

## TRAFFIC AND RESOURCE USAGE MEASUREMENTS

### DESCRIPTION

# AT&T *WESTERN ELECTRIC*® 1 PACKET SWITCHING SYSTEM

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#### 1. GENERAL

**1.01** The purpose of this document is to provide operating personnel of an AT&T *WESTERN ELECTRIC* 1 Packet Switching System (1PSS) with a description of the traffic, plant, and service measurements available. This document is applicable to Releases 3 and 3A3 and also includes information for Releases 2 and 2A2 of a 1PSS. In addition, information pertinent to local area data transport (LADT) service is included. Basic measurement reports are available in Releases 2 and 2A2, while additional reports are added in Releases 3 and 3A3.

**1.02** This document is reissued to include additional Release 3 and Release 3A3 information and to reflect a title change. Since this issue is a general revision, change arrows are not used.

**1.03** A Network Control Center System (NCCS) in Releases 3 and 3A3 controls a 1PSS while performing the administrative functions for a local packet switch. An NCCS has additional input message commands available that are not allowed in local packet switch locations. Table A contains a listing of the applicable messages for Releases 2 and 2A2 and indicates whether the messages are available for

NCCS only. Table B contains a listing of the applicable messages for Releases 3 and 3A3 and indicates whether the messages are available for NCCS only.

**1.04** Measurements are an important part of 1PSS operation. Data is used to monitor performance of the packet switch in customer call handling, the amount of use for the various items of hardware or software, and the number of times a measured occurrence happens. Without reliable data, an equipment engineer cannot determine the exhaust interval for equipment or how much to install when it is needed.

**1.05** This document will address the following measurement categories:

- (a) **Traffic Measurements:** This report provides measurements to an equipment engineer on a timely basis and is used for engineering the hardware and software for a packet switch. These measurements provide recent interval data on a packet switch.
- (b) **Plant Measurements:** This report provides data on both equipment and maintenance performance, such as equipment out of service and hardware or software generated errors.
- (c) **Service Measurements:** This report measures the quality of service provided to a customer by counting the customer attempt failures, network degradation due to call blocking, etc.

**A. Packet Switch Timing**

**1.06** Packet switch timing, with respect to network timing, is an important function in the collection of data by a central location, such as the NCCS. To provide meaningful information, the data at all sites must be collected within a given time window. This window is under the control of the local packet switch clock, which must be the same as the network clock excluding time zone differences.

**B. Input/Output Messages**

**1.07** Throughout this document when reference is made to an input or output message and additional detailed information is required, refer to the following input or output manuals:

- IM/OM-70000-02 (Release 2)

- IM/OM-75000-02 (Release 2A2)
- IM/OM-70000-03 (Release 3)
- IM/OM-75000-03 (Release 3A3).

**2. MEASUREMENTS**

**2.01** Four types of counts are used in evaluating system performance and integrity:

- (a) **Peg Count:** This count is the number of times that an event occurs. For instance, each time a customer originates a call on an access line, a counter is incremented by one.
- (b) **Usage:** This measurement is how long an item is being used. The system monitors the time that an access line is in use by scanning the busy/idle bits every 10 seconds and, if busy, incrementing a counter by one. The counter data is then accumulated every 2.5 minutes.
- (c) **Occupancy:** This is a measurement of the length of time that a unit is in use. An interval in seconds is determined by dividing the usage by its corresponding peg count and multiplying by 100 (36 ccs [hundred call seconds] is equal to 3600 seconds). This is the length of time that an event took, such as how long an access line was being used.
- (d) **Overflow:** This count is the number of times that a call attempt was made but could not be completed. If a request for service from an incoming trunk to an access line was made and the access line was busy or otherwise unavailable, an overflow count would be registered for the access line.

**3. INPUT MESSAGE FORMAT**

**3.01** Input messages can be entered in either upper or lower case characters. The system software converts any lower case characters to upper case before passing them to the command execution process. The language syntax for the input messages defines the fields that specify command actions, the entities to which the action applies, command options, and other parameter data required by the command execution process. The syntax also defines the punctuation and symbols required for the message fields.

TABLE A		
RELEASE 2 MEASUREMENT ADMINISTRATION		
MESSAGE	NCCS ONLY	DESCRIPTION
ALW:AMR		Allows automatic reporting of 5-minute or 30-minute detailed plant measurement data
ALW:RAMR	X	Activates automatic reporting of packet switch data for 5-minute measurement reports at the network control center from data saved at the NCCS
CLR:MEAS		Removes measurements and facilities to be reported on for the 30-minute detailed measurement report
COPY:R30MIN	X	Transfers a 30-minute measurement file from a specified packet switch to the NCCS
DUMP:MEAS		Prints a dump of the current contents of a specified section of the specified measurement data buffer
INH:AMR		Inhibits automatic reporting of 5-minute or 30-minute measurement data
INH:RAMR	X	Inhibits printing at the NCCS of 5-minute reports for the specified packet switches
OP:MEAS		Prints the requested measurement report
OP:RMEAS	X	Prints the requested measurement report at the NCCS
OP:MFILE		Prints the measurement script files or contents used for printing detailed measurement reports
OP:THV		Prints the specified measurement threshold value
SET:MEAS		Sets measurement script for the 30-minute detailed measurement report
SET:THV		Sets a specific measurement threshold value in the measurement threshold table

TABLE B		
RELEASE 3 MEASUREMENT ADMINISTRATION		
MESSAGE	NCCS ONLY	DESCRIPTION
ALW:MEAS		Allows automatic printout of specified measurement report
CLR:SCRIPT;DETAIL		Removes a section of measurements and facilities within a measurement section of the 30-minute detailed measurement report
CLR:SCRIPT;SUMMARY	X	Removes a section of measurements or facilities within a measurement section of the DLDSV, DBH, W5BH, or W7BH summary report
COPY:R30MIN	X	Transfers a 30-minute measurement file from the specified packet switch to the NCCS
DUMP:MEAS		Prints a dump of the current contents of a section of the specified measurement data buffer
INH:MEAS		Inhibits automatic printout of a measurement report
OP:MEAS		Prints the specified detailed, summary, or plant measurements on request
OP:MEAS;CURRENT		Schedules the printout of specified current measurements on a selected periodic basis
OP:SCRIPT;DETAIL		Prints the list of measurement script files available or files the contents for detailed measurement reports
OP:SCRIPT;SUMMARY	X	Prints the list of measurement script files available or files the contents for summary measurement reports at the NCCS
OP:THRESHOLD		Prints the specified threshold value
SET:SCRIPT;DETAIL		Sets the measurement script for the detailed measurement report
SET:SCRIPT;SUMMARY	X	Sets measurements and facilities to be reported on for daily load/service summary reports at the NCCS
SET:THRESHOLD		Sets a specific measurement threshold value in the threshold table
STOP:MEAS;CURRENT		Stops or sets the time to stop printing the current measurement report

**3.02** Input messages are partitioned into three major fields:

ACTION:IDENTIFICATION:DATA!

The action and identification fields must be followed by a colon (:), which is the separator between fields. The message must also be completed by either an exclamation point (!) or operation of the RETURN key. The TTY controller translates a RETURN key to an exclamation point, which indicates the end of the message.

**3.03** The action field defines the general action, or function, to be performed by the command execution process. This field normally contains an abbreviation of the action to be performed, such as DGN for diagnose or RACT for recent change activate.

**3.04** The identification field consists of objects or entities to which the command is directed. This field may also be used to specify action options for some commands. This field may be divided into up to three subfields, depending on the requirements of the command, as follows:

ACTION:ID1;ID2;ID3:DATA!

At least one identification subfield must be specified for the message to be valid. When more than one subfield exists, they must be separated by a semicolon (;).

**3.05** When the message is entered, an acknowledgment is returned to the terminal used for input. Consult the input message manual for the acknowledgment explanation.

**3.06** Two methods can be used to correct an input error:

- (a) Type an underscore (\_) or a backspace to erase one or more characters.
- (b) Type an ampersand (&) or a dollar sign (\$) to erase the complete line just typed.

**3.07** The data field of the input message is either null or contains additional variable information pertaining to the message. This variable data is in the same format as the identification field. If the DATA field is not specified, then the colon is not used

following the identifier field and the message is terminated by an exclamation point or operation of the RETURN key.

