LOCAL AREA DATA TRANSPORT (LADT) NETWORK SYSTEM ADMINISTRATION DESCRIPTION NETWORK ADMINISTRATION

CONTENTS PAGE

CONTENTS PAGE

Printed in U.S.A.

CONTENTS PAGE

Figures

Tables

CONTENTS PAGE

1. GENERAL

1.01 This section provides the network administrator with guidelines to be used during the overall administration of the Local Area Data Transport (LADT) network.

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

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

1.04 The terms and specifications provided in this document are related to LADT, Generic 1, Release 1A. Any references to the No. 1 Packet Switching System (No. 1 PSS) packet switch relate to Version 2.0, Release 2.0.

1.05 This document is generally based on the LADT service offering implemented in the Florida area, which employs AT&T Technologies products for the access concentrators and the packet switch. The access concentrators used are Data Subscriber Interfaces (DSIs) and the packet switch implemented is the No. 1 PSS packet switch.

1.06 The LADT network for initial service is composed of three major components, as depicted in Fig. 1:

(a) *Data Subscriber Interface:* The DSI provides terminations for customer access. It also accepts the data packets over the dial-up and data SLC* carrier system connections and transmits these data packets to and from the No. 1 PSS packet switch.

(b) *No. 1 PSS Packet Switch:* The packet switch accepts data packets from the DSIs and the information service providers (service vendors), and routes these packets over the LADT network. By way of Facility Interface Processors (FIPs), the packet switch provides terminations for the DSIs, the administrative processor (AP), and the service vendors.

(c) *Administrative Processor:* The AP contains the programs that are responsible for the integrity, management, and maintenance of the DSIs. These programs are also responsible for the network service, including billing and traffic measurements.

2. NETWORK ADMINISTRATION RESPONSIBILITIES

2.01 Network Administration is responsible for the quality of service provided by the LADT network. This is accomplished by supporting three major functions:

- Data Administration
- Performance Surveillance
- General Administrative Support.

2.02 For data administration, Network Administration ensures that the traffic measurements from the AP and the packet switch are properly collected and validated. This includes determining which measurements are to be reported on the various report formats, and establishing and setting of thresholds for the available threshoided measurements.

2.03 Performance surveillance involves the monitoring of the measurements in terms of load, utilization, and performance indicators. This function provides valuable support information for customer assistance, as well as Network Maintenance and Engineering. The trending of historical data is useful in determining the validity of any thresholds that have been set.

2.04 General administrative support functions encompass Network Administration's responsibilities during a transition state. During any rearrangements, equipment additions and deletions, or retrofits, Network Administration's overall objective is to protect the network from any adverse effects that may be caused by the transition.

3. DATA ADMINISTRATION

SCOPE

3.01 Data is the basic tool available to aid Network Administration in the performance of their responsibilities in managing the LADT network. Therefore, the functions required within the Data Administration segment are of primary importance.

3.02 Network Administration is accountable for the collection, reporting, validation, and distribution of all traffic and performance data. These data are generated from both the AP and the packet switch. Network Administration schedules reports and maintains data to identify and analyze network performance.

DATA COLLECTION

3.03 Network Administration collects DSI and packet switch data for each 24-hour period. These reports can be manually generated and/or can be scheduled to print automatically.

A. AP Measurement Collection

3.04 The DSIs' activity and performance measurements are measured by a set of counters that are maintained and controlled by each DSI microprocessor. At 5-minute intervals, data is sent simultaneously from each DSI, in the form of a data packet, to the AP for processing. This is achieved by establishing a virtual call from each DSI through the packet switch to the AP.

3.05 Data packets at the AP are partitioned into two separate sets of information. One set is defined as those pertaining to "traffic" measurements, relating to DSI activity. The second set of data deals specifically with "error" measurements. Defining those counts that, under normal call processing conditions, should be zero.

*Trademark of AT&T Technologies, Inc.

B. Packet Switch Measurement Collection

3.06 Raw data on traffic and performance are taken both at the FIPs and at the 3B20D processor of the packet switch. The raw data is processed by the packet switch. This final set of processed measurements is used to generate the various reports.

FIP Data Collection

3.07 The FIPs scan for measurement collection every 10 seconds. Data is collected by both the firmware in the XPC chip (X.25 communications protocol level 2) and the software in the FIP main processors.

3.08 The XPC chip has one group of counters that maintain data on the basic events that occur when a call is processed. These counters are incremented each time an actual events occurs. In addition, the XPC chip is also responsible for collecting data for counts that occur less frequently than the basic call processing events, but are more serious in nature. In this case, the XPC chip generates an interrupt to the FIP main processor at the time the event occurs. If the data for this type of event is to be maintained, the FIP forwards the data to the packet switch. It is at the packet switch that this data is actually scored and incremented.

3.09 The FIP main processor software also collects measurements on the FIP activity. These data basically relate to the utilization of FIP resources and the X.25 level 3 protocol traffic measurements. Measurements collected by the software are also collected at 10-second intervals. Once each minute the raw data are sent to the Measurements Control Process (MCP) of the 3B20D processor for retention and further processing.

3B20D Processor Data Collection

3.10 The packet switch 3B20D processor plays a vital role in the overall collection and administration of packet switching data. It receives raw measurements from the FIPs, and accumulates its own raw measurements. In addition, the 3B20D processor collates all raw data into the appropriate files and generates reports.

3.11 Measurements taken by the 3B20D processor (identified in the measurement labels as the Central Controller Computer [CCC]) on an event basis are similar to those taken by the FIP. Raw data are accumulated as a normal call processing event occurs, and/or may be incremented on an interrupt basis for those events that are considered to be serious system problems. Measurements are sampled by both the MCP, as well as other processes in the CCC.

3.12 The FIP data are accumulated in the packet switch by two different processes. The Automatic Recovery (AUTOR) process in the 3B20D processor receives the transactions containing event interrupts from the FIPs. These event interrupts are transmitted at the time the event occurs, and the AUTOR process scores the counter(s) related to the event. The MCP in the 3B20D processor receives the raw data from the FIPs for those normal call handling events. These data are received at 1-minute intervals. Additionally, the MCP also takes FIP data samples itself.

DATA SOURCES

A. AP Measurements

3.13 Traffic and error source files are initially created from the 5-minute data transmitted by the DSIs to the AP. As these data are gathered over longer periods of time, additional files are created. These files, which accumulated the 5-minute data, provide measurements for 30-minute and 24-hour time frames for each type of source file.

3.14 The traffic and error source files encompass a total of six different files for the three reporting periods. These files are used to provide formatted reports, as designed by the network administrator. There are a total of 10 report formats available for each type of measurement (i.e., traffic and error), for a combined sum of 20 reports. These formats, known as tables, are segregated into three major categories:

- Periodic
- On-Demand
- Special.

3.15 The periodic reports are defined as those reports which are scheduled to generate automatically. These reports are available for all three time periods (5 minutes, 30 minutes, and 24 hours), as indicated by the format table names: 5P, 30P, and 24P. Measurement values provided in these reports are based on Network Administration discretion at the time the report forms are established.

3.16 On-demand reports are available for the same time periods as the periodic reports and are only available at user request. Measurement values appearing in the on-demand reports are set by Network Administration, based on the available format tables identified as 5Ø, 30Ø, and 24Ø.

3.17 There are four special report formats available for each type of measurement. These special report formats provide the user with additional methods in which to group the data. The abbreviated report names are F1, F2, F3, and F4. These names have no time reference as they can be retrieved for any reporting period by specifying the format table desired.

3.18 Threshold reports are also available for the administration of data from the DSIs. Two thresholds forms are provided for traffic measurements and two for error measurements. Each form relates to a single time interval (either 5 minutes or 30 minutes) and can contain up to 12 measurements, each with its own maximum or minimum limit.

3.19 Section 255-025-040 provides additional details on the various measurements provided for traffic and error data, and information on report formatting. Refer to the LADT Input/Output Manual for a complete description of the variables and the recent change input.

B. Packet Switch Measurements

3.20 Traffic reports for the packet switch are provided for two basic time intervals: 5 minutes and 30 minutes. Both report types may be scheduled and printed as required.

3.21 Data provided on the 5-minute reports are only those measurement items specifically designated for this report. Since the 12 latest 5-minute measurement reports are retained in the system, these reports can also be requested on a demand basis. All or selected sections of the rolling 60-minute data can be demanded.

3.22 There are two categories of 30-minute reports that may be allowed to print. The first category is the standardized 30-minute report, The second category provides detailed measurements. All measurements appearing in the Detail Measurement Reports is specified by the network administrator.

3.23 The 30-minute data are stored for the previous 24-hours. Every 30 minutes the data files are updated. Therefore, the user may demand any and all sections of the 30-minute reports for the preceding 24-hour period.

3.24 In addition to the 5-minute and 30-minute reports, the No. 1 PSS provides for a fixed set of thresholds for certain measurements. These thresholds are automatically compared at specific intervals, i.e., 30 seconds and 2 minutes. Each measurement threshold has a specified default value that is preset with the system generic, but may be changed by the network administrator. Each time a threshold is violated, a message may be printed, an alarm may accompany the threshold, and a traffic indicator may be triggered.

3.25 Section 255-025-041 provides additional details on the types of measurements provided for each of the available reports, and information on report formatting. Refer to the Transport Network (TNET) Input/Output Manual for a complete description of the variables and the recent change input.

REPORT ADMINISTRATION

3.26 Report administration is a key function in the overall data administration process. Network Administration in conjunction with NSEC should monitor the network and maintain engineering and administrative data. One responsibility within this segment is establishing thresholded measurements. This includes determining which measurements, where applicable, are to be thresholded, establishing the default values, and monitoring the default values to determine threshold effectiveness.

3.27 A second responsibility is the setting up of the standard reports available within the system. Network Administration must identify which reports are to be generated automatically or on demand.

3.28 A third responsibility of Network Administration involves the preparation of manual report summaries. Manual report summaries are required until a down-stream process is available for LADT data.

3.29 The reports for the AP and packet switch are divided into three categories as follows:

- Threshold reports
- Standard reports

- Manual reports.

The report formats for the AP are described before those for the packet switch.

A. AP Threshold Reports

3.30 The AP allows users to set up traffic and error thresholds on any per DSI or system type of traffic and error measurement. However, these thresholds are limited to 12 measurements per type (traffic and error) for each of the reporting time periods. It is the responsibility of Network Administration to set up thresholds for the 5-minute and the 30-minute reports.

3.31 It is important to note at this point that caution should be taken when determining which measurements are to be thresholded. In order for a report to be generated due to a threshold violation, the measurement must also appear in one of the four sections of the periodic report for the same time period. In addition, not only must the REPORT SWITCH be set on conditional (COND), but the SECTION SWITCH in which the measurement appears must be set to ON.

3.32 Only a small number of measurements provided by the AP actually relate to DSI performance and indicate potentially poor service or DSI exhaust. It is, recommended that these network surveillance type of measurements be monitored at 5-minute intervals. The measurements need not appear on the 30-minute report, as the data for this report are merely accumulations of the 5-minute totals.

5-Minute Traffic Thresholds

3.33 The 5-minute traffic measurements recommended for thresholding all relate to measurements on a per DSI basis. This factor is important when specifying the category on the Traffic Thresholds Form. In addition to the actual limit value, the type of limit must also be specified. If the limit is a maximum type of value, it will be identified along with the recommended value. Minimum value limits will also be identified. Five traffic measurements recommended for thresholding are:

- AVG-FREE-PKT-BUFF
- OUT-QUEUE-LENGTH
- TOTAL-DSI-PS-PKT
- TOTAL-PS-DSI-PKT
- CPU-SCHED-CYCLES.

3.34 *AVG-FREE-PKT-BUFF:* This measurement is the average number of free (available) packet buffers at the DSI. The value is the average of 10 second scans at the DSI. The AVG FREE-PKT-BUFF threshold is equal to the high packet threshold (HI PKT THR) plus 10. The HI PKT THR, found on the DSI Equipment Form, is 21. Therefore, the threshold limit for this measurement should be set at 31.

3.35 *OUT-QUEUE-LENGTH:* The data for this measurement label is defined as the average number of buffers assigned to output queues going to the packet switch. The value is the average of 10-second scans at the DSI. The OUT-QUEUE-LENGTH threshold is equal to 80 percent of the packet switch queue threshold (PS QUE THR). The packet switch QUE THR, also found on the DSI Equipment Form, is 10. Therefore, the threshold limit for this measurement should be set at 8.

3.36 *TOTAL-DSI-PS-PKT:* This measurement is the total number of packets transmitted from a DSI to the packet switch for all DSI ports. The present number of engineered packets per second is 500. This value is multiplied by 300 because the values are stated in terms of the 5-minute reporting interval (300 seconds equals 5 minutes). The threshold limit for this measurement is 150,000.

3.37 *TOTAL-PS-DSI-PKT:* This measurement is the total number of packets transmitted from the packet switch to the DSI for all ports. Like the TOTAL-DSI-PS-PKT measurement, the threshold limit is set at 150,000.

