE service receivers and MF receivers against the peg counts on DIGITONE service receivers and MF receivers to ensure calls are processing correctly. Also, the peg count of DIGITONE service and dial pulse calls found in OPM 002 should be equal to the peg count of dial tone found in OPM 005. As stated earlier, the peg count of total calls (shown in OPM 002) can be greater than DIGITONE service plus dial pulse calls due to some originating calls requiring neither service.

3.17 When data reflect that a problem exists in the service circuits, the NA may query the system with an overlay circuit (**OVLY CKT**) command that will list the following:

- Maintenance busy circuits (MMB)
- Call processing busy circuits (BUSY)
- Circuits in lockout (LKOT).

The NA should notify the SCC for assistance in restoring the service circuits to service. (See NTP 297-3001-506 for a detailed description of overlay circuits.)

F. Trunking Analysis

3.18 Trunk service results are provided in measurement block OPM 004. See Fig. 6 and Table F. The data are divided into outgoing trunk groups

and incoming trunk groups. Maintenance calls are excluded from these data.

3.19 The NA is responsible for analyzing trunk service results. All instances of overflow should be identified and the percentage of overflow computed. (Overflow divided by peg count equals percentage of overflow.) If the percentage is above expected limits (based on previous office history), the reason should be determined and corrective action taken.

3.20 Incoming and outgoing trunk groups that have members that are made busy (circuit found faulty or man-made busy) produce peg count and usage in measurement block OPM 008. Outgoing trunk groups will also show overflow registrations, if any, to that trunk group. The SCC can assist with determining which trunk circuits are in a made-busy condition, possibly causing overflow registrations, or the NA can use the **OVLY CKT** command to list trunks that are MMB, BUSY, or in LKOT status. The **OVLY CKT** command will also list all incoming and outgoing trunks by trunk group number specified by the NA. The list prints the physical location, hardware type, and status of the specified trunk group. Refer to NTP 297-3001-506 for detailed instructions.

3.21 The NA may also schedule a trunk study using study registers in OPM 007. See Fig. 7 and Table G. Instructions are detailed in NTP 297-3001-456. The study will reflect peg count and usage on every member of a trunk group that is added to study registers. The NA should notify the trunking engineer and request their assistance if trunk group augmentation is required.

G. Maintenance Printouts

3.22 Measurement block OPM 008 provides data on equipment unavailability. See Fig. 8 and Table H. The DMS-10 performs diagnostic tests internally on control, network, and peripheral equipment. If a faulty unit is detected, the system will automatically disable the active unit and turn up the standby unit. Maintenance personnel can manually perform this task.

3.23 Each time a piece of equipment is disabled, it will be reflected in the peg count column(s) of the maintenance block. The usage column will reflect the amount of time (in CCS) the equipment is disabled. It is recommended that this measurement block be scheduled to print out on the Network Administration terminal for service surveillance.

4. SYSTEM OVERLOAD RECOVERY PROCEDURES

4.01 The objective of the DMS-10 recovery system is to minimize service interruption. The system performs continuous diagnostic tests on its own operation and initiates corrective action if a fault is detected. The TRAP sequence determines the cause of the fault, ensures that there is enough memory to run software, checks the integrity of the memory, and effects a system recovery. The TRAP sequence is a program within the Trouble Report Analysis System (TRAS). The system recovery can be either execution of a software Initialization (INIT), a system reload (SYSLOAD), or System Memory Automatic Regenerative Technique (SMART) Program. Both hardware and software detected errors can invoke the TRAP sequence for recovery action.

A. Initialization

4.02 The INIT program initializes and allocates call store, configures the networks according to current status in data store, and rebuilds stable calls from data in the network connection memories.

B. System Memory Automatic Regenerative Technique

4.03 The SMART program uses standby memory to restore system information. Without causing a reload of system information from tape, SMART allows the system to recover from a memory fault within 10 to 15 seconds. During this time, stable calls will remain intact, but the system will not respond to new requests for service or complete calls in the process of being set up. The INIT and SMART recovery do not affect measurement data. They are resident programs that are able to correct faults with no disruption to service.