#### 4. MEASUREMENT REPORTS

**4.01** Measurement reports are available to operating personnel of a local packet switch, either as scheduled reports or upon demand. The data collection scheme has the new data for the current collection time written over the oldest data being stored as follows:

(a) **5-Minute Report (OP:MEAS):** This report contains data for the last twelve 5-minute reports stored on disk, supplying data for any 5-minute interval of the previous 60 minutes. The 5-minute report is used by network management personnel for network surveillance of control functions and to analyze network or packet switch traffic conditions.

(b) **30-Minute Report (OP:MEAS):** This report contains data for the previous forty-eight 30-minute intervals available on disk, supplying data for the previous 24 hours in 30-minute increments. The oldest (24 hours) 30-minute interval is overwritten at each 30-minute increment. All, or specified, measurements for transmission facilities can be requested.

(c) **0- to 30-Minute Report (DUMP:MEAS):** This report contains data accumulated over a 30-minute interval for a specified measurement. This report is designed to be used as a debugging device only and may provide erroneous data if not used properly. A DUMP:MEAS request can be used as often as needed with normal use being two times during the same 30-minute interval. The first dump establishes a reference point while the second dump determines usage during the interval.

(d) **60-Minute Plant Measurement Report (OP:MEAS PLANT):** This report contains the previous twenty-four 60-minute reports available on disk, providing data for the previous 24 hours in 1-hour increments. The plant measurement report is used to evaluate equipment performance and the impact of system troubles on customer service. It also provides part of the data with which to calculate performance indices and to

monitor packet switch equipment conditions such as equipment out of service.

(e) **Detailed Measurement Report (OP:MEAS:DETAIL):** This detailed report contains any combination of measurements that can be selected for output for any number (up to a maximum of 20) of specified measurements.

(f) **Current Measurement Report (OP:MEAS:Current):** This report is available in Releases 3 and 3A3 only and contains the specified current measurements in either a processed or raw format. A scheduled current measurement report will continue to be output until aborted by a STOP:MEAS command.

**4.02** The 5-minute report can be printed if the 1PSS exceeds certain preset thresholds. Table C contains the measurement acronyms and threshold values that can be set using input message SET:THRESHOLD. The reports can be controlled by using an ALW: input message. If the report is allowed, it will be printed every 5 minutes. If the report is conditionally inhibited, it will be printed only once when at least one set threshold is exceeded. If the report is absolutely inhibited by using the INH: message, the report will not be printed at all.

#### A. NCCS Summary Reports

**4.03** The following five reports are available to the NCCS only. They are generated from data collected by the NCCS from the individual packet switch locations and stored on disk. These reports are output on demand.

(a) **Daily Load/Service Summary Report (OP:MEAS:DLDSV):** This report contains a summary of load/service measurements for each packet switch connected to an NCCS. Selected information from the detailed reports for the day is condensed into this report.

(b) **Daily Plant Summary Report (OP:MEAS:DPLANT):** This report contains a summary of plant measurements for each packet switch connected to an NCCS. The information in all 60-minute plant reports for the day is condensed into this report.

(c) **Daily Busy Hour Summary Report (OP:MEAS:DBH):** This report contains a

summary of busy hour measurements for each packet switch during each hour of daily operation.

(d) **5-Day Daily Busy Hour Summary Report (OP:MEAS;W5BH):** This report contains a summary of busy hour measurements from each packet switch for a period of 5 business days (Monday through Friday).

(e) **7-Day Weekly Summary Report (OP:MEAS;W5BH):** This report contains a summary of the seven busy hour measurements for each selected packet switch for the week.

**4.04** The NCCS summary reports provide a traffic engineer with current data needed to monitor the service load on a packet switch. The information contained in these summary reports is as follows:

(a) **Daily Summary:** This fixed output report contains major traffic, maintenance, and performance data and indicates whether more detailed measurements may be required.

(b) **Daily Plant Summary:** This report sums selected daily plant measurements such as alarms and system initializations.

(c) **Weekly Summary Reports:** These reports contain summaries of collected traffic and utilization data corresponding to each day's busy hour.

**4.05** Normally, data from a packet switch is transferred to an NCCS automatically. However, in the event that the link used for transmitting the data is unavailable, data transfer can be activated by the NCCS at a later time by using input message COPY:R30MIN for the affected packet switch.

#### B. Raw Data Output

**4.06** Raw data can be output under control of the DUMP:MEAS input command. In normal application, two dumps are taken to monitor specific measurements, one to establish a reference point and the other to determine usage during the interval. Both dumps should be taken within the same 30-minute interval. This output provides the contents of

TABLE C					
THRESHOLD VALUES					
THRESHOLD	DEFAULT	MINIMUM	MAXIMUM	REPORT TYPE	RESPONSE
CCPUUSG	650	0	1000	Threshold exceeded	No action
CFPBUF	20000	0	400000	Threshold exceeded	Minor alarm (TC)*
CSUCPSR	990	0	1000	Threshold exceeded	Minor alarm (TC)*
FCDSCDR	10	1	1000	Threshold exceeded	Minor alarm (TF)†
FCYCLES	6200000	0	120000000	Threshold exceeded	No action
FDSCDR	10	1	1000	Threshold exceeded	Minor alarm (TF)†
ICDSCDR	10	1	1000	Threshold exceeded	Minor alarm (TF)†
L3NWRST	3000	1000	1500000	Threshold exceeded	No action
LBADFRR	50	10	1000	Threshold exceeded	No action
LFBPBUF	20000	0	50000	Threshold exceeded	Minor alarm (TF)†
LIFRETR	100	5	1000	Threshold exceeded	No action
LINTRP	2000	0	20000	Threshold exceeded	No action
LLNKRCV	5000	1000	60000	Threshold exceeded	No action
LL2ERR	30000	0	1000000	Threshold exceeded	No action
LRSTCUS	2000	1000	10000	Threshold exceeded	No action
LLTRSTC‡	2000	1000	50000	Threshold exceeded	No action
TBADFRR	50	1	1000	Threshold exceeded	No action
TERRCC	50000	0	100000	1PSS error	Minor alarm
TERRFBC	50000	0	100000	1PSS error	Minor alarm
TFBPBUF	20000	0	120000	Threshold exceeded	Minor alarm (TF)†
TIFRETR	100	5	1000	Threshold exceeded	No action
TINTRP	2000	0	20000	Threshold exceeded	No action
TLNKRCV	5000	1000	100000	Threshold exceeded	No action
TL2ERR	30000	0	1000000	Threshold exceeded	No action
TLSTEMSG	50000	0	100000	No message	—
MINFRMTH	30	0	10000	No message	Does not apply
* TC indicator lighted at the network control center.					
† TF indicator lighted at the network control center.					
‡ Release 2 only.					

the specified measurement data buffer. Measurements that can be taken are:

- CCC (all central control computer measurements per packet switch)
- AL (all access line measurements for a specified line)
- TRK (all trunk measurements for a specified trunk)
- FIP (all measurements for a specified facility interface processor)
- GL (all measurements for a specified gateway link)
- CIDTE (all measurements for specified client internal data terminal equipment)
- IDTE (all measurements for specified internal data terminal equipment).

**4.07** Due to the size of measurement data storage areas for the above measurements, they are the only sections that can be printed using the DUMP:MEAS command. The dump output shown in Fig. 1 is formatted in an array of ten rows and ten columns, separated by a blank line. The first block is labeled 0, and the elements in it are labeled 0 through 99. The next is labeled block 1, and the elements are defined as 100 through 199. Block 2 contains elements 200 through 299, etc. Table D contains the measurements and their identifiers. For example, if a measurement specifies an identifier of 45, then its value is found in block 0, row 4, column 5. An identifier of 245 is found in block 2, row 4, column 5. Table E contains the measurement variables and their definitions.

