NO. 4 ELECTRONIC SWITCHING SYSTEM
MEASUREMENT SYSTEMS
GENERAL

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1. GENERAL

INTRODUCTION TO SYSTEM

1.01 The No. 4 Electronic Switching System (ESS) measurements system is responsible for providing data which reflects the operating characteristics of the switching system. Measuring the operation of components in the switching system provides an indication of the efficient operation of the switching system. This data is required by several groups to ensure maximum flow of traffic under all conditions while maintaining high quality customer service.

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

1.03 The machine administrator is responsible for the administration of the measurements system. This system will permit the machine administrator (MA) to detect and correct problem areas to ensure high quality service. Through

reports generated by this system, management and other company groups will be kept advised of service conditions.

IDENTITY OF USERS

1.04 Traffic engineers will use measurement data to verify that existing equipment is sufficient to meet current service demands and to determine future equipment requirements. Long range planning data also comes from this system.

1.05 The network management group uses measurement data to effectively manage the network. Data is presented in the network management display system and triggers indicators on the exception panel. Results of control activity are measured by this system.

1.06 Machine maintenance forces will use these measurements to locate equipment irregularities and evaluate the effectiveness of office maintenance procedures.

In this document the term 'machine maintenance' will be used in place of the term 'plant' which is used in other documents and drawings.

1.07 Several terms will be used throughout the description of the measurements system. Table A provides a list of counts and measurements. Table B contains a list of counters and registers. Included with each item in these two tables is the definition for that item as used in the measurement system.

2. MEASUREMENT SYSTEM PROGRAM

2.01 The measurement system program performs four functions. These are:

Data Gathering

Data Collection

Data Output

Measurement Report Definition

Data gathering and data collection are performed on a quarter hour basis.

2.02 The measuring routines normally allow peg counts to accumulate for the full 15 minutes in each measurement interval. However, in some cases the quantity of peg counts exceeds the capacity of the counter. In this situation it is necessary to periodically clear this counter and move its contents to a larger accumulating register.

2.03 Usage measurements are obtained by periodic sampling of the occupancy counters or idle counters of a device group. These counts are compiled in an accumulating register during the measuring interval.

2.04 The accuracy of these measurements is dependent upon the scanning interval, the size of the device group, the average holding time of the devices in the group and the traffic offered to the group. To provide the accuracy required while maintaining compatibility with the rest of the measurement system, scan intervals of 10 and 180 seconds have been provided.

2.05 Measurement data collection routines obtain data from counters and accumulating registers gathered during the measuring interval. The data is put into holding registers and the counters and accumulating registers are reset to zero. The holding registers which reside on disk now contain the data base that will be processed into the measurement output.

2.06 Three other sets of routines used by the program provide definitions of measurement reports, generate a data base for measurement reports that have accumulation intervals longer than one hour and output the measurement reports.

2.07 The extended interval accumulation routine provides a data base for measurement reports having accumulation intervals greater than one hour. This is accomplished by accumulating the required data in extended interval accumulating registers.

2.08 The measurement output routines process data residing in the holding registers and extended interval accumulation registers into a format suitable for output. These routines will output the data to the various output terminals and magnetic tape. Further description of the measurement system program can be found in BSP 234-180-140.

3. TRAFFIC SEPARATIONS

3.01 The machine administrator is responsible for providing traffic separations data for division of revenue, network management, traffic engineering, and other organizations which also require traffic separations data. DFMP Division H, Section 9F(2), Traffic Measurements-Traffic Separations, provides information relating to the traffic separations function.

4. MACHINE ADMINISTRATION REPORTS

(MLSS, MSR, LDR, LSR)

4.01 The machine administrator is responsible for maintaining the overall service of the office at or above objective level. The MA is also responsible for load balancing, data collection, and management of growth transitions.

4.02 Four reports containing critical items, related measurements, calculations, and other data are presented in a format tailored to the functions of machine administration, machine maintenance and traffic engineering. The four reports are listed below:

- ***Machine Load and Service Summary (MLSS)***
- ***Machine Service Report (MSR)***
- ***Load Distribution Report (LDR)***
- ***Load Service Report (LSR)***

4.03 These reports are addressed in DFMP Division H, Section 9f(3), 4 ESS Machine Administration Reports.

5. INEFFECTIVE ATTEMPTS

5.01 Reducing ineffective attempts improves the level of service provided by the switching system. The machine administrator will work closely with machine maintenance and network management forces to identify and correct problem areas. The measurement data base provides information needed to identify and investigate these problem areas. DFMP Division H, Section 9f(4), 4 ESS Ineffective Attempts provides further infomation on ineffective attempts.