C. System Reload

4.04 In the event that INIT or SMART cannot recover the system, a reload of system information from tape (SYSLOAD) will be executed. The SYSLOAD recovery time varies from 3 to 7 minutes, during which the effect on system operation is the same as described for SMART recoveries. Stored OPM data may be lost due to a SYSLOAD as it causes all OPM registers to be set to zero. All OPM data collected since the last printout will be lost.

4.05 An interactive program exists which allows communication with the DMS-10 via a TTY.

All diagnostics and tests output a message identifying faulty units clearly by physical location ensuring minimal delay in repair activities. Peg count on initializations and other failures can be found in measurement block OPM 008. The DMS-10 will also print a message on the TTY in the event of SYSLOAD, SMART, or INIT. Central office (CO) maintenance personnel must notify the NA when a failure occurs that may affect data measurements.

5. LINE LOAD CONTROL

5.01 When a traffic overload is caused by excessive originations by subscribers, the DMS-10 line load control (LLC) feature can restrict originating service to designated essential lines. Call processing will then only respond to originations from subscriber lines located in pack positions 12, 13, and 14. Trunk service packs are not affected.

5.02 The system will not automatically activate this feature. The LLC must be activated manually by CO maintenance personnel via a TTY.

5.03 All calls in progress (dial tone and beyond) are not affected, but nonessential lines will have no dial tone. Terminating calls are not affected.

5.04 The LLC will remain during an INIT, but SYSLOAD will deactivate the LLC feature. The message **LLC001 ACT** will print on the TTY every 15 minutes as long as the LLC feature remains active.

5.05 The LLC activation should follow local procedures, based on system standards, and whenever possible should be jointly determined by the local network maintenance and network administration personnel.

6. RECORDED ANNOUNCEMENT ADMINISTRATION

6.01 Announcements are used to inform customers and operators of the disposition of dialed calls. Announcements are provided by a recorded announcement machine. (The AUDICHRON* recorded announcement machine is usually provided by Northern Telecom with the DMS-10.) The calling subscriber will receive an audible ringback tone while waiting for the start of an announcement. The announcement will cycle one to three times, depending on office engineering. Thereafter, the connection will route to operator intercept, a tone, or line lock out.

*Registered trademark of the Audichron Company.

6.02 The NA is responsible (except as modified by local Bell Operating Company [BOC] practices) for administering recorded announcements as follows:

- Assignment of announcement trunks
- Recording of announcements
- Monitoring recordings for proper wording and clarity
- Analysis of recorded announcement traffic data.

6.03 Each AUDICHRON recorded announcement machine will provide up to six channels. Each message will last 13.5 or 27.5 seconds maximum. It is recommended that the NA ensure that there are recorded announcements to handle the following call types:

- Temporary disconnect number
- Permanent signal
- Vacant (unassigned) code
- Vacant (unassigned) directory number
- Changed directory number
- Custom calling in error
- Revertive calls
- Machine congestion (reorder tone may be used).

6.04 Recorded announcement messages should be Bell System standard. Recommended standard announcement wording can be found in Section 780-200-020. Messages can be modified with the recorder built into the announcement machine at the DMS-10 CO. The announcement machine is arranged to run continuously. Should the announcement machine system fail, subsequent calls are routed to overflow.

6.05 The NA is responsible for monitoring recorded announcements for correct wording and clarity every 30 days, or more frequently if required locally. It is recommended that directory

numbers be assigned, via translations, to each recorded announcement trunk to enable the NA to monitor the announcements from remote locations. Monitoring can also be performed directly in the CO. Announcement trunks should be equipped so that an announcement will be heard from the start of the message.

6.06 Surveillance of the data contained in trunk measurement block OPM 004 is necessary to ensure recorded announcement facilities are adequate. The NA should notify the traffic engineer if overflow registrations on announcement trunks indicate the need for additional recorded announcement facilities.

7. TONES AND ROUTES

7.01 Tones are also used to inform customers and operators of the disposition of dialed calls. In the DMS-10, call progress tones are provided by tone and digit senders.

