

PLANT MEASUREMENTS

DESCRIPTION

1A ESS™ SWITCH

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1. GENERAL

1.01 This practice describes the plant measurement counts that are accumulated in the 1A ESS switch. The purpose of the plant measurements is to provide maintenance personnel with a concise quantitative summary of the state of central office hardware and its impact on customer service. This data is printed out by the system at the input/output (I/O) monitoring facilities (terminal) and is used by office maintenance personnel to aid them in locating and repairing problems that occur in the central office. This information also serves as valuable indicators of the condition of the system hardware so that maintenance personnel will be alerted to potential problems prior to hardware failure.

1.02 This practice is reissued to include additional plant measurements for generic programs 1AE9 and later. Revision arrows are used to emphasize the more significant changes. The following are specific reasons for this reissue.

- (a) Add plant measurements data for the intelligent simplex peripheral interface (ISPI) feature. This addition includes changes to the PM01 and PM03 (PLNT-MEAS-DPU) output messages.
- (b) Add plant measurements data for the local area signaling services (LASS) feature. This

addition also includes changes for the PM01 output message.

(c) Add plant measurements data for the improved public telephone service (IPTS) feature. This addition includes a new section in the PM01 message and a new PM03 output message (PLNT-MEAS-DPT).

1.03 Descriptions of peg, overflow, and usage counts and various types of counters are found in AT&T Practice 231-090-207, Traffic Measurements Feature Document. Also refer to AT&T Practice 231-371-001.

2. PLANT MEASUREMENTS

2.01 The plant measurements program (PPMP1A00, PR-6A089) is intended to provide maintenance personnel with information on the state of the central office hardware and its impact on customer service. This data is printed out by the system at the terminal. A configuration of the basic performance measurements is shown in Fig. 1.

2.02 Plant measurement data is printed on the maintenance terminal via the following output messages:

- (1) PM01—The PM01, daily printout (Fig. 1 through 9), is printed daily at 2:30 am.
- (2) PM02—The PM02, monthly summary (Fig. 10), is printed immediately following the daily PM01 printout only on the 23rd of the month.
- (3) PM05—The PM05, AUTOPLEX™ System 100 plant measurement summary (Fig. 11), is also a daily summary. This message will print daily, following the PM01 or PM02, on the 23rd of the month. The PM05 output messages will be interspersed by other messages. The PM05 is utilized in offices equipped with the AUTOPLEX System 100 feature.
- (4) PM04—The PM04, carrier interconnect (CI) plant measurement summary (Fig. 12), is a daily summary. This message will print daily, following the PM01 or the PM02, on the 23rd of the month. The PM04 will be utilized in 1AE8 and later offices equipped with the CI feature.

(5) PM03—The PM03, daily or monthly count summary (Fig. 13 through 28), provides PPMP1A00 counts to central office maintenance personnel upon manual request.

(6) The PM05—The PM05, AUTOPLEX System 100 daily plant measurement summary (Fig. 29), also provides counts to central office maintenance personnel upon manual request.

TYPES OF DATA RECORDED

2.03 The counts provided by the plant measurements program are basically of three types:

- Customer Service Measurements
- Hardware Performance Measurements
- Base Measurements.

Customer Service Measurements

2.04 Customer service measurements (counts) are a measure of the service received by the customer as influenced by the condition of the system's hardware. These include the number of calls or billings that are offered to the system but are delayed or lost because of faulty or marginal equipment.

Hardware Performance Measurements

2.05 Hardware performance measurements (counts) are an indication of the condition of the system hardware which is described in terms of the number of errors, trouble indications, and out-of-service intervals. These measurements may not reflect customer service directly, but do indicate how well the system is functioning.

Base Measurements

2.06 The base measurements that are provided are counts of total calls carried by the system broken into various categories. These counts are necessary to normalize service counts and performance counts of mechanical units if comparisons are to be made of offices with dissimilar traffic characteristics. (See paragraph 2.08.)

DAILY PM01 OUTPUT MESSAGE

2.07 The daily plant measurement data in the PM01 output message is organized as follows:

- Base measurements on certain categories (Fig. 2)
- Selected customer service measurements (Fig. 2)
- Maintenance measurements including emergency action (EA), maintenance interrupts, and network failures (Fig. 3)
- Performance measurements of system hardware including the central processor and bus system (Fig. 4)
- Coded enable peripheral units, peripheral units, and trunk and service circuits (Fig. 4)
- Other measurements (Fig. 5)
- Time-out totals (Fig. 5)
- Attached processor measurements (Fig. 6)
- Circuit switched digital capability (CSDC) measurements (Fig. 7)
- Improved public telephone service (IPTS) measurements (Fig. 8)
- Remote Switching System (RSS) measurements (Fig. 9).

A. Base Measurements

2.08 The base measurements provided by PPMP1A00 are needed to normalize the service counts and performance counts of units whose uses vary with the traffic load. By using these counts, meaningful comparisons can be made with past performance and with the performance of offices with dissimilar traffic characteristics. The counts are taken in terms of carried load (excluding all traffic overflows). The base measurements are as follows:

- (1) **Originating Calls (ORIG CALLS)**—Count the number of customer receiver seizures for which at least one digit is received. This count includes partial dials (but not permanent signals) as

well as additional parties added to a conference circuit. The PPMP1A00 obtains this count directly from the traffic measurements program.

- (2) **Incoming Calls (INC CALLS)**—Count the total number of calls originating from trunks incoming from distant locations that seize an incoming register (and in the case of by-link, receive one digit). The PPMP1A00 obtains this count directly from the traffic measurements program.

- (3) **Outgoing Calls (OUTG CALLS)**—Count the number of calls for which outpulsing is required and a transmitter is successfully seized.

- (4) **Coin Control Seizures (COIN CONTR SEIZ)**—Count the number of times the coin control circuit is successfully connected to a coin line. This count will exceed coin line originations as the coin control circuit may be seized more than once during a call.

- (5) **Centralized Automatic Message Accounting Seizures (CAMA SEIZ)**—Count the number of times an incoming CAMA trunk (operator or ANI) is seized.

- (6) **Automatic Message Accounting Entries (AMA ENTRIES)**—Count the number of billing entries put on AMA tape.

- (7) **Automatic Identification Outward Dialing Seizures (AIOD SEIZ)**—Count the number of successful connections to an AIOD receiver.

- (8) **Centrex Data Link Seizures (CTX DL SEIZ)**—Count the number of connections to a centrex DL for transmission or reception of lamp and key orders. This is *not* a count of centrex calls.

- (9) **Output Message Register (OMR SEIZ)**—Count of the number of seizure output message registers.

B. Service Measurements

2.09 The service measurements give valid indications of the level of customer service. A count of the calls lost by the system, as the result of hardware malfunctions, is a significant measure of the influence of the condition of the central office hard-

ware on customer service. The following service measurements are provided:

(1) Hardware Lost Calls (HWR LOST CALLS)—

The number of calls dropped when a trunk is suspected and is placed on the trunk maintenance list (TML) for diagnosis or when a network failure has occurred on the call.

(2) Hardware Lost Billing (HWR LOST BILLING)—Number of calls not billed because both AMAs are out of service (local, long distance, and special service calls are allowed to proceed without billing).

(3) Coin Control Failures (COIN CONTR FAILURES)—Count the number of stuck coin conditions and coin telephones served by the office which had coin relays that were out of limits. To determine the number of coin phones experiencing difficulties with coin relays or stuck coins, examine the CN02 output data for the office which is printed hourly. Also, the PM01 coin control failure data indicates the conditions during the previous 24 hours. The CN02 counts for a 24-hour period should be equal to the PM01 coin control failure counts.

(4) Automatic Identification Outward Dialing Special Billing Number Billing (AIOD SBN BILLING)—Counts the number of times the AIOD equipment fails to bill a local private branch exchange (PBX) number correctly.

(5) Dial Tone Speed Test (DTST) Delays—Count the number of times the customer has to wait an “excessive” length of time for the system to process the call because all trunks in the desired trunk group are busy or the system is overloaded, causing queuing for equipment. This count includes 3-second and 11-second delays.

Note: Maintenance personnel may find it necessary to suspend the running of the DTST, because in certain trouble conditions DTST may generate traffic that would interfere with maintenance activities. Extended or frequent use of this option is *not* recommended. To discourage unnecessary use of the DTST inhibit option, the PM01 output message will include a one-line comment alerting maintenance personnel as to its use. This information is printed only if the inhibit option is used.

(6) Centralized Automatic Message Accounting Lost Billing (CAMA LOST BILLING)—Counts the number of times a CAMA call is handled but, due to hardware failure, no AMA register is available which is necessary for charging.

(7) Centralized Automatic Message Accounting Automatic Number Identification Failures (CAMA ANI FAILURE)—Counts the number of calls for which ANI failure digit is received.

(8) Receiver Attachment Delay (RCVR ATT DELAY)—Number of times a receiver connection was not made in 4 seconds.

(9) Receiver Attachment Delay Recorder (RADR Inhibit Usage)—Number of 100-second intervals during which the RADR feature was inhibited.

(10) FALSE STARTS—Counts the number of times a receiver is seized and then abandoned with no digits dialed.

(11) Output Message Register Failures (OMR SEIZ FAILURES)◆

C. Maintenance Measurements

2.10 A concise summary of maintenance measurements is given as follows:

- Emergency action
- Interrupts
- Network failures.