3.38 *CPU-SCHED-CYCLES:* This measurement is the average number of processor scheduler cycles completed at the DSI over 5 minutes. These cycles relate to internal maintenance levels that are executed. The higher the traffic load on the system, the lower the number of cycles executed. The threshold limit is less than the busy period expected value. Since this measurement is traffic dependent, the recommended threshold limit should be set based on a sample study of all DSIs. This can be accomplished by initially setting the threshold limit to a low value in order to establish a historical base. It is necessary that this base be monitored for all 288 5-minute intervals per day. The study should take place for no less than 7 days, including weekends, since the busiest day could be a Saturday or

Sunday.

5-Minute Error Thresholds

3.39 It is recommended that those error measurements that relate to the DSI overload controls 1 and 2 be established as thresholds on the 5-minute error thresholds report. Each level of overload control is activated and cleared by preset values. These values are set up by administrative personnel via the DSI Equipment Form. Table A provides activation, repercussion, and clearance arguments for these overload controls, and identifies the recommended values for these preset factors.

3.40 The actual measurement labels recommended to be set are:

- DSI-CNT-OVRLD-1
- DSI-CNT-OVRLD-2
- DSI-TIME-OVRLD-1
- DSI-TIME-OVRLD-2.

3.41 The DSI-CNT-OVRLD-1 and -2 measurements provide counts of the total number of times the DSI invokes level 1 or level 2 overload controls. Measurements identified as DSI-TIME-OVRLD-1 and -2 provide counts of the total time in tenths of seconds that a DSI is in the particular level of overload control. These four measurements should be set at zero. The implementation of a level 1 control, which is the least severe of the two, causes a service disruption on new call requests as well as active calls.

3.42 It is also recommended that measurement label BLOCKING-CONG-CRLS also be set on the 5-minute error threshold report. This measurement is the total number of calls at any stage of setup that are blocked due to active DSI overload controls. The limit set should be zero.

30-Minute Traffic Thresholds

3.43 There are currently no specific engineering and administrative threshold limits recommended for 30-minute data. Instead, the following guidelines are suggested. Periodic or on-demand reports should be run during the anticipated busy periods. The busiest periods will probably fall in the afternoon and evening. The study should run for approximately 2 weeks to validate thresholds. These data should be maintained in a summary format, and, at the end of the study, the average should be found for each of the respective measurements. Once the average is determined, threshold limits can be set at approximately 90 percent of the average for each measurement. Depending on the number of subsequent reports generated, the value should be either raised or lowered until the threshold limit becomes meaningful. If the calling characteristics and/or traffic patterns change the threshold line, it should be reviewed.

3.44 The following measurement labels are recommended for the establishment of thresholds on the 30-minute traffic thresholds report. All of these measurements are on a per DSI basis.

- DIALUP-PORT-USAGE
- DIALUP-MBSY-USAGE
- TOTAL-DSI-CT-IFR
- TOTAL-CT-DSI-IFR
- TOTAL-DSI-CT-OCT
- TOTAL-PS-DSI-PKT.

3.45 In addition to the per DSI measurements, the network administrator may wish to generate statistics on a system basis. Examples of such measurements include:

- AVG-PS-OUT-QUEUE
- DIALUP-PORT-USAGE
- TOTAL-LC-SETUPS.

3.46 Another measurement is the total number of DSIs in service (TOTAL-DSI-INS) at the end of the reporting period. This measurement indicates trouble on a given DSI within the last 5 minutes prior to the report generation. The threshold value for this measurement should be set to the total number of DSIs installed.

3.47 Table B provides a complete list of the traffic measurements collected by the AP. The measurement labels shown in the table are itemized, and a definition is provided to the right of each label. Table C is provided as a cross-reference for all traffic measurement labels itemized in Table B. The measurements in the cross-reference table are listed in alphabetical

order, with corresponding item numbers indicated in the column to the right of the label.

30-Minute Error Thresholds

3.48 The 30-minute error thresholds report provides Network Administration with an additional method of monitoring error measurements beyond the limited data established on the 5-minute report. The suggested method of determining the actual threshold values for these measurements are the same as prescribed in paragraph 3.43. Values should be set so that the violation of a threshold is meaningful. Initially this should be determined through the study of historical data as related to the overall performance of the DSI.

3.49 The following measurement labels are recommended for the establishment of threshold on the 30-minute error thresholds report. All of these measurements are on a per DSI basis.

- ALL-DSI-CRC-ERR
- CALL-CLR-DSI-CONG
- DSI-LCHAN-BLOCK
- DSI-TO-ALL-RTIFRM
- SERV-BLOCK-PSCONG.

3.50 In addition to the per DSI measurements, it is recommended that at least the AP-MISSING-PACKETS measurement be monitored via this report. Although this measurement is a system count, providing a total over all DSIs, it does indicate that some data are missing for one or more DSIs. The measurement is defined as the number of DSI to AP traffic data packets that were expected but not received by the AP. This maximum threshold value should be set at zero.

3.51 Table D provides a list of all the error measurements collected by the AP. The measurements shown in the table are itemized, and a definition is provided to the right of each label. Table E is provided as a cross-reference for all error labels itemized in Table D. The measurements in the cross-reference table are listed in alphabetical order, with corresponding item numbers indicated in the column to the right of the label.

B. AP Standard Reports

3.52 The AP standard reports available for the group of traffic measurements and the group of error measurements are:

- 5-Minute Periodic
- 5-Minute On-Demand
- 30-Minute Periodic
- 30-Minute On-Demand
- 24-Hour Periodic
- 24-Hour On-Demand.

3.53 Each of these reports has provisions for the reporting of up to 96 measurements (4 sections x 24 measurements per section), for a total of 1152 measurements. In addition, there are four special format reports available that provide a total of 384 possible measurements. Some basic recommendations and general guidelines are provided in the following paragraphs.

5-Minute Reports

3.54 The 5-minute periodic reports for both traffic and error measurements contain the 5-minute thresholded measurements that appear on the respective thresholds reports. It is recommended that the periodic report REPORT SWITCH setting be set to conditional (COND). This inhibits the generation of the report every 5 minutes, but will still allow threshold violations to be reported. However, the SECTION SWITCH of any thresholded measurements established in Sections 1 through 4 must be set to ON. The thresholded measurements should be assigned to the second section of the report. The first section is for system measurements only. The remaining two sections can be set to OFF.

3.55 All system counts can be established within the first section of the reports. The remainder of the per DSI traffic and error counts (excluding those thresholded measurements already defined in Section 2) can be defined in Sections 3 and 4 of their respective reports. The generation of data for these three sections will only be generated when the conditional report switch setting is changed to ON, and the OFF switch settings are changed to ON. At this time it is not envisioned that the 5-minute on-demand reports for either

traffic or error measurements need be used. Data measurements set for these reports are at the discretion of the Network Administrator.

30-Minute Reports

3.56 The recommended traffic error measurements per DSI to be thresholded should be assigned to Section 2 of the 30-minute periodic reports. Any 30-minute thresholded measurements that are on a per system basis must appear within the first section of the report.

3.57 Once enough historical data has been monitored to determine normal values and meaningful measurements, data appearing in Sections 3 and 4 of the periodic reports can be moved to the on-demand reports. Those periodic reports sections can be turned off.

24-Hour Reports

3.58 Recommendations for the 24-hour periodic reports are similar to those for the 30-minute data. Section switches should be turned ON in order to receive automatic reports for activity and performance monitoring.

Special Report Formats

3.59 There are four special report formats for traffic measurements and four for error measurements. These formats are available for Network Administration to segregate certain types of data for reporting on an on-demand basis. For example, there are five traffic measurements that are required for traffic engineering. Once traffic characteristics are established by monitoring these data via the thresholds and periodic reports, the measurements can be moved to a special format report. Data can then be specifically monitored only for those time intervals which are considered peak periods.

3.60 Another use for this type of format could be special studies for customers and other work groups. If the required time intervals are known, the data can be grouped on a special format report, and only viewed when desired.

C. AP Manual Report Summaries

3.61 Currently, the major requirement for summarized data is data which are monitored for traffic engineering. These data provide engineering and administration with those measurements that represent the overall DSI load.

3.62 The DSIs are provisioned using the extreme value engineering (EVE) methods. With EVE, only the highest loads that are observed for a given time frame are used in the engineering calculations. For LADT, the time frame is on a weekly basis. This eliminates any problems that may be encountered regarding how to handle weekend and holiday traffic.

3.63 There are five traffic measurements on a per DSI basis that need to be summarized for 30-minute reporting periods for engineering purposes:

- DIALUP-PORT-USAGE
- TOTAL-CT-DSI-IFR
- TOTAL-DSI-CT-IFR
- TOTAL-DSI-CT-OCT
- TOTAL-PS-DSI-PKT.

3.64 *DIALUP-PORT-USAGE:* This measurement is the load or CCS on dial-up ports. This measurement is not affected by maintenance usage. Therefore, it can be used directly as reported.

3.65 *TOTAL-CT-DSI-IFR:* This measurement is the total number of information (I) frames transmitted to the DSI from customer terminals. This data value is part of an equation to calculate the DSI load in terms of data packets per second. The I frame counts are used since the level 3 packet counters include the acknowledgement packets as well as data packets.

3.66 *TOTAL-DSI-CT-IFR:* This measurement is the total number of I frames transmitted from the DSI to customer terminals. It is used to calculate the DSI load in terms of data packets per second.

3.67 *TOTAL-DSI-CT-OCT:* This measurement is the total number of octets transmitted from the DSI to the customer terminals. This measurement is part of the equation to calculate the load on the DSI to packet switch access line. The majority of the load is measured by this counter. However, this measurement does not include overhead.

3.68 *TOTAL-PS-DSI-PKT:* The count measures the total number of packets transmitted to a DSI from the packet switch for all ports on that DSI. This measurement is used with the TOTAL-DSI-CT-OCT to determine the line load on the DSI to packet switch

access line.

3.69 Current restrictions only allow 12 threshold files. To limit the number of thresholds used it is recommended that only the DIAL-UP-PORT-USAGE measurement be thresholded.

3.70 Once the data are retrieved, whether by thresholding or by demand, the data should be validated. The results can be accumulated on existing exception logs, or on a form that would provide entries for each respective measurement.

3.71 Once the data have been collected for a week the data must be calculated and summarized. Figure 2 is a sample of the summary report that should be sent to the traffic engineer and retained as part of the historical data. The figure also includes the calculations required to determine the DSI load in terms of data packets per second and the packet switch to DSI line load, which is stated in terms of kilobits per second (kb/s). The dial-up port load data requires no calculations. For each of the three load measurements, only the peak value for each measurement need be reported for any given week.

D. Packet Switch Threshold Reports

3.72 The No. 1 PSS provides a fixed set of thresholds for certain measurements. These thresholds are automatically compared at specific intervals, i.e., 30 seconds and 2 minutes. The measurement value that is compared to the threshold has a fixed formula, where the value is equal to a raw data value, or a group of raw data values that have been used in an equation. Table F provides a listing of the measurement thresholds labels, along with the fixed formula, and a definition of each. The formulae are described by using the raw measurement labels defined in Table G.

3.73 Each measurement threshold has specified default values. These values are preset, but may be changed by Network Administration if dictated by historical trends. Table H provides a listing of the same measurement thresholds identified in Table F, but also provides their default values and the range of acceptable values. Each of these values has been multiplied by 1000, for ease of computation. For example, CCPUUSG has a default value expressed as 750. The actual value of 0.75 or 75 percent has been multiplied by 1000 for reporting and threshold setting purposes. This factor should be taken into consideration any time the values are being revised. In addition, Table H also identifies the type of report and the severity with which the measurements will be reported, if the threshold value is exceeded.

3.74 There are nine threshold measurements that are of major interest to Network Administration, although the other measurements also provide indications that should be monitored. At least the following nine items should be tracked on thresholds logs for packet switch data:

- CCPUUSG
- CFPBUF
- CSUCPSR
- FCDSCDR
- FCTFOUTQ
- FCYCLES
- FDSCDR
- FTCOUTQ
- LFBPBUF.

E. Packet Switch Standard Reports

3.75 The term standard reports refers to all No. 1 PSS reports other than the threshold report. Currently three different reports are provided. Data accumulations for a 24-hour period are not available until Release 3. The available reports are:

- 5-Minute
- 30-Minute
- Detail Measurements.

3.76 Not all traffic measurements are available for all reports. Table I provides an alphabetical listing of all of the No. 1 PSS traffic measurements. The measurements defined specifically for each report are discussed in the following paragraphs.

5-Minute Reports

3.77 The 5-minute reports provide data for four different categories of measurements. The first category of measurements are Central Control Computer (CCC) or system measurements. The second

category of data relates to the FIPs, while the third and fourth categories provide data for lines and trunks, respectively. Table J provides a summary of these report types with their respective measurement labels. Also provided in this table is an indication of whether or not the particular measurement in question has an associated alarm.

3.78 The association of alarms to the various measurements is of primary interest when administering the 5-minute reports. These reports may be set to print every 5 minutes or may be set to print only after a traffic alarm has been triggered.

3.79 The conditional option is as effective as a threshold. The traffic alarm can be considered the threshold value, and when the alarm is triggered (or the threshold violated), the report will print. The only difference is that a threshold is usually associated with a single measurement, while the alarm will cause the data for the entire category to print.

3.80 The visibility of 5-minute data only when an alarm has been triggered does not mean that the data for reports not generated are lost from view. Since the 12 latest 5-minute reports are stored, these reports can also be requested on a demand basis.