7.02 All calls that do not terminate on a line within the DMS-10 office must terminate on a route. Therefore, all tone and announcement, outgoing, and test trunk groups require a route number. There are a maximum of 256 routes (000 to 255) available in the DMS-10.

7.03 Route 000 is defined as lockout. Lockout is equivalent to high and dry in Electronic Switching System (ESS) machines. It is recommended that the NA use route 000 for any items that need translating which do not apply to their offices. Additional route numbers can be found in Configuration Record 06.

8. REFERENCES

8.01 The following Bell System Practices will aid the NA in accomplishing the required administrative functions. See Section 780-100-027 for a complete list of recommended documents.

SECTION	TITLE
241-120-010	Manual Office Records
241-120-011	Line and Number Administration
241-120-020	Translations
241-120-030	Data Modification Operations
241-120-040	Data Management
241-120-060	Machine Capacity Management
780-200-014	Determination of Line and Number Requirements

8.02 In addition, the following NTPs may be of use to the NA.

SECTION	TITLE
297-3001-060	Performance Oriented Practices User's Guide
297-3001-100	General Description
297-3001-105	Features and Services Description
297-3001-150	Equipment Identification
297-3001-181	Line Circuit Interface
297-3001-182	Trunk Circuit Interface
297-3001-200	System Growth Practices
297-3001-300	Input/Output System
297-3001-304	Data Modification—General
297-3001-307	Line Load Control
297-3001-311	Data Modification Manual
297-3001-450	Traffic Provisioning
297-3001-456	Operational Measurements
297-3001-506	Maintenance Diagnostics Input Manual

OPM 002 OSVC CHLN THUR 15/10/81 09:00:00 HRHR

	PEG
PSIG	00014
PDTO	00000
PABN	00069
FSTR	00184
DGTC	00188
DPC	00836
TOTC	01033
	%
DGTS	000.0
DPS	000.0
TOTS	000.0

Fig. 1—OPM 002—Originating Service (3.02)

OPM 005 SVCE CHLN THUR 15/10/81 09:00:00 HRHR

	REQ	PEG	USE	OVFL
DGTR	00188	00188	0011.9	00000
MFR	00556	00556	0008.3	00000
SNET	02310	02308	0144.7	
DSND	00500	00500	0008.9	
BUSY	00069	00069	0001.8	
RNGB	00677	00675	0098.8	
RORD	00015	00015	0000.5	
DIAL	01024	01024	0031.7	
HOWL	00012	00012	0002.3	
HIGH	00004	00004	0000.0	
LOW	00002	00002	0000.0	
SPDT	00000	00000	0000.0	
CFMT	00000	00000	0000.0	
CWT	00007	00007	0000.7	

Fig. 2—OPM 005—Service Circuits (3.02, 3.05, 3.15)

OPM 003 ISVC CHLN THUR 15/10/81 09:00:00 HRHR

	PEG
PSIG	00000
PDTO	00001
PABN	00003
HITS	00006
MFRC	00556
TOTC	00608
	%
RDLY	000.0

Fig. 3—OPM 003—Incoming Service (3.07)