**C. Formatted Reports**

**4.08** The available formatted reports are:

RELEASES 2 AND 2A2	RELEASES 3 AND 3A3
OP:MEAS 5MIN	OP:MEAS;PS5MIN
OP:MEAS 30MIN	OP:MEAS;PS30MIN
OP:MEAS DETAIL	OP:MEAS;DETAIL

**RELEASES 2 AND 2A2**

**RELEASES 3 AND 3A3**

OP:MEAS PLANT

OP:MEAS;PLANT

OP:MEAS;CURRENT

**4.09** The contents of a 30-minute detailed report can be modified as follows. Using the SET:SCRIPT;DETAIL (Releases 3 and 3A3 only) and OP:MEAS DETAIL (Releases 2 and 2A2 only) input messages, the report can be changed to reflect items to be measured at any particular time. Items that can be measured are:

- Central control computer (CCC)
- Facility interface processor (FIP)
- Access line traffic
- Access line errors
- Trunk traffic
- Trunk errors
- Gateway link traffic
- Gateway link errors
- Internal data terminal equipment (IDTE) traffic
- IDTE errors
- Client internal data terminal equipment (CIDTE) traffic.

**4.10** The measurements for a selected section of the 30-minute detailed measurement report are listed in Table F, along with the bit position in the report control word. Bit positions are in the following order:

31-28 27-24 23-20 19-16 15-12 11-8 7-4 3-0

Locations of the desired measurements are determined by specifying a hexadecimal number in the input message. For instance, if the CCC is specified as the item to be measured, X'4b would specify binary 1s in bit positions 0, 1, 3 and 6, providing the measurements on PKT-RCV, PKT-XMT, TSP-CPU-USE, and DISCON-LNK.

```

1PSS                                DUMP:MEAS
OM-70000-03

ID . . . . . DUMP:MEAS
GENERIC . . . . 3
APP. . . . . 1PSS
TYPE . . . . . Output
OP CLASS . . . . LMS03
    
```

1. FORMAT

```

M tt DUMP:MEAS
type [idnum]
    
```

```

FIP ID: fip_num      SAMPLES: fip_samp
    
```

```

-----
-----
-----
    
```

```

type [idnum]
    
```

```

FIP ID: fip_num      SAMPLES: fip_samp
    
```

```

-----
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-----
    
```

```

cur_time
    
```

2. REASON FOR OUTPUT

Requested raw dump of 30-minute measurements data

3. VARIABLE FIELD DEFINITIONS

- type = The type of dump taken (CCC, AL, TRK, GL, IDTE, CIDTE or FIP)
- id\_num = Line, trunk, gateway link, CIDTE, or FIP ID number.
- fip\_num = FIP ID number when dump type is AL, TRK, GL, or FIP.
- fip\_samp = Number of FIP measurement samples at the time of the dump (only when dump type is AL, TRK, GL, or FIP)

Fig. 1—Sample of the DUMP:MEAS Raw Data Output Format (Sheet 1 of 2)

1PSS  
OM-70000-03

DUMP:MEAS

cur\_time = Current time. The format is: mm/dd/yy  
hh:mm:ss.

The dump will be printed in decimal with 10 values (7 digits minimum) per row with a space after every 10 rows. If a value exceeds 7 digits, the row will be continued (looped around) to the next line followed by a carriage return to start a new row. Appendix IM/OM-H provides tables to locate specific raw measurements within the dump output.

4. ACTION TO BE TAKEN

None

5. REFERENCES

APPENDIX IM/OM-H

Input Messages:  
DUMP:MEAS

DUMP:MEAS

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December 5, 1984

Fig. 1—Sample of the DUMP:MEAS Raw Data Output Format (Sheet 2 of 2)

TABLE D						
DUMP:MEAS MEASUREMENTS (RELEASE 3)						
IDENT	MEASUREMENTS					
	CCC	FIP	AL/GL	TRUNK	IDTE	CIDTE
0	ccpuabvt	fdscotf	idmrev	tdmrev	irsteus	ipbufs
1	cfpbufs	fnoprev	ifrmrr	tfrmrr	iactle	ipbsms
2	cfpbelt	fnopxmt	lfrmrt	tfrmrt	idsrec	Unassigned
3	ctvce	fsihots	llnkrev	tlnkrev	idsnrec	Unassigned
4	idscabvt	opnpkt	ln2exc	tn2exc	ipkrev	Unassigned
5	ropkxmt	billec	lrecf1	trecf1	ipkxmt	Unassigned
6	rtpnep	fcycbelt	luarev	tuarev	ivecub	Unassigned
7	osmpr0	fcycsq	irevovr	trevovr	isetup	Unassigned
8	osmpr1	fdscabvt	lxundr	txundr	iveblk	Unassigned
9	osmpr2	foutabvt	lt1exp	tt1exp	iclxmtn	Unassigned
10	osmpr3	fcycles	lrnxmt	trnxmt	ifl3rexmt	Unassigned
11	oterrpt	f13rexmt	lparity	tparity	ifsoutccc	Unassigned
12	ccsetups	datapkt	lbyterr	tbyterr	isihots	Unassigned
13	cctdmsu	fsoutccc	lmisl	tmisl	idscotf	Unassigned
14	cctdmpk	numfsamp	lpbufabt	tpbufabt	Unassigned	Unassigned
15	numcsamp	Unassigned	losetup	trnrrov	Unassigned	Unassigned
16	nair_na	Unassigned	ltsetup	tbadfsov	Unassigned	Unassigned
17	nair_mt	Unassigned	lbillpkt	tcfrrv	Unassigned	Unassigned
18	nair_mtf	Unassigned	lrnrrov	tifrretr	Unassigned	Unassigned
19	nair_mo	Unassigned	lbadfsov	trnrfr	Unassigned	Unassigned
20	rnopxmt	Unassigned	lcfrrv	tbadfes	Unassigned	Unassigned
21	rnoprev	Unassigned	lifrretr	tifrrev	Unassigned	Unassigned
22	fdscotf	Unassigned	lrnrfr	tifsrev	Unassigned	Unassigned
23	rtretr	Unassigned	lbadfes	tifrxmt	Unassigned	Unassigned
24	Unassigned	Unassigned	lifrrc	tifxmt	Unassigned	Unassigned
25	Unassigned	Unassigned	lifsrev	tdsrec	Unassigned	Unassigned
26	Unassigned	Unassigned	lifrxmt	tpbufs	Unassigned	Unassigned
27	Unassigned	Unassigned	lifsxmt	Unassigned	Unassigned	Unassigned
28	Unassigned	Unassigned	ldsrec	Unassigned	Unassigned	Unassigned
29	Unassigned	Unassigned	lpbufs	Unassigned	Unassigned	Unassigned
30	Unassigned	Unassigned	lclxmtnc	Unassigned	Unassigned	Unassigned
31	Unassigned	Unassigned	lclxmtnf	Unassigned	Unassigned	Unassigned
32	Unassigned	Unassigned	lsetup	Unassigned	Unassigned	Unassigned
33	Unassigned	Unassigned	lvcub	Unassigned	Unassigned	Unassigned
34	Unassigned	Unassigned	ldscrec	Unassigned	Unassigned	Unassigned

TABLE D (Contd)						
DUMP:MEAS MEASUREMENTS (RELEASE 3)						
IDENT	MEASUREMENTS					
	CCC	FIP	AL/GL	TRUNK	IDTE	CIDTE
35	Unassigned	Unassigned	lrsteus	Unassigned	Unassigned	Unassigned
36	Unassigned	Unassigned	lrcub	Unassigned	Unassigned	Unassigned
37	Unassigned	Unassigned	ldgnclr	Unassigned	Unassigned	Unassigned
38	Unassigned	Unassigned	lrsrey	Unassigned	Unassigned	Unassigned
39	Unassigned	Unassigned	lrsxmtn	Unassigned	Unassigned	Unassigned
40	Unassigned	Unassigned	ltletrl	Unassigned	Unassigned	Unassigned
41	Unassigned	Unassigned	llpbsms	Unassigned	Unassigned	Unassigned
42	Unassigned	Unassigned	lactle	Unassigned	Unassigned	Unassigned
43	Unassigned	Unassigned	lsoavce	Unassigned	Unassigned	Unassigned
44	Unassigned	Unassigned	lsoavei	Unassigned	Unassigned	Unassigned
45	Unassigned	Unassigned	lobpe	Unassigned	Unassigned	Unassigned
46	Unassigned	Unassigned	lobpi	Unassigned	Unassigned	Unassigned
47	Unassigned	Unassigned	lovbe	Unassigned	Unassigned	Unassigned
48	Unassigned	Unassigned	lovcbi	Unassigned	Unassigned	Unassigned
49	Unassigned	Unassigned	Unassigned	Unassigned	Unassigned	Unassigned
50	Unassigned	Unassigned	Unassigned	Unassigned	Unassigned	Unassigned
51	Unassigned	Unassigned	Unassigned	Unassigned	Unassigned	Unassigned
52	Unassigned	Unassigned	Unassigned	Unassigned	Unassigned	Unassigned

4.11 The contents of a current measurement report can also be modified. Using the SET:SCRIPT;DETAIL input message, the report can be changed to reflect items to be measured at any particular time. Items that can be measured are:

- Packet switch (CCC)
- Internal data terminal equipment (IDTE)
- Internal DTE (IDTE)
- Access line traffic (AL)
- Gateway link traffic (GL)
- Trunk traffic (TRK)
- FIP traffic (FIP).