6. MEASUREMENT REPORTS

GENERAL INTRODUCTION

6.01 The measurement system provides a maximum of 24 reports for the purpose of outputting measurement data. These reports are numbered 0 to 23 and are output in serial order with the lowest numbered report output first. Any report may call for collection of any measurements contained in the data base. Data can be collected for any interval of time, in quarter hour increments, for up to one week. Any report may be output, at any specified quarter hour, on any output channel.

USER REQUIREMENTS

6.02 The machine administrator (MA) is responsible for administration of the 24 traffic measurement reports. Various organizations, network management, traffic engineering, machine maintenance, and others may have need to obtain data from these reports. To insure all needs are satisfied, all requirements for reports should be processed through the MA. All changes to the measurement reports will be accomplished by the MA.

6.03 Interfaces with the machine maintenance system are numerous. All machine maintenance reports must be included in the maximum of 24 reports provided by the measurement system. Machine maintenance data will be assigned to measurement reports of low order numbers (ie, report #2, 3, and 4) to provide a priority high enough to insure output of all data. The machine administrator will obtain machine maintenance requirements from the machine maintenance supervisor. Memory requirements for these reports must be considered when administering spare engineered memory for all reports.

REPORT PARAMETERS

6.04 Each report is associated with semi-permanent parameters which are contained in the office data base. These parameters define each report and specify the control channel assigned to each report. The control channel is assigned for the purpose of changing the variable parameters for that report. The keyword PRIM in the input message used to construct a report identifies the control channel. Only nine of the channels in the 4 ESS can be designated as measurements input channels, these are:

MTC	RCDT1	RCMOC
SREC1	RCDT2	NMPR1
SREC2	RCREC	NMPR2

Note: Systems standards dictate that all measurement system input messages must be accepted from the MTC, SREC 1 and SREC 2.

The variable parameters specify the following items associated with each report.

1. Measurements to be output
2. Collection interval length
3. Collection output time(s)
4. Input/Output channels where measurements will be output.

6.05 The machine administrator is responsible for determining the parameters associated with each measurement report. This requires the machine administrator to have an understanding of the report structure and memory associated with these reports.

6.06 The input message to establish a report contains three pieces of data which determine the memory requirements for a given report.

Maximum Number of Measurements (MAXM)

Trunk Subgroup Capacity (TSGCAP)

Engineered Memory (ENGMEM)

A. Maximum Number of Measurements

6.07 It has been stated that the maximum number of measurements each report may contain must be established. This maximum number is determined by the machine administrator. The designator MAXM provides to the system this maximum number.

6.08 To establish a report the machine administrator must first determine the measurement subclasses (MSC) and output measurement sets (OMS) that are to be included in the report. (See example) A count must then be made of the individual measurements included in all the OMSs of the MSCs. This total is the figure designated MAXM. An exception to this rule exists with MSC 12. Since each TSIF, SPC pair is treated as a measurement, MSC 12 will always require 16 measurements be designated. If the measurement interval is less than one hour, memory has been provided to accommodate the MAXM established. For measurement intervals of more than one hour, engineered memory must be allocated.

Example: The machine administrator establishes a report which will output MSC 0, MSC 5, and MSC 12. For MSC 5 the machine administrator only desires OMS 0 and OMS 1.

Example: The MAXM for this report would be determined as follows.

MSC 0 OMS 0 = 9 measurement

MSC 5 OMS 0 = 4 measurement

MSC 5 OMS 1 = 4 measurement

MSC 12 OMS = 16 measurement

MAXM = 33 measurement

B. Engineered Memory

6.09 For reports requiring measurement accumulation for periods greater than one hour, extended interval accumulation registers must be provided. These disk resident registers are provided for each OMS in the report on a MSC basis. That is, one block of accumulating registers for each MSC contained in the report. The size of these blocks is determined by the number of OMSs and the number of measurements in each OMS. These blocks of registers are known as MSC accumulating register blocks (MSCARB). All MSCARBs for a given report reside in one large contiguous block of disk called an extended interval accumulation register block (EIARB). The size of this block is determined by the maximum size of the schedule. The size is determined by the maximum number of measurements contained in the report. The length of the EIARB (number of words) is indicated by MAXM. Apportioning memory in the EIARB among the MSCs for a particular report is completely

up to the machine administrator. The total memory allocated to the MSCs must not exceed the size of the EIARB. Memory for EIARBs reside in disk in blocks of 32 words. When MAXM is determined the ENGMEM must be designated as the next highest multiple of 32 words. As an example, if MAXM is 40 the ENGMEM would be 64. Only 40 measurements would be permitted on this report even though 64 words are available.