OPM 006 NTWK CHLN THUR 15/10/81 09.00:00 HRHR

NTLP	PEG	BLK	USE
SNWK CE 1 4 11	00628	00000	00022
CONF CE 1 4 12	00003	00000	00000
PESH CE 1 4 13 1	00080	00000	00083
PESH CE 1 4 13 2	00236	00000	00105
PESH CE 1 4 14 1	00113	00000	00204
PESH CE 1 4 14 2	00163	00000	00090
PESH CE 1 4 15 1	00071	00000	00066
PESH CE 1 4 15 2	00136	00000	00102
PESH CE 1 4 16 1	00172	00000	00121
PESH CE 1 4 16 2	00258	00000	00068
PESH CE 1 4 17 1	00078	00000	00081
PESH CE 1 4 17 2	00250	00000	00233
PESH CE 1 4 18 1	00288	00000	00329
PESH CE 1 4 18 2	00000	00000	00000
PESH CE 1 4 19 1	00237	00000	00101
PESH CE 1 4 19 2	00162	00000	00144
SNWK CE 1 5 11	01021	00000	00053
CONF CE 1 5 12	00003	00000	00000
PESH CE 1 5 13 1	00169	00000	00095
PESH CE 1 5 13 2	00238	00000	00083
PESH CE 1 5 14 1	00216	00000	00072
PESH CE 1 5 14 2	00107	00000	00133
PESH CE 1 5 15 1	00130	00000	00082
PESH CE 1 5 15 2	00158	00000	00137
PESH CE 1 5 16 1	00179	00000	00094
PESH CE 1 5 16 2	00128	00000	00106
PESH CE 1 5 17 1	00064	00000	00103
PESH CE 1 5 17 2	00236	00000	00314
PESH CE 1 5 18 1	00000	00000	00000
PESH CE 1 5 18 2	00000	00000	00000
PESH CE 1 5 19 1	00213	00000	00104
PESH CE 1 5 19 2	00243	00000	00214
SNWK CE 2 2 11	00083	00000	00003
CONF CE 2 2 12	00001	00000	00000
PESH CE 2 2 13 1	00394	00000	00203
PESH CE 2 2 13 2	00000	00000	00000
PESH CE 2 2 14 1	00137	00000	00077
PESH CE 2 2 14 2	00118	00000	00049
PESH CE 2 2 15 1	00221	00000	00105
PESH CE 2 2 15 2	00000	00000	00000
SNWK CE 2 3 11	00328	00000	00038
CONF CE 2 3 12	00003	00000	00000
PESH CE 2 3 13 1	00000	00000	00000
PESH CE 2 3 13 2	00000	00000	00000
PESH CE 2 3 14 1	00258	00000	00058
PESH CE 2 3 14 2	00063	00000	00040
PESH CE 2 3 15 1	00000	00000	00000
PESH CE 2 3 15 2	00000	00000	00000
JCTR			
GRP 0 — 1	00684	00000	00477

Fig. 4—OPM 006—Network Loop (3.09)

OPM 001 TRAF CHLN THUR 15/10/81 09:00:00 HRHR

	PEG	BLK	USE
ORTM	00245	00000	00306
OROG	00492	00000	01248
ORNC	00043		
RVRT	00000		00000
INTM	00433	00000	01204
INOG	00000	00000	00000
INNC	00015		

Fig. 5—OPM 001—Traffic Distribution (3.11)

OPM 004 TRK CHLN THUR 15/10/81 09:00:00 HRHR

OGP #	PEG	OVFL	USE
001	00011	00000	00022
002	00014	00000	00028
003	00001	00000	00002
004	00041	00000	00082
005	00067	00000	00124
006	00036	00000	00072
007	00016	00000	00032
008	00014	00000	00028
009	00006	00000	00012
010	00037	00000	00074
018	00021	00000	00042
029	00015	00000	00030
030	00001	00000	00002
031	00006	00000	00012
034	00007	00000	00014
042	00215	00000	00430
043	00002	00000	00004
044	00057	00000	00114
045	00041	00000	00082
046	00001	00000	00002
047	00067	00000	00134
055	00016	00000	00032
056	00014	00000	00028
062	00000	00000	00000
063	00000	00000	00000

IGP #	PEG	USE
029	00040	00139
030	00032	00104
031	00052	00183
040	00044	00095
041	00000	00000
048	00008	00008
062	00010	00017
063	00001	00001

Fig. 6—OPM 004—Trunk Groups (3.18)

OPM 007 SREG CHLN THUR 15/10/81 09:00:00 HRHR

			PEG	USE
DN 675	2345	PE 01 1 06 1	00000	00000
DN 675	1234	PE 01 1 07 1	00000	00000
TG 02	INC	PE 01 1 10 1	00000	00000
TG 03	OUT	PE 01 1 01 1	00000	00000
TG 29	2WAY	PE 01 2 01 1	00000	00000

Fig. 7—OPM 007—Trunk and Line Studies (3.21)