## 5. TRAFFIC AND ERROR MEASUREMENTS FOR LADT SERVICE

### A. Releases 2 and 2A2

5.01 The activity and performance of a remote packet module used for LADT service in Releases 2 and 2A2 of a 1PSS are measured by a set of counters in the remote packet module and transmitted through the packet switch link to the administrative processor. This data is transmitted at 5-minute intervals to the administrative processor, which processes the data into separate traffic and error measurement files. These files become the source for periodic and on-demand traffic and error measurement reports.

<b>TABLE E</b>	
<b>1PSS MEASUREMENT VARIABLES (NOTE)</b>	
<b>MEASUREMENT</b>	<b>DESCRIPTION</b>
billcc	Total number of virtual call billing record packets received by the central control computer (CCC) from a packet switch unit.
ccpuabvt	Number of times that the CCC transport process central processor unit usage went above the threshold.
ccsetups	Total number of setup attempts, both originating and terminating. Includes setup of permanent virtual circuits (PVCs) and excludes tandem setup attempts.
cctdmpk	Total number of tandem packets processed by the CCC.
cctdmsu	Total number of tandem call setup attempts from all other switches.
cfpbelt	Number of times that the average number of free packet buffers available at the CCC (cfpbufs) went below the threshold.
cfpbufs	Sum of 30-second samples of the number of free packet buffers available at the CCC.
ctvce	Number of terminating inter-1PSS virtual call setup attempts.
datapkt	Number of data and interrupt packets received and transmitted by each packet switch unit.
fcycbelt	Number of times that packet switch unit cycles (fcycles) went below the threshold.
fcycles	Number of cycles by the FIP executive program for a packet switch unit.
fcycsq	Square of the number of cycles by the FIP executive program for a packet switch unit (reserved for future use).
fdscabvt	Number of times that the CCC discard rate went above the threshold for a packet switch unit.
fdscotf	Number of recoverable packets discarded by the central switch interface handler (CSIH) due to the output table being full for a packet switch unit.
fl3rexmt	Number of packets retransmitted from an access line (level 3) for a packet switch unit.
fmpktrev	Number of times that measurements are received from a packet switch unit.
fnoprev	Number of transport packets received from a packet switch unit.
fnopxmt	Total number of packets sent by a packet switch unit.
foutabvt	Number of times that a packet switch unit to central control output queue and table (fsoutccc) went above the threshold.
fsihots	Sum of the sample number of packets in the CSIH output table and queue to the packet switch unit.
See note at end of table.	

TABLE E (Contd)	
IPSS MEASUREMENT VARIABLES (NOTE)	
MEASUREMENT	DESCRIPTION
fsoutccc	Sum of the samples of the number of packets waiting to be sent to the CCC (sum of the number of packets in the local switch interface handler [LSIH] output table and the LSIH output queue).
iactle	Sum of the samples of the number of logical channels in use per time interval for all client processes.
iclxmtn	Number of network-generated clear packets on existing calls to the IDTE (clearing caused by a network fault).
idscabvt	Number of times that the discard rate of CCC to IDTE exceeded a threshold.
idsenrec	Number of nonrecoverable discarded packets per IDTE.
idscotf	Number of packets discarded by the CSIH due to the output table being full for the IDTE.
idscrec	Number of recoverable discarded packets per IDTE.
if13rexmt	Number of packets retransmitted at level 3 by the IDTE.
ifsoutccc	Number of packet buffers in the output queue to the CSIH for the IDTE (sum of the samples).
ipbsms	Total number of packet buffers used for level 3 flow control for a client of the IDTE.
ipbufs	Total number of packet buffers in use for a client process of the IDTE.
ipkrev	Total number of packets received by the IDTE.
ipkxmt	Total number of packets transmitted by the IDTE.
irsteus	Number of IDTE restarts caused by the client processes and/or caused by other than our network.
isetup	Total setup attempts, both originating and terminating, for the IDTE.
isihots	Sum of 30-second samples of the number of packets in the CSIH output table and queue to the IDTE.
ivcblk	Total number of setup attempts that were unsuccessful excluding "ivcunb."
ivcunb	Number of call setup attempts that failed due to blocking from network causes at the IDTE.
lbadfcs	Number of frames received per line (level 2) with bad frame check sequence.
See note at end of table.	

<b>TABLE E (Contd)</b>	
<b>IPSS MEASUREMENT VARIABLES (NOTE)</b>	
<b>MEASUREMENT</b>	<b>DESCRIPTION</b>
lbadfesov	Number of overflow counts of frames received with bad frame check sequence.
lbillpkt	Number of total billable packets sampled by the measurement process.
lbytterr	Number of byte mode error link interrupts per line (level 2).
lefrrev	Number of control frames received (includes only good frames) per line (level 2).
lelxmtnc	Number of network-generated clear packets (network congestion).
lelxmtnf	Number of network-generated clear packets (out of order).
ldgnclr	Number of diagnostic packets sent to the data terminal equipment (DTE) and the number of clears transmitted on the line that was on a channel with no call up (level 3).
ldmrev	Number of times a set asynchronous balance mode (SABM) was transmitted in response to a disconnected mode frame being received (level 2).
ldserec	Number of packets discarded that were not recoverable (includes those due to the facility going out of service).
ldserec	Number of packets discarded that were recoverable (includes those due to lack of buffers).
lfrmrr	Number of frame reject frames received and number of SABMs sent.
lfrmrt	Number of frame reject frames transmitted (in response to certain bad frames received) (level 2) (does not include received F=1 but did not send P=1).
lifrrcv	Number of information frames received (includes only good frames).
lifrretr	Number of information frames retransmitted (level 2).
lifrxmt	Number of information frames transmitted (does not include level 2 transmissions).
lifsrev	Sum of the number of bytes in information fields received (includes only good frames).
lifsxmt	Sum of the number of bytes in information fields transmitted (does not include retransmissions).
linkrev	Number of SABMs received (level 2).
llpbsms	Sum of the samples of the number of long holding time packet buffers used for speed matching (level 3 flow control).
lmisl	Summation of interrupts for (1) byte mode errors, (2) short frames, (3) invalid address, (4) aborts, and (5) null frames.
See note at end of table.	

<b>TABLE E (Contd)</b>	
<b>IPSS MEASUREMENT VARIABLES (NOTE)</b>	
<b>MEASUREMENT</b>	<b>DESCRIPTION</b>
ln2exc	Number of times SABM transmitted in response to counter N2 being exceeded (level 2).
lobpe	Sum of interstate, intranetwork billable packets sent to and received from DTE on calls originating (normally billed) and terminating (reversed charges accepted) at the DTE and for PVCs that are assigned as the calling DTE per line. For gateway links, sum of interstate billable segments sent to and received on calls originating and terminating at the gateway per gateway link.
lobpi	Sum of intrastate billable packets received from or sent to DTE on virtual calls or PVCs originating at DTE per line. For gateway links, sum of intrastate billable segments sent to and received on calls originating and terminating at the gateway link per gateway link.
lovbe	Number of billable originating and terminating interstate virtual call setup attempts (both successful and unsuccessful).
lovbi	Number of billable originating and terminating intrastate virtual call setup attempts (both successful and unsuccessful).
losetup	Number of original setups (sampled by the measurement process).
lparity	Number of times that the countdown register fired for parity errors.
lpbufabt	Number of times that the number of FIP packet buffers in use (lpbufs) exceeded the threshold.
lpbufs	Sum of the samples of the number of packet buffers in use.
lrcvovr	Number of receiver overrun link interrupts (level 2).
lrecf1	Number of times that a frame reject frame was transmitted in response to receiving F=1 but did not send P=1 (level 2).
lrrnfr	Number of receiver not ready frames received (level 2).
lrrfrov	Number of overflow counts for receiver not ready frames received (level 2).
lrrxmt	Number of times that the countdown register fired for receiver not ready frames sent.
lrsrv	Number of level 3 reset request packets received from the DTE.
lrstcus	Number of customer-caused restarts. These include restarts requested by the customer or that are generated by the network due to errors directly caused by the customer.
lrsxmtn	Number of network-generated reset packets sent to DTE due to network failures. This is pegged only at the packet switch unit where the reset is initiated.
See note at end of table.	