Emergency Action

2.11 The software EA phases may be initiated by any of the following sources:

- A failure by the system to answer an interject request
- An E-to-E cycle becoming excessive
- An E-to-E priority class frequency failure
- An excessive rate of interrupts
- Two successive data validation failures

- The time spent in a phase becoming excessive
- Aborting of a phase
- The request of a phase at the master control center (MCC).

2.12 The number of EA phases that are requested either automatically or manually are printed in the PM01 output message. Refer to AT&T Practice 231-368-001 for a detailed description of the EA phases and the audits that are associated with each phase.

Interrupts

2.13 The number of various maintenance interrupts provides a picture of nonroutine maintenance action taken by the system. These interrupts are generally not as serious as a higher order EA phase, but they do interrupt normal call processing to correct possible hardware problems. A count of these interrupts will give a good indication of the state of the system's equipment. The number of interrupts that occur are printed as part of the PM01 output message. Refer to AT&T Practice 231-368-001 for a detailed description of the maintenance interrupts.

Note: The PM01 output message prints information that will call attention to any inhibiting of interrupts. This information is printed only if the inhibit option has been used during the day.

Network Failures

2.14 The network failure counts are provided to give an indication of how well the network is completing and terminating calls. *Each time a network failure occurs in the system an "NT" output message is printed.* The following network failure counts are printed as part of the PM01 output message:

- Supervisory scan failure (SUPF)
- False cross and ground test failure (FCGF)
- Ringing current failure (RC)
- Low-line resistance failure (LLR)

- Power cross test (PX)
- Restore verify failure count (RVFY)
- Showering line test failure (SHWL).
- Call cutoff failure (CO).

Note: Refer to AT&T Practice 231-049-330 (Remreed) or 231-049-331 (Ferreed) for a detailed description of the network failures.

D. Performance Measurements

2.15 This portion of plant measurements provides maintenance personnel with a more descriptive picture of the performance of equipment in the central office. The data concerning the maintenance activity in the office is recorded for each type of unit to aid in locating the source of problems and determining the switching integrity of an office. These basic measurements are made:

- Out of service
- Trouble indications (TBL IND)
- Errors (ERR)
- Faults (LOC; NON-LOC).

2.16 Refer to Fig. 1 for the configuration of the basic performance measurements.

Out-of-Service Counts for Central Processor, Bus System, Coded Enable Peripheral Units, Peripheral Units, and Trunk and Service Circuits

2.17 Maintenance out-of-service counts are a measure of the availability of central office switching equipment. Measurements of troubles incurred in an office do not give any indication of the amount of equipment left unrepaired for long periods of time. The out-of-service counts will indicate either of the following conditions:

- Many units down during a short interval (this would also be reflected in trouble and error counts as well as customer service).
- A few units being left out of service for long periods of time.

2.18 Measurement of unit outage is done on a 100-second sampling basis of system status tables. Each time the program finds a unit out of service, it increments the appropriate counter by one, giving a measurement in terms of hundred unit seconds (CUS) of outage. Out-of-service counts are incremented as a result of routine diagnostic procedures.

2.19 The out-of-service counts for the nine central processor units are summed and printed out under normal business day (NBD) total. The bus system, coded enable peripheral units, and seven peripheral units likewise have their out-of-service counts summed under NBD total. If the office collection interval is other than the normal business hours, the above out-of-service counts will print out under abbreviated business day (ABD) total.

2.20 The out-of-service counts are kept for the items listed in Table A.

2.21 Busy hour out-of-service (BSY HR O/S) counts are made on all trunks. "Busy hours" is defined by the central office on the basis of peak traffic periods. Since the number of hours over which this count is taken may vary, the number of hours of "busy hours" is also printed as the last item of the trunk and service circuit counts in the PM01 output message.

Trouble Indications Counts for Bus System, Peripheral Units, and Trunk and Service Circuits

2.22 Trouble indications (TBL IND) refer to those items when the system associates a unit with a specific trouble condition. The ESS switch makes this association by entering a particular fault recognition program, making a TML entry, or printing a message that locates a suspected unit for further manual testing. The TBL INDs do not constitute proof that a faulty condition exists in a particular unit. These counts are used as a good indication that trouble does exist and serves as a pointer to the location at which the trouble was found.

2.23 Trunk and service circuit counts are counts of the number of times call processing or nonroutine maintenance programs attempt to put a trunk on the TML for diagnosis. These counts are incremented regardless of the outcome of the diagnostic or whether the diagnostic was run. The only

exception is that entries to the TML, as a result of a time-out, will be counted as a TBL IND only if:

- The trunk subsequently fails diagnosis or
- Initial examination indicates a possible fault (revertive trunks).

This is done to avoid counting traffic overload and maintenance problems external to the office as a trouble within the office.

2.24 Trouble indications are printed for the units listed in Table B.

Error Counts for Central Processor, Bus System, Coded Enable Peripheral Units, and Peripheral Units

2.25 Error (ERR) counts are printed for all units that maintain such counts. The ERR counts supply information about the trouble activity of the unit that is not already provided in "trouble indications." An error is defined as a malfunction within the machine that either cannot be reproduced utilizing available program control or can easily be corrected without altering normal operation. A retry failure after an error, where provided, will not be counted as a second error, but in some cases will cause an interrupt and, consequently, a plant interrupt count to be incremented. Error counts are printed for the units listed in Table C.

Fault Counts for Central Processor and Peripheral Units

2.26 Faults refer to specific problems due to hardware failures. There are two types of faults in 1A ESS switch:

- Located faults—Fault conditions which are automatically resolved to an equipment unit.
- Nonlocated faults—Fault conditions which are not automatically resolved to an equipment unit.

Fault counts are printed for the units listed in Table D.

◆TABLE A◆

OUT OF SERVICE COUNTS

EQUIPMENT GROUP	OUT OF SERVICE COUNTS
Central Processor	Central Control (CC) Program Store (PS) Call Store (CS) Master Control Console (MCC) File Store (FS) (for non-APS offices only) Attached Processor Interface (API) [for Attached Processor System (APS) office only] Data Unit Selector (DUS) Disk File (DF) (for non-APS offices only) Tape Unit Controller (TUC) Power Distribution Frame (PDF) Normal Business Day Total (NBD TOT) Abbreviated Business Day Total (ABD TOT)
Peripheral Units	Call Store Bus (CS Bus) Program Store Bus (PS Bus) Auxiliary Unit Bus (AU Bus) Coded Enable/Peripheral Unit Bus (CE/PUB) Peripheral Unit Address Bus (PUA Bus) Central Pulse Distributor Bus (CPDB) Scanner Answer Bus (SCAB) Normal Business Day Total (NBD TOT) Abbreviated Business Day Total (ABD TOT) I/O Unit Selector (IOUS) I/O Unit Channel (IOUC) Central Pulse Distributor (CPD) Scanner Network and Signal Distributor Controller (NET & SD) Automatic Identified Outward Dialing (AIOD) Centrex Data Link (CTX DL) Peripheral Unit Controller (PUC) PUC Data Link (PUCDL) Data Terminal Frame (DTF) Data Terminal (DTRM) Intelligent Simplex Peripheral Interface (ISPI) Controller
Trunk and Service Circuits	Outgoing Trunks (OGT) Incoming Trunks (ICT) Two-Way Trunks (2WAY TRKS) Originating Receivers (OR) Incoming Receivers (IR) Transmitters (XTMR) Miscellaneous Trunks (MISC)

TABLE B
TROUBLE INDICATION COUNTS

EQUIPMENT	TROUBLE INDICATION COUNTS
Peripheral Units	<p>Peripheral Unit Bus (PUB) -- Counts the number of times a PUB fails the CPD fault recognition program. The CPD fault recognition program is entered after an F-level interrupt.</p> <p>Central Pulse Distributor Bus (CPD Bus).</p> <p>Scanner Answer Bus (SCAB).</p> <p>Central Pulse Distributor (CPD) -- Counts the entries to the CPD fault recognition from the F-level interrupt filter program that resulted in suspecting CPD trouble.</p> <p>Scanner -- Counts the entries to the scanner fault recognition from an F-level interrupt.</p> <p>Network and Signal Distributor Controller (NET & SD) -- Counts the entries to the network and signal distributor fault recognition because of an unable verify failure.</p> <p>Automatic Message Accounting (AMA) -- Counts the entries to this unit's fault recognition.</p> <p>Automatic Identified Outward Dialing (AIOD) -- Counts the number of automatic requests for AIOD diagnosis because equipment is suspect.</p> <p>Centrex Data Link (CTX DL) -- Counts the number of times a link fails to retransmit an order five consecutive times or the number of errors on a link becomes excessive, and a diagnosis program is called to correct the problem.</p> <p>Peripheral Unit Controller Data Link (PUCDL).</p> <p>Data Terminal Frame (DTF).</p> <p>Data Terminal (DTRM).</p>
Trunk and Service Circuits	<p>Outgoing Trunks (OGT).</p> <p>Incoming Trunks (ICT).</p> <p>Two-Way Trunks (2WY TRKS).</p> <p>Originating Receivers (OR).</p> <p>Incoming Receivers (IR).</p> <p>Transmitters (XTMR).</p> <p>Miscellaneous Trunks (MISC TRKS) -- This count includes TML entries of all trunks (not listed above).</p>