6.10 Referring to the example in paragraph 6.08, if this same report were to be accumulated for intervals greater than one hour, the MAXM would be 33 and the ENGMEM would be 64. If a report was established to present traffic separations data for 1024 OMSs at an accumulation interval of greater than one hour the MAXM would be 2048 and the ENGMEM would be 2048. The machine administrator does not input the figure for ENGMEM. Entering this word on the input message directs the program to reserve the proper amount of memory based on the value of MAXM.

6.11 The provision of 840 blocks (32 words each) of EIARs should be sufficient to accommodate the 24 measurement reports. The machine administrator is responsible for administering these EIARBs by knowing the amount of spare EIARBs available and the amount required by each report. In order to administer these blocks over the reports, the machine administrator must know how many will be required per report in use and how many spare EIARBs are available. When a report is established the machine administrator may choose to include extra memory to provide for future additions to the report. This can be accomplished by increasing the MAXM of the report. There is no verify message which provides an overview of engineered memory associated with each of the reports, and the amount of that memory which is assigned to measurements on each report. However, an input message is provided which will provide the amount of spare engineered memory available for assignment.

C. Trunk Subgroup Capacity

6.12 One important use of measurement reports will be to provide studies on TSGs. MSC 13 is the TSG measurement subclass. The size of the TSG OMS will vary depending upon the directionality of the group. The largest OMS will contain 11 measurements. TSGCAP is a key word which indicates the maximum number of TSGs which will be included in the report. There can be a maximum of 64 TSGs assigned to a report. It is recommended that each TSG on a report be considered as having 11 measurements when determining the MAXM of a report containing TSGs.

CONSTRUCTION OF REPORTS

6.13 When all requirements for a report have been determined, the report can be established using input messages described in BSP 234-100-045 and Translation Guide TG 4. It is recommended that input messages used to establish a report be executed in the following sequence.

6.14 The first message should identify the reports and the control channel (PRIM) associated with the report. This message may also include the parameters MAXM, TSGCAP, ENGMEM as required. The next message should establish the channel or channels the report is to be output over. If an output channel is not specified, the report will be output to the MTC channel. Messages establishing the content of the report should then be entered. The final messages should establish the accumulation interval and output time.

OUTPUT OF REPORTS

6.15 Accumulation and collection of data can be accomplished well within a minute after the end of a collection interval. This leaves 14 minutes available for the output of the reports. It must be noted that if sufficient output time is not available, some data scheduled for output will be lost. A message will be output stating the reports are lost. This message will be output on the MTC channel and all channels to which the lost report was directed. Several factors will affect the time required to output reports.

Partitioned Outputs

Sequence of output reports

Volume of data contained in reports

Number of reports established

Number of reports to be output during a given interval

Output channels

Other system output message and input requirements

Output device speed

In administering the measurement reports the machine administrator must consider the following points and use discretion in the establishment of the reports.

PARTITIONED OUTPUT

6.16 Measurement reports are output in partitions. Several output partitions may be required to produce a complete measurement report. Messages which are output are assigned priorities. Measurement reports are assigned the lowest priority. For this reason, a report which is directed to a channel which handles many higher priority messages, such as the MTC, may not be output in continuous partitions. The partitions may be interspersed with other messages or even lost altogether. The machine administrator should consider this when assigning output channels for measurement reports. Measurement reports should not be directed to the MTC channel as a general practice.

6.17 ***Report output sequence***—Reports are output in increasing numerical order. The most important data required should be assigned to the lower numbered reports to insure output. When an EIARB is involved, the EIARB is zeroed just prior to the first extended interval accumulation of the new interval. The data for a report, in this case, is available from the time the last extended interval accumulation was made for one interval to the first made for the next interval. The output time can be scheduled for any quarter hour in that period. In the case of a cyclic report (6.20), the data is available for four quarter hours before it is zeroed for the next interval. Messages have been provided to change the structure of the measurement reports. The machine administrator must be aware that modifying any report while measurements are being accumulated may cause distorted data. It is essential that changes to a report be processed during periods when the report is inactive to insure its measurement output will be unaffected.