30-Minute Reports

3.81 The basic or standard 30-minute reports are formatted in the same manner as the 5-minute reports. The CCC measurements are followed by the FIP measurements, and then the line and the trunk data are presented. The actual measurements reported vary from those reported on the 5-minute reports. Table K provides a summary of the measurement labels for each category of data.

3.82 The standard 30-minute reports may either be allowed to print every 30 minutes or may be inhibited from printing. Initially the standard 30-minute reports should be inhibited. This recommendation is made because additional 30-minute reports, entitled Detail Measurement Reports, are available, and can be manipulated in terms of actual measurements reported.

Detail Measurement Reports

3.83 The Detail Measurement Reports also provide data for 30-minute intervals. This report is subdivided into six different measurement types:

- CCC Measurements
- FIP Measurements
- Line Traffic Measurements
- Line Error Measurements
- Trunk Traffic Measurements
- Trunk Error Measurements.

Since the current environment does not include trunks from one packet switch to another, trunk data will not be addressed in this issue.

3.84 The detailed 30-minute reports will include the measurements identified in Table L. These reports provide flexibility in the amount and type of measurements reported, and provide a focal point for key service indicators and summarization data.

3.85 The recommended measurements that are to be set up using the Detail Measurement Report format are those measurements that could be used for the load service and equipment traffic and error summary reports. These measurements, along with their bit positions, are provided in Tables M through O as follows:

- CCC Measurements (Table M)
- FIP Measurements (Table N)
- Line Measurements (Table O).

3.86 The Detail Measurement Reports should be allowed to print every half hour and the data retained for the manual report summaries.

F. Packet Switch Manual Report Summaries

3.87 The Network Administration should provide a load service and utilization report for the packet switch and each of its major components, i.e., the CCC, FIPs, and lines. Network Administration can use this data to determine the packet switch and component utilization, performance, and busy periods. This report also provides input to a daily summary report. The following two report types are recommended:

- Daily Load Service
- Daily Packet Switch Load Service Summary.

Daily Load Service Reports

3.88 The daily load service report is based on 30-minute data and is used to determine the daily busy hour for the packet switch and its components. It also provides a collection vehicle for the daily summary reports. A separate report should be administered for each of the following components: CCC, FIPs, and access lines, grouped by hunt groups when appropriate.

3.89 *CCC:* The CCC load service report should consist of those measurements specified in Table M. Network Administration should the busy hour of the CCC by tracking the CCC-SETUPS measurement.

3.90 *FIP:* The FIP load service report should consist of those measurements specified in Table N. The FIP number and the lines configured for the FIP is also required. Network Administration should identify the busy period for each FIP on the packet switch. (Review packet load and virtual call setup load).

3.91 *Access Line:* The load service report for an individual access line should consist of the measurements specified in Table O. This report should be grouped by hunt groups on the packet switch. The report provides input for the daily summary report and an error tracking history for use by maintenance and customer assistance.

4. PERFORMANCE SURVEILLANCE

SCOPE

4.01 Performance surveillance is the monitoring of the available measurements in terms of workload, utilization, and performance indicators. Information is also acquired to aid customer assistance and Network Maintenance.

4.02 Thresholded measurements are designed as an inspection criterion for certain service and load measurements, as well as performance monitoring. It is important to practice caution when establishing threshold values at the early stage of LADT implementation. The guidelines to be used for establishing the threshold values for both AP and packet switch measurements have been discussed previously. As thresholds are exceeded performance should be tracked for affects on the machine.

4.03 Causes of any high counts of service measurements and utilization factors should be determined by a complete analysis of the AP or packet switch data for the time period. This includes reviewing data on generated reports. Demand reports can be obtained through interaction with the Network Administration terminal. Problems with service measurements should be referred to Network Maintenance and/or maintained in record format to provide support information for future occurrences that are similar in nature. Network Administration is also responsible for escalating load problems to the engineer.

4.04 The LADT performance objectives are specified for the DSI, the DSI to packet switch link, and the packet switch. The performance of other system components is complied with through the meeting of these fundamental objectives. These objectives should be considered throughout performance surveillance.

PERFORMANCE OBJECTIVES

A. Busy Hour

4.05 The busy hour is defined as the peak traffic hour of the day. Component busy hours are also based on peak load hours of the day, and may be different hours from the system busy hour.

B. Scheduled Hours of Service

4.06 The scheduled hours of service are the hours that LADT is scheduled to provide service to the system users. The current scheduled hours of service are for 24 hours a day, 7 days a week.

C. Availability

4.07 Availability is the long term average of the ratio of actual service time to the scheduled service time. This performance objective is expressed as a percentage. The current system objective is 99.7 percent.

D. Serviceability

4.08 Serviceability is defined as the Mean Time to Restore (MTTR) a user-affecting failure in LADT. This measurement is primarily a performance objective for not only system maintenance, but the maintenance of the user access lines. The MTTR expected level of performance is 5 hours.

E. Service Blocking

4.09 Service blocking is the denial of a request for call setup. This denial is due to a lack of sufficient shared network resources for reasons other than failures in the LADT network. Service blocking applies only to the first attempt for a call setup. A retry for a call setup within 1 minute is considered a reattempt and is not counted. By definition, service blocking does not include the blocking of dial-up calls specifically caused by the lack of DDD resources.

F. Premature Disconnect

4.10 Premature disconnect is the probability that a virtual call will be cleared prematurely due to LADT action in any 1-second period during the system busy hour.

G. Accuracy

4.11 Accuracy is defined as a measure of the correctness and completeness of any transaction which is completed using LADT. Accuracy is measured by the following:

(a) ***Errored Packet Rate:*** Errored packet rate is the probability of an error in a packet received by a user. Misdelivered packets are not included in this objective.

(b) ***Misdelivery Packet Rate:*** Misdelivery packet rate is the probability that a packet is delivered to the wrong destination. This does not include those packets that are delivered in error by fault of the user, such as entering the incorrect destination address for the called party. Misdelivered packets are only those delivered to the incorrect terminal due to the fault of LADT.

(c) ***Lost Packet Rate:*** Lost packet rate is the probability that a packet is never delivered due to the fault of LADT. These packets are those which meet all of the communications standards required by the LADT protocols, and are not lost due to an error by the user. Lost packets caused by LADT generated resets are counted in the lost packet rate. However, this performance measurement does not apply to users that cannot be flow controlled.

(d) ***Duplicated Data Packet Rate:*** Duplicated data packet rate is the probability of a packet being duplicated by LADT. Any duplication that results from user action is not included.

(e) ***Out of Sequence Data Packet Rate:*** Out of Sequence Data Packet Rate: Out-of-sequence data packet rate is the probability of a data packet being delivered out of sequence to a user by LADT. The sequence of packets is determined by the order in which the packets are transmitted by the user.

H. Response Time

4.12 Response time objectives for LADT are stated in terms of the average response time during the busy hour. Response time performance is measured for call setup and call transfer.

(a) ***Call Setup:*** Call setup response time is measured from the time that LADT receives a destination address from the originator until the time that LADT is ready to transmit the response to the originator. This objective excludes any delays induced by the host and the host access line.

(b) ***Data Transfer:*** Data Transfer: Data transfer response time is measured from the time that LADT receives the entire data packet from the originator until the data packet is ready to be sent to the destination.

I. Virtual Circuit Data Transfer Rate

4.13 Virtual circuit data transfer rate is the average throughput in kb/s in one direction that LADT should be capable of supporting for a virtual circuit during the system busy hour. This data rate applies for each direction of transmission, and is simultaneously supported. The rate applies for full packets, regardless of the maximum packet size that applies to the virtual circuit. This rate also assumes the proper user selection of the negotiable parameters, such as the window size.

4.14 The equivalent rate in packets per second may be computed using the throughput class and the amount of data in a full packet. If a user does not use full packets, the user may be limited by the equivalent packet-per-second value.

5. GENERAL ADMINISTRATIVE SUPPORT

5.01 General administrative support relates to Network Administration's role during transition management. A transition is categorized by local rearrangements, network rearrangements, equipment additions and deletions, retrofits and installations. The Network Administration group is responsible for protecting the system from adverse effects which may be caused

by a transition. The impact on the service of the LADT component(s) can be minimized by Network Administration through the preplanning of any transition. It is recommended that Network Administration participate when the transition methods are being developed.

5.02 Network Administration should provide loading plans with the detailed assignments available for implementation. Accurate data should be collected and summarized by Network Administration before, during, and after the transition in order to evaluate how the network was affected. In addition, Network Administration is responsible to ensure that any system data base information that requires revision because of the transition be updated accordingly.

6. ABBREVIATIONS AND ACRONYMS

6.01 Abbreviations and acronyms used in this section are defined in the following list:

TERM	DEFINITION
AP	Administrative Processor
AUTOR	Automatic Recovery (process)
CCC	Central Controller Computer
COND	Conditional
DSI	Data Subscriber Interface
EVE	Extreme Value Engineering
FIP	Facility Interface Processor
LADT	Local Area Data Transport
MCP	Measurements Control Process
NA	Network Administration
TNET	Transport Network

7. REFERENCES

7.01 The following references should be used to obtain additional information:

SECTION	TITLE
255-025-005	General Description
255-025-021	Data Subscriber Interface—Description and Assignment
255-025-022	Data Terminal Numbers—Description and Assignments
255-025-023	Packet Switch—Assignment Guidelines
255-025-040	LADT Network—Traffic and Performance Measurements
255-025-041	Packet Switch Measurements
255-093-010	Feature Document—No. 1 PSS Description
255-093-510	Feature Document—Data Subscriber Interface "

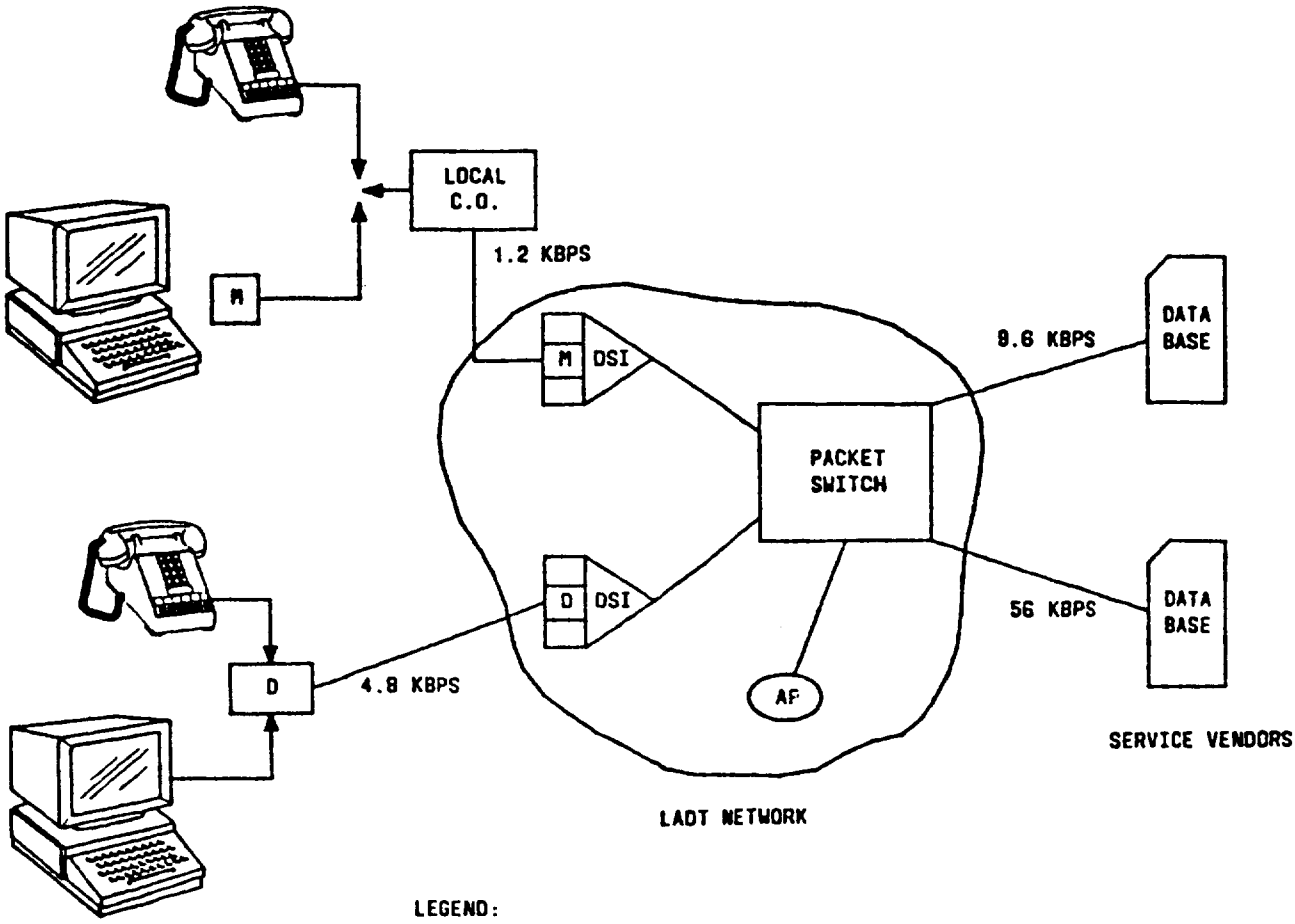

Fig. 1—LADT Basic Network Architecture

DAYS OF WEEK	PEAK HOUR	DIAL PORT LOAD	DSI LOAD			PACKET SWITCH TO DSI LOAD		
		DIALUP-PORT-USAGE	TOTAL-CT-DSI-IFR	TOTAL-DSI-CT-IFR	DATA PACKETS PER SECOND (D + E) ÷ 1800	TOTAL-DSI-CT-OCT	TOTAL-PS-DSI-PKT	LINE LOAD (Kbps) G + (8 x H) ÷ 225,000
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
S								
M								
T								
W								
TH								
F								
S								

Fig. 2—DSI Traffic Intensity Summary Report

TABLE A

DSI OVERLOAD CONTROLS

STATUS	LEVEL 1	LEVEL 2
ACTIVATION:	Activated when either one of the following two measurements cross a present value: 1. The number of free packet buffers goes below the present value for the high packet threshold (HI PKT THR [21]) 2. The length of the queue of packets going out to the packet switch exceeds the packet switch queue threshold (PS QUE THR [10]).	Activated when the number of free packet buffers goes below the low packet threshold (LO PKT THR [16])
REPERCUSSIONS:	If a DSI goes into overload state 1, then the following will occur: 1. All new call requests will be denied. Dial-up calls will get a busy signal, and data-SLC carrier system calls will get no answer. 2. Terminals with active calls will be flow controlled. No new requests for information from users will be honored. 3. Incoming packets from the packet switch destined for the customer terminals will still be processed. More than likely these packets are in response to a request made to the service vendor prior to the overload condition and will be handled.	If a DSI goes into overload state 2, then the following will occur: 1. All level 1 repercussions will be in effect. 2. The packet switch will be flow controlled. No incoming packets from the packet switch destined for the customer terminals will be processed.