♦TABLE C♦
ERROR COUNTS

EQUIPMENT GROUP	ERROR COUNTS
Central Processor	<p>Central Control (CC)</p> <p>Program Store (PS) — Counts both single and double errors. Single errors are parity or hamming code errors which can be corrected without a reread. A double error is a word with two or more bit errors and must be reread. Also included in the count of double errors are single bit errors in the program store address and all-seems-well (ASW) failures from program store. These likewise require a reread. A reread failure will cause an E-level interrupt.</p> <p>Call Store (CS) — Counts the number of CS parity failures requiring a CS reread. Should the reread fail, a D-level interrupt is initiated.</p> <p>Master Control Center (MCC)</p> <p>File Store (FS) (for non-APS offices only)</p> <p>Data Unit Selector (DUS)</p> <p>Disk File (DF) (for non-APS offices only)</p> <p>Tape Unit Controller (TUC)</p> <p>Power Distribution Frame (PDF)</p>
Peripheral Units	<p>Call Store Bus</p> <p>Program Store Bus</p> <p>Auxiliary Unit Bus</p> <p>Coded Enable/Peripheral Unit Bus</p> <p>I/O Unit Selector</p> <p>I/O Unit Channel</p> <p>Network and Signal Distributor (NET & SD) — Counts the number of times that network or signal distributor peripheral controller orders were executed correctly, under control of the fault recognition program, after having failed on the initial attempt by the I/O program.</p> <p>Miscellaneous Peripheral Unit (MISC PU) — Counts the number of times the F-level filter program is entered, but finds no reproducible problem. The CP01 ERR message will also be printed in this situation.</p> <p>Automatic Identified Outward Dialing (AIOD) — Two counts of errors are kept on the AIOD system to distinguish between those errors caused by the AIOD hardware and those caused by the PBX automatic number identification (ANI) hardware on customer premise. The AIOD errors consist of shift register errors (invalid 2-out-of-5 codes in the shift register). The ANI errors include ANI parity errors which indicate that an invalid 2-out-of-5-code was detected in the ANI before the data was transmitted to the central office and ANI failure to respond condition which indicates that the ANI failed to send data once a receiver had been seized.</p>

◆TABLE C (Contd)◆

ERROR COUNTS

EQUIPMENT GROUP	ERROR COUNTS
Peripheral Units (Contd)	<p>Centrex Data Link (CTX DL) — Counts the number of times a data link fails to receive an ASW signal from a centrex console control cabinet after two consecutive attempts to transmit data, or receives an illegal key signal from a console. After each transmission of a lamp order to a centrex console, the data link waits for an ASW signal. If this signal is not received, a retransmission is made. If the data link fails to receive the ASW signal the second time, an error is counted. If five consecutive attempts fail using various CPD-PUB configurations, a trouble indication is counted, the link is turned off, and a diagnostic is requested. Key signals generated by the customer centrex console are checked for validity as they are received on the data link. The plant measurements error counter is incremented whenever an illegal signal is received. Thirty-two illegal key signals or nonconsecutive ASW failures on lamp orders within 4 minutes cause the trouble indications counter to be incremented and the data link to be removed from service for diagnosis.</p> <p>Peripheral Unit Controller (PUC) — Counts PUC frame-detected errors in orders to the frame. The PUC error count is pegged when first trial fails and second trial succeeds.</p> <p>Intelligent Simplex Peripheral Interface (ISPI) Controller</p>

E. Other Measurements and Time-Out Totals

2.27 Some additional counts are included in plant measurements that do not fit into any specific category. These counts are:

- The number of working trunks in the office
- The number of automatic progression tests run
- The number of disable-automatic processor configurations.
- The number of override configurations which have been activated (1A ESS switch)
- The individual time-out totals for incoming and outgoing trunks and also partial dials and preempts.

If the number of trunks count is different from the office records, this may indicate that some trunks

have been moved into trunk group zero (a nonassigned trunk group). The count of automatic progression tests is printed to insure that these lengthy diagnostic tests are run on a continuing basis.

2.28 The number of disable-automatic processor configurations is a count of the number of times the processor switched from a faulty unit to its duplicate, correctly operating unit. The count of activated override configurations indicates the number of times a faulty unit is manually switched to its duplicate, correctly operating unit.

F. Attached Processor Measurements

2.29 The measurements for the APS are defined as follows:

- (1) REQUESTS ACCEPTED (Base Measurements)—Count of the number of client requests accepted.

♦TABLE D♦
FAULT COUNTS

EQUIPMENT GROUP	FAULT COUNTS
Central Processor	Central Control (located; nonlocated) Program Store (located; nonlocated) Call Store (located; nonlocated) Master Control Center (located; nonlocated) File Store (located; nonlocated) (for non-APS offices only) Attached Processor Interface (located; nonlocated) (for APS offices only) Data Unit Selector (located; nonlocated) Disk File (located; nonlocated) (for non-APS offices only) Tape Unit Controller (located; nonlocated) Power Distribution Frame (located; nonlocated)
Bus System and Peripheral Units	Call Store Bus (located; nonlocated) Program Store Bus (located; nonlocated) Auxiliary Unit Bus (located; nonlocated) Coded Enable/Peripheral Unit Bus (located; nonlocated) I/O Unit Selector (located; nonlocated) I/O Unit Channel (located; nonlocated) Peripheral Unit Controller (PUC FAULT) — Count of PUC frame-detected faults in orders to the frame Intelligent Simplex Peripheral Interface (ISPI) Controller

(2) **REQUESTS FAILED** (Performance Measurements)—Count of the number of client requests that failed.

(3) **API out of service** (Performance Measurements)—Count of the number of API units that are out of service.

(4) **TBL IND** (Performance Measurements)—Count of the number of API units that enters the fault state.

(5) **ERR** (Performance Measurements)—Count of the number of API unit errors.

(6) **API-PIC TBL IND** (Performance Measurements)—Count of the number of API-peripheral interface controllers (PIC) that enters the fault state.

(7) **D-LEVEL INTERRUPTS**—The number of times an API causes an in-range or out-of-range D-level interrupt.

(8) **CALL STORE (CS) ACCESS FAILURES**—The number of times API access to CS results in an in-range or out-of-range failure.

(9) **PROGRAM STORE (PS) ACCESS FAILURES**—Reflects the number of times API access to PS results in an in-range or out-of-range failure.

(10) **MAINTENANCE INTERJECTS**—The number of times an API causes a maintenance interject.

(11) **API DIAGNOSTICS RUN**—The number of times API manual diagnostics or automatic diagnostics is run.

(12) **ATP**—The number of API manual diagnostics or automatic diagnostics runs that were All Tests Pass (ATP).

G. Circuit Switched Digital Capability Measurements

2.30 The measurements for CSDC are defined as follows.

Note: The term public switched digital capability (PSDC) is now known as CSDC.

Base Measurements

2.31 The following base counts are provided for CSDC calls.

- (1) The CSDC originating calls (PSDC ORIG CALLS)—The number of line seizures which can be identified as CSDC call attempts.
- (2) The CSDC incoming calls (PSDC INC CALLS)—The number of CSDC calls originating from trunks incoming from distant locations that seize an incoming register.

Note: Trunk diagnostics peg the incoming calls counts three (3) times.

- (3) The CSDC tandem calls (PSDC TAND CALLS)—The number of incoming CSDC calls for which outpulsing is required and a transmitter is successfully seized.

Service Measurements

2.32 Only one CSDC count is provided for plant service measurements.

- The CSDC hardware lost calls (PSDC HWR LC)—The number of CSDC calls dropped when a trunk is suspected and is placed on the TML for diagnosis or when a network failure has occurred on the call.

Performance Measurements

2.33 The following performance measurements are provided for CSDC.

- (1) The CSDC clock unit interface out of service (PSDC CLK INTF O/S)—The number of hundred call seconds (CCS) that the clock interface is unavailable.

Note: No other count is administered during an interface failure.

- (2) The CSDC clock unit out of service (PSDC CLK O/S)—The number of CCS that the office clock unit is functioning in the holdover, or fast start mode of operation.

(3) The CSDC clock unit trouble indications (PSDC CLK TBL)—The incidence of the following alarm conditions will increment this count:

- Power Failure
- Synchronizer 0 failure
- Synchronizer 1 failure
- Composite clock generator 0 failure
- Phase lock loop 0 end-of-range
- Phase lock loop 1 end-of-range
- Line driver unit failure.

(4) The CSDC synchronization out of service (PSDC SYNC O/S)—The number of CCS that the back-up synchronization reference is in use. This count indicates that period of time when the synchronization reference is unduplicated.

(5) The CSDC synchronization trouble indications (PSDC SYNC TBL)—The incidence of the following alarm conditions will increment this count:

- Misframe alarm—primary synchronization reference
- Misframe alarm—back-up synchronization reference.

(6) The CSDC trunks trouble indications (PSDC TRK TBL)—The number of trouble indications associated with CSDC trunks.

(7) The CSDC trunks out of service (PSDC TRK O/S)—The number of CCSs that CSDC trunks are out of service.

(8) The CSDC trunks busy hour out of service (PSDC TRK BSY HR O/S)—The number of CCS that CSDC trunks are out of service during the busy hour.

(9) The CSDC loops trouble indications (PSDC LOOP TBL)—The number of CSDC loops which fail automatic tests generated by the CSDC maintenance circuit.

(10) The CSDC loop tests (PSDC LOOP TESTS)—
The number of CSDC loops tested automatically by the CSDC maintenance circuit.

2.34 The following counts are included for all CSDC digital carrier trunk (DCT) frames. These counts are part of the peripheral units performance measurements of the PM01 output message.