OPM 008 MTCE CHLN THUR 15/10/81 09:00:00 HRHR

CNTL	PEG	USE
CPU	00000	00000
MEM	00000	00000
INI	00000	
NTWK		
NSPK	00000	00000
NTLP	00000	00000
IGS	00000	00000
LPTS	00000	00000
JRTS	00000	00000
PEQP		
PSHF	00000	00000
DCM	00000	00000
TRK	00000	00000
LINE	00000	00000
RCVR	00000	00000

Fig. 8—OPM 008—Maintenance (3.22)

TABLE A

ORIGINATING SERVICE

MNEMONIC	EXPLANATION	DESCRIPTION
PSIG	Permanent Signal	PEG: A count of calls where the first digit is not dialed within the dial tone time-out (DTTO) period as specified in the CRTM section of the configuration record. See NTP 297-3001-305.
PDTO	Partial Dial Timeout	PEG: A count of calls where an interdigital time-out occurs with an insufficient number of digits dialed.
PABN	Partial Dial Abandon	PEG: A count of calls where disconnect occurs before a sufficient number of digits are dialed.
FSTR	False Start	PEG: A counts of calls where disconnect occurs before the first digit is dialed.
DGTC	DIGITONE Calls	PEG: Number of originations from lines requiring DIGITONE service.
DPC	Dial Pulse Calls	PEG: Number of originations from lines requiring dial pulse service.
TOTC	Total Calls	PEG: Total number of originations from lines. *Note.* Do not include calls from stations with the manual or automatic option in DGTC and DPC. Such calls, plus originations from lines that fail the automatic number identification (ANI) test, are included in TOTC.
DGTS	DIGITONE Dial Tone Speed	%: The percentage of calls from lines with DIGITONE service that do not receive dial tone within 3 seconds after origination.
DPS	Dial Pulse Dial Tone Speed	%: The percentage of calls from lines with dial pulse service that do not receive dial tone within 3 seconds after origination.
TOTS	Total Dial Tone Speed	%: The percentage of all calls that do not receive dial tone within 3 seconds after origination.

TABLE B

SERVICE CIRCUITS

MNEMONIC	EXPLANATION	DESCRIPTION
DGTR	DIGITONE Receiver	REQ: A count of requests to connect to DIGITONE receivers and associated circuits necessary for providing DIGITONE service. A queued request is counted only once. However, multiple requests within the same call are all counted. PEG: A count of DGTR requests that are satisfied, either immediately or after delay in the queue. Failure to satisfy a DGTR request can be due to unavailable receivers and also to network blocking or unavailable dial tone. Therefore this measurement provides information about the performance of the total DIGITONE service and not about the adequacy of the engineering of the DIGITONE receiver circuits. Availability of DIGITONE receivers can be inferred from the OVFL measurements. Because there can be a time delay between request for a service and its provision, the REQ count may be incremented in one measurement period and the PEG count in the next. USE: A usage measurement for all DIGITONE receivers. Usage starts when a receiver is obtained and ends when it is released. OVFL: A count of requests to connect to DIGITONE receivers that cannot be satisfied in the first attempt because all DIGITONE receivers are busy.
MFR	Multifrequency Receiver	REQ, PEG, USE, OVFL: As for DGTR except data are collected on MF receivers.
SNET	Service Network	REQ: A count of requests for service which involves a digit sender or a tone source. PEG: A count of SNET requests that are satisfied either immediately or after a delay in the queue. USE: A usage measurement for all service network circuits. Usage starts when a circuit is obtained and ends when it is released.
DSND to LOW		REQ, PEG, USE: As for SNET, except the data are collected for the individual tone sources and the digit sender.
DSND	Digit Sender	
BUSY	Busy Tone	
RNGB	Ring-Back Tone	
RORD	Reorder Tone	
DIAL	Dial Tone	
HOWL	Howler Tone	

TABLE B (Contd)

SERVICE CIRCUITS

MNEMONIC	EXPLANATION	DESCRIPTION
HIGH	High Tone	
LOW	Low Tone	
SPDT	Special Dial Tone	
CFMT	Confirmation Tone	
CWT	Call Waiting Tone	