6.18 ***Volume of data contained in reports***—As the volume of data in a report increases, more time is required to output that report. Processor time is required to output traffic reports. The measurement data base is only available for 15 minutes following the end of a measurement interval. Accumulation and output of all required reports must be accomplished during these 15 minutes. For this reason, each report is limited to a maximum number of measurements it can accumulate and output. The machine administrator must assign the data to the reports on the basis that only required data is included.

6.19 ***Number of Reports Established***—The machine administrator should only establish those reports needed to provide required information. There is no requirement for all 24 reports to be established if not needed.

6.20 ***Number of Reports to be output during a given interval***—There is some flexibility in the scheduling of output times. By varying the output times of various reports the chance of losing data will be reduced. The data collection time for a given report can also be designated to generate a report with one of the following characteristics.

(1) A report which accumulates over only one interval,

eg, Monday 10:15 to 11:15

(2) A report which accumulates over several non-successive intervals,

eg, Monday 1:00 - 5:00

Tuesday 8:00 - 12:00

Tuesday 1:00 - 5:00

(3) A cylic report which accumulates over several successive intervals between start time and stop time,

eg, Monday 8:00 - 10:00

10:00 - 12:00

12:00 - 2:00

2:00 - 4:00

4:00 - 6:00

Note: Only one accumulation interval is permitted per report.

6.21 The output times must be scheduled also. In all cases the default output time is the end of the accumulation interval. Default is a term used to identify an action which is performed when no specific instructions have been received. Translation Guide TG 4 provides message structure to specify the accumulation and output interval(s) of a report.

6.22 ***Output Channels***—Reports can be output on up to five channels concurrently with the output being passed to the channels as they become idle. If messages of higher priority are being output on a given channel (eg, MTC channel) the measurement report output will be delayed. The machine administrator must be aware of this and assign measurement reports to be output only to those channels required. Several assignment possibilities exist by alternating output times, output channels, etc. Output of a given report must be completed to all designated channels before output of the next report can begin. These TTY channels are specified by the machine administrator.

6.23 ***Output Device Speed***—Output devices are not required to have the same output speed. However since the output is passed from one channel to the next as the channels become idle, a slow speed channel will increase the holding time of the output message registers. The machine administrator should consider this when assigning measurements to individual reports. Since the reports are output serially, all reports which output data on devices with speeds slower than 120 characters/second should have the lowest priority report numbers (ie, a large numerical number). It is recommended that output devices at slower than 120 characters/second not be used to output measurement reports.

REPORT ADMINISTRATION

6.24 In administering the measurement report system the machine administrator is responsible for maintaining the integrity of the system during normal day-to-day operation. In the event any reports become distorted or erased from the system, the machine administrator will have to re-establish the reports in question. To accomplish this, a magnetic tape copy of all current reports will be maintained by the machine administrator. This measurement system tape MST will be mounted and activated in the MOC. The machine administrator is responsible for maintaining the accuracy of the MS tape. It is recommended that a second MS tape, containing the previous report configuration, be retained. This will allow return to a working system in the event the new report configuration is in error.

6.25 Reports may be eliminated due to system interrupts or audits. Memory recovery phases 2 through 4 occurring during the output of a report will cause that report and all subsequent reports to be lost. These conditions require the MS tape to be loaded to return the measurement system to the proper configuration. It is possible for reports to become distorted when changes are made to report structures. These changes could also result in distortion of the report system hash sums, data bits used by the system to maintain system integrity. When this occurs, the system will abort input messages associated with the measurement report system. Audit messages will also be received in the MOC. To correct this situation, the MS tape must be loaded.

6.26 When reports are established or changed, all actions should be verified to ensure accuracy. Adding and deleting TSGs from a report will cause problems if not coordinated with recent change activity. TSGs must always be removed from reports prior to their removal from translations. In addition, measurements should only be specified for existing facilities. If a measurement is specified for non-existent facilities, the report output will be aborted.

6.27 When changes are made to an existing report, the first output may contain invalid data. A full accumulation interval must take place before the data can be considered valid. It is recommended that changes to the reports never be made during the time reports are being generated. Changing reports during the output operation may become time consuming as the system will perform the output function before serving the input requests.

6.28 The machine administrator should be aware that the input order of the TSGs contained in report will dictate the output order. If an alphabetical listing is desired in the output, the CINs must be input in that order. This capability permits maximum flexibility to construct reports in the most usable format.

6.29 The machine administrator may also consider the use of multiple MS tapes. If several configurations of reports are used and the same configurations recur, it may be time-saving to put the configuration on tape. When a certain configuration is desired, the tape containing that configuration can be loaded.