- CSDC DCT Slips (PSDC DCT SLP)—The total number of slips on all T1 trunks terminating on the switching system.
- CSDC DCT Misframes (PSDC DCT MIS)—The total number of misframes on all T1 trunks terminating on the switching system.

PH. Improved Public Telephone Service Measurements

2.35 The IPTS feature (1AE9 and later) requires plant measurements that deal specifically with problems concerning coin detection in public phones. Refer to AT&T Practice 231-390-109 for details.

2.36 The IPTS measurements are shown in Fig. 8. These measurements (counts) are incremented whenever the initial rate presence test or coin presence test differs from the rate tone test.♦

I. Remote Switching System (RSS) Measurements

2.37 The RSS host offices require additional plant measurements which provide performance data necessary to implement a controlled maintenance plan which includes the remote terminals and data links (DLs). These measurements are added to the daily plant measurements printout (PM01 output message) for the host offices. Multiple remote terminals are listed separately in the printouts and identified by terminal number.

2.38 The measurements for the RSS are defined as follows:

- (1) Initializations-low (INIT LOW)—Count of low-level microprocessor initializations (levels 1 through 3) indicates occurrences of possible loss of transient calls and, in level 3, emergency audits and initializations of some memory locations.
- (2) Initializations-transient (INIT TRN)—Count of the level 4 initializations which clear transient calls.

(3) Initializations-stable clear (INIT STB)—
Count of the number of initializations resulting in loss of transient and stable calls (levels 5 and 6).

(4) Microprocessor controller automatic removals (MPC AUTO RMV)—Count of the number of automatic removals from service of a microprocessor controller.

(5) Microprocessors out of service (MPC O/S)—
A 100-second out-of-service measurement when the off-line microprocessor controller is out of service, excluding automatic removals for diagnostics.

(6) Memory error (MEM ERR)—Count of the number of detected mismatches between on-line and off-line memories.

(7) Fanout board automatic removal (FO AUTO RMV)—Count of the number of automatic removals from service of fanout boards.

(8) Peripheral unit access troubles (PU ACC TBL)—Count of peripheral unit access troubles as determined by failure to access the periphery from both microprocessors.

(9) Peripheral unit errors (PU ERR)—Count of all occurrences of failures to access the periphery from either microprocessor, but not both.

(10) Routine exercise troubles (REX TBL)—Count of the number of troubles encountered in the automatic running of the routine exercises.

(11) Audit errors (AUDIT ERR)—The number of errors detected by data base and hardware audits.

(12) Remote order buffer troubles (ROB TBL)—
Count of the number of occurrences of troubles encountered in the execution of an order in the remote order buffer.

(13) Network troubles (NTWK TBL)—Count of the number of detected network troubles including half-path continuity, half-path cross, and junctor troubles.

(14) Universal service circuit troubles (USC TBL)—The number of detected troubles in

universal service circuits including metallic access, USC, and USC voltage troubles.

(15) Channel troubles (CHNL TBL)—Count of the number of channel troubles as detected by either the host or the remote terminal.

(16) Originating calls (ORIG CALL)—Count of the number of originations reported to the host from a remote terminal.

(17) Terminating calls (TERM CALL)—Count of the number of ringing orders from the host to a remote terminal.

J. AUTOPLEX™ System 100

2.39 The vehicles for displaying the AUTOPLEX System 100 measurements involved are the PM01 and PM05 output messages.

2.40 The PM01 output message will contain the same counts as any other 1A ESS switch. These counts, however, will describe the volume of mobile activity and the state of the hardware connecting the mobile activity and the state of the hardware connecting the mobile telephone switching office (MTSO) and the cell sites.

2.41 The PM05 output message summarizes the cell site equipment performance. One output message will print for each operational cell in the office. The PM05 has two possible formats. The first format will be printed for all equipped cells which are able to send the plant measurement counts to the MTSO. The second format will be printed whenever two-way communications are not possible. (See Fig. 11.)

2.42 The counts used to evaluate the cell site hardware deficiencies are listed below:

- (1) Cell site controllers out-of-service time (CSCO/S).
- (2) Cell site controllers trouble indications (CSCTBL).
- (3) Data links out-of-service time (DLO/S).
- (4) Data links trouble indications (DLTBL).
- (5) Set-up radios out-of-service time (SUO/S).

(6) Set-up radios trouble indications (SUTBL).

(7) Location radios out-of-service time (LCO/S).

(8) Location radios trouble indications (LCTBL).

(9) Voice-channel groups out-of-service time (RCO/S).

(10) Voice-channel groups trouble indications (RCTBL).

(11) Test groups out-of-service time (TGO/S).

(12) Test groups trouble indications (TGTBL).

(13) Routine audit failures (AUDF).

(14) Single process purge phases (SPP).

(15) Transient clear phases (TC).

(16) Stable clear phases (SC).

(17) Bootstrap request phases (BSR).

(18) Peripheral error analysis and recovery message received (PEAR).

(19) Assert count (ASERT).

(20) Cell controller manual removals to out of service (CSCMAN).

(21) Routine diagnostic failures (RDF).

(22) Initialization completions (INCMP).

The number of counts representing the out-of-service time for the voice radio, set-up radio, locate radio, test functional groups, and cell controller functional groups represents intervals of 100 second (36 counts per hour).

CARRIER INTERCONNECT MEASUREMENTS

2.43 The CI plant measurements are provided for generic programs 1AE8 and later.

2.44 The PM04 output message displays the inter-exchange carrier (IEC)/international carrier (INC) counts associated with the CI plant measurements.

2.45 The PM04 output message has two versions, the standard version and the continuation version. The purpose of the continuation version is to print the remaining IEC/INC counts in the event that plant measurements get forced off as a maintenance control (MAC) client. If an abort occurs during the printing of the PM04 output message, the continuation version (PM04 CONTINUED) will start printing with count lines beginning with the first IEC/INC whose counts have not been fully printed. (See Fig. 12.)

2.46 The IEC/INC counts are defined as follows:

- (1) Direct incoming attempts (INCATT)—The number of calls originating from trunks incoming directly from an IEC/INC to an office that seizes an incoming register.
- (2) Direct outgoing attempts (OUTATT)—The number of calls outgoing from an office directly to an IEC/INC for which outpulsing is required and a transmitter is successfully seized.
- (3) Direct incoming machine detected interoffice irregularity (MDIIs) (INCMDII)—The number of calls that time-out where the calls originate from trunks incoming directly from an IEC/INC to an office that has seized an incoming register.
- (4) Direct outgoing MDIIs (OUTMDII)—The number of calls that time-out where the calls are outgoing from an office to an IEC/INC for which outpulsing is required and a transmitter is successfully seized.
- (5) Tandem outgoing attempts (TOUTATT)—The number of calls outgoing from an office to an IEC/INC over trunks used in the tandem arrangement for which outpulsing is required and a transmitter is successfully seized.
- (6) Tandem outgoing set-up MDIIs (TSUMDII)—The number of failures occurring in setting up the connection to the access tandem (AT) office and time-outs at the end office access trunk arrangement (EOATA) awaiting an off-hook or start pulsing wink from the AT.
- (7) Tandem outgoing other MDIIs (TICMDII)—The number of all other time-outs that occur on trunks used in the tandem arrangement including time-out waiting for acknowledgment wink

from the IEC/INC excepting those time-outs already being counted for tandem outgoing set-up MDIIs.

MONTHLY PM02 OUTPUT MESSAGE

2.47 The monthly plant measurements summary is designed as a general overview of the performance of a central office. The monthly counts will be printed out automatically each month on the 23rd of the month immediately following the daily printout. The monthly counts are printed out in the PM02 output message (Fig. 10). The organization of the data follows the basic approach of the daily printout (PM01 output message). The PM02 output message is organized as follows:

Service Affecting Data

- Base Measurements
- Service Measurements.

Maintenance Measurements

- Emergency Action
- Interrupts.

Performance Measurements

- Central Processor
- Bus System
- Coded Enable Peripheral Units
- Peripheral System
- Trunk and Service Circuits
- Time-out Totals.

Detailed descriptions of the various counts may be found in paragraphs 2.08 through 2.28. Counts included as part of the PM02 output message are as follows:

Base Measurements

- Originating Calls
- Incoming Calls

- Outgoing Calls
- Centralized Automatic Message Accounting Seizures
- Coin Control Seizures
- Automatic Message Accounting Entries
- Automatic Identified Outward Dialing Seizures
- Centrex D-L Seizures.

Service Measurements

- Hardware Lost Calls
- Hardware Lost Billing
- Coin Control Failures
- Automatic Identified Outward Dialing Special Billing Number
- Dial Tone Speed Test Delays
- Centralized Automatic Message Accounting Seizure Lost Billing
- Centralized Automatic Message Accounting Automatic Number Identification Failures
- Receiver Attachment Delays
- Receiver Attachment Delay Recorder Inhibit Usage
- Dial Tone Speed Test Inhibit Usage
- False Starts.

Emergency Action

- Data Validation Failures
- EA Phase 1
- EA Phase 4
- EA Phase 5
- EA Phase 6.

Interrupts

- A-Level:RC Clear
- A-Level:Total
- B-Level
- C-Level
- D-Level
- E-Level
- F-Level
- Inhibit Usage.

Central Processor

- Errors
- Located Faults
- Nonlocated Faults
- Out of Service.

Note: The above counts are summed over all the central processing units in the central office (CC, PS, CS, MCC, API, FS, DF, DUS, TUC, and PDF).