<b>TABLE E (Contd)</b>	
<b>IPSS MEASUREMENT VARIABLES (NOTE)</b>	
<b>MEASUREMENT</b>	<b>DESCRIPTION</b>
lsaetlc	Sum of samples of the number of logical channels in use per time interval.
lsetup	Total numbers of setup attempts (originating and terminating).
lsoavce	Sum of the samples of the number of originating interstate active virtual calls per time interval.
lsoavci	Sum of the samples of the number of originating intrastate active virtual calls per time interval.
ltlctrl	Number of times that T1 flow control was put into effect per line.
ltlexp	Number of times that the countdown register (T1) expired.
ltsetup	Number of terminating setups (sampled by the measurement process).
luarcv	Number of times SABM transmitted in response to an unnumbered acknowledgment being received (level 2).
lxundr	Number of transmitter underrun link interrupts (level 2).
lvcub	Originating billable, but unsuccessful, call setup attempts.
lvcunb	Number of unsuccessful virtual call setup attempts that cannot be billed (includes those due to code block and network causes).
nalr_mo	Number of minor alarms without TC or TF.
nalr_mt	Number of minor alarms with TC.
nalr_mtf	Number of minor alarms with TF.
nalr_na	Number of no action alarms.
numcsamp	Number of samples taken for CCC.
numfsamp	Number of samples taken for measurements that are summed.
opnpkt	Operation packets received by the CCC from the FIP per FIP.
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.
See note at end of table.	

**TABLE E (Contd)**  
**IPSS MEASUREMENT VARIABLES (NOTE)**

MEASUREMENT	DESCRIPTION
osmpr3	Number of samples taken at sampling rate 3 (reserved for future use).
oterrpt	Number of transport network CCC errors reported.
rdscotf	Number of packets discarded by CSIH due to RTPAD output table being full.
rnoprev	Number of packets received from RTPAD.
ropkxmt	Number of nontransport packets sent to, or through, all FIPs by the remote transaction packet assembler/disassembler.
rtpncp	Number of times that a retransmission of a remote transaction was not attempted because the number of allowed retransmissions to the sending remote transaction packet assembler/disassembler was exceeded (the transaction was not completed).
rtretr	Number of transactions retransmitted by RTPAD.
tbadfcs	Number of frames received per trunk with bad frame check sequence.
tbadfscov	Number of overflow counts for bad frame check sequence frames.
tbytterr	Number of byte mode error link interrupts per trunk (level 2).
tcfrrev	Number of control frames received (includes only good ones) per trunk (level 2).
tdmrev	Number of times SABM transmitted in response to disconnected mode frame being received per trunk (level 2).
tdscrec	Number of packets discarded per trunk that were recoverable (includes those due to lack of buffers).
tfrmrr	Number of frame reject frames received and SABMs transmitted per trunk.
tfrmrt	Number of 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).
tifrrrev	Number of information frames received (includes only good frames) per trunk.
tifrrretr	Number of information frames retransmitted per trunk (level 2).
tifrxmt	Number of information frames transmitted (does not include level 2 retransmissions) per trunk.
tifsrev	Sum of the number of bytes in the information fields received (includes only good frames) per trunk.
See note at end of table.	

<b>TABLE E (Contd)</b>	
<b>IPSS MEASUREMENT VARIABLES (NOTE)</b>	
<b>MEASUREMENT</b>	<b>DESCRIPTION</b>
tifsxmt	Sum of the number of bytes in the information fields transmitted (does not include re-transmissions) per trunk.
tlkrev	Number of SAMBs received per trunk (level 2).
tmisl	Summation of interrupts for (1) byte mode errors, (2) short frames, (3) invalid address, (4) aborts, and (5) null frames.
tn2exc	Number of times that SABM is transmitted per trunk in response to the counter N2 being exceeded.
tparity	Number of times that the countdown register fired for parity errors.
tpbufabt	Number of times that the number of FIP packet buffers in use per trunk (tpbufs) exceeded the threshold TFBPBUF.
tpbufs	Sum of the samples of the number of packet buffers in use per trunk.
trcvovr	Number of receiver overrun link interrupts per trunk (level 2).
treclf	Number of times that a frame reject frame is transmitted per trunk in response to receiving F=1 but did not send P=1 (level 2).
trnrfr	Number of receiver not ready frames received per trunk (level 2).
trnrfrov	Number of overflow counts for receiver not ready frames received.
trnrxmt	Number of times that the countdown register fired for receive not ready frames sent.
ttlexp	Number of times that the countdown register (T1) expired.
tuarcv	Number of times that SABM is transmitted per trunk in response an unnumbered acknowledgment being received (level 2).
txundr	Number of transmitter underrun link interrupts per trunk (level 2).
<p><b>Note:</b> Measurement variables begin as follows:            "c" refers to a CCC.            "f" refers to a packet switch unit.            "i" refers to either IDTE or CIDTE.            "l" refers to an access line/gateway link.            "t" refers to a trunk.</p>	

TABLE F			
RELEASE 3 IPSS MEASUREMENTS			
BIT POS	MEASUREMENTS		
	CCC	FIP	AL/GL
0	PKT-RCV	PKT-FROM-CCC	PKT-IN
1	PKT-XMT	PKT-TO-CCC	PKT-OUT
2	AV-FREE-BUF	AV-CYCLES	ACT-VC-IN-USE
3	TSP-CPU-USE	AV-FTC-OUTQ	BAD-SETUP-NTWK
4	BAD-SETUP-NTWK	AV-CTF-OUTQ	FLOW-CNTL-T1
5	DISCON-NTWK	DISCARD-CTF	DISCARD-PKT
6	DISCON-LNK	CYCLES-BL-TH	UN-DISCARD-PKT
7	RESET-NTWK	RETRANS-L3	RESET-CUST
8	DISCARD-PKT-FP	DISCARD-AB-TH	RESET-NTWK
9	UN-DISCARD-PKT	DATA-PKT	DISCON-NTWK
10	DISCARD-PKT-CC	OPRN-PKT	AV-PKT-BUF
11	OPRN-CPU-USE	BILL-PKTS	I-FLD-BYTE-RCV
12	DMERT-CPU-USE	Unassigned	I-FLD-BYTE-XMT
13	PKT-RTPAD	Unassigned	PKT-IN-AB-TH
14	IDLE-TIME	Unassigned	PKT-OUT-AB-TH
15	FREE-BUF-BL-TH	Unassigned	PKT-BUF-AB-TH
16	TSP-AB-TH	Unassigned	CNTL-FRM-RCV
17	RETRAN-RTPAD	Unassigned	AV-HLD-BUF
18	CCC-SETUPS	Unassigned	RETRANS-L2
19	KER-CPU	Unassigned	SETUP-ATMPT
20	TDM-SETUPS	Unassigned	DISCON-LNK
21	TDM-PKTS	Unassigned	BAD-FCS-FRMS
22	AFP-CPU	Unassigned	RNR-RCV-L2
23	OPN-PKT-RCV	Unassigned	DIAG-PKT
24	BILL-VC-PKT	Unassigned	RESTART-CUST
25	Unassigned	Unassigned	AV-OUT-QUE
26	Unassigned	Unassigned	SET-UP-UNBILL
27	Unassigned	Unassigned	ERR-MISL
28	Unassigned	Unassigned	ERR-HDW
29	Unassigned	Unassigned	ERR-L2
30	Unassigned	Unassigned	Unassigned
31	Unassigned	Unassigned	Unassigned