6.30 When assigning large groups of measurements to a report, the machine administrator must take into consideration the amount of time required to output such a report. In the case of traffic separations, if all 2048 OMSs were to be output, on the same report, it would require approximately 20 minutes to output. It is recommended that for reports of this volume, two separate reports be established. The accumulation interval of both reports would be the same, however, the output time for the second report should be delayed 15 minutes from the first.

TDAS TAPE ADMINISTRATION

6.31 Measurement report 0 is the first report output and is the only report which is output onto magnetic tape. This report is assigned a fixed accumulation interval of one hour.

6.32 Report 0 will be used to provide data for downstream processing by TDAS. This data will be used by the traffic engineers.

6.33 Special measurement classes which are unique to the TDAS function have been established. Table C provides a list of TDAS MCs and the corresponding MSCs which make up the TDAS MCs. TDAS data is output on a scheduled basis. TDAS requirements are published annually by AT&T general letter.

6.34 Two operations are required to satisfy the TDAS requirements. Assignments to report 0 must be made and the hardware, tape unit controller (TUC), must be assigned to perform the traffic function. The TUC must be assigned to the traffic function prior to the output of report 0. The TUC assignment is made via input messages in the MOC. If a TUC is not ready at the time report 0 is to be output, all subsequent reports will be delayed. The system provides a 10-minute waiting period for action to be taken to put the TUC in service. At the end of this period, report 0 will be lost, a message will be printed at the MTC indicating measurement system trouble, and the system will commence outputting the remaining reports.

6.35 The 8 a.m. hour must always be scheduled. This is the only time during the day the TSG identity and size will be entered on the tape.

7. MEASUREMENT CLASSES

7.01 To facilitate the internal manipulation of data, all traffic measurements have been divided into sets of measurements called measurement classes (MC). Related measurements are, in general assigned to the same MC. As an example, all trunk subgroup measurements are included in one MC. There are nine MCs, devoted primarily to traffic measurements, in the 4 ESS which are identified by both number and name.

These nine are as follows:

MC0 — Service Circuit, Engineered Memory, and Queue Measure

MC1 — Traffic Measurements

MC2 — Traffic Separations

MC3 — Ineffective Attempts

MC4 — TSI Usage

MC5 — Trunk Subgroup Measurements

MC6 — CCIS Data Links

MC7 — International Calls

MC8 — Input/Output, File Store, Tape Unit, Data Link

The MCs are internal and are not output on the traffic measurement reports. These MCs contain data for the measurement subclasses (MSC) and output measurement sets (OMS).

7.02 Since the data base for machine maintenance measurements contains counters which are of a complementary nature to the traffic measurements and vice versa, it also is partitioned into MCs. These MCs are subdivided into MSCs and OMSs in the same fashion as the traffic measurements. A traffic OMS may contain counts found in the machine maintenance data base. This scheme eliminates

the duplication of counters and consequently the real-time required to peg two counters. There are 64 possible MSCs. Measurement subclasses 0 through 17 represent the traffic MSCs and 20 through 47 are designated as plant MSCs. Plant MSCs are identified in BSP 234-100-045.

8. MEASUREMENT SUBCLASSES

8.01 All measurement classes are divided into subsets called measurement subclasses (MSC). This is done to facilitate measurement accumulation, output processing and to conserve memory. The following is a list of the 19 MSCs which are identified in the No. 4 ESS:

MSC	
0	MF Receivers and Transmitters
1	CCIS Transceivers
2	Announcement Circuits
3	Centralized Automatic Message Accounting (CAMA)
4	Network
5	Office Totals
6	MF Irregularities
7	DP Irregularities
8	Incoming Processing Delay
9	Processor Load
10	Traffic Separations
11	Ineffective Attempts
12	Time Slot Interchange Usage
13	Trunk Subgroup
14	CCIS Data Link
15	International Calls
16	I/O, File Store, Tape Unit and Data Link
17	Engineered Memory
18	CAMA Ineffective Attempts
19	CAMA

8.02 Within a MSC all measurements associated with a particular facility or entity are grouped into an output measurement set (OMS). To retrieve a specific set of measurements, the machine administrator (MA) must specify the MSC and OMS for the specific set of measurements.