TABLE A (Contd)

DSI OVERLOAD CONTROLS

STATUS	LEVEL 1	LEVEL 2
CLEARANCE:	Overload controls are cleared when: 1. For the restoral of packet buffers, the total available number of buffers, exceeds the sum of the HI PKT THR plus the high packet hysteresis (HI PKT HYST [12]). The HI PKT HYST is a preset value that provides a margin for an extra number of buffers before the control is cleared. 2. For the restoral of normal packet output, the total number of packets that are in queue goes below the sum of the PS QUE THR minus the packet switch queue hysteresis (PS QUE HYST [5]). The PS QUE HYST is a preset value that provides a margin for a lesser number of packets to be in queue before the control is cleared.	Overload controls are cleared when the number of free packet buffers goes above the sum of the LO PKT THR plus the low packet hysteresis (LO PKT HYST [2]). The LO PKT HYST is a present value that provides a margin for an extra number of free buffers before the control is cleared.

Notes: The preset values described for the overload control activation and clearance are input into Recent Change via the DSI Equipment Form.

A hysteresis is provided for each measurement in order to prevent a DSI from constantly thrashing into and out of an overload condition.

TABLE B

AP TRAFFIC MEASUREMENTS LADT CALL ORIGINATION

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	DSI
PORTS IN SERVICE	1. TOTAL-DSI-INS	THE NUMBER OF DSIs in service at the end of the reporting period.	X	
	2. TOTAL-PORTS-INS	The total number of ports in service for all DSIs or for a DSI at the end of the reporting period.	X	X
	3. DIALUP-PORTS-INS	The total number of dial-up ports in service for all DSIs or for a DSI at the end of the reporting period.	X	X
	4. DSLC-PORTS-INS	The total number of data SLC carrier system ports in service for all DSIs or for a DSI at the end of the reporting period.	X	X
DDS CALLS	5. DIALUP-CALL-ANSWER	The total number of DDD calls answered on dial-up ports via the MLHG.		X
	6. DIALUP-CALL-TIMOUT	The total number of DDD calls from dial-up ports to a DSI that time out without establishing data link protocol.		X
DIAL-UP	7. DIALUP-PORT-USAGE	The usage, stated in terms of CCS, of all dial-up ports over all DSIs or over a DSI.	X	X
PORTS TO MBSY	8. TOTAL-TRANS-MBSY	The total port transitions to a maintenance busy state.		
	9. DIALUP-TRANS-MBSY	The number of dial-up port transitions to a maintenance busy state.		X
	10. DSLC-TRANS-MBSY	The number of data SLC carrier system port transitions to a		X

TABLE B (Contd)

AP TRAFFIC MEASUREMENTS LADT CALL ORIGINATION

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	DSI
		maintenance busy state.		
MBSY CCS	11. TOTAL-MBSY-USAGE	The total maintenance busy CCS.		X
	12. DIALUP-MBSY-USAGE	The maintenance busy CCS of all dial-up ports.		X
	13. DSLC-MBSY-USAGE	The maintenance busy CCS of all data SLC carrier system ports.		X
MBS TIME	14. AVG-TIME-DLUP-MBY	The average number of seconds that a dial-up port is in a maintenance busy state.		X
	15. AVG-TIME-DSLC-MBY	The average number of seconds that a data SLC carrier system port is in a maintenance busy state.		X
PORTS TO OOS	16. TOTAL-TRANS-OOS	The total port transitions to an out-of-service state.		X
	17. DIALUP-TRANS-OOS	The number of dial-up port transitions to an out-of-service state.		X
	18. DSLC-TRANS-OOS	The number of data SLC carrier system port transitions to an out-of-service state.		X
OOS CCS	19. TOTAL-OOS-USAGE	The total out-of-service CCS.		X
	20. DIALUP-OOS-USAGE	The out-of-service CCS of dial-up ports.		X
	21. DSLC-OOS-USAGE	The out-of-service CCS of data SLC carrier system ports.		X
OSS TIME	22. AVG-TIME-DLUP-OOS	The average number of seconds that a dial-up port is in an out-of-service state.		X
	23. AVG-TIME-DSLC-OOS	The average number of seconds that a data SLC carrier system port is in an out-of-service		X

TABLE B (Contd)

AP TRAFFIC MEASUREMENTS LADT CALL ORIGINATION

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	DSI
		state.		
SUBSCRIBER DISTORTION SELECTION	24. TOTAL-DEST-SELECT	The number of time a destination selection process (DTN) is entered by all ports of a DSI.		X
	25. DIALUP-DEST-SELECT	The number of time a destination selection process (DTN) is entered by dial-up ports of a DSI.		X
	26. DSLC-DEST-SELECT	The number of times a destination selection process (DTN) is entered by data SLC carrier system ports of a DSI.		X
INVALID SUBSCRIBER DESTINATION SELECTIONS	27. TOTAL-INVAL-DEST	The number of times an invalid address (DTN) is entered in the destination selection process of all ports of a DSI.		X
	28. DIALUP-INVAL-DEST	The number of times an invalid address (DTN) is entered in the destination selection process of dial-up ports of a DSI.		X
	29. DSLC-INVAL-DEST	The number of times an invalid address (DTN) is entered in the destination selection process of data SLC carrier system ports of a DSI.		
	30. TOTAL-AVG-CALLS	The sum of the average number of dial-up and data SLC carrier system virtual calls connected from all ports for all DSIs or on an individual DSI basis. The calls are in a data transfer state; a call accept packet has been received.	X	X
	31. DIALUP-AVG-CALLS	The average number of virtual	X	X

TABLE B (Contd)

AP TRAFFIC MEASUREMENTS LADT CALL ORIGINATION

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	DSI
VIRTUAL CALL VOLUMES		calls connected from dial-up ports for all DSIs or an individual DSI basis. The calls are in a data transfer state; a call accept packet has been received.		
	32. DSLC-AVG-CALLS	The average number of virtual calls connected from data SLC carrier system ports for all DSIs or on an individual DSI basis. The calls are in a data transfer state; a call accept packet has been received.	X	X
	33. MAX-CALLS-CONNECT	The maximum number of virtual calls connected from all DSIs or on an individual DSI basis at the end of all 10-second intervals collected. These calls are in a data transfer state; a call accept packet has been received. For reporting periods longer than 5 minutes, it is the maximum of the 5-minute maxima.	X	X
LOGICAL CHANNEL	34. TOTAL-LC-SETUPS	The total number of logical channel setups over all DSIs, as determined by the number of initial request commands received from terminals and acknowledged by UA frame. Will count multiple origination requests (seizures) that may be made during one dial-up call.	X	X
	35. DIALUP-LC-SETUPS	The total number of logical channel setups by dial-up ports over all DSIs, as determined by the number of initial request commands received from terminals and acknowledged by UA frame. Will count multiple origination requests (seizures) that may be made during one dialup call.	X	X
	36. DSLC-LC-SETUPS	The total number of logical channel setups by data SLC carrier system ports over all DSIs.	X	X

TABLE B (Contd)

AP TRAFFIC MEASUREMENTS LADT CALL ORIGINATION

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	DSI
DSI TO PACKET SWITCH PACKETS	37. TOTAL-DSI-PS-PKT	The total number of packets transmitted from a DSI to the packet switch for all DSI ports.		X
	38. DIALUP-DSI-PS-PKT	The total number of packets transmitted from a DSI to the packet switch for dial-up ports.		X
	39. DSLC-DSI-PS-PKT	The total number of packets transmitted from a DSI to the packet switch for data SLC carrier system ports.		X
PACKET SWITCH	40. TOTAL-PS-DSI-PKT	The total number of packets transmitted to a DSI from the packet switch for all DSI ports.		X
	41. DIALUP-PS-DSI-PKT	The total number of packets transmitted to a DSI from the packet switch for dial-up ports.		X
	42. DSLC-PS-DSI-PKT	The total number of packets transmitted to a DSI from the packet switch for data SLC carrier system ports.		X
DSI/AP PACKET EXCHANGE	43. TOTAL-DSI-AP-PKT	The total number of packets transmitted from a DSI to the LDT AP. These are data and control packets.		X
	44. TOTAL-AP-DSI-PKT	The total number of packets transmitted to a DSI from the LADT AP. These are data and control packets		X
DSI PACKET AVAILABILITY DSI.	45. AVG-FREE-PKT-BUFF	The average number of free (available) packet buffers at at the DSI. The value is the average of 10-second scans at the		X

TABLE B (Contd)

AP TRAFFIC MEASUREMENTS LADT CALL ORIGINATION

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	DSI
AVERAGE QUEUE LENGTH TO PACKET SWITCH	46. OUT-QUEUE-LENGTH	The average number of buffers assigned to output queues going to the packet switch. The value to the average of 10-second scans at the DSI.		X
	47. AVG-PS-OUT-QUEUE	The average number of buffers assigned to output queues to the packet switch. The value is the sum of the averages over all DSIs.	X	
HIGHEST QUEUE LENGTH TO PACKET SWITCH	48. MAX-OUT-QUEUE	Maximum number of packet buffers assigned to output queues to the packet switch. The value is the maximum of 10-second scans for the 5-minute reporting period. For longer period reporting, the value is the maxima of the 5-minute maxima.		X
	49. MAX-PS-OUT-QUEUE	The maximum number of buffers assigned to output queues to the packet switch by a DSI.	X	
FRAMES SENT FROM SUBSCRIBERS TO DSI	50. TOTAL-CT-DSI-FRM	The total number of frames transmitted to the DSI from customer terminals.		
	51. DIALUP-CT-DSI-FRM	The total number of frames transmitted to the DSI from dial-up customer terminals.		X
	52. DSLC-CT-DSI-FRM	The total number of frames transmitted to the DSI from data SLC carrier system customer terminals.		X
FRAMES SENT FROM DSI TO SUBSCRIBERS	53. TOTAL-DSI-CT-FRM	The total number of frames transmitted from the DSI to customer terminals.		X
	54. DIALUP-DSI-CT-FRM	The total number of frames transmitted from the DSI to dial-up customer terminals.		X

TABLE B (Contd)

AP TRAFFIC MEASUREMENTS LADT CALL ORIGINATION

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	DSI
	55. DSLC-DSI-CT-FRM	The total number of frames transmitted from the DSI to data SLC carrier system customer terminals.		X
INFORMATION FRAMES FROM SUBSCRIBERS TO DSIs	56. TOTAL-CT-DSI-IFR	The total number of I frames transmitted to the DSI from customer terminals.		X
	57. DIALUP-CT-DSI-IFR	The total number of I frames transmitted to the DSI from dial-up customer terminals.		X
	58. DSLC-CT-DSI-IFR	The total number of I frames transmitted to the DSI from data SLC carrier system customer terminals.		X
INFORMATION FRAMES FROM DSI TO SUBSCIRBERS	59. TOTAL-DSI-CT-IFR	The total number of I frames transmitted from the DSI to customer terminals.		X
	60. DIALUP-DSI-CT-IFR	The total number of I frames transmitted from the DSI to dial-up customer terminals.		X
	61. DSLC-DSI-CT-IFR	The total number of I frames transmitted from the DSI to data SLC carrier system customer terminals.		X
	62. TOTAL-CT-DSI-OCT	The total number of octets transmitted to the DSI from customer terminals. The number of octets is an integral number. A packet may be 128 or 256 octets in length, including the header. The conversion of a packet to a frame adds a maximum of 6 additional octets, if both beginning and ending flags are specified [each flag is		X

TABLE B (Contd)