Bus System

- Errors
- Located Faults
- Nonlocated Faults
- Out of Service.

Note: The above counts are summed over the CSB, PSB, AUB, and CE/PUB.

- Trouble Indications
- Out of Service.

Note: The above counts are summed over the PUA BUS, the CPD bus, and the SCAB.

Coded Enable Peripheral Units

- Errors
- Located Faults
- Nonlocated Faults
- Out of service.

Note: The above counts are summed over the I/O unit selector and the I/O unit channel.

Peripheral System

- Out of Service
- Trouble Indications.

Note: The above counts are summed over all peripheral units (CPD, scanners, NET&SD, AIOD, and centrex DL).

- Network (NET) Failures.

Note: The above counts are summed over all the NET failures (SUPF + FCGF + RC + LLR + PX + RVFY + SHWL). In addition, (SUPF + FCGF) and RVFY are listed separately for office edification.

Trunk and Service Circuits

- Out of Service on Outgoing, Incoming, and Two-way Trunks
- Trouble Indications on Outgoing, Incoming, and Two-way Trunks
- Out of Service on all other Trunks and Service Circuits
- Trouble Indications on all other Trunks and Service Circuits
- Incoming Receiver Time-outs
- Partial Dials
- Transmitter Time-outs
- Preempts.

Time-out Totals

- Incoming Trunks
- Partial Dials
- Outgoing Trunks
- Preempts.

Attached Processor Measurements

- Base Measurements
- Performance Measurements
- API Caused Events.

PROGRAM INTERFACES

2.48 Plant measurements require the insertion of counts in a large number of programs. Routines to increment a given counter are added to tabulate occurrences of selected phenomena. This is accomplished by the use of macros of varying length, so that the incrementing of a PPMP1A00 counter can be easily recognized in a listing. Programs that contain these routines include the fault recognition programs for CC, PS, CPD, signal distributor, scanner, network controller, AMA, and trunks. Count routines are also inserted in the Maintenance Control Program, the Traffic Measurements Program, and the Interrupt Recovery (IREC) Program.

PM03/PM05 OUTPUT MESSAGE RESPONSE TO PLNT-MEAS INPUT MESSAGE

2.49 In addition to the daily and monthly printouts, PPMP1A00 counts are available to central office maintenance personnel upon manual request. **Caution: Once the plant measurements printout is begun, no high-priority message may seize the terminal until all data is printed; therefore, maintenance personnel should not request the plant measurement printout during peak traffic periods.** During any trouble condition experienced by the system, maintenance personnel can request specific daily or monthly counts from any channel by the use of the PLNT-MEAS-aaa. input message, where:

aaa = DBS (Daily Base and Service Counts)

- = DCS (Daily AUTOPLEX System 100 Cell Site Counts)
- = DEI (Daily EA and Interrupt Counts)
- = DNT (Daily Network Failure Counts)
- = DCP (Daily Central Processor Counts)
- = DPU (Daily Peripheral Unit Counts)
- = DTK (Daily Trunk and Service Circuit Counts)
- = DOT (Daily Other Measurements)
- = DTO (Daily Time-outs by Destination)
- = DPS (Daily Circuit Switched Digital Capability Counts)
- = DRS (Daily Remote Switching System Counts)
- = DAP (Daily APS Counts) (for APS offices only)
- = ♦DPT (Daily Improved Public Telephone Service Counts)♦
- = MBS (Monthly Base and Service Counts)
- = MEI (Monthly EA and Interrupt Counts)
- = MPF [Monthly Performance Counts (includes central processor, peripheral, and trunk and service circuit sections)].
- = MAP (Monthly APS Counts) (for APS offices only).

2.50 The PLNT-MEAS-DCS. input message triggers the PM05 output message (Fig. 29). All other PLNT-MEAS-aaa. input messages trigger the PM03 output message. The format for the PM03 output message is as follows:

```
PM03
aaa-aaa PLANT MEASUREMENTS-bbb COUNTS
ccc
...
...
```

aaa-aaa = Office identification number (the area code and the office NNX code).

bbb = Section of data requested.

ccc = Blank (daily counts requested).

= DATA OVER__DAYS (monthly counts requested). The underscore will be replaced by the number of days of data included in the counts.

Examples of PM03 messages are shown in Fig. 13 through Fig. 28.

2.51 Care must be exercised in the interpretation of the counts printed in the PM03/PM05 output message because not all counts are totally representative of the events in the system at any one time. Several of the counts are incremented only quarter-hourly or hourly. The PM03/PM05 output message is provided only to give maintenance personnel a general picture of the operation of the system. The counts are **not** zeroed after a manual printout request.

PROTECTION OF PLANT MEASUREMENTS

2.52 Counts maintained by the Plant Measurements Program are stored in an area of CS that is protected from initialization by any EA phase. This protection is provided for PPMP1A00 counts because it is under such severe conditions that the plant measurements may be of the most value in reporting on the reliability of the system. Some of the counts will be inaccurate after an EA phase 4 and higher because counts not yet transferred to the plant registers will be zeroed.

2.53 To protect the plant measurements counts in the event of a high priority message, all counts are printed directly from CS. **Caution: Once the plant measurements printout is begun, no high priority message may seize the terminal until all data is printed.** If output is heavy when PPMP1A00 attempts to make its entry, the printout will be printed at the earliest time possible. Under these conditions, the counts may have been incremented after the normal 2:30 a.m. time.

3. GLOSSARY OF ABBREVIATIONS AND ACRONYMS

3.01 Abbreviations and acronyms used in this practice are listed below.

ABD	Abbreviated Business Day
AIOD	Automatic Identification Outward Dialing
AMA	Automatic Message Accounting
ANI	Automatic Number Identification
API	Attached Processor Interface
APS	Attached Processor System
ASW	All-Seems-Well
AT	Access Tandem
ATP	All Tests Pass
BSR	Bootstrap Request
BSY HR O/S	Busy Hour Out of Service
CAMA	Centralized Automatic Message Accounting
CC	Central Control
CCS	Hundred Call Seconds
CI	Carrier Interconnect (Feature)
CLK	Clock
CO	Call Cutoff Failure
CONTR	Controller
CPD	Central Pulse Distributor
CPDB	Control Pulse Distributor Bus
CS	Call Store
CSC	Cell Site Controller
CSDC	Circuit Switched Digital Capability (Feature)

CTX DL	Centrex Data Link
CUS	Hundred Unit Seconds
DCT	Digital Carrier Trunk
DF	Disk File
DL	Data Link
DTF	Data Terminal Frame
DTRM	Data Terminal
DTST	Dial Tone Speed Test
DUS	Data Unit Selector
EA	Emergency Action
EOATA	End Office Access Trunk Arrangement
ERR	Error
FCGF	False Cross and Ground Test Failure
FS	File Store
HWR	Hardware
ICT	Incoming Trunk
IEC	Interexchange Carrier
INC	International Carrier
INCOMP	Initialization Complete
INTF	Interface
I/O	Input/Output
◆ IPTS	Improved Public Telephone Service (Feature)◆
IR	Incoming Receiver
IREC	Interrupt Recovery
◆ ISPI	Intelligent Simplex Peripheral Interface (Feature)◆

LASS	Local Area Signaling Services (Feature)	PM03	Daily or Monthly Counts per Manual Request
LC	Last Calls	PM04	Carrier Interconnect Plant Measurement Output Message
LLR	Low Line Resistance (or leakage) Test	PM05	Advance Mobile Phone Service Plant Measurement Output Message
MAC	Maintenance Control		
MCC	Master Control Center	PPMP1A00	Plant Measurement Program
MDII	Machine Detected Interoffice Irregularity	PS	Program Store
MIS	Misframe	PSDC	Public Switched Digital Capability (Feature)
MISC	Miscellaneous	PUA BUS	Peripheral Unit Address Bus
MTSO	Mobile Telephone Switching Office	PUB	Peripheral Unit Bus
		PUC	Peripheral Unit Controller
NET & SD	Network and Signal Distributor	PUCDL	Peripheral Unit Controller Data Link
NBD	Normal Business Day		
OGT	Outgoing Trunk	PX	Power Cross Test
OMR	Output Message Register	RADR	Receiver Attachment Delay Recorder
OR	Originating Receivers	RC	Ringing Current Failure
ORIG	Originating	RCO/S	Voice-Channel Groups Out of Service
OUTG	Outgoing		
PBX	Private Branch Exchange	RCTBL	Voice-Channel Groups Trouble Indications
PDF	Power Distribution Frame	RDF	Routine Diagnostic Failure
PEAR	Peripheral Error Analysis and Recovery	RCVR ATT	Receiver Attachment
PIC	Peripheral Interface Controller	RSS	Remote Switching System
PLNT-MEAS	Plant Measurement	RVFY	Restore Verify Failure Count
PM01	Daily Plant Measurement Output Message	SBN	Special Billing Number
		SC	Stable Clear
PM02	Monthly Plant Measurement Output Message	SCAB	Scanner Answer Bus

SEIZ	Seizures	TC	Transient Clear
SHWL	Showering Line Test Failure	TG	Test Group
SLP	Slips	TGN	Trunk Group Number
SPP	Single Process Purge	TML	Trunk Maintenance List
SUPF	Supervisory Scan Failure	TRK	Trunk
SYNC	Synchronization	TUC	Tape Unit Controller
TAND	Tandem	XTMR	Transmitters
TBL	Trouble	2WY	Two-Way Trunk.
TBL IND	Trouble Indicators		