8.03 The following paragraphs identify the traffic measurements which are available in the OMSs for each MSC.

OUTPUT MEASUREMENT SETS FOR MSC 0 (MF RECEIVERS AND TRANSMITTERS)

Output Measurement Set (OMS) 0

1. MF Receiver Seizure Peg Count
2. MF Receiver Service Usage
3. MF Receiver Maintenance Usage
4. MF XMTR Queue Peg Count
5. MF XMTR Queue Usage
6. MF XMTR Queue Abandon Peg Count
7. MF XMTR Seizure Peg Count
8. MF XMTR Service Usage
9. MF XMTR Maintenance Usage

OUTPUT MEASUREMENT SETS FOR MSC 1 (CCIS TRANSCEIVERS)

Output Measurement Set (OMS) 0

1. CCIS XCVR Seizure Peg Count
2. CCIS XCVR Service Usage
3. CCIS XCVR Queue Abandon Peg Count
4. CCIS XCVR Seizure Peg Count
5. CCIS XCVR Service Usage
6. CCIS XCVR Maintenance Usage
7. CCIS XCVR Overflow Peg Count

OUTPUT MEASUREMENT SETS FOR MSC 2 (ANNOUNCEMENT CIRCUITS)

Output Measurement Set (OMS) 0

1. DP NONOP False Start Peg Count
2. DP OP False Start Peg Count
3. DP NONOP Permanent Signal Peg Count
4. DP OP Permanent Signal Peg Count
5. DP NONOP Partial Dial Abandon Peg Count
6. DP OP Partial Dial Abandon Peg Count
7. DP NONOP Partial Dial Time-Out Peg Count
8. DP OP Partial Dial Time-Out Peg Count

Output Measurement Set (OMS) 1

1. Incoming DP Early Digit Peg Count
2. Incoming DP Worklist Full Peg Count
3. DP Outpulsing Worklist Full Peg Count

OUTPUT MEASUREMENT SETS FOR MSC 8 (INCOMING PROCESSING DELAY)

Output Measurement Set (OMS) 0

1. MF Incoming Delay Accept Peg Count
2. MF Incoming Delay Unaccept Peg Count
3. DP Incoming Delay Accept Peg Count
4. DP Incoming Delay Unaccept Peg Count
5. CCIS Incoming Delay Accept Peg Count
6. CCIS Incoming Delay Unaccept Peg Count

OUTPUT MEASUREMENT SETS FOR MSC 9 (PROCESSOR LOAD)

Output Measurement Set (OMS) 0

1. Average Base Level Cycle Length

Output Measurement Set (OMS) 1

1. Non Load No Overload Control Peg Count
2. Non Load MAC Overload Control Peg Count
3. Non Load Segment Overload Control Peg Count
4. Load Level 1 Overload Control Peg Count
5. Load Level 2 Overload Control Peg Count
6. Load Level 3 Overload Control Peg Count

OUTPUT MEASUREMENT SETS FOR MSC 10 (TRAFFIC SEPARATIONS)

Output Measurement Set (OMS) 0

1. Traffic Separation Class 0 Peg Count
2. Traffic Separation Class 0 Usage

Output Measurement Set OMS 1 to 2047

Note: All 2048 measurement sets will contain the two counts as shown in OMS 0. The Traffic Separation Class number is the same as the OMS number. The Traffic Separation Class equals the destination separation class (DESEP) times 32 plus the Incoming Separation Class (INSEP). Since the OMS is equal to the Traffic Separations Class, OMS = DESEP X 32 + INSEP.

OUTPUT MEASUREMENT SETS FOR MSC 11 (INEFFECTIVE ATTEMPTS)

Output Measurement Set (OMS) 0

1. Pulsing Errors Peg Count
2. Outpulsing Failures Peg Count
3. Glare Peg Count

Output Measurement Set (OMS) 1

1. Final Trial Network Path Hunt Failure Peg Count
2. No Circuit Intertoll Peg Count
3. No Circuit Toll Completing Peg Count
4. Carrier Group Failure Peg Count

Output Measurement Set (OMS) 2

1. Vacant Code Peg Count
2. INWATS Band Check Peg Count

Output Measurement Set (OMS) 3

1. Code Block Control Blocked Call Peg Count
2. SDOC Control Blocked Call Peg Count
3. STR Control Blocked Call Peg Count
4. Cancel To Control Blocked Call Peg Count
5. Cancel From Control Blocked Call Peg Count
6. AOOC Blocked Call Peg Count

Output Measurement Set (OMS) 4

1. MF Transmitter Queue Entry Failure Peg Count
2. MF Transmitter Queue Abandon Peg Count

Output Measurement Set (OMS) 5

1. DP CR Queue Overflow Peg Count
2. DP CR Queue Abandon Peg Count
3. CCIS Origination CR Queue Overflow Peg Count
4. CCIS Origination CR Queue Abandon Peg Count
5. MF Origination Queue Abandon Peg Count

OUTPUT MEASUREMENT SETS FOR MSC 12 (TIME SLOT INTERCHANGE USAGE)

Output Measurement Set (OMS) 0

1. TSI Number
2. TSI Usage

Note: Up to eight of the possible 128 TSIs may be measured for usage under this OMS. The individual TSIs must be assigned to or deleted from this OMS with the messages in Division 10 Section 2a and 2b.