AP TRAFFIC MEASUREMENTS LADT CALL ORIGINATION

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	DSI
		8 bits to 1 byte (octet)].		
OCTETS FROM SUBSCRIBERS TO DSI	63. DIALUP-CT-DSI-OCT	The total number of octets transmitted to the DSI from dial-up customer terminals. The number of octets is an integral number. A packet may be 128 or 256 octets in length, including the header. The conversion of packet to a frame adds a maximum of 6 additional octets, if both beginning and ending flags are specified [each flag is 8 bits or 1 byte (octet)].		X
	64. DSLC-CT-DSI-OCT	The total number of octets transmitted to the DSI from data SLC carrier system customer terminals. The number of octets is an integral number. A packet may be 128 or 256 octets in length, including the header. The conversion of a packet to a frame adds a maximum of 6 additional octets, if both beginning and ending flags are specified [each flag is 8 bits or 1 byte (octet)].		X
	65. TOTAL-DSI-CT-OCT	The total number of octets transmitted from the DSI to customer terminals. The number of octets is anintegral number. A packet may be 128 or 256 octets in length, including the header. The conversion of a packet to a frame adds a maximum of 6 additional octets, if both beginning and ending flags are specified [each flag is 8 bits to 1 byte (octet)].		X
	66. DIALUP-DSI-CT-OCT	The total number of octets		

TABLE B (Contd)

AP TRAFFIC MEASUREMENTS LADT CALL ORIGINATION

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	DSI
OCTETS FROM DSI TO SUBSCRIBER		transmitted from the DSI to dial-up customer terminals. The number of octets is an integral number. A packet may be 128 or 256 octets in length, including the header. The conversion of a packet to a frame adds a maximum of 6 additional octets, if both beginning and ending flags are specified [each flag is 8 bits or 1 byte (octet)].		
	67. DSLC-DSI-CT-OCT	The total number of octets transmitted from the DSI to data SLC carrier system terminals. The number of octets is an integral number. A packet may be 128 or 256 octets in length, including the header. The conversion of a packet to a frame adds a maximum of 6 additional octets, if both beginning and ending flags are specified [each flag is 8 bits or 1 byte (octet)].		X
PROCESSOR CYCLES	68. CPU-SCHED-CYCLES	The average number of processor scheduler cycles completed at the DSI over 5 minutes. These cycles relate to maintenance levels that are executed. The higher the traffic load on the system, the lower the number of cycles executed.		X
EXECUTED AUDITS	69. DSI-AUDITS-EXC	The number of DSI audits of all types that have been executed in the reporting period. Does not indicate internal audit failures, nor that, if low, there is a critical failure.		X

TABLE C

AP MEASUREMENTS CROSS-REFERENCE

MEASUREMENT LABEL	ITEM NUMBER
AVG-FREE-PKT-BUFF	45
AVG-PS-OUT-QUEUE	47
AVG-TIME-DLUP-MBY	14
AVG-TIME-DLUP-OOS	22
AVG-TIME-DSLC-MBY	15
AVG-TIME DSLC-OOS	23
CPU-SCHED-CYCLES	68
DIALUP-AVG-CALLS	31
DIALUP-CALL-ANSWER	5
DIALUP-CALL-TIMEOUT	6
DIALUP-CT-DSI-FRM	51
DIALUP-CT-DSI-IFR	57
DIALUP-CT-DSI-OCT	63
DIALUP-DEST-SELECT	25
DIALUP-DSI-CT-FRM	54
DIALUP-DSI-CT-IFR	60
DIALUP-DSI-CT-OCT	66
DIALUP-DSI-PS-PKT	38
DIALUP-INVAL-DEST	28
DIALUP-LC-SETUPS	35
DIALUP-MBSY-USAGE	12
DIALUP-OSS-USAGE	20
DIALUP-PORTS-INS	3
DIALUP-PORT-USAGE	7
DIALUP-PS-DSI-PKT	41
DIALUP-TRANS-MBSY	9
DIALUP-TRANS-OOS	17
DSI-AUDITS	69
DSLC-AVG-CALLS	32
DSLC-CT-DSI-FRM	52
DSLC-CT-DSI-IFR	58
DSLC-CT-DSI-OCT	64
DSLC-DEST-SELECT	26
DSLC-DSI-CT-FRM	55
DSLC-DSI-CT-IFR	61

MEASUREMENT LABEL	ITEM NUMBER
DSLC-DSI-CT-OCT	67
DSLC-DSI-PS-PKT	39
DSLC-INVAL-DEST	29
DSLC-LC-SETUPS	36
DSLC-MBSY-USAGE	13
DSLC-OOS-USAGE	21
DSLC-PORTS-INS	4
DSLC-PS-DSI-PKT	42
DSLC-TRANS-MBSY	10
DSLC-TRANS-OOS	18
MAX-CALLS-CONNECT	33
MAX-OUT-QUEUE	48
MAX-PS-OUT-QUEUE	49
OUT-QUEUE-LENGTH	46
TOTAL-AP-DSI-PKT	44
TOTAL-AVG-CALLS	30
TOTAL-CT-DSI-FRM	50
TOTAL-CT-DSI-IFR	56
TOTAL-CT-DSI-OCT	62
TOTAL-DEST-SELECT	24
TOTAL-DSI-AP-PKT	43
TOTAL-DSI-CT-FRM	53
TOTAL-DSI-CT-IFR	59
TOTAL-DSI-CT-OCT	65
TOTAL-DSI-INS	1
TOTAL-DSI-PS-PKT	37
TOTAL-INVAL-DEST	27
TOTAL-LC-SETUPS	34
TOTAL-MBSY-USAGE	11
TOTAL-OOS-USAGE	19
TOTAL-PORTS-INS	2
TOTAL-PS-DSI-PKT	40
TOTAL-TRANS-MBSY	8
TOTAL-TRANS-OOS	16

TABLE D

AP ERROR MEASUREMENTS

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	PER DSI
LOST PACKETS TO AP	1. AP-MISSING-PACKETS	The number of DSI to AP traffic data packets expected but not received by the AP. This value impacts data collected and accumulated for the reporting periods.	X	
BLOCKING	2. BLOCKING-CONG-CRLS	Total number of calls at any stage of setup that are blocked due to active DSI overload controls.		X
	3. SERV-BLOCK-PSCONG	Total number of virtual circuit requests denied because of packet switch congestion or blocking. These calls would have reached the packet switch, but the packet switch has denied them due to internal congestion or blocking.		X
	4. SERV-BLOCK-PSSETUP	Total number of virtual circuit requests denied because of the setup failure by the packet switch from the packet switch out to the service vendor. The number of logical channels available on a service vendor access line could create this type of blocking, or by the vendor line being out of order. Denial is determined by the destination address.		X
	5. SERV-BLOCK-VENDOR	Total number of virtual circuit requests denied by the service vendor. For example, a request from the service vendor to take down the access line will block the call before setup.		X
	6. DSI-LCHAN-BLOCK	Total number of logical channel set-ups failing due to lack of DSI resources. The count does not include failures when the DSI is in an overload state. The count does include virtual circuit setups denied because the maximum number of virtual circuits (internal, not recent change) has been reached, or if, during call setup, no buffers are available.		X
LOGICAL CHANNEL INITIALIZATIONS	7. ALL-DSI-LC-INITS	Total number of logical channel initializations received from a terminal or sent to a terminal on logical channels in the data transfer state.		X

TABLE D (Contd)

AP ERROR MEASUREMENTS

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	PER DSI
	8. DU-DSI-LC-INITS	Total number of logical channel initializations received from a dial-up terminal or sent to a dial-up terminal on logical channels in the data transfer state.		X
	9. DSLC-DSI-LC-INITS	Total number of logical channel initializations received from a data SLC carrier system terminal or sent to a data SLC carrier system terminal on logical channels in the data transfer state.		T
X.25 LEVEL 3 RESETS	10. DSI-L3-RESETS	Total number of DSI originated level 3 resets. The count does not include level 2 resets at the terminal to DSI interface.		X
	11. VENDOR-L3-RESETS	Total number of remotely generated level 3 resets by the service vendor.		X
RETRANSMIT INFORMATION	12. DSI-TO-ALL-RTIFRM	The total number of DSI to terminal retransmission of I frames.		X
	13. DSI-TO-DU-RTIFRM	The number of DSI to terminal retransmission of I frames for dial-up terminals.		X
	14. DSI-TO-DSLC-RTIFRM	The number of DSI to terminal retransmission of I frames for data SLC carrier system terminals.		X
CYCLIC REDUNDANCY CHECK ERROR	15. ALL-DSI-CRC-ERR	The total number of frames received having a CRC error.		X
	16. DU-DSI-CRC-ERR	The total number of frames received, from dial-up terinals, having a CRC error.		X
	17. DSLC-DSI-CRC-ERR	The total number of frames received, from data SLC carrier system terminals, having a CRC error.		X
	18. PS-DSI-CRC-ERR	Total number of frames received by a DSI from the packet switch, having a CRC error.		X

TABLE D (Contd)

AP ERROR MEASUREMENTS

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	PER DSI
FRAME REJECTS	19. ALL-DSI-REJ-COND	Total number of frame rejects sent to a terminal.		X
	20. DU-DSI-REJ-COND	Total number of frame rejects sent to a dial-up terminal.		X
	21. DSLC-DSI-REJ-COND	Total number of frame rejects sent to a data SLC carrier system terminal.		X
CALLS CLEARED BY (DSI COUNTS)	22. CALL-CLR-CUST	Total number of established virtual calls cleared by a customer terminal.		X
	23. CALLS-CLR-PS	Total number of established virtual calls cleared by the packet switch.		X
	24. CALL-CLR-VENDOR	Total number of established virtual calls cleared by the service vendor.		X
	25. CALL-CLR-DSI-CONG	Total number of established virtual calls cleared by DSI congestion controls. This is currently not done and should be zero.		X
CALLS CLEARED BY COUNTS)	26. TOT-CALL-CLR-PS	The total number of calls over all DSIs cleared by the packet switch.	X	
	27. TOT-CALL-CLR-VEND	The total number of calls over all DSIs cleared by the service vendor.	X	
	28. TOT-CALL-CLR-NDSI	The total number of calls over all DSIs cleared by non-DSI facilities.	X	
OVERLOAD CONTROLS	29. DSI-CNT-OVRLD-1	Total number of times a DSI enters overload mode 1. (Refer to Table L for overload 1 definition.).		X

TABLE D (Contd)

AP ERROR MEASUREMENTS

MEASUREMENT	MEASUREMENT LABEL	DEFINITION	SYSTEM	PER DSI
	30. DSI-CNT-OVRLD-2	Total number of times a DSI enters overload mode 2. (Refer to Table L for overload 2 definition.)		X
	31.. DSI-TIME-OVRLD-1	Total time in tenths of seconds that a DSI is in overload mode 1.		X
	32. DSI-TIME-OVRLD-2	Total time in tenths of seconds that a DSI is in overload mode 2.		X
LEVEL INITIALIZATIONS	33. DSI-INIT-1	Total number of DSI level 1 initializations. A level 1 initialization replaces the current software operating system. It can be done manually or automatically and takes place over a short period of time (about 10 to 20 seconds).		X
	34. DSI-INIT-2	Total number of DSI level 2 initializations. This involves rebooting the system (power down, power up) and downloading an entirely new generic into the DSI operating system. Approximate time involved is 5 minutes.		X
INTERRUPTS	35. DSI-EXC-INTRR-HDW	Total number of exceptional hardware interrupts for a DSI.		X
	36. DSI-EXC-INTRR-STM	Total number of sanity timer interrupts for a DSI.		X
ALARMS	37. DSI-ALARM-MINOR	Total number of minor alarms generated by a DSI.		X
	38. DSI-ALARM-MAJOR	Total number of major alarms generated by a DSI.		X
	39. DSI-ALARM-CRIT	Total number of critical alarms generated by a DSI.		X
AUDIT FAILURES	40. DSI-AUDITS-FAIL	Total number of DSI audit failures. The count is the sum of failures of all types of DSI audits. This count does not provide specifics on which audits have failed.		X

TABLE E

AP ERROR MEASUREMENTS CROSS-REFERENCE

MEASUREMENT LABEL	ITEM NUMBER
ALL-DSI-CRC-ERR	15
ALL-DSI-LC-INITS	7
ALL-DSI-REJ-COND	19
AP-MISSING-PACKETS	1
BLOCKING-CONG-CRLS	2
CALL-CLR-CUST	22
CALL-CLR-DSI-CONG	25
CALL-CLR-PS	23
CALL-CLR-VENDOR	24
DSI-ALARM-CRIT	39
DSI-ALARM-MAJOR	38
DSI-ALARM-MINOR	37
DSI-AUDITS-FAIL	40
DSI-CNT-OVRLD-1	29
DSI-CNT-OVRLD-2	30
DSI-EXC-INTRR-HDW	35
DSI-EXC-INTRR-STM	36
DSI-INIT-1	33
DSI-INIT-2	34
DSI-L3-RESETS	10
DSI-LCHAN-BLOCK	6
DSI-TIME-OVRLD-1	31
DSI-TIME-OVRLD-2	32
DSI-TO-ALL-RTIFRM	12
DSI-TO-DSLC-RTIFRM	14
DSI-TO-DU-RTIFRM	13
DSLC-DSI-CRC-ERR	17
DSLC-DSI-LC-INITS	9
DSLC-DSI-REJ-COND	21
DU-DSI-CRC-ERR	16
DU-DSI-LC-INITS	8
DU-DSI-REJ-COND	20
PS-DSI-CRC-ERR	18
SERV-BLOCK-PSCONG	3
SERV-BLOCK-PSSETUP	4
SERV-BLOCK-VENDOR	5
TOTAL-CALL-CLR-NDSI	28
TOTAL-CALL-CLR-PS	26
TOTAL-CALL-CLR-VEND	27
VENDOR-L3-RESETS	11