PERFORMANCE MEASUREMENTS
CENTRAL PROCESSOR (NOTE 1)

F M R	ERR	C	P	C	M	F	A	D	D	T	P	NBD
		C	S	S	C	S	P	U	F	U	D	OR
FIG. 4	ERR	X	X	X	X	X	X	X	X	X	X	ABD
	LOCATED FAULTS	X	X	X	X	X	X	X	X	X	X	TOT
	NONLOCATED FAULTS	X	X	X	X	X	X	X	X	X	X	
	O/S	X	X	X	X	X	X	X	X	X	X	X

F M R	ERR	BUS SYSTEM							CODED ENABLE PUs					PERIPHERAL UNITS										
		CS BUS	PS BUS	AU BUS	CE/PU BUS	PUA BUS (CUS)	CPD BUS	SCAB	NBD TOT	I/O UNIT SEL	I/O UNIT CHAN	NBD OR ABD TOT	CPD	SCAN	NET & SD	MISC PU	AIOD	A N I	CTX DL -	NBD OR ABD TOT	P U C	P U C D L	DL-DTF	DL-DTRM
FIG. 4 AND 5	ERR	X	X	X	X				X	X				X	X	X	X	X		X				X
	LOCATED FAULTS	X	X	X	X				X	X										X				X
	NONLOCATED FAULTS	X	X	X	X				X	X														
	O/S	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X
	TBL IND					X	X	X					X	X	X		X		X		X	X	X	

PSDC DCT:SLP,MIS

F M R	ERR	TRUNK AND SERVICE CIRCUITS							
		OGT	ICT	2-WY	OR	IR	XMTR	MISC	BUSY HOURS
FIG. 5	O/S	X	X	X	X	X	X	X	
	BSY HR O/S	X	X	X	X	X	X	X	
	TBL IND	X	X	X	X	X	X	X	

NOTE:

1. For an APS office, the FS and DF counts will be removed and the API counts will be added. For a non-APS office, the FS and DF counts will remain, but the API counts are not included.

Fig. 1—Configuration of the Basic Performance Measurements

V
312-124
MON
4/12/1982

6

5

4

3

2

1

MAINT MEASUREMENTS
EMERGENCY ACTION:

0 DV01
0 PH1 AUTO
1 MAN
0 PH4 AUTO
0 MAN
0 PH5 AUTO
0 MAN
1 PH6 MAN

INTERRUPTS :

0 A:TOTAL
0 A:OTHER
0 A:RECENT CHANGE
0 B:TOTAL
1 B:HWREA
0 B:IN RANGE
0 B:OUT OF RANGE
0 B:CC SWITCH
0 C:TOTAL
0 D:TOTAL
0 D:CS IN RANGE
0 D:API IN RANGE ← (APS OFFICES ONLY)
0 D:FS IN RANGE ← (NON-APS OFFICES ONLY)
0 D:DUS IN RANGE
0 D:STK RELATED
0 D:INVALID TRANSFER TO CS
0 D:PROTECTED AREA
0 D:OUT OF RANGE
0 D:AU OUT OF RANGE
0 E:TOTAL
0 E:IN RANGE
0 E:OUT OF RANGE
0 F:TOTAL

NET FAILURES:

0 SUPF
0 FCGF
0 RC
0 LLR
0 PX
0 RVFY
0 SHWL
0 CO

Fig. 3—The Maintenance Measurements of the PM01 Output Message

V 6 5 4 3 2 1
 312-124
 MON
 4/12/82

PERFORMANCE MEASUREMENTS		BUS SYSTEM	
CENTRAL PROCESSOR			
12 CC	ERR	0 CSB	ERR
0	LOC FAULTS	0	LOC FAULTS
0	NON-LOC FAULTS	0	NON-LOC FAULTS
0	O/S	0	O/S
2 PS	ERR	0 PSB	ERR
0	LOC FAULTS	0	LOC FAULTS
0	NON-LOC FAULTS	0	NON-LOC FAULTS
0	O/S	0	O/S
0 CS	ERR	0 AUB	ERR
0	LOC FAULTS	0	LOC FAULTS
0	NON-LOC FAULTS	0	NON-LOC FAULTS
0	O/S	0	O/S
0 MCC	ERR	0 CE/PUB	ERR
0	LOC FAULTS	0	LOC FAULTS
0	NON-LOC FAULTS	0	NON-LOC FAULTS
0	O/S	0	O/S
0 FS	ERR	0 PUAB	O/S
0	LOC FAULTS	0	TBL IND
0	NON-LOC FAULTS	0 CPDB	O/S
10	O/S	0	TBL IND
0 API	ERR	0 SCAB	O/S
0	LOC FAULTS	0	TBL IND
0	NON-LOC FAULTS	0 NBD TOT	O/S
0	O/S	0 ABD TOT	O/S ← ALTERNATE FORM OF NBD TOT
0 DUS	ERR		
0	LOC FAULTS		
0	NON-LOC FAULTS		
0	O/S		
0 DFU	ERR		
0	LOC FAULTS		
0	NON-LOC FAULTS		
0	O/S		
50 TUC	ERR		
0	LOC FAULTS		
0	NON-LOC FAULTS		
0	O/S		
0 PDF	ERR		
0	LOC FAULTS		
0	NON-LOC FAULTS		
0	O/S		
0 NBD TOT	O/S		
0 ABD TOT	O/S ← ALTERNATE FORM OF NBD TOT		

Fig. 4—The Central Processor and Bus System Performance Measurements of the PM01 Output Message

V	6	5	4	3	2	1
312-124						
MON						
4/12/1982						
	PUBLIC SWITCHED DIGITAL CAPABILITY					
	MEASUREMENTS					
7						
6						
103						
104						
105						
1						
3						
106						
107						
108						
109						
2						
43						
21						

Fig. 7—The Circuit Switched Digital Capability Measurements of the PM01 Output Message

V	6	5	4	3	2	1
609-229						
FRI						
2/20/1984						
	IMPROVED PUBLIC TELEPHONE SERVICE					
	MEASUREMENTS					
0						
0						
0						
0						
0						
0						
0						
0						
0						
0						

Fig. 8—The Improved Public Telephone Service Measurements of the PM01 Output Message

V		6	5	4	3	2	1
312-124							
MON							
4/12/1982							
	REMOTE SWITCHING SYS						
	MEASUREMENTS						
	RSS NO. 1						
0	INIT LOW						
513	INIT TRN						
1	INIT STB						
3	MPC AUTO RMV						
829	MPC O/S						
2	MEM ERR						
2	FO AUTO RMV						
770	PU ACC TBL						
0	PU ERR						
3	REX TBL						
770	AUDIT ERR						
0	ROB TBL						
2	NTWK TBL						
768	USC TBL						
0	CHNL TBL						
5	ORIG CALL						
770	TERM CALL						

Fig. 9—Example of the Remote Switching System Measurements of the PM01 Output Message

V
312-124
WED
1/23/85

6 5 4 3 2 1

PLANT MEASUREMENTS MONTHLY SUMMARY
DATA OVER 20 DAYS

BASE MEASUREMENTS

4	ORIG CALLS
11	INC CALLS
0	OUTG CALLS
112	CAMA SEIZ
1	COIN CONTR SEIZ
0	AMA ENTRIES
0	AIOD SEIZ
36	CTX D-L SEIZ

SERVICE MEASUREMENTS

0	HWR LOST CALLS
0	HWR LOST BILLING
0	COIN CONTR FAILURES
0	AIOD SBN BILLING
0	DTST DELAYS
0	CAMA LOST BILLING
0	CAMA ANI FAILURE
4128	RCVR ATT DELAY
528416	RADR INHIBIT USAGE
0	DTST INHIBIT USAGE
0	FALSE STARTS

MAINT MEASUREMENTS

EMERGENCY ACTION:

0	DV01
0	PH1
X	PH4
0	PH5
2	PH6

INTERRUPTS:

0	A:RC CLEAR
1	A:TOTAL
0	B
0	C
0	D
0	E
1	F
0	INHIBIT USAGE

Fig. 10—Example of the Monthly PM02 Output Message (Sheet 1 of 3)

V
312-124
WED
1/23/85

6 5 4 3 2 1

ATTACHED PROCESSOR MEASUREMENTS

	BASE MEASUREMENTS		
REQUESTS ACCEPTED	0		
	PERFORMANCE MEASUREMENTS		
REQUESTS FAILED	0		
API O/S	0		
TBL IND	0		
ERR	0		
API-PIC TBL IND	0		
API CAUSED EVENTS:			
	TOTAL	IN RANGE	OUT OF RANGE
D-LEVEL INTERRUPTS	0	0	0
CALL STORE ACCESS FAILURES	0	0	0
PROGRAM STORE ACCESS FAILURES	0	0	0
MAINTENANCE INTERJECTS	0		
		MANUAL	AUTOMATIC
API DIAGNOSTICS RUN	0	0	
ATP	0	0	

Fig. 10—▶Example of the Monthly PM02 Output Message (Sheet 3 of 3)◀

Format 1:

PM05

609-267 PLANT MEASUREMENTS SUMMARY

SAT

10/30/1982

ADVANCED MOBILE PHONE SERVICE (NOTE 1)

MEASUREMENTS

CELL SITE NO. 1

CSCO/S	CSCTBL	DLO/S	DLTBL	SUO/S	SUTBL	LCO/S	LCTBL	RCO/S
10	12	13	201	14	19	16	18	19
RCTBL	TGO/S	TGTBL	AUDF	SPP	TC	SC	BSR	PEAR
21	22	31	25	27	28	32	32	33
ASERT	CSCMAN	RDF	INCMP					
34	36	7	39					

Format 2:

PM05

609-267 PLANT MEASUREMENTS SUMMARY

SAT

10/30/1982

ADVANCED MOBILE PHONE SERVICE (NOTE 1)

MEASUREMENTS

CELL SITE NO. 7

COUNTS ARE NOT AVAILABLE.