TABLE C

INCOMING SERVICE

MNEMONIC	EXPLANATION	DESCRIPTION
PSIG	Permanent Signal	PEG: A count of calls where the first digit is not received within a specified time interval following trunk seizure. The time interval is specified for each incoming trunk group as the "trunk timing entry number" data item for the trunk group.
PDTO	Partial Dial Timeout	PEG: A count of calls where an interdigital timeout occurs with an insufficient number of digits being received.
PABN	Partial Dial Abandon	PEG: A count of calls where disconnect occurs before a sufficient number of digits are received.
HITS	Hits	PEG: A count of calls where disconnect occurs before the first digit has been received.
MFRC	MF Receiver Calls	PEG: A count of calls requiring MF receiver service.
TOTC	Total Calls	PEG: Total number of trunk originations.
RDLY	Receiver Attachment Delay	%: The percentage of calls that are not connected to an MF receiver within a 3-second period. The percentage is given in 0.1% accuracy.

TABLE D

NETWORK LOOP

MNEMONIC	EXPLANATION	DESCRIPTION
NTLP	Network Loop	PEG: A count of the number of attempts to establish a connection over a loop. The count includes both successful and unsuccessful attempts. Where multiple attempts are made to establish one connection, ie, connection to a service circuit, only the first attempt is pegged. On an intraloop connection, both sides of the connection are pegged.
SNWK	Service Network	
CONF	Conference	BLK: A count of the number of attempts to establish a connection over a loop that fail due to network blockage. USE: A usage measurement for all time slots on the loop. Usage starts when a time slot is software reserved for a network connection and ends when it returns to idle.
JCTR	Junctor Group	PEG, BLK, USE: As for NTLP except data are collected on junctor groups, and the data are for time slot pairs, rather than for individual time slots.

TABLE E

TRAFFIC DISTRIBUTION

MNEMONIC	EXPLANATION	DESCRIPTION
ORTM	Originating-terminating	PEG: A count of all successful originating-terminating calls, excluding revertive calls and including calls to busy numbers. The count is incremented for each call for which ringing begins and for each call to a busy number. BLK: A count of all originating-terminating calls which cannot terminate due to lack of some office resource, eg, no line register, network blockage, ringing plant overload. USE: A usage measurement for all successful originating-terminating calls. Usage starts when a ringing begins and ends when the call disconnects.
OROG	Originating-outgoing	PEG: A count of all successful originating-outgoing calls. An OROG call is regarded as successful when all resources are obtained and signaling is completed on the outgoing trunk. The necessary resources include a seized trunk, a network path, and usually a digit sender. BLK: A count of all originating-outgoing calls which cannot terminate successfully on an outgoing trunk. This count is incremented when alternate routing points to a generic route, or to a logical tone or AUDICHRON route. USE: A usage measurement for all successful originating-outgoing calls. Usage starts when signaling is completed on the outgoing trunk and ends when the call disconnects.
ORNC	Originating-noncompleting	PEG: A count of all originating calls that are routed to a generic route, or to a tone or announcement route before being classified as a successful ORTM or OROG call. Blocked originating calls contribute to this count. Other conditions contributing to this count are vacant code, directory number intercept, not enough digits dialed before time-out.
RVRT	Revertive	PEG, USE: As for ORTM except the data are collected on revertive calls.
INTM	Incoming-terminating	PEG, BLK, USE: As for ORTM except the data are collected on incoming-terminating calls.
INOG	Incoming-outgoing	PEG, BLK, USE: As for OROG except the data are collected on incoming-outgoing calls.
INNC	Incoming-noncompleting	PEG: As for ORNC except data are collected on incoming calls.