TABLE F (Contd)			
RELEASE 3 IPSS MEASUREMENTS			
BIT POS	MEASUREMENTS		
	AL/GL ERROR	TRK	TRK ERROR
0	Unassigned	PKT-IN	Unassigned
1	Unassigned	PKT-OUT	Unassigned
2	Unassigned	DISCARD-PKT	Unassigned
3	Unassigned	RETRANS-L2	RETRANS-L2
4	Unassigned	AV-PKT-BUF	Unassigned
5	Unassigned	I-FLD-BYTE-RCV	Unassigned
6	Unassigned	I-FLD-BYTE-XMT	Unassigned
7	RESET-CUST	PKT-IN-AB-TH	Unassigned
8	RESET-NTWK	PKT-OUT-AB-TH	Unassigned
9	DISCON-NTWK	PKT-BUF-AB-TH	Unassigned
10	Unassigned	CNTL-FRM-RCV	Unassigned
11	Unassigned	BAD-FCS-FRMS	BAD-FCS-FRMS
12	Unassigned	RNR-RCV-L2	RNR-RCV-L2
13	Unassigned	AV-OUT-QUE	Unassigned
14	Unassigned	ERR-MISL	ERR-MISL
15	Unassigned	ERR-HDW	ERR-HDW
16	Unassigned	ERR-L2	ERR-L2
17	Unassigned	Unassigned	Unassigned
18	RETRANS-L2	Unassigned	Unassigned
19	Unassigned	Unassigned	Unassigned
20	DISCON-LNK	Unassigned	Unassigned
21	BAD-FCS-FRMS	Unassigned	Unassigned
22	RNR-RCV-L2	Unassigned	Unassigned
23	DIAG-PKT	Unassigned	Unassigned
24	RESTART-CUST	Unassigned	Unassigned
25	Unassigned	Unassigned	Unassigned
26	Unassigned	Unassigned	Unassigned
27	ERR-MISL	Unassigned	Unassigned
28	ERR-HDW	Unassigned	Unassigned
29	ERR-L2	Unassigned	Unassigned
30	Unassigned	Unassigned	Unassigned
31	Unassigned	Unassigned	Unassigned

TABLE F (Contd)			
RELEASE 3 1PSS MEASUREMENTS			
BIT POS	MEASUREMENT		
	IDTE	IDTE ERROR	CIDTE
0	IPKT-IN	Unassigned	AV-IPKT-BUF
1	IPKT-OUT	Unassigned	AV-IHKD-BUF
2	AV-ITC-OUTQ	Unassigned	Unassigned
3	AV-CTI-OUTQ	Unassigned	Unassigned
4	DISCARD-IDTE	DISCARD-IDTE	Unassigned
5	DISCARD-AB-ITH	Unassigned	Unassigned
6	RETRAN-IL3	RETRAN-IL3	Unassigned
7	RESTART-ICUST	RESTART-ICUST	Unassigned
8	ACT-IVC-IN-USE	Unassigned	Unassigned
9	UN-DISCARD-IPK	Unassigned	Unassigned
10	ISETUP-ATMPT	Unassigned	Unassigned
11	BLK-SETUP-INTWK	BLK-SETUP-INTWK	Unassigned
12	BLK-SETUP-IDTE	BLK-SETUP-IDTE	Unassigned
13	DISCON-INTWK	DISCON-INTWK	Unassigned
14	DISCARD-CTI	DISCARD-CTI	Unassigned
15	Unassigned	Unassigned	Unassigned
16	Unassigned	Unassigned	Unassigned
17	Unassigned	Unassigned	Unassigned
18	Unassigned	Unassigned	Unassigned
19	Unassigned	Unassigned	Unassigned
20	Unassigned	Unassigned	Unassigned
21	Unassigned	Unassigned	Unassigned
22	Unassigned	Unassigned	Unassigned
23	Unassigned	Unassigned	Unassigned
24	Unassigned	Unassigned	Unassigned
25	Unassigned	Unassigned	Unassigned
26	Unassigned	Unassigned	Unassigned
27	Unassigned	Unassigned	Unassigned
28	Unassigned	Unassigned	Unassigned
29	Unassigned	Unassigned	Unassigned
30	Unassigned	Unassigned	Unassigned
31	Unassigned	Unassigned	Unassigned

**5.02** Traffic measurement counters reflect the operational status, customer activity, and the load on a remote packet module during each 5-minute interval just passed. Error measurement counters should remain at zero over a reporting interval. An accumulated count indicates data switching errors not resulting from customer actions and exception conditions or failures that are internal to the remote packet module. Traffic data is collected for each operational remote packet module while error data is written to file only for remote packet modules that incur a nonzero data value.

**5.03** Longer periods (30 minutes or 24 hours) of traffic and error measurements are accumulated from the 5-minute source files. At each midnight, a duplex multienvironment real-time (DMERT) plant measurement file is created. It contains a set of DMERT performance counters and a set of differences representing the counter increase over the previous hours. This forms the basis of the 24-hour plant measurement report.

**5.04** The length of time that traffic and error measurement data files exist depends on their use. The 5-minute files are accumulated for the 30-minute report. Each 5-minute interval results in the creation of a new file and the removal of the oldest 5-minute file from 30 minutes earlier. On-demand requests for a 5-minute report are valid only 30 minutes after their creation. The 30-minute files are accumulated into the 24-hour report before automatically being removed. Thus, on-demand requests for a 30-minute report are valid for 24 hours after their creation. The 24-hour traffic and error files exist for a 24-hour period before removal when a current file is created; thus, an on-demand request for a 24-hour report is valid for 24 hours after its creation.

**5.05** Traffic and error measurement reports for Releases 2 and 2A2 are under control of the following input messages:

(a) **5-Minute Traffic Report (OP:TRAFFIC 5MIN)**: This report contains traffic measurements from any of the six latest 5-minute intervals that were collected over the past 30 minutes. Each specified interval can be output on demand; or if no interval is specified, the latest interval will be output. The report can also be output automatically at 5-minute intervals. The 5-minute traffic report is used for network management control functions and maintenance actions by providing real-time data on system operation.

(b) **30-Minute Traffic Report (OP:TRAFFIC 30MIN)**: This report contains traffic measurements from any of the 48 latest 30-minute traffic measurements collected in the past 24 hours. Each specified interval can be output on demand; or if no interval is specified, the latest interval will be output. The 30-minute report is used primarily by Network Administration and Engineering for traffic administration, capacity management, and equipment administration.

(c) **24-Hour Traffic Report (OP:TRAFFIC 24HR)**: This report contains traffic measurement data from the previous 24 hours and will be output automatically or upon request. The 24-hour report is used to evaluate the performance of the hardware/software system, to evaluate the impact of customer service troubles, and to calculate the performance index.

(d) **5-Minute Error Report (OP:ERRMEAS 5MIN)**: This report contains data from the six latest 5-minute error measurements collected over the past 30 minutes. Each specified interval can be output on demand; or if no interval is specified, the latest interval will be output. The 5-minute report is used for network management control functions and maintenance actions by providing real-time data on system operation. Abnormal traffic conditions can be analyzed with this report.

(e) **30-Minute Error Report (OP:ERRMEAS 30MIN)**: This report contains data from the 48 latest 30-minute error measurements collected in the past 24 hours. Each specified interval can be output on demand; or if no interval is specified, the latest interval will be output. The 30-minute report is used primarily by Network Administration and Engineering for traffic administration, capacity management, and equipment administration. This report can also assist maintenance personnel in trouble isolation.

(f) **24-Hour Error Report (OP:ERRMEAS 24HR)**: This report contains error measurement data from the previous 24 hours and will be output on request. The 24-hour report is used to evaluate the performance of the hardware/software system, to evaluate the impact of customer service troubles, and to calculate the performance index.

(g) **Daily Plant Summary Report (OP:PLANT):** This report contains data collected from the packet administrative module during the previous 24 hours. The report has a fixed format and is generated automatically at each successive midnight or on demand. Measurements of the 3B20D processor activity and performance, such as system initializations and alarms summed from the previous midnight, are contained in this report.