OUTPUT MEASUREMENT SETS FOR MSC 13 (TRUNK SUBGROUP)

Output Measurement Set (OMS) (One-Way Incoming Trunk Subgroups)

1. Incoming Seizure Peg Count
2. Total Usage

Output Measurement Set (OMS) (One-Way Outgoing Trunk Subgroups)

1. Outgoing Attempts Peg Count
2. Total Usage
3. Overflow Peg Count
4. Reroute to Seizure Peg Count
5. SDOC Peg Count
6. STR Peg Count
7. Cancel To Peg Count
8. Manual From Peg Count
9. Skip Peg Count
10. Time-Out Peg Count

Output Measurement Set (OMS) (Two-Way Trunk Subgroups)

1. Incoming Seizure Peg Count
2. Outgoing Attempts Peg Count
3. Total Usage
4. Overflow Peg Count
5. Reroute To Seizure Peg Count
6. SDOC Peg Count
7. STR Peg Count
8. Cancel To Peg Count
9. Manual From Peg Count
10. Skip Peg Count
11. Time-Out Peg Count

OUTPUT MEASUREMENT SETS FOR MSC 14 (CCIS DATA LINK)

Output Measurement Set (OMS) 0 – 255 CCIS Data Link

1. VFL-1 Near-end Initiated Automatic Changeovers Peg Count
2. VFL-2 Near-end Initiated Automatic Changeovers Peg Count
3. VFL-1 Far-end Initiated Automatic Changeovers Peg Count
4. VFL-2 Far-end Initiated Automatic Changeovers Peg Count
5. VFL-1 Retransmission Requests Peg Count
6. VFL-2 Retransmission Requests Peg Count
7. VFL-1 Signal Units In error Peg Count
8. VFL-2 Signal Units In error Peg Count
9. VFL-1 Quarter Hour In Service Peg Count
10. VFL-2 Quarter Hour In Service Peg Count
11. Received Repeated ACU Peg Count
12. Received Skipped ACU Peg Count
13. Total Incoming Data Filled Signal Units Peg Count
14. Total Outgoing Data Filled Signal Units Peg Count
15. Incoming IAM Peg Count
16. Outgoing IAM Peg Count

OUTPUT MEASUREMENT SETS FOR MSC 15 (INTERNATIONAL CALLS)

Output Measurement Set (OMS) –

OUTPUT MEASUREMENT SETS FOR MSC 16 (I/O, FILE STORE, TAPE UNIT AND DATA LINK)

Output Measurement Set (OMS) 0

1. Outgoing Message Success Peg Count
2. Outgoing Message Failure Peg Count
3. OMR Seizure Peg Count
4. OMR Usage
5. OMR Overflow Peg Count

Output Measurement Set (OMS) 1

1. Disk Requests Accepted Peg Count
2. Disk Requests Rejected Peg Count
3. Disk Requests Successfully Completed Peg Count
4. Disk Requested Canceled Peg Count
5. Disk Requested Failed Peg Count
6. High Priority Queue Peg Count
7. High Priority Queue Usage
8. High Priority Queue Overflow Peg Count
9. Low Priority Queue Peg Count
10. Low Priority Queue Usage
11. Low Priority Queue Overflow Peg Count
12. DDR0 Peg Count
13. DRR0 Usage
14. DRR0 Overflow Peg Count
15. DRR1 Peg Count
16. DRR1 Usage
17. DRR1 Overflow Peg Count

OUTPUT MEASUREMENT SETS FOR MSC 17 (ENGINEERED MEMORY)

Output Measurement Set (OMS) 0

1. MF CR Seizure Peg Count
2. DP CR Seizure Peg Count
3. CCIS CR Seizure Peg Count
4. CR Usage
5. DP CR Queue Peg Count
6. DP CR Queue Usage
7. DP CR Queue Overflow Peg Count
8. DP CR Queue Abandon Peg Count
9. CCIS Origination CR Queue Peg Count
10. CCIS Origination CR Queue Usage
11. CCIS Origination CR Queue Overflow Peg Count
12. CCIS Origination CR Queue Abandon Peg Count
13. MF Origination Queue Peg Count
14. MF Origination Queue Usage
15. MF Origination Queue Abandon Peg Count