TABLE F

PACKET SWITCH THRESHOLD MEASUREMENTS

MSMT LABEL	RAW MEASUREMENT OR FORMULA	DEFINITION
ACT-VC-IN-USE	(fmd.lsoavce + fmd.lsoavci + fmd.lstavce + fmd.lstavci) / (NUMFSAMP x interval)	Average number of active VCs simultaneously in use for a line over the interval (30 minutes).
AV-CTF-OUTQ	md.fsihots / (NUMCSAMP x interval)	Average number of packets in the queue and output table from the CCC to FIP over the interval (5 or 30 minutes).
AV-CYCLES	fmd.fcycles / interval	Average number of cycles of the FIP (per minute) over the interval (30 minutes).
AV-FREE-BUF	md.cfpbufs / (NUMCSAMP x interval)	Average number of free packet buffers available at the CCC over theintervals (5 or 30 minutes).
AV-FTC-OUTQ	fmd.fsoutccc / (NUMCSAMP x interval)	Average number of packets in the FIP to CCC output queue over the interval (5 or 30 minutes).
AV-HLD-BUF	fmd.llpbsms / (NUMFSAMP x interval)	Average number of holding buffers in use.
AV-PKT-BUF	For Lines: fmd.lpbufs / (NUMFSAMP x interval) For Trunks: fmd/tpbufs / (NUMFSAMP x interval)	Average number of packet buffers in use for a line (or trunk) over theinterval (5 or 30 minutes).
BAD-FCS-FRMS	For Lines: md.lbadfcs For Trunks: md.tbadfcs	Number of frames received with bad FSS

TABLE F (Contd)

PACKET SWITCH THRESHOLD MEASUREMENTS

MSMT LABEL	RAW MEASUREMENT OR FORMULA	DEFINITION
BAD-SETUP-NTWK	fmd.lvcunb	Total number of unsuccessful VC setup attempts due to a network fault.
BILL-PKT	fmd.lobpe + fmd.lobpi + fmd.ltbpe + fmd.ltbpl	Number of billable packets for the access line.
CCC-SETUPS	md.ccsetups	Total number of setup attempts (originating and terminating) recorded at the CCC.
CNTL-FRM-RCV	For Lines: fmd.lcfrrcv For trunks: fmd.tcfrrcv	Number of control frames received.
CYCLES-BL-TH	md.fcycbelt	Number of times the DIP cycles went below a threshold.
DIAG-PKT	fmd.ldgnclr	Number of diagnostic packets sent to DTE on a line.
DISCARD-AB-TH	md.fdscabvt	Number of times the discard rate went above the threshold for a FIP.
DISCARD-PKT	For Lines: fmd.ldscrec For Trunk: fmd.tdscrec	Total number of recoverable packets discarded for an access line (or trunk) by the FIP.
DISCARD-PKT-CC	md.fdscotf over all FIPs	Total number of packets discardedby the CCC.
DISCON-NTWK	fmd.lclxmtn	Total number of network generated VC disconnects.
DM-RCV	For Lines: md.ldmrcv For Trunks: md.tdmrcv	Number of DM frames received for a line (or trunk).

TABLE F (Contd)

PACKET SWITCH THRESHOLD MEASUREMENTS

MSMT LABEL	RAW MEASUREMENT OR FORMULA	DEFINITION
DMERT-CPU-USE	DMERT spy routines used	Percentage of CPU time used by DMERT. Includes OST for permanent application processes plus time spend in selected DMERT kernel went above the threshold for a level processes. Does not include any temporary DMERT processes.
FLOW-CNTL-T1	fmd.ltlctrl	Number of times that T1 buffer control was put into effect.
FREE-BUF-BL-TH	md.cfpbbelt	Number of times that free CCC buffers went below the threshold.
FRMR-RCV	For Lines: md.lfrmrr For trunks: md.trmrr	Number of FRMR frames received for line (or trunk).
FRMR-XMT	For Lines: md.lfrmrt For Trunks: md.tfrmt	Number of FRMR frames transmitted over a line (or trunk).
FTC-OUTQ-AB-TH	md.foutabvt	Number of times the FIP to CCC output queue went above a threshold.
IDLE-TIME	DMERT spy routines used	Percentage of CPU time that the system was idle.

TABLE F (Contd)

PACKET SWITCH THRESHOLD MEASUREMENTS

MSMT LABEL	RAW MEASUREMENT OR FORMULA	DEFINITION
I-FLD-BYTE-RCV	For Lines: fmd.lifsrcv For Trunks: fmd.tifsrcv	Total number of bytes in all I-fields received from a line (or trunk).
I-FLD-BYTE-XMT	For Lines: fmd.lifsxmt For Trunks fmd.tifsxmt	Total number of bytes in all I-fields transmitted over a line (or trunk) not including retransmissions.
OPRN-CPU-USE	DMERT spy routines used	Percentage of CPU time spent in nondeferrable operations processes. Does not include craft CEPS or DMERT overhead.
ORIG-SETUP	fmd.lovcbe + fmd.lovcbi	Total number of setup attempts originating at the access line.
PKT-BUF-AB-TH	For Lines: md.lpbufabt For Trunks: md.tpbufabt	Number of times that the packet buffers on a line (or trunk) was above a threshold.
PKT-IN	For Lines: fmd.lifrrcv For Trunks: fmd.tifrrcv	Number of packets received by an access line (or trunk).
PKT-IN-AB-TH	For Lines: fmd.lifrabt For Trunks: fmd.tifrabt	Number of times that packets received was above the threshold.
PKT-OUT	For Lines: fmd.lifrxmt For Trunks: fmd.tifrmt	Number of packets transmitted on an access line (or trunk).
PKT-OUT-AB-TH	For Lines: fmd.lifxabt For Trunks: fmd.tifxabt	Number of times that packets transmitted was above the threshold.
PKT-RCV	md.fnoprcv over all FIPs	Total number of packets received from the FIPs.
PKT-FROM-CCC	md.fnopxmt	Total number of packets received by the FIP from the CCC.
PKT-RTPAD	md.ropkxmt	Number of packets sent by RTPAD at the CCC.

TABLE F (Contd)

PACKET SWITCH THRESHOLD MEASUREMENTS

MSMT LABEL	RAW MEASUREMENT OR FORMULA	DEFINITION
PKT-XMT	md.fnopxmt over all FIPS	Total number of packets transmitted to the FIPs.
PKT-TO-CCC	md.fnoprcv	Total number of packets sent to the CCC by the FIP.
RESET-CUST	fmd.lrsrcv	Total number of level 3 resets caused by DTE.
RESET-NTWK	fmd.lrsxmtn	Total number of network generated resets.
RETRAN-RTPAD	md.rtpncp	Number of times a retransmission of a remote transaction was not attempted because the number of retransmissions allowed was exceeded.
RETRANS-L2	For Lines: fmd.lifrretr For Trunks: fmd.tifrretr	Total number of information frames transmitted over a line (or trunk).
RETRANS-L3	fmd.fl3rexmt	Total number of packet retransmissions.
RNR-RCV-L3	For Lines: fmd.lrnrfr For Trunks fmd.trnrfr	Total number of RNR packets received at level 2 over a line (or trunk).
SABM-RCV	For Lines: md.llnkrev For Trunks: md.tlnkrcv	Number of SABMs received over a line (or trunk).
SETUP-ATMPT	fmd.lovcbe + fmd.lovcbi over all lines + md.ctvce	Total number of setup attempts.
TERM-SETUP	fmd.ltvcbe + fmd.ltvcbi	Total number of setup attempts that terminated on the access line.
TSP-AB-TH	md.ccpuabvt	Number of times that the TSP usage went above the threshold.

TABLE F (Contd)

PACKET SWITCH THRESHOLD MEASUREMENTS

MSMT LABEL	RAW MEASUREMENT OR FORMULA	DEFINITION
TSP-CPU-USE	DMERT spy routines used	Percentage of CPU time spent in the TSP process. Time spend does not include DMERT overhead.
UN-DISCARD-PKT	fmd.ldscnrec	Total number of unrecoverable packets discarded by the FIP for an access line.
UA-RCV	For Lines: md.luarcv For Trunks: md.tuarcv	Number of UA frames received for a line (or trunk).

TABLE G

PACKET SWITCH RAW MEASUREMENTS

MEASUREMENT LABEL	DEFINITION	USED IN TRAFFIC MEASUREMENT FORMULA FOR:
ccpuabvt	Number of times the CCC transport process CPU usage went above threshold CCPUUSG.	TSP-AB-TH
cfpbbelt	Number of times average number of free packet buffers available at the CCC (cfpbufs) went below the threshold CFPBUF.	FREE-BUF-BL-TH
cfpbufs	Sum of samples of the number of free packet buffers available at the CCC.	AV-FREE-BUF
ccsetups	Total number of setup attempts (originating and terminating) recorded at the CCC.	CCC-SETUPS
ctvce	Number of terminating inter-packet switch virtual call setup attempts.	SETUP-ATMPT
fcycbelt	Number of time FIP cycles (fcycles) went below threshold FCYCLES.	CYCLES-BL-TH
fcycles	Number of cycles by the FIP Executive, per FIP.	AV-CYCLES
fcycsq	Square of the number of cycels by the FIP Executive, per FIP (reserved for future use).	
fdscabvt	Number of times the CCC discard rate went above the threshold FCDSCDR, per FIP.	DISCARD-AB-TH
fdscotf	Number of (recoverable) packets discarded by CSIH due to output table full, per FIP.	DISCARD-CTF DISCARD-PKT-CC
f13rexmt	Number of packets retransmitted from an access line, level 3, per FIP.	RETRANS-L3
fmpktrev	Number of times measurements processed from the FIP.	
fnoprcv	Number of transport packets received from the FIP, per FIP.	PKT-RCV PKT-TO-CCC

TABLE G (Contd)

PACKET SWITCH RAW MEASUREMENTS

MEASUREMENT LABEL	DEFINITION	USED IN TRAFFIC MEASUREMENT FORMULA FOR:
fnopxmt	Total number of packets sent to the FIP, per FIP.	PKT-FROM-CCC PKT-XMT
foutabvt	Number of times the FIP to CCC output queue and table (fsoutccc) went above threshold FTCOUTQ.	FTC-OUTQ-AB-TH
fsihots	Sum of samples of numbers of packets in the CSIH output table and queue to the FIP, per FIP.	AV-CTF-OUTQ
fspvtccc	Sum of samples of number of packets waiting to be sent to the CCC (sum of the number of packets in LSIH output table and LSIH output queue), per FIP.	AV-FTC-OUTQ
lbadfcs	Number of frames received with bad FCS, per line, level 2.	BAD-FCS-FRMS
lbyterr	Number of byte mode error link interrupts, per line, level 2.	
lcfrrcv	Number of control frames received (includes only good ones), per line, level 2.	CNTL-FRM-RCV
lclxmtn	Number of network generated clear packets on existing calls (does not include confirmations), where the decision to clear was made by this FIP (does not include restarts), per line, level 3.	DISCON-NTWK
ldgnclr	Number of diagnostic packets sent to the DTE and the number of clears transmitted on line that were on a channel with no call up, per line, level 3.	DIAG-PKT
ldmrcv	Number of times a SABM transmitted in response to a DM received per line, level 2.	DM-RCV
ldscnrec	Number of packets discarded that were not recoverable (includes) due to facility going out of service, per line.	UN-DISCARD-PKT
lsaxewx	Number of packets discarded that were recoverable (includes due to lack of buffers), per line.	DISCARD-PKT
lfrmrr	Number of FRMR (frame reject) frames received and SABM sent, per line.	FRMR-RCV

TABLE G (Contd)

PACKET SWITCH RAW MEASUREMENTS

MEASUREMENT LABEL	DEFINITION	USED IN TRAFFIC MEASUREMENT FORMULA FOR:
lfrmrt	Number of FRMR (frame reject) frames transmitted (in response to certain bad frames received), level 2, per line. (Does not include received F=1, but did not sent P=1.)	FRMR-XMT
lifrabt	Number of times the number of information frames received on a line (lifrrcv) went above threshold LIFRRCV.	PKT-IN-AB-TH
lifrrcv	Number of information frames received (includes only good frames), per line.	PKT-IN
lifrretr	Number of information frames retransmitted, level 2, per line.	RETRANS-L2
lifrxmt	Number of information frames transmitted (does not include level 2 retransmissions), per line.	PKT-OUT
lifsrcv	Sum of the number of bytes in information fields received (includes only good frames), per line.	I-FLD-BYTE-RCV
lifsxmt	Sum of the number of bytes in information fields transmitted (does not include retransmissions), per line.	I-FLD-BYTE-XMT
lifxabt	Number of times the number of information frames transmitted on a line (lifrxmt) went above threshold LIFRXMT.	PKT-OUT-AB-TH
llnkrcv	Number of SABMs received, level 2, per line.	SABM-RCV
llpbsms	Sum of samples of number of long holding time packet buffers used for speed matching (level 3 flow control), per line.	AV-HLD-BUF
ln2exc	Number of times a SABM transmitted, in response to counter N2, was exceeded per line, level 2.	
lobpe	Number of interstate billable packets received from or sent to DTE on VCs or PVCs originating at DTE, per line. Billable packets and data, reset, and interrupt packets.	BILL-PKT
lobpi	Number of intrastate billable packets received from or sent to DTE on VCs or PVCs originating at DTE, per line.	BILL-PKT