NOTE

1. AUTOPLEX System 100

Fig. 11—Example of the AUTOPLEX System 100 Measurements of the PM05 Output Message

SAMPLE "PM04" OUTPUT MESSAGE WITHOUT ABORT

PM04
 312-123 PLANT MEASUREMENTS SUMMARY FOR IEC/INC
 MON
 9/17/1982

IEC/INC	INCATT	OUTATT	INCMDII	OUTMDII	TOUTATT	TSUMDII	TICMDII
2	123456	111111	2000	1000	12345	135	14
14	1234567	876543	246	544	765432	6421	98
889	33333	5555	444	642	5431	865	147
***	44444	6666	555	753	6542	976	258

(above line occurs only if error counts are not all zero)
 IEC/INC DATA PRINTOUT IS FINISHED

SAMPLE "PM04" OUTPUT MESSAGE WITH SINGLE ABORT

PM04
 312-123 PLANT MEASUREMENTS SUMMARY FOR IEC/INC
 MON
 9/17/1982

IEC/INC	INCATT	OUTATT	INCMDII	OUTMDII	TOUTATT	TSUMDII	TICMDII
2	123456	111111	2000	1000	12345	135	14
14	1234567	876543	246	544	765432	6421	98
889	33333	5555	444	642	5431	865	147

PM04 CONTINUED
 312-123 PLANT MEASUREMENTS SUMMARY FOR IEC/INC
 MON
 9/17/1982

IEC/INC	INCATT	OUTATT	INCMDII	OUTMDII	TOUTATT	TSUMDII	TICMDII
994	123456	111111	2000	1000	12345	135	14
997	1234567	876543	246	544	765432	6421	98
999	33333	5555	444	642	5431	865	147
***	44444	6666	555	753	6542	976	258

(above line occurs only if error counts are not all zero)
 IEC/INC DATA PRINTOUT IS FINISHED

Fig. 12—▶Example of the Carrier Interconnect Measurements of the PM04 Output Message◄

```
PLNT-MEAS-DBS.PF
PM03
312-123—PLANT MEASUREMENTS—DBS COUNTS

      BASE MEASUREMENTS
1000  ORIG CALLS
2050  INC CALLS
1830  OUTG CALLS
      0  CAMA SEIZ
      870 COIN CONTR SEIZ
      234 OMR SEIZ
1410  AMA ENTRIES
      0  AIOD SEIZ
      910 CTX D-L SEIZ

      SERVICE MEASUREMENTS
      0  HWR LOST CALLS
      0  HWR LOST BILLING
      20 COIN CONTR FAILURES
      0  AIOD SBN BILLING
      0  DTST DELAYS
      0  CAMA LOST BILLING
      0  CAMA ANI FAILURES
      1  RCVR ATT DELAY
      0  RADR INHIBIT USAGE
      0  FALSE STARTS
      2  OMR SEIZ FAILURES
```

Fig. 13—▶Example of the PM03 System Response to PLNT-MEAS-DBS Input Message◀

PLNT-MEAS-DEI.PF

PM03

609-222—PLANT MEASUREMENTS—DEI COUNTS

MAINT MEASUREMENTS

EMERGENCY ACTION:

```

0     DV01
0     PH1 AUTO
0         MAN
0     PH4 AUTO
0         MAN
0     PH5 AUTO
0         MAN
1     PH6 AUTO
0     PH7 MAN

```

INTERRUPTS

```

0     A: TOTAL
0     A: OTHER
0     A: RC CLEAR
0     B: TOTAL
0     B: HWR EA
0     B: IN RANGE
0     B: OUT OF RANGE
0     B: CC SWITCH
0     C: TOTAL
0     D: TOTAL
0     D: CS IN RANGE
0     D: API IN RANGE ← (APS OFFICES ONLY)
0     D: FS IN RANGE ← (NON-APS OFFICES ONLY)
0     D: DUS IN RANGE
0     D: STACK RELATED
0     D: INVALID TRANSFER TO CS
0     D: PROTECTED AREA
0     D: OUT OF RANGE
0     D: AU OUT OF RANGE
0     E: TOTAL
0     E: IN RANGE PULSE SOURCE
0     E: OUT OF RANGE PULSE SOURCE
0     F: TOTAL

```

Fig. 14—Example of the PM03 System Response to PLNT-MEAS-DEI Input Message

```
PLNT-MEAS-DNT.PF
PM03
609-222—PLANT MEASUREMENTS—DNT COUNTS
      NET FAILURES:
0      SUPF
0      FCGF
0      RC
0      LLR
0      PX
0      RVFY
0      SHWL
0      CO
```

Fig. 15—Example of the PM03 System Response to PLNT-MEAS-DNT Input Message

PLNT-MEAS-DCP.PF

PM03

609-222—PLANT MEASUREMENTS—DCP COUNTS

```

CENTRAL PROCESSOR
12      CC      ERR
0        LOC FAULTS
0        NON-LOC FAULTS
0        O/S
2        PS      ERR
0        LOC FAULTS
0        NON-LOC FAULTS
0        O/S
0        CS      ERR
0        LOC FAULTS
0        NON-LOC FAULTS
0        O/S
0        MCC     ERR
0        LOC FAULTS
0        NON-LOC FAULTS
0        O/S
0        FS      ERR
0        LOC FAULTS
0        NON-LOC FAULTS
0        O/S
0        API     ERR
0        LOC FAULTS
0        NON-LOC FAULTS
0        O/S
0        DUS     ERR
0        LOC FAULTS
0        NON-LOC FAULTS
0        O/S
0        DFU     ERR
0        LOC FAULTS
0        NON-LOC FAULTS
0        O/S
0        TUC     ERR
0        LOC FAULTS
0        NON-LOC FAULTS
0        O/S
0        PDR     ERR
0        LOC FAULTS
0        NON-LOC FAULTS
0        O/S
0        NBD TOT O/S
0        ABD TOT O/S ← { ALTERNATE FORM
                        OF NBD TOT
    
```

NON-APS OFFICES ONLY

APS OFFICES ONLY

NON-APS OFFICES ONLY

Fig. 16—Example of the PM03 System Response to PLNT-MEAS-DCP Input Message

PLNT-MEAS-DPU.PF

PM03

609-222 - PLANT MEASUREMENTS - DPU COUNTS

BUS SYSTEM			PERIPHERAL UNITS (CONT)		
0	CSB	ERR	0	MISC PU	ERR
0		LOC FAULTS	0	AIOD	O/S
0		NON-LOC FAULTS	0		TBL IND
0		O/S	0		ERR
0	PSB	ERR	0	ANI	ERR
0		LOC FAULTS	0	CTX D-L	O/S
0		NON-LOC FAULTS	0		TBL IND
0		O/S	0		ERR
0	AUB	ERR	0	PUC FRAME	O/S
0		LOC FAULTS	0	PUC FAULT	
0		NON-LOC FAULTS	0	PUC ERROR	
0		O/S	0	PUCDL	O/S
0	CE/PUB	ERR	0	PUCDL	TBL IND
0		LOC FAULTS	0	PSDC	DCT SLP
0		NON-LOC FAULTS	0	PSDC	DCT MIS
0		O/S	1	ISPI	O/S
0	PUAB	O/S	0	ISPI	ERR
0		TBL IND	0	ISPI	FAULT
0	CPDB	O/S	0	NBD TOT	O/S
0		TBL IND	0	ABD TOT O/S	← ALTERNATE FORM OF NBD TOT
0	SCAB	O/S	0		
0		TBL IND			
0	NBD TOT	O/S			
0	ABD TOT O/S	← ALTERNATE FORM OF NBD TOT			
CODED ENABLE PERIPHERAL UNITS					
0	IOUS	ERR			
0		LOC FAULTS			
0		NON-LOC FAULTS			
0		O/S			
0	IOUC	ERR			
0		LOC FAULTS			
0		NON-LOC FAULTS			
0		O/S			
0	NBD TOT	O/S			
0	ABD TOT O/S	← ALTERNATE FORM OF NBD TOT			
PERIPHERAL UNITS					
0	CPD	O/S			
0		TBL IND			
0	SCANNER	O/S			
0		TBL IND			
0	NET & SD	O/S			
0		TBL IND			
0		ERR			

Fig. 17 — Example of the PM03 System Response to PLNT-MEAS-DPU Input Message

```

PLNT-MEAS-DTK.PF
PM03
609-222—PLANT MEASUREMENTS—DTK COUNTS
      TRUNK & SERVICE CIRCUITS
30   OGT      O/S
20           BSY HR O/S
0           TBL IND
50   ICT      O/S
30           BSY HR O/S
0           TBL IND
50   2WY      O/S
30           BSY HR O/S
0           TBL IND
0   OR        O/S
0           BSY HR O/S
0           TBL IND
0   IR        O/S
0           BSY HR O/S
1           TBL IND
0   XMTR      O/S
0           BSY HR O/S
0           TBL IND
0   MISC      O/S
0           BSY HR O/S
0           TBL IND
1   BUSY HOURS