**5.06** All valid system traffic measurement labels for Releases 2 and 2A2 are listed in Appendix OM-A of IM/OM-75000-02. In addition, all valid error measurements are listed in Appendix OM-B of IM/OM-75000-02.

**B. Releases 3 and 3A3**

**5.07** The activity and performance of a remote packet module used in Releases 3 and 3A3 of a 1PSS are measured as previously described for Releases 2 and 2A2. Data collected by each remote packet module is transmitted through the packet switch link to the administrative feature package where the data is separated into traffic and error measurement files. These files become the source for periodic and on-demand traffic and error measurement reports.

**5.08** Traffic and error measurement reports for Releases 3 and 3A3 are under control of the following input messages:

REPORT	MESSAGE
5-Minute Traffic	OP:MEAS;AFP5MIN TRAFFIC
30-Minute Traffic	OP:MEAS;AFP30MIN TRAFFIC

REPORT	MESSAGE
24-Hour Traffic	OP:MEAS;AFP24HR TRAFFIC
5-Minute Error	OP:MEAS;AFP5MIN ERRMEAS
3-Minute Error	OP:MEAS;AFP30MIN ERRMEAS
24-Hour Error	OP:MEAS;AFP24HR ERRMEAS

**5.09** Appendix OM-J of IM/OM-75000-03 contains traffic and/or error measurement labels. These labels appear on 5-minute, 30-minute, and 24-hour reports along with actual measurement values.

**C. Traffic and/or Error Measurement Thresholds**

**5.10** All three types of traffic and/or error measurement thresholds for LADT service of the 1PSS can be specified. The 5-minute, 30-minute, and 24-hour reports have threshold measurements specified by using the appropriate form from the recent change (RC) menu. The traffic threshold form is requested from the menu by typing "tthr" while the error threshold form is requested by typing "ethr."

**6. ABBREVIATIONS AND ACRONYMS**

**6.01** Table G contains abbreviations and acronyms used in the 1PSS.

<b>TABLE G</b>	
<b>IPSS MEASUREMENT ACRONYMS AND ABBREVIATIONS</b>	
<b>ACRONYM</b>	<b>DESCRIPTION</b>
ACT-IVC-IN-USE	Sum of the samples for the number of logical channels in use per time interval for all client processes.
ACT-VC-IN-USE	Average number of logical channels simultaneously in use for an access line/gateway link over the interval.
AFP-CPU	Fraction of real-time usage by the application feature package.
AUTO-DGN OOS	Number of times that the unit was removed from service due to automatic diagnostics.
AV-CTF-OUTQ	Average number of packets in the queue and output table from the central control computer (CCC) to the facility interface processor (FIP) over the interval.
AV-CTI-OUTQ	Average number of packets in the queue from the CCC to the internal data equipment (IDTE) over the interval.
AV-CYCLES	Average number of cycles of the FIP over the interval.
AV-FREE-BUF	Average number of free packet buffers available at the CCC over the interval.
AV-FTC-OUTQ	Average number of packets in the FIP to CCC output queue over the interval.
AV-HLD-BUF	Average number of holding buffers in use for an access line/gateway link.
AV-IHLD-BUF	Average number of packet buffers used for level 3 flow control per client.
AV-IPKT-BUF	Average number of packet buffers in use per client process of the IDTE.
AV-ITC-OUTQ	Average number of packets in the IDTE to CCC output queue.
AV-PKT-BUF	Average number of packet buffers in use for a trunk or an access line/gateway link over the interval.
BAD-FCS-FRMS	Number of frames received with bad frame check sequence.
BAD-SETUP-NTWK	Total number of unsuccessful virtual call setup attempts due to a network fault.
BILL-PKTS	Total number of virtual call records sent to the CCC from FIPs supporting per-call recording.
BILL-VC-PKT	Total number of billing virtual call records sent from all FIPs to the CCC.
BLK-SETUP-IDTE	Total number of unsuccessful setup attempts at the IDTE not due to network causes.

<b>TABLE G (Contd)</b>	
<b>IPSS MEASUREMENT ACRONYMS AND ABBREVIATIONS</b>	
<b>ACRONYM</b>	<b>DESCRIPTION</b>
BLK-SETUP-INWK	Number of call setup attempts that failed due to blocking from network causes at the IDTE.
CCC	Central control computer.
CCC-SETUPS	Total number of setup attempts processed by the CCC, including permanent virtual circuit (PVC) initializations, and setups to the IDTE.
CCPUUSG	Upper limit for transport service central processing unit (CPU) usage at the CCC.
CEP	Command execution process.
CFPBUF	Lower limit for average number of free packet buffers available at the CCC.
CIDTE	Client internal data terminal equipment.
CNTL-FRM-RCV	Number of control frames received for access line/gateway links or trunks.
CRIT-ALARMS	Number of critical alarms received.
CSUCPSR	Lower limit for the ratio of the number of packets to be switched that were successfully switched.
CYCLES-BL-TH	Number of times that the facility interface processor cycles went below a threshold.
DATA-PKT	Total number of data packets sent and received per FIP.
DIAG-PKT	Number of diagnostic packets sent to a DTE and the number of clears transmitted on a channel in the ready state for lines. Also, the number of clears transmitted on a channel in the ready state for gateway links.
DISCARD-AB-ITH	Count of the number of times that the discard rate of the CCC to the IDTE was above the set threshold.
DISCARD-AB-TH	Count of the number of times that the discard rate of the CCC to FIPs was above the set threshold per FIP.
DISCARD-CTF	Total number of packets discarded by the CCC for the FIP when the queue to the FIP was full.
DISCARD-CTI	Total number of packets discarded by the CCC for the IDTE when the queue to the IDTE was full.

<b>TABLE G (Contd)</b>	
<b>IPSS MEASUREMENT ACRONYMS AND ABBREVIATIONS</b>	
<b>ACRONYM</b>	<b>DESCRIPTION</b>
DISCARD-IDTE	Total number of recoverable packets discarded by the IDTE.
DISCARD-PKT	Total number of recoverable packets discarded for an access line/gateway link or trunk by the FIP summed over a 5-minute report period.
DISCARD-PKT-CC	Total number of packets discarded by the CCC.
DISCARD-PKT-FP	Sum of the number of packets discarded by the CCC FIPs over the packet switch plus the packets discarded by the IDTE.
DISCON-INWK	Total number of virtual calls cleared by the network at the IDTE.
DISCON-LNK	Total number of network-generated virtual call disconnects attributed to link failures for access lines and gateway links.
DISCON-NTWK	Total number of network-generated virtual call disconnects attributed to network congestion and/or failure for access lines/gateway links.
DMERT-AUD-ATMP	Number of DMERT audit attempts.
DMERT-AUD-FAIL	Number of DMERT audit failures.
DMERT-CPU-USE	Percentage of central processing unit time used by DMERT. Includes originating station treatment (OST) for permanent application processes plus time spent in selected DMERT kernel-level processes. Does not include any temporary DMERT processes.
ERR-HDW	Count of the errors, which have a correlation to hardware errors in the FIP, per access line/gateway link and trunk.
ERR-L2	Total number of level 2 resets based on the sum of collected measures per access line/gateway link and trunk.
ERR-MISL	Count of errors collected by AUTOR for miscellaneous categories per access line/gateway link and trunk.
FAULT OOS	Number of times that the unit was removed from service due to a fault in the unit.
FCDSCLR	Upper limit for the ratio of discarded packets at the CCC (in relation to an FIP) to transmitted packets per FIP.
FCTFOUTQ	Upper limit for the number of packets in the CCC output queue to the FIP.
FCYCLES	Lower limit for the number of cycles by the FIP executive.
FDSCLR	Upper limit for the ratio of packets discarded at the FIP to transmitted packets per FIP.