TABLE G (Contd)

PACKET SWITCH RAW MEASUREMENTS

MEASUREMENT LABEL	DEFINITION	USED IN TRAFFIC MEASUREMENT FORMULA FOR:
lovcbe	Number of originating interstate VC setup attempts that will be billed, per line.	ORIG-SETUP SETUP-ATMPT
lovcbi	Number of originating intrastate VC setup attempts that will be billed, per line.	ORIG-SETUP SETUP-ATMPT
lpbufabt	Number of times the number of FIP packet buffers in use per line (lpbufs) went above the threshold LFBPBUF.	PKT-BUF-AB-TH
lpbufs	Sum of samples of number of packet buffers in use, per line. Samples are taken every 10 seconds.	AV-PKT-BUF
lrcvovr	Number of receiver overrun link interrupts, per line, level 2.	
lrecfl	Number of times a FRMR frame transmitted in response to receiving F=1 but did not send P= per line, level 2.	
lrnrfr	Number of RNR (receiver-not-ready) frames received, per line, level 2.	RNR-RCV-L2
lrsrcv	Number of level 3 reset request packets received from DTE, per line.	RESET-CUST
lrsxmtn	Number of network generated reset packets sent to DTE where due to network failures, per line. This is pegged only at the FIP where the reset is initiated.	RESET-NTWK
lsoavce	Sum of samples of the number of originating interstate active VCs per time interval, per line.	ACT-VC-IN-USE
lsoavci	Sum of samples of the number of originating intrastate active VCs per time interval, per line.	ACT-VC-IN-USE
lstavce	Sum of samples of the number of terminating interstate active VCs per time interval, per line.	ACT-VC-IN-USE
lstavci	Sum of samples of the number of terminating intrastate active VCs per time interval, per line.	ACT-VC-IN-USE
ltlctrl	Number of times T2 flow control was put into effect, per line.	FLOW-CNTL-T1

TABLE G (Contd)

PACKET SWITCH RAW MEASUREMENTS

MEASUREMENT LABEL	DEFINITION	USED IN TRAFFIC MEASUREMENT FORMULA FOR:
ltbpe	Number of interstate billable packets received from or sent to DTE on VCs or PVCs terminating at DTE, per line.	BILL-PKT
ltbpi	Number of intrastate billable packets received from or sent to DTE on VCs or PVCs terminating at DTE, per line.	BILL-PKT
ltvcbe	Number of terminating interstate VCs setup attempts that will be billed (successful and unsuccessful), per line.	TERM-SETUP
ltvcbi	Number of terminating intrastate VCs setup attempts that will be billed (successful and unsuccessful) per line.	TERM-SETUP
luarcv	Number of times a SABM transmitted in response to UA received per line, level 2.	UA-RCV
lxundr	Number of transmitter underrun link interrupts, per line, level 2.	
lvcunb	Number of unsuccessful VC call setup attempts that cannot be billed/includes due to code block and network causes), per line.	BAD-SETUP-NTWK
osmpr0	Number of samples taken at sampling rate 0.	
osmpr1	Number of samples taken at sampling rate 1.	
osmpr2	Number of samples taken at sampling rate 2.	
osmpr3	Number of samples taken at sampling rate 3. (reserved for future use).	
oterrpt	Number of TNET CCC errors reported.	
ropkxmt	Number of nontransport packets sent to (throughout) all FIPs by the Remote Transaction Packet Assembler/Disassembler.	PKT-RTPAD
transport packet	Established because of a customer initiated request.	
non-transport packet	System initiated (sanity, header, etc).	

TABLE G (Contd)

PACKET SWITCH RAW MEASUREMENTS

MEASUREMENT LABEL	DEFINITION	USED IN TRAFFIC MEASUREMENT FORMULA FOR:
rtpncp	Number of times a retransmission of a remote transaction was not attempted because the number of retransmissions allowed was exceeded (to the sending Remote Transaction Packet Assembler/Disassembler, the transaction was not completed).	RETRAN-RTPAD
tbadfcs	Number of frames received with bad FCS, per trunk.	BAD-FCS-FRMS
tbyterr	Number of byte mode error link interrupts, per trunk, level 2.	
tcfrrcv	Number of control frames received (includes only good ones), per trunk, level 2.	CNTL-FRM-RCV
tdmrcv	Number of times a SABM transmitted in response to DM received, per trunk, level 2.	DM-RCV
tdscrec	Number of packets discarded that were recoverable (includes due to lack of buffers), per trunk.	DISCARD-PKT
tfrmrr	Number of FRMR (frame reject) frames received and a SABM transmitter, per trunk.	FRMR-RCV
tfrmrr	Number of FRMR (frame reject) frames transmitted (in response to certain bad frames received), per trunk. (Does not include received F=1, but did not send P=1.)	FRMR-XMT
tifrabt	Number of times the number of information frames received on a trunk (tifrrcv) went above threshold TIFRRCV.	PKT-IN-AB-TH
tifrretr	Number of information frames received (includes only good frames), per trunk.	PKT-IN
tifrrcv	Number of information frames retransmitted, level 2, per trunk.	RETRANS-L2
tifrxmt	Number of information frames transmitted (does not include level 2 retransmissions), per trunk.	PKT-OUT
tifsrcv	Sum of the number of bytes in information fields received (includes only good frames), per trunk.	I-FLD-BYTE-RCV

TABLE G (Contd)

PACKET SWITCH RAW MEASUREMENTS

MEASUREMENT LABEL	DEFINITION	USED IN TRAFFIC MEASUREMENT FORMULA FOR:
tifsxmt	Sum of the number of bytes in information fields transmitted (does not include retransmissions), per trunk.	I-FLD-BYTE-RCV
tifxabt	Number of times the number of information frames transmitted on a trunk (tifrxmt) went above the threshold TIFRXMT.	PKT-OUT-AB-TH
tlnkrcv	Number of SAMBs received, level 2, per trunk.	SABM-RCV
tn2exc	Number of times a SABM transmitted in response to counter N2 exceeded per trunk, level 2.	
tpbufabt	Number of times the number of FIP packet buffers in use per trunk (tpbufs) went above threshold TFBPBUF.	PKT-BUF-AB-TH
tpbufs	Sum of samples of number of packet buffers in use, per trunk.	AV-PKT-BUF
trcvovr	Number of receiver overrun link interrupts, per trunk, level 2.	
trecfl	Number of times a FRMR frame transmitted in response to receiving F=1 but didn't send P=1 per trunk, level 2.	
trnrfr	Number of RNR (receiver-not-ready) frames received, per trunk level 2.	RNR-RCV-L2
tuarcv	Number of times a SABM transmitted in response to UA received per trunk level 2.	UA-RCV
txundr	Number of transmitter underrun link interrupts, per trunk, level 2.	

TABLE H

PACKET SWITCH THRESHOLD VALUES AND REPORTS

THRESHOLD	DEFAULT	MIN.	MAX.	REPORT	
				TYPE	SEVERITY
CCPUUSG	750	0	1000	THRHLD EXC.	MINOR ALM(TC)
CFPBUF	30000	0	400000	THRHLD EXC.	MINOR ALM(TC)
CSUCPSR	900	0	1000	THRHLD EXC.	MINOR ALM
FCDSCDR	100	50	200000	THRHLD EXC.	MINOR ALM
FCTFOUTQ	100000	0	200000	THRHLD EXC.	MINOR ALM
FCYCLES	0	0	70000000	THRHLD EXC.	MINOR ALM(TF)
FDSCDR	200	10	1000	THRHLD EXC.	MINOR ALM(TF)
FTCOUTQ	100000	0	200000	THRHLD EXC.	MINOR ALM
L3NWRST	1000	1000	512000	THRHLD EXC.	MINOR ALM
LBADFRRC	50	10	500	THRHLD EXC.	NON-ACTION
LFBPBUF	35000	0	50000	THRHLD EXC.	MINOR ALM(TF)
LIFRETR	100	10	1000	THRHLD EXC.	MINOR ALM
LIFRRCV	3400000	0	10000000	THRHLD EXC.	NON-ACTION
LIFRXMT	3400000	0	10000000	THRHLD EXC.	NON-ACTION
LLNKRCV	5000	1000	60000	THRHLD EXC.	NON-ACTION
LLPVI	50000	0	1000000	THRHLD EXC.	NON-ACTION
LLTPBUF	35000	0	50000	THRHLD EXC.	MINOR ALM
LRNRRCV	500	10	1000	THRHLD EXC.	NON-ACTION
LRPVI	50000	0	1000000	THRHLD EXC.	NON-ACTION
LRCVOVR	1000	0	10000	THRHLD EXC.	NON-ACTION
LXUNDR	1000	0	10000	THRHLD EXC.	NON-ACTION
LBYTERR	1000	0	10000	THRHLD EXC.	NON-ACTION
TBADFRRC	50	10	500	THRHLD EXC.	NON-ACTION
TFBPBUF	35000	0	50000	THRHLD EXC.	MINOR ALM(TF)
TIFRETR	100	10	1000	THRHLD EXC.	MINOR ALM
TIFRRCV	3400000	0	10000000	THRHLD EXC.	NON-ACTION
TIFRXMT	3400000	0	10000000	THRHLD EXC.	NON-ACTION
TLNKRCV	5000	1000	60000	THRHLD EXC.	NON-ACTION
TLPVI	50000	0	1000000	THRHLD EXC.	NON-ACTION
TLTPBUF	35000	0	50000	THRHLD EXC.	MINOR ALM
TRNRRCV	500	10	10000	THRHLD EXC.	NON-ACTION
TRPVI	50000	0	1000000	THRHLD EXC.	NON-ACTION
TRCVOVR	1000	0	10000	THRHLD EXC.	NON-ACTION
TXUNDR	1000	0	10000	THRHLD EXC.	NON-ACTION
TBYTERR	1000	0	10000	THRHLD EXC.	NON-ACTION
TERRCCC	50000	0	100000	TNET ERROR	MINOR ALM
TERRFBC	50000	0	100000	TNET ERROR	MINOR ALM
TLSTEMSG	50000	0	100000	No Message	–
MINFRMTH	30	0	10000	Not applicable	

TABLE I

PACKET SWITCH TRAFFIC MEASUREMENTS

MSMT LABEL	RAW MEASUREMENT OR FORMULA	DEFINITION
ACT-VC-IN-USE	(fmd.lsoavce + fmd.lsoavci + fmd.lstavce + fmd.lstavci) / (NUMFSAMP x interval)	Average number of active VCs simultaneously in use for a line over the interval (30 minutes).
AV-CTF-OUTQ	md.fsihots / (NUMCSAMP x interval)	Average number of packets in the queue and output table from the CCC to FIP over the interval (5 or 30 minutes).
AV-CYCLES	fmd.fcycles / interval	Average number of cycles of the FIP (per minute) over the interval (30 minutes).
AV-FREE-BUF	md.cfpbufs / (NUMCSAMP x interval)	Average number of free packet buffers available at the CCC over theintervals (5 or 30 minutes).
AV-FTC-OUTQ	fmd.fsoutccc / (NUMCSAMP x interval)	Average number of packets in the FIP to CCC output queue over the interval (5 or 30 minutes).
AV-HLD-BUF	fmd.llpbsms / (NUMFSAMP x interval)	Average number of holding buffers in use.
AV-PKT-BUF	For Lines: fmd.lpbufs / (NUMFSAMP x interval) For Trunks: fmd/tpbufs / (NUMFSAMP x interval)	Average number of packet buffers in use for a line (or trunk) over theinterval (5 or 30 minutes).
BAD-FCS-FRMS	For Lines: md.lbadfcs For Trunks: md.tbadfcs	Number of frames received with bad FSS

TABLE I (Contd)

PACKET SWITCH TRAFFIC MEASUREMENTS

MSMT LABEL	RAW MEASUREMENT OR FORMULA	DEFINITION
BAD-SETUP-NTWK	fmd.lvcunb	Total number of unsuccessful VC setup attempts due to a network fault.
BILL-PKT	fmd.lobpe + fmd.lobpi + fmd.ltbpe + fmd.ltbpl	Number of billable packets for the access line.
CCC-SETUPS	md.ccsetups	Total number of setup attempts (originating and terminating) recorded at the CCC.
CNTL-FRM-RCV	For Lines: fmd.lcfrrcv For trunks: fmd.tcfrrcv	Number of control frames received.
CYCLES-BL-TH	md.fcycbelt	Number of times the DIP cycles went below a threshold.
DIAG-PKT	fmd.ldgnclr	Number of diagnostic packets sent to DTE on a line.
DISCARD-AB-TH	md.fdscabvt	Number of times the discard rate went above the threshold for a FIP.
DISCARD-PKT	For Lines: fmd.ldscrec For Trunk: fmd.tdscrec	Total number of recoverable packets discarded for an access line (or trunk) by the FIP.
DISCARD-PKT-CC	md.fdscotf over all FIPs	Total number of packets discardedby the CCC.
DISCON-NTWK	fmd.lclxmtn	Total number of network generated VC disconnects.
DM-RCV	For Lines: md.ldmrcv For Trunks: md.tdmrcv	Number of DM frames received for a line (or trunk).