```

Fig. 18—Example of the PM03 System Response to PLNT-MEAS-DTK Input Message

```

PLNT-MEAS-DOT.PF
PM03
609-222—PLANT MEASUREMENTS—DOT COUNTS
      OTHER MEASUREMENTS
      TRUNK MEAS
616   TRUNKS IN OFFICE
0     AUTO PROG TESTS
19    DISABLE AUTO PC
1     ACTIVATE OVERRIDE

```

Fig. 19—Example of the PM03 System Response to PLNT-MEAS-DOT Input Message

```

PLNT-MEAS-DTO.PF
PM03
609-222 - PLANT MEASUREMENTS - DTO COUNTS
      TIMEOUT TOTALS
1     ICT
0     PD
0     OGT
0     PRMT

```

Fig. 20—Example of the PM03 System Response to PLNT-MEAS-DTO Input Message

```
PLNT-MEAS-DPS.PF
PM03
609-222
  SUN
    5/30/1982 - PLANT MEASUREMENTS - DPS COUNTS
      PUBLIC SWITCHED DIGITAL CAPABILITY
      MEASUREMENTS
        7  PSDC ORIG CALLS
        6  PSDC INC CALLS
       103 PSDC TAND CALLS
       104 PSDC LOOP TESTS
       105 PSDC LOOP TBL
         1  PSDC HWR LC
         3  PSDC CLK INTF O/S
       106 PSDC CLK O/S
       107 PSDC CLK TBL
       108 PSDC SYNC O/S
       109 PSDC SYNC TBL
         2  PSDC TRK TBL
        43  PSDC TRK O/S
        21  PSDC TRK BSY HR O/S
```

Fig. 21—Example of the PM03 System Response to PLNT-MEAS-DPS Input Message

PLNT-MEAS-DRS.PF

PM03

609-222 - PLANT MEASUREMENTS - DRS COUNTS

REMOTE SWITCHING SYSTEM

MEASUREMENTS

RSS NO. 1

0	INIT LOW
513	INIT TRN
1	INIT STB
3	MPC AUTO RMV
829	MPC O/S
2	MEM ERR
2	FO AUTO RMV
770	PU ACC TBL
0	PU ERR
3	REX TBL
770	AUDIT ERR
0	ROB TBL
2	NTWK TBL
768	USC TBL
0	CHNL TBL
5	ORIG CALL
770	TERM CALL

Fig. 22—Example of the PM03 System Response to PLNT-MEAS-DRS Input Message

PLNT-MEAS-DAP.PF

PM03

609-222 PLANT MEASUREMENTS - DAP COUNTS

ATTACHED PROCESSOR MEASUREMENTS

	BASE MEASUREMENTS		
REQUESTS ACCEPTED	0		
	PERFORMANCE MEASUREMENTS		
REQUESTS FAILED	0		
API O/S	0		
TBL IND	0		
ERR	0		
API-PIC TBL IND	0		
API CAUSED EVENTS:			
	TOTAL	IN RANGE	OUT OF RANGE
D-LEVEL INTERRUPTS	0	0	0
CALL STORE ACCESS FAILURES	0	0	0
PROGRAM STORE ACCESS FAILURES	0	0	0
MAINTENANCE INTERJECTS	0		
	MANUAL	AUTOMATIC	
API DIAGNOSTICS RUN	0	0	
ATP	0	0	

Fig. 23—Example of the PM03 System Response to PLNT-MEAS-DAP Input Message

PLNT-MEAS-DPT.PF

PM03

609-222 - PLANT MEASUREMENTS - DPT COUNTS

IMPROVED PUBLIC TELEPHONE SERVICE
MEASUREMENTS

0	IPTS	CN04 FAIL1
0	IPTS	CN04 FAIL2
0	IPTS	CN04 FAIL3
0	IPTS	CN04 FAIL4
0	IPTS	CN04 FAIL5
0	IPTS	CN04 FAIL6
0	IPTS	CN04 FAIL7
0	IPTS	CN04 FAIL8
0	IPTS	CN04 FAIL9

Fig. 24—Example of the PM03 System Response to
PLNT-MEAS-DPT

PLNT-MEAS-MBS.PF

PM03

609-222 - PLANT MEASUREMENTS - MBS COUNTS

```

DATA OVER 30 DAYS
BASE MEASUREMENTS
0  ORIG CALLS
0  ING CALLS
0  OUTG CALLS
0  COIN CONTR SEIZ
0  CAMA SEIZ
0  AMA ENTRIES
0  AIOD SEIZ
0  CTX D-L SEIZ

SERVICE MEASUREMENTS
0  HWR LOST CALLS
0  HWR LOST BILLING
0  COIN CONTR FAILURES
0  AIOD SBN BILLING
0  DTST DELAYS
0  CAMA LOST BILLING
0  CAMA ANI FAILURES
0  RCVR ATT DELAYS
0  RADR INHIBIT USAGE
0  FALSE STARTS

```

Fig. 25—Example of the PM03 System Response to PLNT-MEAS-MBS Input Message

PLNT-MEAS-MEI.PF

PM03

609-222 - PLANT MEASUREMENTS - MEI COUNTS

```

DATA OVER 30 DAYS
MAINT MEASUREMENTS
EMERGENCY ACTION
0  DV01
0  PH1
0  PH4
0  PH5
0  PH6

INTERRUPTS:
0  A:RC CLEAR
0  A:TOTAL
0  B
0  C
0  D
0  E
0  F
0  INHIBIT USAGE

```

Fig. 26—Example of the PM03 System Response to PLNT-MEAS-MEI Input Message

PLNT-MEAS-MPF.PF

PM03

609-222 - PLANT MEASUREMENTS - MPF COUNTS

APS OFFICES ONLY

DATA OVER 30 DAYS

CENTRAL PROCESSOR

NON-APS OFFICES ONLY

0 UNIT ERRORS:(CC + PS + CS + MCC + API + FS + DF + DUS + TUC + PDF)
 0 LOC FAULTS:
 0 NON-LOC FAULTS:
 227 O/S:

BUS SYSTEM

0 UNIT ERRORS:(CSB + PSB + AUB + CEPUB)
 0 LOC FAULTS:
 0 NON-LOC FAULTS:
 61 O/S:
 0 TBL IND:(PUAB + CPDB + SCAB)
 1 O/S:

CODED ENABLE PERIPHERAL UNITS

0 UNIT ERRORS:(IOUS + IOUC)
 0 LOC FAULTS:
 0 NON-LOC FAULTS:
 46 O/S:

PERIPHERAL SYSTEM

53 O/S:(CPD + SCAN + NET + SD + AIOD + CTX D-L)
 3 TBL IND:
 0 NET FAILURES:(SUPF + FCGF + RC + LLR + PX + RVFY + SHWL)
 0 NET FAILURES:(SUPF + FCGF)
 0 NET FAILURES:(RVFY)

TRUNK AND SERVICE CIRCUITS

31 O/S:(OGT + ICT + 2WY)
 0 TBL IND:OGT + ICT + 2WY)
 0 O/S:(OR + IR + XMTR + MISC)
 1 TBL IND:(OR + IR + XMTR + MISC)
 0 IR TIMEOUTS
 0 PARTIAL DIALS
 0 XMTR TIMEOUTS
 0 PRE-EMPTS

TIMEOUT TOTALS

0 ICT
 0 PD
 0 OGT
 0 PRMT

Fig. 27—Example of the PM03 System Response to PLNT-MEAS-MPF Input Message

PLNT-MEAS-MAP.PF

PM03

609-222

PLANT MEASUREMENTS - MAP COUNTS

DATA OVER 0 DAYS

ATTACHED PROCESSOR MEASUREMENTS

	BASE MEASUREMENTS		
REQUESTS ACCEPTED	0		
	PERFORMANCE MEASUREMENTS		
REQUESTS FAILED	0		
API O/S	0		
TBL IND	0		
ERR	0		
API-PIC TBL IND	0		
API CAUSED EVENTS:	TOTAL	IN RANGE	OUT OF RANGE
D-LEVEL INTERRUPTS	0	0	0
CALL STORE ACCESS FAILURES	0	0	0
PROGRAM STORE ACCESS FAILURES	0	0	0
MAINTENANCE INTERJECTS	0		
	MANUAL AUTOMATIC		
API DIAGNOSTICS RUN	0	0	
ATP	0	0	

Fig. 28—Example of the PM03 System Response to PLNT-MEAS-MAP Input Message

PLNT-MEAS-DCS. PF

Format 1:

PM05

609-267 PLANT MEASUREMENTS SUMMARY

SAT

10/30/1982

ADVANCED MOBILE PHONE SERVICE

MEASUREMENTS

CELL SITE NO. 1

CSCO/S	CSCTBL	DLO/S	DLTBL	SUO/S	SUTBL	LCO/S	LCTBL	RCO/S
10	12	13	201	14	19	16	18	19
RCTBL	TGO/S	TGTBL	AUDF	SPP	TC	SC	BSR	PEAR
21	22	31	25	27	28	32	32	33
ASERT	CSCMAN	RDF	INCOMP					
34	36	7	39					

Format 2:

PM05

609-267 PLANT MEASUREMENTS SUMMARY

SAT

10/30/1982

ADVANCED MOBILE PHONE SERVICE

MEASUREMENTS

CELL SITE NO. 7

COUNTS ARE NOT AVAILABLE.

Fig. 29—Example of the PM05 System Response to PLNT-MEAS-DCS Input Message