TABLE G (Contd)	
IPSS MEASUREMENT ACRONYMS AND ABBREVIATIONS	
ACRONYM	DESCRIPTION
FIP-AUTO-OOS	Number of times that an FIP was taken out of service because of automatic diagnostics.
FIP-SETUP-LD	Total number of originating and terminating setup attempts.
FLOW-CNTL-T1	Number of times that the T1 buffer control was placed into effect for access lines/gateway links.
FRC ACT	Number of times that the central control unit was forced active.
FREE-BUF-BL-TH	Number of times that free CCC buffers went below the threshold.
FTCOUTQ	Upper limit for the average number of packets in the CCC output queue to the FIP.
IDTE	Internal data terminal equipment.
ICDSCDR	Ratio of packets discarded at the IDTE to transmitted packets.
IDLE-TIME	Percentage of central processing unit time that the system was idle.
I-FLD-BYTE-RCV	Total number of bytes in all I-fields received from an access line or trunk not including retransmissions.
I-FLD-BYTE-XMT	Total number of bytes in all I-fields transmitted from an access line or trunk.
IPKT-IN	Total number of packets received by the IDTE from the CCC.
IPKT-OUT	Total number of packets sent to the CCC from the IDTE.
ISETUP-ATMPT	Total number of setup attempts for the IDTE.
KER-CPU	Fraction of time accumulated in the kernel process modes.
LEV-1-HDW-INIT	Number of hardware-initiated level 1 initializations.
LEV-2-HDW-INIT	Number of hardware-initiated level 2 initializations.
LEV-3-HDW-INIT	Number of hardware-initiated level 3 initializations.
LEV-4-MAN-INIT	Number of manually initiated level 4 initializations.
LEV-0-PRC-INTR	Number of level 0 processor error interrupts.
LEV-1-PRC-INTR	Number of level 1 processor error interrupts.
LEV-2-PRC-INTR	Number of level 2 processor error interrupts.

<b>TABLE G (Contd)</b>	
<b>IPSS MEASUREMENT ACRONYMS AND ABBREVIATIONS</b>	
<b>ACRONYM</b>	<b>DESCRIPTION</b>
LEV-1-SFW-INIT	Number of software-initiated level 1 interrupts.
LEV-2-SFW-INIT	Number of software-initiated level 2 interrupts.
LEV-3-SFW-INIT	Number of software-initiated level 3 interrupts.
LFBPBUF	Upper limit for the average number of FIP packet buffers in use per line.
LIFRETR	Upper limit of the ratio of information frames retransmitted to the total number of information frames transmitted per line.
LIFRRCV	Upper limit for the number of information frames received from DTE on a line.
LIFRXMT	Upper limit for the number of information frames transmitted to DTE on a line.
LINTRP	Number of link interrupts.
LL2ERR	Number of times that a level 2 protocol violation was indicated.
LLNKRCV	Upper limit for the number of SABMs received per access line.
LLPVI	Upper limit for the number of times that a local protocol violation was indicated.
LLTPBUF	Upper limit for the average number of FIP packet buffers in use per line over a long term.
LLTRSTC	Upper limit for the number of customer-caused restarts on a line over a long term.
LRCVOVR	Upper limit for the number of received overrun link interrupts on a line.
LRNRRCV	Upper limit for the ratio of receiver not ready frames received to the total number of frames received per line.
LRPVI	Upper limit for the number of times that a remote protocol violation was indicated.
LRSTCUS	Upper limit for the number of customer-caused restarts on a line. These restarts are requested by the customer or are generated by the network due to errors directly caused by the customer.
LXUNDR	Upper limit for the number of transmitter underrun interrupts on a line.
MAJ-ALARMS	Number of major alarms received.
MAN-REQ OOS	Number of times that the unit was removed from service due to a manual request.

<b>TABLE G (Contd)</b>	
<b>IPSS MEASUREMENT ACRONYMS AND ABBREVIATIONS</b>	
<b>ACRONYM</b>	<b>DESCRIPTION</b>
MIN-ALARMS	Number of minor alarms received.
MIN-ALRM-TC-TF	Number of minor alarms with TC or TF.
MIN-ALRM-NO-TC	Number of minor alarms without TC or TF.
NO-ACT-ALARMS	Number of alarms for which no action was taken.
OPN-PKT-RCV	Operation packets received by the CCC from all FIPs.
OPRN-CPU-USE	Percentage of central processing unit time spent in nondeferrable operation processes. Does not include craft CEPs or DMERT overhead.
PKT-BUF-AB-TH	Number of times that the packet buffers on an access line/gateway link or trunk were above a threshold.
PKT-FROM-CCC	Total number of packets received by the FIP from the CCC.
PKT-IN	Number of packets received by an access line/gateway link or trunk.
PKT-OUT	Number of packets transmitted on an access line/gateway link or trunk.
PKT-RCV	Total number of packets received from the FIPs and the internal DTE on the packet switch.
PKT-RTPAD	Number of packets sent by the remote transaction packet assembler/disassembler (RTPAD) at the CCC.
PKT-TO-CCC	Total number of packets sent at the CCC by the FIP.
PKT-XMT	Total number of packets transmitted to the FIPs and the IDTE.
RESET-CUST	Total number of level 3 resets caused by DTE for access lines and remote network STE generated resets for gateway links.
RESET-NTWK	Total number of network-generated resets for access lines/gateway links.
RESTARTS-CUST	Number of restarts per access line/gateway link caused by the customer or remote network due to customer/remote network errors.
RESTART-ICUST	Number of restarts of the IDTE caused by the client processes and/or the customer.
RETRANS-IL3	Total number of packets retransmitted by the IDTE at level 3.
RETRANS-L2	Total number of information frames retransmitted over an access line/gateway link or trunk.
RETRANS-L3	Total number of packet retransmissions by an FIP.

<b>TABLE G (Contd)</b>	
<b>IPSS MEASUREMENT ACRONYMS AND ABBREVIATIONS</b>	
<b>ACRONYM</b>	<b>DESCRIPTION</b>
RETRAN-RTPAD	Number of times that a retransmission of a remote transaction was not attempted because the number of allowed retransmissions was exceeded.
RNR-RCV-L2	Total number of receiver not ready packets received at level 2 over an access line/gateway link or trunk.
SABM-RCV	Number of SABMs received over a line or trunk.
SETUP-ATMPT	Total number of setup attempts, both originating and terminating, on access lines/gateway links.
TBADFRCC	Upper limit for ratio of bad frames received per trunk.
TBYTERR	Upper limit for the number of byte mode error link interrupts on a trunk.
TOTAL ALARMS	Total number of alarms.
SETUP-UN-BILL	Count of originating billable, but unsuccessful, setup attempts per access line/gateway link.
TDM-PKTS	Total number of tandem packets processed by the CCC.
TDM-SETUPS	Total number of tandem call setup attempts processed by the CCC.
TERM-SETUP	Total number of setup attempts that terminated on the access line.
TERRCCC	Upper limit for number of logged errors at the CCC.
TERRFBC	Upper limit for number of logged errors per FIP.
TFBPBUF	Upper limit for the average number of FIP packet buffers in use per trunk.
TIFRETR	Upper limit for the ratio of information frames retransmitted to the total number of information frames transmitted per trunk.
TIME SEC	Time, in seconds, that the unit was out of service/forced active due to automatic diagnostics, a fault, or a manual request.
TINTRP	Number of link interrupts.
TL2ERR	Number of times that a level 2 protocol violation was indicated.
TLNKRCV	Upper limit for the number of SABMs received per trunk.
TLPVI	Upper limit for the number of times that a local protocol violation was indicated per trunk.

<b>TABLE G (Contd)</b>	
<b>1PSS MEASUREMENT ACRONYMS AND ABBREVIATIONS</b>	
<b>ACRONYM</b>	<b>DESCRIPTION</b>
TLSTEMSG	Upper limit for the number of lost error reports.
TLTPBUF	Upper limit for the average number of FIP packet buffers in use per trunk over a long term.
TOTAL-SFW-INIT	Total number of software initializations.
TRANS ERRS	Number of transient errors.
TRPVI	Upper limit for the number of times that a remote protocol violation was indicated per trunk.
TSP-AB-TH	Number of times that the transport process usage exceeded a threshold.
TSP-CPU-USE	Percentage of central processing unit time spent in the transport process (excluding DMERT overhead).
UN-DISCARD-IPK	Total number of unrecoverable packets discarded by the IDTE.
UN-DISCARD-PKT	Total number of unrecoverable packets discarded by the FIP for an access line/gateway link.
UNIT NAME	Name of unit.
UNIT NUM	Number of unit.
1PSS-AUD-ATMP	Number of 1PSS audit attempts.
1PSS-AUD-FAIL	Number of 1PSS audit failures.