TABLE I (Contd)

PACKET SWITCH TRAFFIC MEASUREMENTS

MSMT LABEL	RAW MEASUREMENT OR FORMULA	DEFINITION
DMERT-CPU-USE	DMERT spy routines used	Percentage of CPU time used by DMERT. Includes OST for permanent application processes plus time spend in selected DMERT kernel went above the threshold for a level processes. Does not include any temporary DMERT processes.
FLOW-CNTL-T1	fmd.ltlctrl	Number of times that T1 buffer control was put into effect.
FREE-BUF-BL-TH	r id.cfpbbelt	Number of times that free CCC buffers went below the threshold.
FRMR-RCV	For Lines: md.lfrmrr For trunks: md.trmrr	Number of FRMR frames received for line (or trunk).
FRMR-XMT	For Lines: md.lfrmrt For Trunks: md.tfrmt	Number of FRMR frames transmitted over a line (or trunk).
FTC-OUTQ-AB-TH	md.foutabvt	Number of times the FIP to CCC output queue went above a threshold.
IDLE-TIME	DMERT spy routines used	Percentage of CPU time that the system was idle.

TABLE I (Contd)

PACKET SWITCH TRAFFIC MEASUREMENTS

MSMT LABEL	RAW MEASUREMENT OR FORMULA	DEFINITION
I-FLD-BYTE-RCV	For Lines: fmd.lifsrcv For Trunks: fmd.tifsrcv	Total number of bytes in all I-fields received from a line (or trunk).
I-FLD-BYTE-XMT	For Lines: fmd.lifsxmt For Trunks fmd.tifsxmt	Total number of bytes in all I-fields transmitted over a line (or trunk) not including retransmissions.
OPRN-CPU-USE	DMERT spy routines used	Percentage of CPU time spent in nondeferrable operations processes. Does not include craft CEPS or DMERT overhead.
ORIG-SETUP	fmd.lovcbe + fmd.lovcbi	Total number of setup attempts originating at the access line.
PKT-BUF-AB-TH	For Lines: md.lpbufabt For Trunks: md.tpbufabt	Number of times that the packet buffers on a line (or trunk) was above a threshold.
PKT-IN	For Lines: fmd.lifrrcv For Trunks: fmd.tifrrcv	Number of packets received by an access line (or trunk).
PKT-IN-AB-TH	For Lines: fmd.lifrabt For Trunks: fmd.tifrabt	Number of times that packets received was above the threshold.
PKT-OUT	For Lines: fmd.lifrxmt For Trunks: fmd.tifrmt	Number of packets transmitted on an access line (or trunk).

TABLE I (Contd)

PACKET SWITCH TRAFFIC MEASUREMENTS

MSMT LABEL	RAW MEASUREMENT OR FORMULA	DEFINITION
PKT-OUT-AB-TH	For Lines: fmd.lifxabt For Trunks: fmd.tifxabt	Number of times that packets transmitted was above the threshold.
PKT-RCV	md.fnoprcv over all FIPs	Total number of packets received from the FIPs.
PKT-FROM-CCC	md.fnopxmt	Total number of packets received by the FIP from the CCC.
PKT-RTPAD	md.ropkxmt	Number of packets sent by RTPAD at the CCC.
PKT-XMT	md.fnopxmt over all FIPS	Total number of packets transmitted to the FIPs.
PKT-TO-CCC	md.fnoprcv	Total number of packets sent to the CCC by the FIP.
RESET-CUST	fmd.lrsrcv	Total number of level 3 resets caused by DTE.
RESET-NTWK	fmd.lrsxmtn	Total number of network generated resets.
RETRAN-RTPAD	md.rtpncp	Number of times a retransmission of a remote transaction was not attempted because the number of retransmissions allowed was exceeded.

TABLE I (Contd)

PACKET SWITCH TRAFFIC MEASUREMENTS

MSMT LABEL	RAW MEASUREMENT OR FORMULA	DEFINITION
RETRANS-L2	For Lines: fmd.lifrretr For Trunks: fmd.tifrretr	Total number of information frames transmitted over a line (or trunk).
RETRANS-L3	fmd.fl3rexmt	Total number of packet retransmissions.
RNR-RCV-L3	For Lines: fmd.lrnrfr For Trunks fmd.trnrfr	Total number of RNR packets received at level 2 over a line (or trunk).
SABM-RCV	For Lines: md.llnkrev For Trunks: md.tlnkrcv	Number of SABMs received over a line (or trunk).
SETUP-ATMPT	fmd.lovcbe + fmd.lovcbi over all lines + md.ctvce	Total number of setup attempts.
TERM-SETUP	fmd.ltvcbe + fmd.ltvcbi	Total number of setup attempts that terminated on the access line.
TSP-AB-TH	md.ccpuabvt	Number of times that the TSP usage went above the threshold.
TSP-CPU-USE	DMERT spy routines used	Percentage of CPU time spent in the TSP process. Time spend does not include DMERT overhead.
UN-DISCARD-PKT	fmd.ldscnrec	Total number of unrecoverable packets discarded by the FIP for an access line.
UA-RCV	For Lines: md.luarcv For Trunks: md.tuarcv	Number of UA frames received for a line (or trunk).

TABLE J

PACKET SWITCH 5-MINUTE REPORT MEASUREMENTS

REPORT TYPE	MEASUREMENT LABEL	ASSOCIATED TRAFFIC ALARM
CCC	AV-FREE-BUF PKT-RCV TSP-CPU-USE	YES NO
FIP	AV-CTR-OUTQ DISCARD-CTF PKT-FROM-CCC	NO YES NO
LINE	AV-PKT BUF DISCARD-PKT PKT-IN PKT-OUT	YES YES NO NO
TRUNK	AV-PKT-BUF DISCARD-PKT PKT-IN PKT-OUT	YES YES NO YES

TABLE K

PACKET SWITCH 30-MINUTE SUMMARY REPORT MEASUREMENTS

REPORT TYPE	MEASUREMENT LABEL
CCC	BAD-SETUP-NTWK DISCARD-PKT DISCARD-PKT-CC DISCON-NTWK PKT-RCV RESET-NTWK SETUP-ATMPT TSP-CPU-USE UN-DISCARD-PKT
FIP	AV-CYCLES PKT-FROM-CCC RETRANS-L3
LINE	AV-VC-IN-USE PKT-IN PKT-OUT
TRUNK	I-FLD-BYTE-RCV I-FLD-BYTE-XMT

TABLE L

DETAIL MEASUREMENT REPORT AVAILABLE MEASUREMENTS AND BIT POSITIONS

REPORT SECTION	BIT POSITION	MEASUREMENT LABEL
CCC MEASUREMENTS	0	PKT-RCV
	1	PKT-XMT
	2	AV-FREE-BUF
	3	TSP-CPU-USE
	4	BAD-SETUP-NTWK
	5	SETUP-ATMPT
	6	DISCON-NTWK
	7	RESET-NTWK
	8	DISCARD-PKT
	9	UN-DISCARD-PKT
	10	DISCARD-PKT-CC
	11	OPRN-CPU-USE
	12	DMERT-CPU-USE
	13	PKT-RTPAD
	14	IDLE-TIME
	15	FREE-BUF-BL-TH
	16	TSP-AB-TH
	17	RETRAN-RTPAD
	18	CCC-SETUPS
FIP MEASUREMENTS	0	PKT-FROM-CCC
	1	PKT-TO-CCC
	2	AV-CYCLES
	3	AV-FTC-OUTQ
	4	AV-CTF-OUTQ
	5	DISCARD-CTF
	6	FTC-OUTQ-AB-TH
	7	CYCLES-BL-TH
	8	RETRANS-L3
	9	DISCARD-AB-TH
LINE TRAFFIC MEASUREMENTS	0	PKT-IN
	1	PKT-OUT
	2	BILL-PKT
	3	ACT-VC-IN-USE
	4	ORIG-SETUP
	5	TERM-SETUP
	6	BAD-SETUP-NTWK
	7	FLOW-CNTL-T1
	8	DISCARD-PKT
	9	UN-DISCARD-PKT
	10	RETRANS-L2

TABLE L (Contd)

DETAIL MEASUREMENT REPORT AVAILABLE MEASUREMENTS AND BIT POSITIONS

REPORT SECTION	BIT POSITION	MEASUREMENT LABEL
	11	RESET-CUST
	12	RESET-NTWK
	13	DISCON-NTWK
	14	AV-PKT-BUF
	15	I-FLD-BYTE-RCV
	16	I-FLD-BYTE-XMT
	17	PKT-IN-AB-TH
	18	PKT-OUT-AB-TH
	19	PKT-BUF-AB-TH
	20	CNTL-FRM-RCV
	21	AV-HLD-BUF
	22	BAD-FCS-FRMS
	23	RNR-RCV-L2
	24	FRMR-RCV
	25	FRMR-XMT
	26	DM-RCV
	27	UA-RCV
	28	SABM-RCV
	29	DIAG-PKT
LINE ERROR MEASUREMENTS	10	RETRANS-L2
	11	RESET CUST
	12	RESET-NTWK
	13	DISCON-NTWK
	22	BAD-FCS-FRMS
	23	RNR-RCV-L2
	24	FRMR-RCV
	25	FRMR-XMT
	26	DM-RCV
	27	UA-RCV
	28	SABM-RCV
	29	DIAG-PKT
TRUNK TRAFFIC MEASUREMENTS	0	PKT-IN
	1	PKT-OUT
	2	DISCARD-PKT
	3	RETRANS-L2
	4	AV-PKT-BUF
	5	I-FLD-BYTE-RCV
	6	I-FLD-BYTE-XMT
	7	PKT-IN-AB-TH
	8	PKT-OUT-AB-TH
	9	PKT-BUF-AB-TH
	10	CNTL-FRM-RCV
	11	BAD-FCS-FRMS
	12	RNR-RCV-L2
	13	FRMR-RCV
	14	FRMR-XMT

TABLE L *(Contd)*

DETAIL MEASUREMENT REPORT AVAILABLE MEASUREMENTS AND BIT POSITIONS

REPORT SECTION	BIT POSITION	MEASUREMENT LABEL
	15	DM-RCV
	16	UA-RCV
	17	SABM-RCV
TRUNK ERROR MEASUREMENTS	3	RETRANS-L2
	11	BAD-FCS-FRMS
	12	RNR-RCV-L2
	13	FRMR-RCV
	14	FRMR-XMT
	15	DM-RCV
	16	UA-RCV
	17	SABM-RCV

TABLE M

RECOMMENDED DETAIL MEASUREMENT REPORT MEASUREMENT SETTINGS FOR THE CCC

MEASUREMENT LABEL	DAILY LOAD SERVICE REPORT	DAILY LOAD SERVICE SUMMARY
AV-FREE-BUF		X
BAD-SETUP-NTWK	X	X
CCC-SETUPS	X	X
DISCARD-PKT		X
DISCARD-PKT-CC	X	X
DISCON-NTWK	X	X
PKT-RCV		X
PKT-XMIT		X
RESET-NTWK	X	X
RETRAN-RTPAD	X	X
SETUP-ATMPT	X	X
TSP-CPU-USE	X	X
UN-DISCARD-PKT	X	X

TABLE N

RECOMMENDED DETAIL MEASUREMENT REPORT MEASUREMENT SETTINGS FOR THE FIP

MEASUREMENT LABEL	DAILY LOAD SERVICE REPORT	DAILY LOAD SERVICE SUMMARY
AV-CYCLES	X	
DISCARD-CTR	X	
DISCARD-PKT	X	
PKT-FROM-CCC		X
PKT-IN	X	
PKT-OUT	X	
PKT-TO-CCC		X
RETRANS-L3	X	

TABLE O

RECOMMENDED DETAIL MEASUREMENT REPORT MEASUREMENT SETTINGS FOR ACCESS LINES/3.24

MEASUREMENT LABEL	DAILY LOAD SERVICE REPORT	DAILY LOAD SERVICE SUMMARY
ACT-VC-IN-USE		X
AV-PKT-BUF	X	
BAD-FCS-FRMS	X	
BILL-PKT		X
CNTL-FRM-RCV	X	
DIAG-PKT	X	
DISCARD-PKT	X	X
DISCON-NTWK	X	
DM-RCV	X	
FRMR-RCV	X	
FRMR-XMT	X	
I-FLD-BYTE-RCV	X	
I-FLD-BYTE-XMT	X	
ORIG-SETUP	X	X
PKT-IN	X	X
PKT-OUT	X	X
RESET-CUST	X	
RESET-NTWK	X	
RETRANS-L2	X	X
RNR-RCV-L2	X	
SABM-RCV	X	
TERM-SETUP	X	X
UA-RCV	X	
UN-DISCARD-PKT	X	