Output Measurement Set (OMS) 1

1. TMR Seizure Peg Count
2. TMR Usage
3. TMR Overflow Peg Count

OUTPUT MEASUREMENT SETS FOR MSC 18 (CAMA INEFFECTIVE ATTEMPTS)

Output Measurement Set (OMS) 0

1. CAMA Position Seizure Time-Out Peg Count
2. CAMA Position Error Peg Count
3. CAMA Position Report Peg Count
4. CAMA Operator Position Abandon During Seizure Peg Count
5. CAMA Position Disconnect Peg Count
6. CAMA Operator Queue Overflow Peg Count
7. CAMA Operator Queue Abandon Peg Count

TABLE A

COUNTS AND MEASURES

Count

A count is the instantaneous value of a counter which is available for change by the main information processing programs of the ESS.

Measurement

A measurement is a function of a count that is obtained from the ESS. A count accumulated over a prescribed time interval or an arithmetic combination of several counts over a specific time interval would constitute a measure.

Peg Count

A peg count is the count of the number of times a given event occurs.

Occupancy Count

An occupancy count is the number of devices of a specific class that are busy at any particular instant of time.

Idle Count

This count indicates the number of devices of a specified class that are available for use at any given instant of time. The idle count subtracted from the total number of devices in a group produces the occupancy count of the group.

Peg Count Measurement

Peg count for an item over a specified interval of time is a peg count measurement.

Usage Measurement

This measurement reflects the total accumulated time a specified group of devices have been busy during a specified time interval. Usage measurements are stated in hundred call seconds (CCS) units.

CCS – Hundred Call Seconds

This is the standard measurement for usage. The total number of seconds a device or group of devices have been in use divided by 100 produces the CCS unit.

TABLE B

COUNTERS AND REGISTERS

Peg Counter

A peg counter is a register to which the number one is added each time a given event occurs.

Occupancy Counter

This is a register to which the number one is added each time a device of a specific class is made busy and from which the number one is subtracted when that same device becomes idle. This counter will reflect the occupancy count of the device group.

Idle Counter

This register reflects the idle count of a specific device group. The number one is subtracted from this register each time a device in a specific group is made busy and a one is added when a device in that group is returned to the non-busy state.

Seizure and Release Peg Counters

The seizure peg counter is incremented by one each time a device in a specific group is seized for service. The release peg counter is incremented by one each time a device in the same group is returned to the idle state. The release peg count subtracted from the seizure peg count of a specific group produces the occupancy count for that group.

Accumulating Registers

This register has the contents of a counter added to it periodically to form a cumulative total over a prescribed interval of time.

Holding Registers

Measurements are stored in this type register for fixed time periods. Extended interval accumulation and/or outputting of the measurement occurs from this register.

Extended Interval Accumulating Registers

The contents of a set of holding registers is summed in this register periodically to form a cumulative total of a measurement over an extended interval of time.

TABLE C

DESCRIPTION OF TRAFFIC DATA ADMINISTRATION SYSTEM MEASUREMENT CLASSES (TDASMCs)

TDASMC	DESCRIPTION OF MC	MSC*
0	SERVICE CIRCUIT, ENGINEERED MEMORY, AND QUEUE	0,1,2,3,17
1	TRAFFIC	4,5,8,9
2	TRAFFIC SEPARATIONS	10
3	INEFFECTIVE ATTEMPTS	6,7,11,18
4	TSI USAGE	12
5	TRUNK SUBGROUP	INCOMING SEIZURE PEG COUNT TOTAL USAGE OUTGOING ATTEMPS PEG COUNT OVERFLOW PEG COUNT REROUTE TO SEIZURE PEG COUNT
6	CCIS DATA LINK	14
7	INTERNATIONAL CALLS (NOT IMPLEMENTED)	15
8	I/Ø, FILE STORE, TAPE UNIT AND DATA LINK	16
9	TRUNK SUBGROUP IDENTITY AND SIZE	18 CHARACTER (CIN) FOLLOWED BY 6 CHARACTER (TSG) SIZE

*ALL MEASUREMENTS THAT COMPRISE THE OMSs IN THESE SUBCLASSES UNLESS OTHERWISE SPECIFIED.