TABLE F

TRUNK GROUPS

MNEMONIC	EXPLANATION	DESCRIPTION
OGP#	Outgoing Trunk Group Number	PEG: A count of calls that are routed to this trunk group. OVFL: A count of attempts to select a trunk in this trunk group that fail due to no trunk available. USE: A usage measurement for all trunks in this trunk group. Usage starts when a trunk is software busy and ends when the trunk returns idle. A centralized automatic message accounting (CAMA) trunk with an unoccupied operator position is regarded as an idle trunk.
IGP#	Incoming Trunk Group Number	PEG: A count of incoming calls that seize a trunk in this trunk group. USE: As for OGP#.

TABLE G

TRUNK AND LINE STUDIES

MNEMONIC	EXPLANATION	DESCRIPTION
DN	Directory Number	PEG: A count of the number of times a line associated with a directory number goes call processing busy. USE: The amount of time a studied line is call processing busy.
TG	Trunk Group	PEG, USE: The same as for DN except the study register is associated with a trunk group and its physical (line) location.

TABLE H

MAINTENANCE

MNEMONIC	EXPLANATION	DESCRIPTION
CNTL	Control Equipment	
CPU	Central Processing Unit	PEG: A count of the number of initializations caused by a fault in the active CPU. (Refer to NTP 297-3001-505 for a description of initialization.) USE: The amount of time the inactive CPU is faulty. Usage starts when the CPU is marked as faulty and ends when the fault condition is cleared.
MEM	Memory	PEG: A count of the number of initializations caused by a fault in system memory. There is a single count for all modules of all types of memory, ie, call store, data store, program store, and spare memory. USE: The amount of time a memory module is faulty. Usage starts when any memory module is marked as faulty and ends when the fault condition is cleared.
INI	Initialization	PEG: A count of the total number of initializations.
NTWK	Network Equipment	
NSPK	Network Signaling Packs	PEG: A count of the number of times previously enabled network signaling packs are disabled. There is one count for all network signaling packs. USE: The amount of time network signaling packs are disabled. Usage starts when a pack is disabled and ends when the pack is enabled.
NTLP	Network Loops	PEG, USE: As for NSPK, except data are collected on network loops.
IGS	Intergroup Switch Packs	PEG, USE: As for NSPK, except data are collected on intergroup switch packs.
PEQP	Peripheral Equipment	

TABLE H (Contd)

MAINTENANCE

MNEMONIC	EXPLANATION	DESCRIPTION
PSHF	Peripheral Shelf	PEG: A count of the number of times previously enabled peripheral shelves are disabled. The count is also incremented when the network loop controlling a peripheral shelf is disabled and the mate of the loop cannot assume control of the shelf. There is one count for all peripheral shelves, except that shelves containing DCM are excluded. USE: The amount of time peripheral shelves are disabled and/or are not controlled by a network loop. Usage starts when a shelf is disabled or is not controlled and ends when the shelf is returned to service.
DCM	Digital Carrier Module	PEG: A count of the number of times previously enabled DCM is disabled. The count is also incremented if the network loop controlling a DCM is disabled. There is one count for all DCMs. USE: The amount of time DCM is disabled or out of service due to a disabled network loop. Usage starts when a DCM is disabled or put out of service and ends when the DCM is returned to service.
TRK	Trunks	PEG: A count of the number of times trunk circuits are taken out of service by being switched, disabled, man-made busy, or machine-made busy. Trunk circuits placed on lock out do not contribute to the count. There is one count for all trunk circuits. USE: The amount of time trunk circuits are out of service. Usage starts when a trunk is removed from service and ends when the trunk is returned to service.
LINE	Lines	PEG, USE: As for TRK, except data are collected on line circuits.
RCVR	Receivers	PEG, USE: As for TRK, except data are collected on receiver circuits (both MF and DIGITONE receivers).
LPTS	Loop Time Slots	PEG: A count of the number of times loop time slots are marked faulty from nonfaulty. The count is incremented when any individual time slot is marked faulty. If a network loop is disabled (thus disabling all 32 time slots on the loop), the count is not incremented. There is one count for all time slots in all network loops. USE: The amount of time loop time slots are disabled. Usage starts when a time slot is disabled and ends when the time slot is enabled.
JRTS	Junctor Time Slot Pairs	PEG USE: As for LPTS except data are collected on junctor time slot pairs.